

Exploring the Predictors of Indonesian Reading Literacy based on PISA Data



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List of Abbreviations

AVE	Average variance extracted
BOS	School Operational Assistance (<i>Bantuan Operasional Sekolah</i>)
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
HLM	Hierarchical Equation MOdelling
HOTS	Higher Order Thinking Skills
HREC	Human Research and Ethics Committee
ICT	Information and Communication Technology
INFIT MNSQ	weighted mean square
K-13	Curriculum 2013
KBK	Competence-Based Curriculum (<i>Kurikulum Berbasis Kompetensi</i>)
	School-Based Curriculum (<i>Kurikulum Tingkat Satuan</i>
KTSP	<i>Pendidikan</i>)
OECD	Organization for Economic Cooperation and Development
OUTFIT MNSQ	unweighted mean square
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
MoEC	Ministry of Education and Culture
MoECRT	Ministry of Education, Culture, Research, and Technology
MoRA	Ministry of Religion Affairs
RMSEA	Root Mean Squared Error of Approximation
SAS	Statistical Analysis System
SEM	Structural Equation Modelling

SPSS	Statistical Package for the Social Sciences
SRMR	Standardised Root Mean Residual
TIMSS	Trends in International Mathematics and Science Study
TLI	Tucker-Lewis's index
UNESCO	United Nations Education and Scientific Cultural Organisation

Abstract

Reading achievement in Indonesia has remained low since 2000 when it first participated in PISA. In Indonesia, reading is not a specific subject, but rather an essential skill integrated with other subjects like Bahasa Indonesia, English, Social Sciences, Natural Sciences, and Mathematics, and as such, it is assessed in the PISA test. Apart from the cognitive tests, PISA also collects additional information related to schools', teachers', parents', and students' characteristics and perceptions that are related to students' cognitive ability. Thus, the main research topics in this field are reading literacy and the factors associated with reading ability.

The research study examines student and school factors and their relationship impact on student reading literacy in Indonesia, considering paper-based (PISA 2000, 2009, and follow up 2020) and computer-based reading performance (PISA 2018). A quantitative research design is used based on the research problems addressed in general that fell within the factors of reading achievement based on PISA data. This approach is used to confirm the validity and reliability of the constructs included in this study and to examine the relationships that exist among those constructs. Data collection consists of primary and secondary data collection. The study uses secondary data from PISA, as well as primary data collected in 2020 concerning the reading questionnaire and cognitive test. Secondary data from PISA 2000, 2009, and 2018 student and school questionnaires are used to examine how schools and students interrelate, which affects student achievement. The study also uses primary data collected in 2020 in a follow-up study with questionnaires adopted from PISA 2018 as the latest test with additional variables from parents and teachers. In addition to taking account of school and student factors, the results of 2020 are compared with those taken in 2000, 2009, and 2018. Thus, the

longitudinal study of reading literacy based on PISA data is attempted. All constructs except the demographic items are validated using the confirmatory factor analysis (CFA) and Rasch Analysis. An analysis of all constructs that have already been anchored to the weighted likelihood estimates is conducted using structural equation modelling (SEM) and hierarchical linear modelling (HLM).

To examine the factors that significantly influence students' reading literacy in Indonesia over the four cycles, the structural equation model (with single and path analysis) and hierarchical linear model are applied. The study hypothesises that school-level factors affect the reading literacy of students. The structural equation model is used to impose a theoretical model on student variables and school variables measured by observed variables. With this model, the study explains the interrelationships between construct and observed variables. Meanwhile, a hierarchical linear model is used since the data had students who are nested in schools or students who were nested in classrooms, and classrooms are nested in schools. With this model, the study examines the effects of group variables (school- and teacher-level) and individual variables (student-level) and seeks the interaction across levels.

In the analysis of the hierarchical approach, it is determined that there are consistency and nonconsistency factors towards reading literacy throughout the four cycles of analysis. There is evidence of consistent predictors at the student level in the factors of gender, reading engagement, and time spent reading. At school-level, the significant factors are: school sector in the 2000, 2018 and 2020 cycles; school location in the 2018 and 2020 cycles; ICT in the 2020 cycle; resources and technology in the 2018 cycle; assessment in the 2000 and 2018 cycles; leadership in the 2018 cycle; and school climate in the 2000 cycle. It is surprising to find that no factor was significant at the teacher-level in the 2020 cycle but a direct effect is found between teacher professional and teacher lesson activities. At student-level, the significant factors are: gender in the 2000, 2009, and 2018 cycles; the number of books in the

2000 cycle; home and educational resources in the 2018 cycle; reading engagement in the 2000, 2009, and 2018 cycles; reading diversity in the 2000, 2009, and 2018 cycles; reading online in the 2018 cycle; reading strategies in the 2009 cycle, reading confidence in the 2018 cycle, and reading time in the 2000, 2009, and 2018 cycles. The predictors are consistently available in the factor of gender, reading engagement, and reading time. In addition, the results indicate that computer-based tests (2018 cycle) provided more predictors than text-based tests (2000, 2009, and 2020 cycles).

This research is particularly valuable in terms of its contributions to the theoretical, practical, and methodological aspects of reading literacy in Indonesia. This study suggests that, in general, private schools and schools located in rural or village areas require more attention regarding ICT, technology, assessment, leadership, and school climate. This likewise suggest that males should receive greater attention to reading activities, such as reading engagement and reading diversity, as well as reading states, such as reading strategies, reading confidence, and reading time. Meanwhile, females should receive more attention when it comes to online reading. Teacher professional activities plays an important role in supporting the delivery of better lessons in the classroom. In addition, it is important not to underestimate parental support in terms of the income and education of the parents.

It would be beneficial for the Indonesian government in the future to maintain a curriculum based on autonomy to increase student reading achievement. Likewise, the government should include teacher and parent survey in future PISA Tests so that a more comprehensive analysis of the factors influencing reading ability can be conducted.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint award of this degree.

I give permission for the digital version of my thesis to be made available on the web, via the University's digital research repository, the Library Search and also through web search engines, unless permission has been granted by the University to restrict access for a period of time.

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Signed:

Date: 12th February 2023

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Safitri Yosita Ratri

Chapter 1

Issues in Indonesia's reading literacy based on PISA Data

1.1 INTRODUCTION

In recognition of the importance of education to society as well as to individual growth, several countries have taken measures to improve and maintain educational quality. As part of these efforts, relevant studies have been conducted to help examine and respond to important areas of concern. In recent decades, Indonesia has concentrated on two key features to make massive improvements regarding access to education: first, building new public schools and second, recruiting teachers (Rosser, 2018). However, these remarkable improvements have not been matched by improvements in educational quality and learning outcomes. In line with this statement, a report by Rosser (2018) said that Indonesia's biggest challenge regarding education is no longer improving access but improving quality.

Since joining the Programme for International Student Assessment (PISA) conducted by the Organization for Economic Cooperation and Development (OECD), there was much discussion in Indonesia in the period between 2000 and 2018 about improving educational outcomes as represented in the international assessment results. One of the most concerning outcomes in Indonesia was reading literacy, where scores have remained consistently low since the program was joined (Argina et al., n.d.; Chintia et al., n.d.; Nugrahanto & Zuchdi, 2019; Ratri, 2015; Yusuf & Lestari, 2015). The Overseas Development Institute (Tobias et al., 2013) noted that, at the same time, Indonesia had made great efforts to improve educational outcomes as measured by literacy rates and had made progress in international assessment results and

completion rates of primary and lower-secondary education, in line with government education policies for the nine years of compulsory education.

There are three literacy assessments in PISA since 2000 namely Reading, Mathematics, and Science. Since 2012, PISA included Financial Literacy as an option. However, the three major domains are still Reading, Mathematics, and Science. This study has focused on reading literacy. Reading literacy here means not only reading proficiently to participate in school activities (Shanahan & Shanahan, 2014) but also reading for a wide range of out-of-school contexts such as communicating with peers, gathering information related to personal interests, or interacting with other communities (IRA, 2012 as cited in OECD, 2019). To improve the standard reading literacy levels, the government has enacted a series of reforms to improve the curriculum and pedagogy.

As part of curriculum reform, four major curriculum changes have occurred since Indonesia joined PISA in 2000. Each national curriculum has been developed with the goal of modernising Indonesia, strengthening Indonesia's workforce, and improving the educational outcomes of students (ACDP, 2016). The curriculum in 2013 called Curriculum 2013 (K-13) was developed to address implementation difficulties that had arisen with the previous curriculum introduced in 2006. The latest curriculum, Merdeka Curriculum, was designed in 2020 to improve education, improve human resource capabilities, and ease the burden that has been carried so far (Tabroni et al., 2022). As the impact, the changes in the curriculum can affect the learning climate and students' reading achievements (Dewantara, 2020; Mariage et al., 2009; Wahyuni, 2016). Various aspects of learning have changed, including the introduction of new resources, new skills, new policies, and new neighbouring school systems which have affected students and teachers, school leaders, and the school community in general. Stecker et al. (2005)

revealed that curriculum changes have an impact on student achievement. There is a growing concern that curriculum change has many implications. For example, changes in student literacy achievement, either positive or negative, can result from curriculum alignment that aims to improve student achievement in the reading literacy space (Kurz et al., 2010). This study indicates that the planned school curriculum provides a positive relationship between curriculum alignment and student achievement. Thus, Curriculum is one of the critical factors in improving students' reading achievement. The findings (Compton & France, 2007) reminded education policymakers that if they want students to achieve competent technological literacy, one strategic solution is to develop a curriculum based on contemporary literacy. Thus, there is nothing wrong with the digital trend that must also be included in the school curriculum content, even in rural villages in Indonesia.

As the world's fourth most populous country - comprising 33 provinces, over 500 districts, and approximately 55 million students, 3 million teachers, and 236,000 schools (Indriyanto et al., 2013), Indonesia represents one of the greatest challenges in the field of education. Despite the issue of low scores in international test outcomes, government work remains in progress. Indonesia has prioritised reforms in learning outcomes, with an emphasis on student skills and competencies and teaching quality, including raising teachers' salaries and skills. However, one reform aimed at improving reading skills is still in the process of realisation and there is very little research that has examined why reading performance in Indonesia continues to be stagnant.

PISA 2012 Result (OECD, 2014) highlighted that Indonesia was one of only a few countries that had simultaneously achieved improvements in PISA reading scores between 2000 and 2009 while narrowing gaps between the best and worst-performing students. Although the

scores continue to be lower relative to the standard score (500), some meaningful improvements have been observed in recent years. Statistically, PISA 2012 improved significantly by 25 points (from 371 to 396). It was also noted that Indonesia had outperformed several wealthier countries including Qatar and Oman (Tobias et al., 2014).

It is generally believed that good reading skills are important for students to become successful people in their future society (Clark & Rumbold, 2006; Genlott & Grönlund, 2013). Reading includes processing the language message, receiving and interpreting information encoded in language through digital and printed media, and allowing students to improve their communication and language skills (Hudelson, 2000). Likewise, reading is a prerequisite for all social activities and provides an important opportunity for students to develop their personal abilities and their social, economic, and civic lives as they learn about other things including theory, knowledge, people, or social studies (Holden & Demos, 2004; Lyon, 1997 as cited in Clark & Rumbold, 2006). According to Moore et al. (1999, as cited in Clark & Rumbold, 2006), In the 21st century, adolescents are expected to read and write more than at any other time in history as they are to deal with the flood of information available. It will be necessary for them to have advanced reading, writing, and math skills to perform their jobs, manage their households, and perform their civic duties. For them to be able to create the world of the future, they will require literacy skills.

Unfortunately for some countries, low reading performance is one of the main problems for education systems to address and improve (Suryanto, 2017; Schubert & Becker, 2010). Globally, this has been a focus of education researchers for several decades. In Indonesia, there has been little research that has investigated the factors of school, teacher, parent, and student practices associated with reading achievement. While some research might focus on a single

factor such as teaching practices or methods, what remains unclear is how each of the factors collectively contributes to achievement in reading literacy. Concern must be expressed about the limited number of research studies that have examined the relationship between reading practices and reading achievement in Indonesia. Given the influence of PISA in making judgements about the level of reading achievement in Indonesia, it is necessary to understand the relationship between the PISA cognitive test results and the PISA reports concerning school, teacher, parent, and student factors related to reading, which provide valuable information regarding the specific reading patterns practised in Indonesian schools and their communities.

In this study, I examined the factors influencing reading achievement and how these factors intersected as predictors of reading achievement from the inception of the PISA test of reading literacy in 2000, then in 2009 and 2018, and a follow-up study in 2020. The study was designed to examine the various predictors of achievement over the years (2000, 2009, and 2018). In addition, the study investigated changes in measures, achievements, and patterns to evaluate significant shifts in school, teacher, parent and student practices in each period of the test. This research was complicated by the way PISA had changed from paper-based methods of testing to a computer-based approach and had also modified aspects of the construct being examined in line with computer-based testing. Japan's Ministry, based on a study by Komatsu and Rappleye (2017) quoted in Mainichi News 2016, "The unfamiliarity with questions and formats associated with the shift to computer-based testing was the most probable reason for the decline from PISA test." However, most students in East Asia including Indonesia, do not rely on computers in schools. Therefore, this study also intended to seek the different achievements of PISA reading literacy between the paper-based assessment in 2000 and 2009 and the computer-based version in 2018.

1.2 STRUCTURE OF THE INDONESIAN EDUCATION SYSTEM

Two ministries manage the Indonesian education system, namely the Ministry of Education and Culture (MoEC) and the Ministry of Religion Affairs (MoRA). MoEC is responsible for more than 80% of all public schools while MoRA is responsible for Islamic Schools or madrasahs. Both ministries support private schools other than Islamic schools or madrasahs by funding civil-servant teachers and providing block grants directly to schools through the School Operation Grants (Bantuan Operasional Sekolah - BOS) initiatives, among other initiatives. According to World Bank (2010), private schools usually have their providers, with estimates that they serve 31% of all students and employ 38% of all teachers. Private schools play an important role in the educational system as their existence helps to meet demands that public schools have been unable to provide, especially in remote and rural areas. Generally, the quality of education offered in private schools is below that of public schools, apart from elite private schools which the wealthier families choose (Tobias et al., 2014).

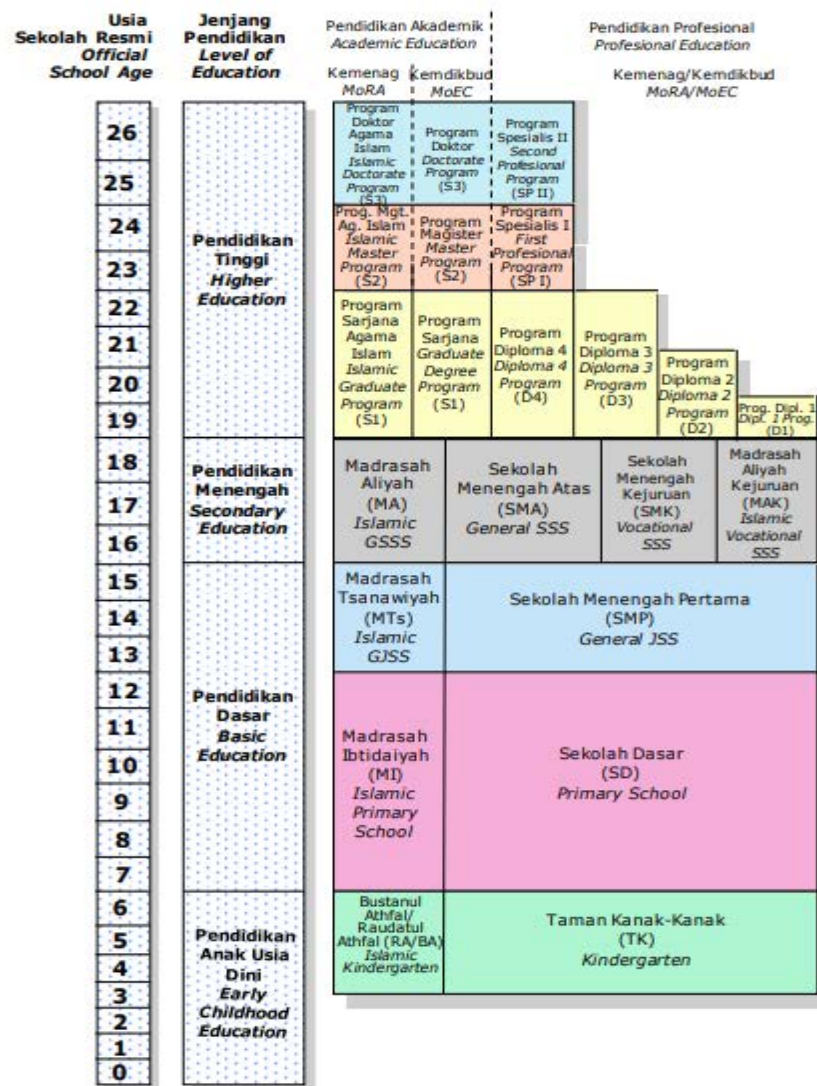
The Indonesian education system comprises four levels of education that consist of early childhood education (primary grades 1 to 6 with a range of age 7 – 13 years old), junior secondary (grades 7 to 9 with a range of age 12 – 16 years old), senior secondary (grade 10 to 12 with a range of age 15 – 19 years old), and higher education. The BOS grants are given to all schools along with another grant, namely Cash Transfer for Poor Students (Bantuan untuk Siswa Miskin - BSM), which refers to a scholarship for those who are from poor families (DFAT, 2016).

Based on Law Number 20 the Year 2003 (*Undang-Undang Nomor 20 Tahun 2003*), schools in Indonesia are classified into government schools (public) coordinated by the Ministry of Education, Culture, Research, and Technology (MoECRT) and non-government schools

(private) coordinated by Ministry of Religious Affairs (MoRA). Based on statistics from 2016, there are about 59,000 junior-secondary schools of which 72 per cent are under the MoECRT and the remaining 28 per cent are under the MoECRT and MoRA. The MoECRT and MoRA oversee some public schools, as do some private schools. Figure 1.1 illustrates the school system in Indonesia.

Figure 1.1

Indonesia school system (Indonesia Educational Statistics, 2016 - 2017, p.15)



National Examination (Ujian Nasional – UN) was previously a standard compulsory assessment in Indonesia’s primary and secondary education system. administered by MoEC until 2020. The three subjects assessed currently were maths, natural science, and Indonesian language (Bahasa Indonesia). All students at the end of levels (grades 6, 9, and 12) are required to join the test, as it is a prerequisite to move to a higher level. In the *Merdeka* Curriculum administered by the MoECRT, national exams have been abolished. However, literacy, under the newly implemented policy of “Assessment of Minimum Competency and Survey Character” is still assessed as part of language (literacy) abilities and character education strengthening (Jannah et al., 2022).

1.3 READING LITERACY IN INDONESIA

Reading literacy skills in each school curriculum are designed to help students achieve better results in all lessons. Students increase reading comprehension skills as per modern-day learning demands, such as project-based learning in response to 21st-century students' future requirements (Bell, 2010). Other experts see that schools' literacy are significantly utilising a reading community program such as a school committee through best practices to enable learning achievement in schools (DuFour, 2016). The two development models above show that students can be helped with academic skills, especially reading literacy, through reading programs. The processes required for literary language learning and students' reading skills can also improve their achievement in other school subjects. Such programs not only focus on skills that are useful for classroom learning but also will help students quickly achieve greater learning outcomes at the end of the study period each year if the level of reading literacy is promising. By itself, this will have an impact on the result achievements in other subjects so that students have

less difficulty improving in other subject areas.

Curriculum factors have an impact on increasing the literacy skills of students (Azzahra & Amanta, 2021; Pereira & Riaño, 2018). Through the curriculum documents, the Indonesian government has prioritised those students to be trained with literacy skills from the beginning. For example, from grade 3, elementary school students are trained to be competent at an adequate literacy level. This study aims to determine what factors can influence the success of Indonesian students when learning reading literacy. The level of reading literacy, which is one of the factors determined by how schools can teach skills, is proven to be lacking in Indonesian students as compared to the level of literacy acquired by other developing countries (Rosser, 2018).

As stated in the national curriculum, the reading literacy factor in schools in Indonesia must be carried out using various models of program approaches to help literacy development efforts for those students who are active in reading. Related to this purpose to help literacy development, several factors that determine its success must be measured. Due to reading literacy being used as an evaluation model, the reading program in schools has now become a nationally recognised program (Wandasari et al., 2019). In line with the literacy movement that has shown these results, the authours have successfully evaluated the school literacy movement's policies. According to their report, literacy programs must be continued to improve students' reading discipline and motivation. The literacy movement is not just an instantiated ceremonial program; the school as an implementing agent must design the program for the continuous improvement of literacy.

However, schools with the support of the teacher council can integrate this movement into classroom learning programs so that the daily interactions are coloured with literacy

movements and presented in the subjects of each class, as described by Katuuk (2014). Azis (2018) successfully implemented the school literacy movement in elementary school learning. He said that literacy must become a reading faculty in schools that will impact the progress of Indonesian students' learning achievements (Suryadarma, 2012). The authors believe that reading skills improvement programs in schools can improve students' reading performance in developing countries. Their review is corroborated by the evidence of best practices in Indonesian schools. For example, the reading program model in the school was developed by Silvia and Djuanda (2017) namely the 'literature-based model in the school literacy movement program'. Several studies have shown a close relationship between student reading learning programs and student success factors at the school level. The findings of this program indicate that schools' literacy movements can foster effective communication between students and their parents. Through this school literacy program, many participants such as teachers, school leaders, invited experts, and students are included (Vanbela et al., 2018).

Apart from other benefits arising from this literacy program, the most significant advantage is for students because the school program is carried out by the school as part of a government policy within the Ministry of Education's regulation on improving student literacy. Through groups and literacy activities such as the morning reading agenda, coordinators, and improving the school library's quality, it becomes a supportive program. The study by Hidayat et al. (2018) shows that the school literacy movement is a determining factor for the success of Indonesian children's literacy in the future.

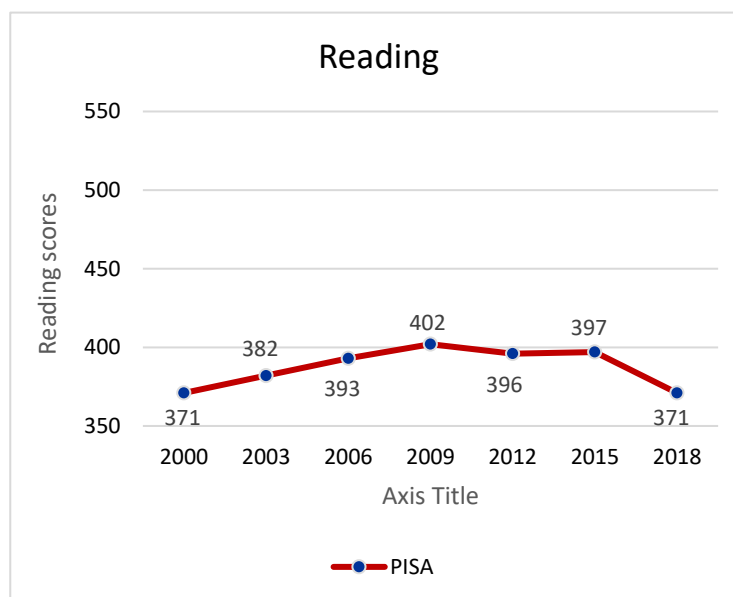
1.4 Declining PISA Reading Scores

Along with 41 countries around the world, Indonesia took part in the Programme for

International Student Assessment (PISA) for the first time in 2000, with one of the objectives being to measure the reading ability of Indonesian students compared to students from other countries (PISA 2018 Result, 2000). In Indonesia, the results of the tests showed that the mean scores were consistently below the average of the international PISA scale (500). In 2000, the Indonesian average was 371, and then the scores were constantly low in each subsequent three-year cycle of PISA testing: 382 in 2003, 393 in 2006, 402 in 2009, 396 in 2012, 397 in 2015, and it worsened to be 371 in 2018. This became a greater concern for Indonesian educators and the government because reading literacy is recognised as a basic skill for individual development in modern society (Zuckerman et al., 2013).

Figure 1.2

Trends in performance in reading Indonesia (OECD, 2019, p.3)



For many years, the Indonesian government has been concerned about its relatively low levels of reading literacy in schools. Based on PISA data from 2018, 15-year-old Indonesian students' reading skills were the second-lowest in Southeast Asia (371), behind only the Philippines (340). The score was compared to other regions such as Singapore (549), Malaysia (415), and Thailand (393). On looking back on the PISA 2009 result, a study (Basuki, 2012) revealed that Indonesian students could master only 30 per cent (approximately) of reading materials as they found it difficult to answer questions that required more understanding and reasoning. However, even though Indonesia has not reached the top in their regional grouping (Southeast Asia), a significant gain in the PISA reading score over the year 2000 to 2009 periods indicated a positive trend. It is also noteworthy that Indonesia was the only country in which the performance increased significantly while the gap between the highest and the lowest-performing students narrowed (Tobias et al., 2014). The government of Indonesia responded to this report by focusing on improvements in educational outcomes, in which reading literacy was one of the main concerns.

The data above have focused on the reading achievement of 15-year-old students, suggesting that there is a need to pay specific attention to the improvement of students' reading skills at all levels of education including the secondary years in Indonesia. In supporting a focus on secondary years' reading practices, one of the key foci in the latest National Curriculum has been literacy. The latest initiative in curriculum development has emerged over successive phases of curriculum reform since the formation of the Indonesian Republic.

1.5 CHANGE OF NATIONAL CURRICULUM

As noted earlier, to improve the quality of education, the Indonesian government has enacted a series of educational reforms. One of the aims of the government has been to build the future of the nation from the successful development of its people. A key driver of educational and therefore national progress has been to reform the curriculum and pedagogy to enhance teaching and learning quality and better education outcomes (Tobias et al., 2014). Beginning with independence in 1945, Indonesia introduced a series of national curricula. There have been eleven periods of curriculum modification, namely Curriculum 1947, 1952, 1964, 1968, 1975, 1984, 1994 (known as Student Active Learning – CBSA), 2004 (known as Competence-Based Curriculum – KBK), 2006 (known as School-Based Curriculum – KTSP), Curriculum 2013 (known as Kurikulum 2013 – K-13), and the latest being *Merdeka* Curriculum. Basically, all Indonesian curriculums have been designed on two major Indonesian Principles: *Pancasila* (Five foundational philosophical in Indonesia) and the *Undang-Undang Dasar* (constitution) of 1945 and the curriculum cannot be in contradiction with the principles as they are the highest aims of living as human beings in the country of Indonesia (Chaira, 2010). Each new curriculum has successively aimed to build on the previous one to improve the quality of the learning outcomes and enhance the success of the nation. All set curriculum is implemented in primary schools, junior high, and senior high levels throughout the country.

It can be observed that from the year 2000, the time when Indonesia first joined the PISA Test, the national curriculum of Indonesia has changed four times, namely Curriculum 2004 (KBK), Curriculum 2006 (KTSP), Curriculum 2013 (K-13) when the latest PISA Test happened, and the latest *Merdeka* Curriculum. Having experienced many curriculum changes, Indonesia has experienced consequences in every aspect of education including the system, politics, social,

economic, and technological issues. In the education system, the changes have logically influenced not only teaching and learning in the classroom but also principals and teachers as executors in their efforts to understand and implement a new curriculum in practice.

In 2000, the curriculum attempted to move from content-based to competency-based; from teacher-centred rote-learning methods to student-centred active methods (Tobias et al., 2014). Every alteration has been considerably challenged in the implementation as a part of driving progress and enhancing the education quality in which the teaching methods play a key role. Some problems have been examined and, while generally there was no ideal form of effective teaching method, it was found there was a strong indication that to make it most effective, the curriculum should be adapted to the local culture and classroom contexts in which it would be taught. Consequently, teachers must be well-trained and satisfactorily flexible to adapt their teaching methods to suit the needs of students from various backgrounds (Perner & Darlene, 2004; Glewwe & Kremer, 2006 in PISA 2014; Tobias et al., 2014). For some years, the major problems facing teaching in the classroom in Indonesia have been large class sizes and poor teaching skills; one teacher might have 35 to 45 students in one class while the learning is dominated by a teacher-centred approach (Rachman, 2019). It means that most students learn by memorising and cannot relate what they have learned to recent knowledge. The new curriculum which began in 2004 with the implementation of a new competency-based approach meant students did not focus on memorisation of facts and theoretical knowledge but moved to learn as being integrated skills, knowledge, attitudes, and values demonstrated by task performance (MoEC, 2013). This approach also allowed teachers to have a shift in teaching methods from teacher-centred rote learning to student-centred so teachers had more discretion in the classroom. Hence, teachers' tasks moved to be facilitators rather than being the only resource people in the

classroom. Learning and teaching processes correlated the materials with the student's daily lives and gave more opportunities for them to think creatively, critically, and analytically rather than simply memorising.

In 2006, the Indonesian government replaced the School-Based Curriculum with Curriculum 2006 (also known as KTSP 2006), which derived from the previous curriculum since KTSP still focused on students' competence. The curriculum was designed to be a better innovative curriculum to be applied in Indonesia, which has different local backgrounds and problems. Accordingly, in the system, KTSP allowed schools to adjust their curriculum in its detail based on the content standard from MoEC. In addition, each school had the authority to decide the best approaches and methods that suited their learning in the classroom. Consequently, teachers needed to be familiar with each student's needs, learning style, and level of competency. Once these were recognised, a teacher could straightforwardly accommodate the student into the adjusted curriculum (Mulyasa, 2006).

Through the curriculum document, the government has prioritised students to be trained from the beginning with literacy skills. For example, from grade 3, elementary school students have been trained to be competent at an adequate literacy level. As one of the educational outcomes that the Indonesian government wishes to improve, reading literacy has been found to be deficient compared to students from other developing countries (Tobias et al., 2014). This section aims to determine what factors can influence the success of Indonesian students' reading literacy learning.

However, there are problems of attitudes and resistance against the changes that influence the curriculum operational practice by each school regarding syllabus, lesson plan, and assessment (Mohamad et al., 2015). As a result, the learning climate has not been optimally

practised since there is no simultaneous learning between the prior curriculum and the new one and they are still busy applying the previous theory. Furthermore, this affects students' learning and achievement. In accordance with reading literacy, this amendment of the learning climate caused unsatisfactory outcomes that were reflected in the Indonesian reading profile of PISA for 2000.

Suryanto (2017) has noted that improving the quality of Indonesian student reading skills will play an important role in improving the future of Indonesian society. It could be argued that the Indonesian government has been mindful of the need to attend to its nation's reading capability by participating in the international PISA Test since 2000. If anything, the first set of results, reflected by a score well below the standard score of 500, clarified the urgency to address the nation's level of reading skills. More recently, concern about improving the quality of Indonesian students' learning outcomes has been voiced as a matter of urgency. Since Independence Day, the curriculum in Indonesia has changed due to the country's needs. Some people argue against the changes from a negative perspective, but this perspective ends up being countered by looking from a positive view because the curriculum needs to be improved due to the needs of society (Katuuk, 2014), and changes in knowledge, technology, art, and culture (Sangia, 2018).

1.6 PAPER-BASED TEST AND COMPUTER-BASED TEST IN PISA

The competency scores of Indonesian students in reading skills and other test subjects on the 2018 PISA test were reported to be lower when viewed against the test results three years previously when it was still a paper-based test. All parties had hoped that it would get better with computer-based tests Schleicher (2019), however, this drop happened not only to the scores of

Indonesian students but was experienced by the majority of other participants, with an average score of 371 in reading skills (OECD, 2019). OECD (2019) found that the 2018 PISA results report did not reflect the fact that schools are not yet able to accommodate students' needs, including Indonesian students.

It is noteworthy that one of the main differences between the PISA tests in 2000, 2009, and 2018 is the shift from paper-based testing (PISA 2000 and 2009) to computer-based testing (PISA 2018). This may have been one of the major factors contributing to declining reading scores for Indonesian students on the PISA examination 2018. According to Nugrahanto (2019), the results of Indonesia's PISA scores have not reflected the positive impact of the implementation of the literacy movement and reading learning activities in Indonesia. Returning to the 2015 PISA score, Indonesian students scored higher on average than in the 2018 results in all areas, with a reading score of 397. Based on the comparison of the results of the two tests in different years, the assumption was that there were influences related to the change from paper-based tests to computer-based tests.

This shift in test methods which caused the declining score was a severe shock to international participants such as students in Indonesia. On the other hand, the results could have meant that the school literacy movement program in 2016 in Indonesia had not brought about significant results. Likewise, Lian and Nopilda (2018) study the school literacy implementation program, which they described as a multiliterate-based program, and said the program has not become a big hope for the time when Indonesian human resources welcome 21st-century competition. Moreover, the evaluation of Indonesian students' competency system must be prepared so that later it will be possible to follow changes to the system and principles of the test, both paper-based and computerised (Sihotang, 2015).

Taking into consideration all of the issues discussed above, the present study examined whether there are differences in reading performance over time between paper-based and computer-based methods.

1.7 STATEMENT OF THE PROBLEM

Despite the importance of reading skills, reading test results based on PISA have worsened in Indonesia. Of all the problems that confront reading literacy in Indonesian schools, whether in primary or secondary school, one is the low mark of performance in assessment, notably the one reflected in an international study by PISA. Since Indonesia first joined the PISA Test in the year 2000, this became a focus of reading literacy researchers in Indonesia, especially since reading is not a subject in the curriculum but a skill integrated into several subjects such as Bahasa Indonesia, English, Social Sciences, Natural Sciences, and Mathematics. There are a number of factors examined in the PISA, including the school, teachers, parents, and students associated with the cognitive test. Hence, the main recent topic for researchers has been reading literacy and those factors associated with reading ability.

Despite the perceived national curriculum importance, over the years reading skills seem to have been maintained at a low level of achievement. What's more, with the purposes underpinning the Curriculum K-13 being to prepare students to succeed in the future, concern over the low performance of student learning outcomes that have been raised for several years must be overcome. The problem of low marks in reading performance needs to be addressed. The primary concerns are those associated factors of school, teacher, parent, and student that could influence student performance. Thus, the main thrust of this study has been to analyse the factors of reading literacy based on PISA Data. A follow-up study was also conducted. In that

stage, primary data was collected from the same schools that participated in PISA 2018 in Yogyakarta city. The results from secondary data collected in 2000, 2009, and 2018 have been compared to the results from the primary data collected in 2020.

1.8 IMPORTANCE OF THE STUDY

The results of this study will have important consequences for educators in understanding reading literacy and will lead to the implementation of better teaching and learning. The researcher intends to bring this knowledge back into the country. On a broader scale, the study will contribute to Indonesia more broadly by supporting multiple policy reforms, especially in the fields of education and sustainable development. The fact that the study has been supported by an Australian university will help to maintain the knowledge exchange between Indonesian and Australian universities. This will serve to enhance collaboration through education-sector cooperation and support public-private institutional partnerships.

1.9 RESEARCH QUESTIONS

The study used secondary data from the PISA Test results in 2000, 2009, and 2018, as well as primary data collected in 2020 regarding reading literacy, focusing on the major assessment domains of mathematics and science subjects. The main and general purposes of this study addressed the following question.

1. How do student and school factors and reading states (reading attitudes, reading strategies, and reading confidence) and their relationships impact student reading literacy in Indonesia considering paper-based (PISA 2000, PISA 2009, and follow up 2020) and computer-based reading performance (PISA 2018)?

- a. Are there any effects of school factors on student factors, reading states, and reading literacy?
- b. Are there any effects of student factors on reading states and reading literacy?
- c. Are there any effects of reading states on reading literacy?
2. How do the factors impact change over time from 2000 to 2020?
3. Are there any differences in the pattern of the relationships (over multiple years) between paper-based and computer-based reading performance?

1.10 AIMS OF THE STUDY

The study was guided by the following aims and objectives:

1. To examine student, parent, and school factors and reading states (reading attitudes, reading strategies, and reading confidence) and their relationships impact on student reading literacy in Indonesia, considering paper-based (PISA 2000, PISA 2009, and follow up 2020) and computer-based reading performance (PISA 2018).
 - a. To identify the effects of school factors on student factors, reading states, and reading literacy on PISA 2000, 2009, and 2018, and teacher factors added on follow-up data 2020.
 - b. To identify the effects of student factors on reading states and reading literacy on PISA 2000, 2009, and 2018.
 - c. To identify the effect of reading states on reading literacy.
2. To investigate the differences in relationship (over multiple years) between text-based-reading and computer-based reading.
3. To investigate the factors that impact change over time from 2000 to 2020.

1.11 PARTICIPANTS IN THE STUDY

This study aimed to investigate the influential predictors of reading achievement based on PISA Data in Indonesia that focused on reading tests every nine years from the period of 2000 until 2018. Therefore, all data in this study came from the PISA for Indonesia conducted by the OECD for three years (2000, 2009 and 2018). The participants in this study were 15-year-old students who were nearing the end of their compulsory education and who had participated in the PISA from various sectors of schools. Drawing upon background considerations, factors were divided into two levels: students and schools. In more detail, the school-level factors consisted of school sector types (government/public schools and non-government/private and religious schools) and also school sectors differentiated by areas, namely village, small town, town, city, city centre, and ‘elsewhere’ categories. Student level factors were classified by parent factors (reading involvement, mother’s education, father’s education, parents’ incomes, and parents’ jobs), individual factors (individual characteristic (gender), home facilities (number of books and ICT at home), and reading activities (reading perception, reading engagement, reading outside school, past reading, and reading for education career).

However, a follow-up study consisted of a survey using PISA questionnaires and it required primary data gathering. Data collecting concerned the factors affecting reading literacy based on schools, parents, and students, and thus some samples were applied with regard to the survey of principals, teachers, parents, and students. In this case, the sample was located at 11 secondary schools in Yogyakarta city, Indonesia. The particular groups were selected based on a purposive sampling technique. Purposive sampling is a type of non-probability sampling in which the samples are collected for a particular purpose in a process that does not give any chance of the probability of the element or group of elements being selected in the sample (Betts,

2008). The group of schools was identified as secondary schools that had been randomly selected as participants in the PISA Test held in 2018. From each group of schools, 1 principal, 3 teachers, 50 students and 50 parents were selected as respondents so the total number of participants was 11 principals, 33 teachers, 550 students, and 550 parents. The detail is shown in Table 2. All schools were located in Yogyakarta, a city in Indonesia that is famous as an “Education City” with more than one hundred higher education institutions, which is why schools in Yogyakarta city were purposively chosen as subjects.

Table 1.1

The number of samples for follow-up data in 2020

No.	School	Principals	Teachers	Parents	Students
1.	Public Junior High School A	1	3	50	50
2.	Public Junior High School B	1	3	50	50
3.	Public Junior High School C	1	3	50	50
4.	Private Junior High School A	1	3	50	50
5.	Private Junior High School B	1	3	50	50
6.	Private Junior High School C	1	3	50	50
7.	Public Senior High School A	1	3	50	50
8.	Public Senior High School B	1	3	50	50
9.	Private Senior High School A	1	3	50	50
10.	Private Senior High School B	1	3	50	50
11.	Private Senior High School C	1	3	50	50
	Total	11	33	550	550

1.12 SIGNIFICANCE TO THE DISCIPLINE

This study contributes to knowledge by exploring important issues as research questions within a relevant theoretical framework. The research examined reading literacy rates based on PISA Data to create new insights and ideas about the PISA reading test by comparing the paper-based test in 2000 and 2009 and the computer-based test in 2018, as well as using the primary data collected in 2020. Therefore, the study has generated further knowledge of a quantitative

kind between the use of paper-based texts and computer-based texts regarding the differences in performance and the factors influencing that performance. There is little evidence of published research studies that compare those reading test methods, and the study has attempted to fill that gap and provide evidence-based information for the education sector in general. Especially in Indonesia to date, there has been little research investigating the effects of school, parent, and student factors on reading literacy. Therefore, the study contributes insights into the influential predictors of Indonesian reading literacy. Additionally, with primary data being collected in 2020 using PISA 2018 instruments, those primary data results add further insight into the problem under investigation. With 20 years of tests to draw on, between 2000 and 2020, the study gives a new perspective on the literature about educational achievement using longitudinal studies.

Also, related to the rapid change of Indonesia's national curriculum, the study gives a new understanding of how the curriculum influence changes over time. In regard to the changing curriculum in Indonesia, the study presents empirical knowledge based on a longitudinal study between 2000 and 2020. Additionally, it provides valuable information about probable causes of Indonesia's low reading literacy scores for future consideration.

The results of this study demonstrate some methodological significance. First, the longitudinal study of PISA from 2000 to 2018 will provide information regarding potential predictors of reading literacy in Indonesia. Secondly, this study used an elaborated correlational study that was applied to determine the relationship among variables found in Structural Equation Model (SEM) and Hierarchical Linear Model (HLM). SEM was used to investigate the influential factors on reading literacy and the relationship among factors. HLM was utilised to analyse the impacts of contexts on the student (individual), school, teacher, and parent accurately. In general, this study will contribute to further developing measurement and

assessment in the educational context especially research about international assessment that Indonesia joins continuously. The SEM used in this study will be beneficial for other studies that examine the relationship between school, teacher, parent, and student. The HLM used in this study will be most appropriate for conducting studies of school, teacher, parent, and student effects in a particular and educational context in general.

1.13 LIMITATIONS

Like all other research undertakings, this study had potential limitations. This study was designed to investigate the predictors of reading literacy achievement using test results based on student, parent, and school factors as well as reading states (reading attitudes, reading strategies, and reading confidence) and their impacts. However, this study was grounded in the context of 15-year-old students' reading literacy achievement at the secondary school level. Thus, there was little potential for the generalisability of the findings due to the limited nature of the sample.

1.14 SUMMARY

This study presents an investigation of Indonesian students' reading literacy based on Programme for International Student Assessment (PISA) data for the years 2000, 2009, and 2018. The purposes were to examine student, parent, and school factors and reading states (reading attitudes, reading strategies, and reading confidence) and their impacts on student reading literacy in Indonesia based on PISA results and on the follow-up study in 2020; to investigate the different relationships (in those time periods) between text-based and online reading; and to investigate how the impacts changed over time from 2000 to 2020.

In Indonesia, there has been little research that has investigated the effects of school, parent, and student factors on student reading literacy. Therefore, this study contributes insights into the influential predictors of Indonesian reading literacy. Using the 18 years of PISA test data, the study provides a new perspective to the literature on longitudinal studies in educational measurement.

Chapter 2

Review of the Literature

2.1 INTRODUCTION

There is not much research conducted on reading literacy in Indonesia compared to other subjects such as mathematics and science. A groundwork study from Lowenberg, (1983) reveals a dramatic increase in literacy in Indonesia has occurred since *Bahasa Indonesia* became the national language after with the declaration of Independence Day in 1945. Having approximately 13,000 islands and 300 ethnic groups in the country, making Bahasa Indonesia the official language of instruction in all areas, including education, law and government administration, science, technology, and others, was initially challenging without disregarding local cultures. In the educational sector, the wide acceptance of Bahasa Indonesia has made the government include Bahasa Indonesia as a part of the 1975 national curriculum. Reading in Bahasa Indonesia has been introduced as compulsory subjects in primary schools.

Several decades later, reading literacy in *Bahasa Indonesia* was introduced as a necessary literacy skill that should be acquired by Indonesian students. Various reading activities have been implemented in schools to encourage students' acquisition in reading literacy skills. Apart from that, the Indonesian government through the Ministry of Education and Culture (MoEC) has been participating in several internationally standardised tests to assess the competence level in science, mathematics, and reading literacy among schoolchildren. Indonesian has participated in Progress in International Reading Literacy

Study (PIRLS), Trends in International Mathematics and Science Study (TIMSS), and Programme for International Student Assessment (PISA). Those tests measure different skills among schoolchildren, such as for fourth-grade students in PIRLS, mathematics, and science for fourth- and eighth-grade students in TIMSS, and reading, mathematics, and science for tenth grades in PISA. Most of the tests have been administered using a paper-based format, but since 2015 a computer-based format has been adopted to deliver PISA testing (Mullis et al., 2019; PISA 2018 Technical Report; PISA 2015 Technical Report).

As a response to the development of technologies, the tests of PISA in 2015 and 2018 were administered using a computer-based format. According to OECD (2019), a rapidly changing world and increasing use of technologies have changed the way people read and exchange information. For students, acquiring skills in using technology and digital tools is highly essential, and thus, students need to be prepared for the increasing demand for more skilled individuals and professionals in the use of technology in the future. This condition has also changed the construct of reading literacy, from reading single texts with textual information to understanding, interpreting, and reflecting upon digital texts on the computer screen.

This chapter presents a review of reading literacy which pertains to certain aspects of its implication in secondary school and assessment in Indonesia, especially from the year first to the latest PISA Test in Indonesia. The theoretical basis of this study comes from reading as part of literacy, progressively implemented in the latest national curriculum of Curriculum 2013 (K-13), the reading problems in the Indonesia education system, and various models of reading literacy that have been developed mainly in Indonesia secondary schools and reading

in PISA. Finally, the chapter reviews the reading test system in PISA between 2000 and 2018, from paper-based to computer-based.

This study uses the existing literature to organise knowledge of the specific reading literacy concept to show that this study would be an addition to this field. The previous research was synthesised in a way to provide the rationale for this study and form the foundation upon which the recent study will be built. In the absence of a literature review, it is likely that the research process would produce shallow and naive results, which duplicate the work of others that have already been undertaken by other researchers (Borg, 1963). Likewise, Good (2002 as cited in Nayak and Singh, 2015) states that having access to the vast published literature can provide insights into significant problems and explainable hypotheses. The resources may provide helpful guidance in the formulation of a problem, the selection of a procedure, and the interpretation of comparative data.

Since the study uses a quantitative design, this literature review provides the context for a new study to be conducted with new subjects and data from newly collected data. During this phase, the sources used are the 'subjects' of the research and the material reviewed represents the 'data'. It shares the results of other studies that are closely related to those being conducted. It also provides a framework for establishing the importance of this study as well as a benchmark for comparing the results with other findings (Creswell & Creswell, 2018).

Additionally, the study contains a section about the literature related to major independent variables, namely the PISA predictors and the dependent variable (reading literacy). All the dependent and independent variables scholarly literature reviewed in each subsection incorporate the model built in the study. At every end of the section, it highlights

the most important studies, captures major themes, provides the reason for the necessity of the study and advances how the study fills this need.

2.2 LITERACY IN READING

Various scholars have defined 'literacy' as offering imprecise conceptions and understandings. However, more and more are defining what reading and writing mean and what may follow from practice from a basic understanding of the term literacy (Graff, 2010). Literacy is easily defined as the fundamental or primary level of reading and writing and its analogies across various media and activities enabled by technology or a set of techniques to decode and reproduce printed materials, such as the alphabet, syllables, pictographs, and other systems, which with itself is created and used in the context of a particular understanding (Street, 1984; Belshaw, 2012). A recent study has defined literacy as a fundamental concept that emphasises the application of reading, writing, and numeracy skills using mediating technologies such as paper and computers while reading refers to the active and cognitive translation process of individuals and symbols in written texts to construct and derive meaning (Weaver, 2006). In a broader definition, literacy is a dynamic and social practice in institutions such as the family, school, and community down to the state level (Unsworth, 1993). The knowledge of individuals and groups distributes as part of everyday life. Reading literacy is formed naturally through aspects of everyday life that are not visible. Unsworth (1993) believes that how children learn literacy is related to their values and attitudes, reflected in their literacy culture and books. According to the OECD (2000), by reading literacy, schoolchildren can understand, use, and reflect on written texts to achieve

goals, develop one's knowledge and potential, and participate effectively in society. Effective literacy learning is an essential part of a student's school success.

Traditionally, literacy skills are seen as the ability to read and write in a language (Pittman et al., 2020; Nation, 2019). Literacy is an essential skill that the public respects for living in the 21st century. Various studies have revealed that Indonesian students have low literacy skills. Indonesia needs to improve as a developing country because Indonesian students fail to live up to expectations that contrast with their territorial and global peers, as revealed in the annual PISA test (Sahlberg, 2021).

The Indonesian government has launched a School Literacy Movement program through Regulation of the Ministry of Education and Culture No. 23/2015 (Pantiwati et al., 2020). The fundamental aim of this program is to frame students' love of reading by involving schools as the front line in the advancement of a culture of professionalism. Therefore, every school should implement and socialise the program in all school spaces because literacy is one of the principal variables to make developed countries more aggressive at the world level (Kurnia & Sadik, 2020). However, many schools in Indonesia cannot implement the program properly or even do not implement the program in any way because of the lack of sufficient human resource assets (Suwana, 2021). Furthermore, it is essential to provide a model that can be used as an illustration to advance reading literacy skills for students from school to college.

2.3 READING IN INDONESIA CURRICULUM

Reading skills have played an essential role in improving Indonesian students' quality in the future society (Suryanto, 2017). This issue has been addressed since Indonesia joined PISA Test in 2000, in which the Indonesian students' reading skill is reflected by the low score, below 500 as a standard score. Meanwhile, recently improving Indonesian students' learning outcomes has been an urgent concern. One strategy being used to achieve this purpose is developing a national curriculum. Since Independence Day, the curriculum in Indonesia has changed due to the needs. Some people argue with a negative perspective, but this end straightened by looking at a positive view as the curriculum needs to be improved due to society's needs (Katuuk, 2014), knowledge, technology, art, and culture (Sangia, 2018). Reforming the curriculum factor besides pedagogy was one of the factors driving change in improving the quality of education that has been studied by (Tobias et al., 2013). Tobias et al. (2013, p.24) describe how the curriculum reforms during the 2000s:

“Indonesia made a series of alterations to the national curriculum: (1) from a content-based to a competency-based; (2) from teacher-centered rote-learning methods to student-centered active methods; and (3) from a centralized system for determining content to a decentralized one.”

Despite the considerable challenges, such as large class sizes and poor teaching skills encountered in implementing these reforms, they appear to be beginning to improve the quality of instruction (Freeman & Faure 2003 as cited in Tobias et al., 2013). There is a strong indication, that for a curriculum to be most effective, it needs to be adapted to the specific contexts of the classroom and culture in which it will be taught, mainly providing training for teachers so they can sufficiently be flexible to adapt their teaching methods to

suit their mix students (Glewwe & Kremer, 2006; OECD, 2012; Tobias et al., 2013). As well, there is a consistency within many curricula that have been reformed since the early 2000s that one of the primary skills to be achieved is reading besides listening, speaking, and writing (Tobias et al., 2013).

The latest curriculum now is called *Kurikulum Merdeka* (*Merdeka Curriculum*) that launched by the Ministry of Education and Culture in 2020. This curriculum is aimed to anticipate the speed of change due to globalisation by making changes in education policy that specifically to improve of human resources that require digital skills and creative thinking (Rusli Baharuddin, 2021; Yuhastina et al., 2020). In recent times, some schools have been able to implement *Merdeka Curriculum*, while school that are not ready may use the previous curriculum. The government will make a formal decision in 2024 regarding this curriculum whether all levels of education are prepared (<http://ditpsd.kemdikbud.go.id>). It is clearly that since the very latest PISA Test in 2018, there has been no evidence that the *Merdeka Curriculum* developed in 2020 is effective at teaching reading literacy. Further discussion should therefore focus on the implementation of K-13, the previous curriculum before the *Merdeka Curriculum* when students in 2018 used it.

The curriculum in Indonesia when it took the latest PISA test was known as Curriculum 2013 (K-13), aiming to improve the quality of students' learning outcomes. The theoretical underpinning emphasis is fostering student-centred and inquiry-based learning as promising practices for the development of 21st century skills (ACDP, 2016). Meanwhile, the subject disciplines are underpinned by Bloom's Taxonomy focuses on six different levels of cognitive processes 'remembering (knowledge), understanding (comprehension), applying (application), analysing (analysis), evaluating, creating (synthesis)' (Arneson & Offerdahl,

2018; Ulum, 2016). While the theory attempts to support multiple-choice questions and assessment systematically, the taxonomy is articulated as a hierarchy of complexity of learning specific content. Thus, in K-13, students are set to learn subject-specific knowledge to different levels of complexity.

Implementing K-13 emphasise the autonomy of schools in determining the curriculum for learning process that are appropriate to the conditions of each school (Agustina et al., 2022; Noor Chairani, 2015). The teacher is required to follow some new principles decided by the school in organising the teaching and learning process. The principals are the most decisive factor that ensures the effectiveness of the implementation of K-13 (Kemdikbud, 2013). Specifically in Indonesian high schools, the curriculum indicates a new direction within the teaching and learning process. Thus, teachers are required to adhere to some new principles in order to organise the teaching and learning process (Agustina et al., 2022).

The K-13 has a conceptual framework for learning activities: attitude, knowledge, and skill. The attitude is obtained through accepting, carrying out, appreciating, living, and practising activities. While the knowledge is obtained through remembering to understand, apply, analyse, evaluate, and create, the skill is obtained through observing, questioning, trying, reasoning, presenting, and creating activities. This learning process aligns with learning information processing with a syntactic strategy that invites students to process and explore information. This category includes learning to solve problems, think critically, and develop creativity (Slavin et al., 2008). In Table 2.1, these skills refer to the following capabilities.

Table 2.1

Summary of the 21st-century skills to be included in K-13

Character quality	Basic literacy	Competencies
Devotion	Reading and writing literacy	Critical thinking and problem-solving
Integrity	Numeracy	Creativity and innovation
Curiosity	Scientific literacy	Communication
Initiative	ICT literacy	Collaboration
Persistence	Financial literacy	
Adaptability	Cultural and civic literacy	
Leadership		
Social and Cultural Awareness		

In line with the aim of K-13, the Director-General of Higher Education, Nizam (<https://dikti.kemdikbud.go.id/>), said that eight competencies needed in the 21st century are characterized by three fundamental things: literacy, competencies, and character qualities. Fundamentally, fundamental literacy consists of literacy, numeracy, scientific numeracy, ICT literacy, financial literacy, and cultural and civic literacy. In contrast, competencies include critical thinking, problem-solving, communication, and collaboration. Finally, the character needs are critical thinking or problem solving, communication, and collaboration.

Regarding reading skills, one of the aims stated in the K-13 is to improve Indonesia's performance in international standardised tests such as PISA and PIRLS. While those international tests' educational purposes are sometimes questioned, it is nonetheless to consider the nature of the rapid curriculum reform undertaken in Indonesia. Despite the theories supposedly underpinning the K-13 to prepare students to succeed in the future, concern over the low performance of student learning outcomes raised for several years must be overcome. The K-13 that looks over-crowding in the implementation was blamed for the

low performance of reading achievement and the delay of generic competencies development (ACDP, 2016).

Reading literacy in K-13 is not a subject, but it is mainly integrated with learning activities in every subject (ACDP, 2016). All subjects in K-13 have been integrated; social and natural science are integrated into *Bahasa Indonesia* (Indonesian language subject) from the early level of primary schools or Grade 1, the local content is integrated into Art and Culture, Craft and Physical Education, and character education is integrated into religious education, as well as extra-curricular activities (Ministry of Education and Culture, 2016). Even though the MoEC has an unclear theoretical foundation about the integration subjects in the K-13, the implementation is progressively utilized (ACDP, 2016). Although this may be true, the integration in a curriculum is generally based on the main reason to 'about making the connection' that involves connection across disciplines, to real life, between connections skill-based or knowledge-based as it has been an issue since the turn of the 20th century (Shaw et al., 2011). Likewise, human resources today are expected to have the ability to apply a variety of disciplines to overcome challenges in the daily environment. Ideally, schools are places where learners are prepared to take on the challenges of the 21st century in their daily lives and their workplaces (Lake, 1994). Thus, the development of an integrated curriculum should be based on the need for a relevant and concrete curriculum to enhance the learners' learning experience (Ansya, 2015). Providing a concrete and relevant curriculum can be accomplished by connecting what is learned and the students' real lives. Relevant refers to the learning material presented to the learners being relevant to their social environment's needs or current conditions, while concrete means the learner is aware of the

function. The purpose of the learning material is that its authenticity can contribute to the organisation's success.

According to Drake and Burns (2004), the basic idea of an integrated curriculum is a process of identifying connections. In this context, the connection is among academic subjects or disciplines, between the natural world and the real world of learning, and between skills and conceptual knowledge. Since then, there have been three basic categories for interdisciplinary work defined in a similar category but often had different names. The following framework can illustrate the connection with Picture 1 showing the integration within a specific subject area; Picture 2 points up the generic skills are integrated across disciplines areas; and Picture 3 illustrates one theme with different subjects utilized for the student to gain knowledge and understanding about that particular theme (Drake & Burns, 2004).

Figure 2.1

The basic integrated curriculum by Drake and Burn

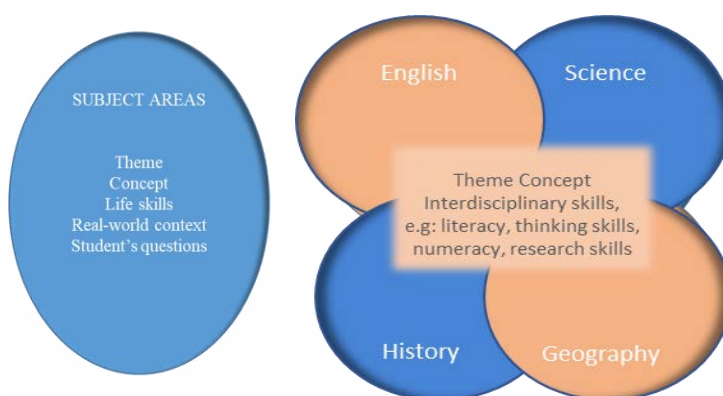


Figure 1
Integration within a subject area

Figure 2
Integration across subject



Figure 3
Using a theme to integrate subject knowledge

According to the table above, as a rule, multidiscipline approaches are based on a theme. With this approach, all disciplines (school subjects) are connected to a common theme, but each has a different learning product. As a result, the standards or competencies of each discipline should be classified as themes, topics, or issues that are presented by learners (Drake & Burns, 2004; Rusman, 2017). In the K-13, learning corners were incorporated into classrooms to integrate learning. At the primary school level, the nuance of integration is more apparent since the curriculum is designed into one single unit and presented in the form of themes, while at the secondary level, the curriculum has gradually been divided into subjects, but the courses are correlated as a whole. For instance, materials from disciplines such as Physics, Chemistry, Biology, and Earth and Space Science have still grouped in Natural Science (IPA) studies.

An integrated curriculum impacts K-13. As Rusman (2011) said, the concept of unified thematic learning is closely related to an integrated curriculum. An integrated curriculum consists of combining two or more disciplines into a single topic, theme, or issue so that the boundaries between disciplines become ambiguous. Triasmanto (2017) stated that unified thematic learning does not pertain to a single subject or discipline, but to a specific theme discussed during the learning process. The learning subject is not determined by a title but rather by a series of activities that assist students in achieving the intended essential competencies. For instance, in the book, students are not given the title of the learning subject but are allowed to perform reading, writing, and other activities as instructed by the teacher. The teacher has scoring rubrics that can give feedback to students after performance. Students are given a literacy project in week four or once the last subtheme is accomplished. Related to the integrated curriculum, students need to integrate various basic competence from

different disciplines to complete the literacy project planned by the teacher. From the curriculum mapping to specific themes, the student-centred learning activities, and the assessment, it can be concluded that K-13 benefits significantly from the integrated curriculum, which includes reading activities such as greater understanding and improved motivation. The K-13 follows the concept of PISA provided by OECD (2019). Reading provides the concept of meaningful experience as lifelong learning, appropriate to the current situation, can be applied in society and the student-centred activities with inquiry and critical thinking purposes.

The OECD emphasizes the importance of providing learners with the skills to develop information literacy as part of higher-order thinking skills (HOTS) skills, which in turn are used by educational reformers to identify cognitive activities that are beyond the stage of reproduction (Bloom, 1956 as cited in Munzenmaier & Rubin, 2013; Wijaya, 2016; OECD, 2018). The HOTS term in reading does not necessarily refer to a new reading issue in Indonesia. Some research has been published discussed assessing HOTS in reading comprehension in English subjects (Garcia, 2010), exploring the impact of HOTS on reading comprehension (Ford & Trujillo-Jenks, 2014), conceptualising and assessing HOTS in reading (Afflerbach et al., 2015), and exploring the effect of HOTS on reading achievement (Koch, 2017). In continuation of this, the MoEC intends, for the time being, to focus more on the integration of higher order thinking skills into the curriculum starting in 2018. The decision has been prompted by the demand for critical thinking skills required in the PISA test and by the poor performance of Indonesia from the first time it took part in the test to the last time (Tanudjaya & Doorman, 2020). This recent regulation highlights the importance of having a shared understanding of HOT in reading at many levels, including curriculum,

pedagogy, and assessment. OECD believes that an international assessment of creative thinking can lead to positive changes in education policies and pedagogies (OECD, 2020). It is hoped that the results will encourage a more comprehensive discussion concerning the importance and the methods for enhancing this essential competence through education.

2.4 READING LITERACY IN PISA

The evolution of PISA reading literacy framework over time

PISA 2000, 2009, and 2018 marked reading as a significant domain, and these three different cycles have given different frameworks with a significant revision. Each revision considers the changing definition of reading literacy and the contexts in which reading is used by citizens (OECD, 2016). As stated in OECD (2016), it is generally accepted that the human understanding of reading literacy evolves due to social and cultural changes. There are implications for the demand for literacy skills for individual development, educational success, economic participation, and citizenship 20 years ago, which were different from today, and in twenty years, they will likely change even more.

PISA reading literacy has changed its nature in new technologies and social contexts. This resulted in a broad range of higher-level reading skills associated with literacy tasks required in the 21st century (Ananiadou & Claro, 2009; Kreiner & Christensen, 2014; Lau & Ho, 2016). It included changing the structure and formats of texts followed by new cognitive strategies such as analysing, synthesising, integrating, and interpreting relevant information from multiple sources and more explicit goals in purposeful reading. Moreover, students will be able to use the information and implement technologies effectively in the future. These

skills, thus, will give advantages for them to participate in the 21st-century labour market and social life (OCDE, 2013).

The reading literacy framework has also evolved in response to the changes in society, the economy and culture (The PISA 2000 Assessment of Reading, Mathematical and Scientific Literacy). Prior to 2000, literacy was considered to be an ability that is acquired during the early stages of formal education, rather than a set of new knowledge, skills, and strategies that are cultivated throughout life (Kirsch et al., 2002). Then it was in 2000, the first significant modification of the framework for PISA 2000 has led to a revision of the definition of reading literacy, which includes motivational and behavioural aspects and cognitive characteristics. Reading engagement and metacognition (awareness of how one develops an understanding of the text and uses reading strategies when reading) was not as prominently as in PISA 2009, which fostered as components of reading literacy. A change continued to the increasing role of digital texts in the literacy skill needed for individual growth and participation in society. This modification led to the performance change of items from paper to computer screen or electronic reading.

Similarly, PISA's definition of reading literacy has evolved due to social, economic, cultural, and technological changes. It is viewed as an expanding set of knowledge, skills, and strategies that individuals build to interact with their broader community and as part of their lifelong learning (PISA-2015 Technical Report). Table 2.2 shows how the definition of reading literacy has changed over time. A significant change in PISA 2018 has been the inclusion of evaluation of texts as an integral part of reading literacy and the removal of the word 'written.'

Table 2.2

Reading literacy definition over time

Year of PISA	The definition
PISA 2000	<i>Reading literacy is understanding, using, and reflecting on written texts to achieve goals, develop one's knowledge and potential, and participate in society.</i>
PISA 2009	<i>Reading literacy is understanding, using, reflecting on, and engaging with written texts to achieve goals, develop one's knowledge and potential, and participate in society.</i>
PISA 2018	<i>Reading literacy is understanding, using, evaluating, reflecting on, and engaging with texts to achieve goals, develop one's knowledge and potential, and participate in society.</i>

Each part of the definition of reading literacy in PISA 2018 is described below, taking into account the original formulations as well as some crucial developments in the field that are based on PISA and other empirical studies, theoretical advances, and changes like the world (OECD, 2015).

- Reading literacy.

"Reading literacy includes a wide range of cognitive and linguistic competencies, from basic decoding to knowledge of words, grammar, and larger linguistic and textual structures for comprehension and integration of meaning with one's knowledge about the world. "literacy" typically refers to an individual's knowledge of a subject or field, although it has been most closely associated with an individual's ability to learn, use and communicate written and printed information."

- . . . is understanding, using, evaluating, reflecting on ...

"The word "understanding" is readily connected with the widely accepted concept of "reading comprehension," that all reading involves some level of integrating information from the text with the reader's knowledge structures."

- . . . and engaging with . . .

"Engagement in this context implies the motivation to read and comprises a cluster of affective and behavioral characteristics that include an interest in and enjoyment of reading, a sense of control over what one reads, involvement in the social dimension of reading, and diverse and frequent reading practices."

- . . . texts . . .

"The phrase "texts" is meant to include all language as used in its graphic form: handwritten, printed, or screen-based. The term "texts" was chosen instead of the term "information" because of its association with written language and because it more readily connotes literary as well as information-focused reading."

- . . . in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society.

"This phrase is meant to capture the full scope of situations in which reading literacy plays a role, from private to public, from school to work, from formal education to lifelong learning and active citizenship."

The cognitive assessment in PISA

The cognitive instrument in PISA reading literacy is intended to measure students' prior knowledge of reading literacy processes through manipulating task and text factors. The cognitive assessment focuses on reading processes classified into three major categories reported as reading subscales: locate information, understand, evaluate and reflect.

Subscales

- Locating information refers to accessing and retrieving information within a text and then searching and selecting relevant text.
- Understand represent literal meaning, then integrate and generate inferences.
- Evaluating and reflecting refers to assessing quality and credibility, reflecting on content and form, and detecting and handling conflict.

Accordingly, it is also helpful in PISA assessment to classify texts into text format and text type (ACER, 2013). Text format refers to whether a text is continuous, non-

continuous, mixed, or multiple. Meanwhile, the text type refers to the predominant features of the text so that the instrument samples texts that represent a wide range of different reading styles. The classification is divided into the description, exposition, argumentation, instruction, and transaction adapted from Werlich (1976 as cited in OECD, 2017)

Text format

- *continuous texts* are composed of sentences, which are then organized into paragraphs, such as in newspapers or novels;
- *non-continuous texts* consist of several lists such as tables or forms; and
- *mixed or multiple* contain elements of both continuous and non-continuous formats and are commonly seen in magazines and authored websites.

Text type

- *the description* is the type of text where the information refers to properties of objects in space using diagrams or illustrations;
- *narration* is the type of text that contains information related to properties of objects in time used in several types such as a novel, biography, comic strip, and newspaper report;
- *An exposition* is a type of text in which the information is presented as concepts or mental constructs or as those elements from which concepts or mental constructs can be analyzed, such as an essay, a graph of population trends, a concept map, and an entry in an online encyclopedia;
- *argumentation* is the type of text that presents the interaction between concepts or propositions referring to opinions and points of view, such as a letter to the editor, a poster advertisement, or a book review on the web;
- *instruction* is a type of text that provides directions on how to perform a specific task, for example, a recipe and guideline for operating software; and
- *the transaction* is a text whose purpose is to achieve a specific objective specified in the text, such as requesting that something is done, organizing a meeting, or making a social engagement with a friend.

As reading skills often require good writing, such as writing essays or summarise the texts, it is important to note in PISA that several items require readers to explain their thinking in writing, demonstrating their ability to write effectively, although aspects such as spelling, or the quality of writing are not measured.

2.5 READING LITERACY MODELS IN INDONESIAN SECONDARY SCHOOLS

The last decade has brought a range of reading models that serve as the foundation for reading strategies (Frost, 2012; Joshi & Aaron, 2012; Suraprajit, 2019). The aims of reading literacy skills needed several years ago for individual growth, educational success, economic participation, and citizenship were different from today, and it is likely still to change in the future (OECD, 2018). Based on the latest PISA reading test, a concept changed which reading context should be used in citizens' lives. As mentioned in the earlier discussion, the students need to locate, understand, evaluate and reflect on all information to participate in society. As a result, reading achievement is for educational system purposes and successful individual participation in long learning life. Several studies have been conducted about reading models, particularly those put into practice in secondary schools in Indonesia, namely top-down, bottom-up, and interactive models (Grabe & Stroller, 2002; Subadiyono, 2014).

The top-down reading model is built on the concept that transferring writing into meaning starts from the reader's prior knowledge. This process begins with making predictions or guessing the meaning of several writing units. The reader reads the graphics symbols into sound to control the hypothesised meaning. The top-down model emphasises that information processing during reading is triggered by the reader's prior knowledge and experience of the author's message. The top-down reading models allow students to guess the text's meaning of the target reading body through their existing or background knowledge (Goodman, 1971 as cited in Suraprajit, 2019). Wartika (2015) conducted classroom action research to study the top-down reading model for secondary students in Indonesia and affirms the effectiveness of the methods in improving students' reading achievement is significantly increased after accomplished in two-cycle of study. The study also makes students feel more

challenged by interpreting text based on their knowledge through several types of diagonal, beam, horizontal, vertical, and zig-zag.

The bottom-up model is built on the assumption that the process of transferring writing into meaning starts from something that is printed. The first step in this process is to determine what the symbol represents. Thus, the reader first identifies the characteristics of the letters, linking the features together into letters, combining the letters as a spelling pattern, linking spelling patterns with words, and then proceeding to sentence paragraph, and text level processes. The bottom-up model in reading begins with decoding words, letters, and other text elements, then building textual meaning (Carrell & Eistenhold, 1983 as cited in Suraprajit, 2019). A previous study by Serafini (2012) adopts bottom-up as a reading model, which explores four models related to reading visual and multi-modal texts which have been established as the basis of reforming curriculum (Ludwig, 2003 as cited in Serafini, 2012) and a theoretical reading literacy framework (Freebody, 1992 as cited in Serafini, 2012). The visual models refer to a simple type in social-cultural context defining how to construct meaning and analyse the texts in reading. Likewise, the model requires readers to engage with a greater variety of visual images and graphics than traditional printed-based texts such as pictures, books, informational texts, magazines and newspapers, and other multi-modal texts (images, hypertext, video, music, sound, and graphic designs). In addition, the designer and the reader have a role in determining the meaning of the text represented and expressing the meaning considered in the text. For example, the text is read, the path to read it, and what is considered in the reading process. Finally, as an interrogator, readers are expected to conclude from the various things they have read.

The third reading model is the interactive model, a combination of bottom-up and top-down approaches. An interactive model assumes that converting the writing into meaning involves prior knowledge and skills. This process begins with making predictions of meaning and reading graphic symbols. Neither prior knowledge nor graphic information is used exclusively by the reader when doing readings. It begins with formulating a meaning hypothesis and concurrently reading letters and words. Grabe and Stoller (2002) also present the three-reading model as follows.

Table 2.3

Three reading model by Grabe and Stoller

Top-down model	Bottom-up model	Interactive model
the reader as someone who has a set of expectations about text information	reader practices each word letter-by-letter, word-by-word, and text sentence-by-sentence	The reader takes useful ideas from a bottom-up perspective and combines them with key ideas from a top-down view
inferencing is the importance of a reader's background knowledge	little interference from the reader's background knowledge	Inferencing, predicting, and background knowledge is a major contributor to text understanding
views highlight the potential interaction of all processes (lower- and higher-level processes) with each other under the general control of a central monitor.	aspects of this view (e.g., lower-level processes such as word recognition abilities and syntactic parsing) are reflected in the overview of the reading process	The top-down model must be served primarily for higher-level processing

According to the discussion above, as the cognitive assessment in PISA uses content primarily from within the text in the subscales, those three reading models seem to have high value to secondary school students in Indonesia. Nonetheless, there is limited evidence that the three reading models contribute to the practice of performing PISA tests in Indonesia. The elements in the top-down, bottom-up, and interactive model implemented in secondary

schools in Indonesia have implicitly been used as the basis for constructing subscales during the test.

For Indonesian children to take the PISA exam, teachers need to become experts to assist students in developing their reading skills at school and at home (Nida et al., 2020). Educators need to set the time deliberately. However, educators can reflect on all kinds of things students read daily. Students read school illustrations and students make meaning from them. Research experts tell us that the most effective way to close the skill gap is to invest more energy in research (Suprpto, 2016). If possible, work on a schedule to read together or have students read freely every day. Here are three ways guardians or parent figures can do from home to help plug gaps in student understanding. Young children without vital skills can be left in school, and the results can last forever. Reading is the basis for tremendous instructive achievement and opens doors throughout everyday life. Days, unless many children do not because time is running out and the ability to build this stance (Prensky, 2016).

For comparison, the reading models can be described here. The first is the bottom-up model, which started in the 1960s and 70s, then the top-down reading model, which was between the 1970s and 80s, while the interactive reading model started in the late 1970s. From the 1980s to the present is a solution (Cromley, 2009). Hence, each of these models has its characteristics; for example, the bottom model sees reading as a decoding process, while the top-down model sees reading as psycholinguistic, while the interactive reading model sees reading as the construction of understanding of the text through the use of the two previous models which involve strategies. which focuses on interaction so that there is

balance and, in other words, can cover gaps in the existing reading context (Chen & Chen, 2016).

2.6 THE SHIFT FROM PAPER-BASED TESTS TO COMPUTER-BASED TESTS

In this study, the paper-based test refers to PISA 2000 and 2009 while the computer-based test refers to PISA 2018. There has been a significant change in the PISA test after 2015 as the testing system has moved from paper to computer. In the 2015 test results, which revealed a significant discrepancy, the results of reading proficiency scores in several countries that had always dominated Asia appeared to have dropped scores. For example, Hong Kong dropped 18 points; South Korea fell about 19 points; Japan dropped about 22 points and Taiwan 26 points. The PISA 2015 shift from the previous paper-based method to a computer-based one might be a leading cause, and the results were seen in countries in Asia (Komatsu & Rappleye, 2017). Many from these countries are not accustomed to the Personal Computer in schools for learning and reading practice. For example, PISA 2009 release data shows that Japanese students have never used digital-based learning in getting lessons in class (West et al., 2019). Similarly, the OECD's ICT use in schools index, which measures student participation in various training activities related to computer operations on several days each week, has placed some previously superior players such as Korea, Japan, and China in the top three now decreasing with Hong Kong and Taiwan (Komatsu & Rappleye, 2017).

However, in this case, the drop is not too far. The Head of Education and Skills of the OECD country confirmed the 2015 PISA shift to computer systems by reporting their analysis that the primary impression of the computer literacy movement is in the affirmation

and disclosure capacity that has followed the continued inventive advances in technology in the country (National Research Council, 2011). Their comments generally emphasize what has happened recently in the shift from the old paper system to an all-digital system (Thompson, 2017). Finally, the educational framework across the test takers needs to find an all-digital approach that is more useful for re-planning any plans that intend to progress to all-digital training and sort out some of the old ways to provide students with a learning environment with a cutting-edge system that maintains informatics techniques in the twentieth century and give children the capacity they need to win to dominate in the future (Chua, 2012).

According to OECD (21st-Century Readers, 2021), PISA 2018 found that, across OECD countries, 88% of students had both a home Internet connection and a computer they could use for schoolwork, a 28-percentage point improvement over PISA 2003. However, fewer than half of the students surveyed had access to a computer at home and an Internet connection in several countries, including Indonesia. Most students in East Asia, including Indonesia, do not rely on computers in schools. Therefore, this study intended to seek the different achievements of PISA reading literacy between the paper-based assessment in 2000 and 2009 and the computer-based version in 2018.

OECD (2019a) reveals that with the shift from print to computer screens to access textual information, the structures and formats of texts have also evolved. Consequently, readers must adopt new cognitive strategies to engage in purposeful reading. In light of this, success in reading literacy should no longer be defined by the ability to read and comprehend one text. Nevertheless, comprehending and understanding complex pieces of continuous text, such as literary texts, remains an important skill. However, success will also require complex

information-processing strategies, including analysis, synthesis, integration, and interpretation of relevant data from numerous texts (or sources of information).

PISA's vision of what is to come goes hand in hand with the changes, namely the introduction of ICT-based PISA (Pelczar & Corporation, 2011). This is PISA's creativity towards innovation. Thus, it takes a serious commitment to ICT for the teaching and learning process is not yet fully known and used (Deng & Gopinathan, 2016). However, the ICT and the website's connection play a significant role in the lives of each participant and the professional life of the PISA implementers. Practically, students who do not have basic skills in ICT and will impact reading, writing, and exploring the computer world will end up dangerous regardless of the financial, social, and social life around students (Aypay, 2010). The idea is that developing countries, such as the whole East Asian countries, are one of the most innovative social structures developing in the participating countries. This and got the most crucial score on tests worldwide (NIR et al., 2016).

The PISA score results can be interpreted as low reading literacy and low digital literacy among Indonesian students. The 2018 PISA results show that 70% of Indonesian students cannot reach level 2 in the PISA framework (Nizar et al., 2018). On average, only about 23% of students in the 79 countries participating in PISA are unable to master level 2 reading skills. Another reason is that the questions at level 2 PISA expect students to determine the main idea in the text, looking for relationships of various information in the text. Moreover, determine simple conclusions from the reading text (Kaya & Elster, 2018).

The implication is that low literacy models and levels are fundamental problems that have an extensive impact on the nation's progress because most of the more up-to-date skills and knowledge are obtained through reading literacy activities. It can be said that Indonesian

students who have not yet become a skilled reading society - able to read, understand, evaluate, and filter information - will be able to reap the maximum benefits from reading sources (Abdurrahman, 2017).

2.7 SUMMARY

In PISA, reading literacy generally accounts for the understanding, using, and reflecting capacity on written texts to develop an individual's knowledge and potential so they can participate in society. Without text and reading, a social practice that makes knowledge could not be applied. In this modern society, literacy for effective participation requires mastery of necessary skills and knowledge, such as decoding texts, interpreting the text's meaning, and understanding grammatical structures. Concerning students' capacity, this innovative literacy concept asks them to understand present information such as lists, forms, graphs, or diagrams between a range of prose of narration, exposition, and argumentation, both printed-based and electronic-based texts. Reading literacy is currently developed as digital reading literacy, which its basic concept is still the same as 'traditional reading literacy,' but its process now considers ICT (Information and Communication Technology) literate in operating devices and appliances. Likewise, it is noteworthy to note that PISA 2015, the paper-based assessment system has been replaced by a computer-based assessment system, which directly impacts reading scores in several countries, including Indonesia.

In Indonesia, reading is not a subject but is mainly integrated into all learning activities. The reading program, which is aligned with the latest national curriculum (*Kurikulum Merdeka*), requires that students be able to demonstrate their competence in digital literacy and creative thinking through activities that foster attitude, knowledge, and

skills. Reading models at the secondary level include top-down, bottom-up, and interactive models. The interactive model is more widely used in Indonesia than either of the other two models.

Chapter 3

Reading Literacy Factors from Schools, Students, Teachers, and Parents

3.1 INTRODUCTION

Globally, numerous studies (Nugrahanto & Zuchdi, 2019; Tavsancil et al., 2019; Ratri, 2015) have researched and discussed the factors influencing the ability to read. These studies indicate that several background characteristics contribute to a person's reading literacy. In particular, the PISA has systematically gathered information about how students, parents, teachers, and schools function as factors when measuring the reading literacy of adolescents across the world. The PISA discussion takes into account how these factors and other background characteristics contribute to improvement and success in students' reading achievement. As stated in Chapter 1, the Indonesian government presently collects and analyses information on the effects of students and schools on literacy results but does not presently collect information on the effects of parents and teachers on their PISA results. This points to a need to further investigate the relationship between parents and teachers on student literacy. Such work could be used to identify more effective policies, which the government and educators may develop and implement across the nation, and adapt, as appropriate, in small local contexts.

Reading literacy as a global concept implicated in secondary schools and assessment in Indonesia was discussed in the previous chapter. This chapter reviews how research literature has globally explored the influence of schools, students, teachers, and parents on reading literacy limited to the PISA context only. The purpose is also to review the literature on PISA's variables from factors of school, student, teacher, and parent used in the study. Specifically, it is designed to explore what has been written about PISA and its variables in its factors. Due to the scope of the topic, it is covered thoroughly and isolates the key themes and issues that pertain only to recent studies. Other variables that are not included in the study will not be addressed. Additionally, this chapter will provide an overview of how future studies may address how these complex interdependent factors affect reading literacy and achievement within the Indonesian context.

3.2 RATIONALE FOR IDENTIFYING FACTORS INFLUENCING READING LITERACY

Vacca et al. (2011, as cited in Henderson, 2012) revealed that not only do parents and the home have strong impacts on student reading performance but also schools and teachers at school are essential elements for enabling students to think, learn and communicate by reading texts. Furthermore, Genick (1997) found that the capacity of a teacher influences students' learning process. For example, teachers should provide a variety of textbooks rather than just working from one particular textbook to contribute positively to reading literacy. This increased variety may include, author talks, and the introduction of new themes. In such cases, school-supported modifications to teaching resources and programs enhance student motivation and willingness to read.

There has been a significant change in the assessment system in Indonesia education, with reforms aimed at improving the quality of education and ensuring that students have the necessary knowledge and skills to be successful in the future (Suratno, 2014; The World Bank, 2020). There are, however, challenges that must be addressed, including issues of equity and the need for ongoing teacher training in assessment practices. These influential factors behave and interact differently depending on the type of school. Karimi (2012) identifies the gap existing between strong features (sources and facilities, teaching procedures, school atmospheres, and experienced teachers) and poor performance in reading literacy among students distinguished by different school environments. This study finds that two variables, teachers' experience and the number of students in the class, are correlating factors of student reading performance in high and low-performing schools. According to Schubert and Becker (2010), a key factor determining the development of student reading ability in schools is the condition of teaching and learning. Here, they suggest that the preconditions for learning across private and public schools, and urban and rural areas are unequal. Their research questions how the economic, cultural, and social capital of the parents contribute to the social inequality of reading literacy from the time of enrolment to the end of elementary school. Additionally, socially differential learning conditions in the different school areas, contribute to an increase in social inequality in learning abilities. Economic, cultural, and social capital, which is influenced by class status, further reinforces the social disparity of school performances at the secondary level.

An implication of the findings above is that school, student, teacher, and parent factors should be taken into account. Therefore, this review will discuss these factors in four sections: (1)

school factors; (2) student factors; (3) parent factors; and (4) teacher factors. School factors are based on school sectors, curriculum, school facilities including ICT at school, resources and technology, and school funding, assessment, and school management including leadership and school climate. Student factors, meanwhile, are measured by estimating some factors of gender, home facilities including several books and home educational resources, reading activities including reading engagement, reading diversity, online reading, and reading for educational career, and other factors of reading states which include reading strategies, reading confidence, and reading time. Teacher factors are defined by professional activities and reading for work. Parent factors are determined by reading involvement, parent sociocultural background, parent income, and parent job.

3.3 FACTORS FROM SCHOOLS INFLUENCING READING LITERACY

Reading literacy can be a multi-level process. First, it is the level of understanding and ability to evaluate, apply and interact with reading materials. Second, reading literacy supports participation in the literacy community to achieve and develop one's knowledge, skills, and competencies, both in the academic environment and outside the academic world (van Staden & Bosker, 2014). Given the complexity of what it means to become literate, the development of reading skills can be understood as very challenging. The training process is very complex, requiring much mental and cognitive skills involvement (Tunmer & Hoover, 2019). There are several factors behind how students can achieve successful reading skills and reading achievement like most students who have been tested successfully in reading events at the world level, such as in the PISA test competition (Peterson et al., 2011; Turgut, 2013). Therefore, identifying the

factors that determine how students succeed in their reading skills and their reading achievement is important, especially in the context of PISA test practices.

3.3.1 SCHOOL TYPE

School sector and Location

A number of research studies (Costa & Araújo, 2018; Duncan & Sandy, 2007) suggest that student reading achievement differs according to characteristics that are particular to different schooling systems. The type of school sector is assumed as one of the main factors in supporting student reading literacy. For example, Sarah Lubienski (2006) and Christopher Lubienski (2006) find that achievement in mathematics is more strongly impacted by the school area. One key concern for this study is to question claims that differences between schooling systems can be considered as a factor that influences student literacy achievement.

There is a tendency in Indonesia to believe that public schools are better than private schools. Public schools benefit from positive selection at secondary levels, for example, enrolment in public schools is positively correlated with household income and primary test scores (David & Beegle, 2006; Kurniawati et al., 2018) and better-educated parents appear to choose public schools (David & Beegle, 2006; Suryadarma, 2012). Based on the PISA study by Stern and Smith (2016), public school students are outperforming their private school counterparts on reading, math, and science exam.

The school sector is noted as one of the factors in student reading literacy. As Lubienski and Lubienski (2006) argues, the achievement of students in mathematics is determined more by the educational sector than by school performance. From this perspective, other academic

achievements, such as reading, may also be affected by the school sector. According to the PISA study, the school sector is divided into two types, public schools and private schools. In addition, the PISA questionnaire suggests that student literacy achievement also relates to location. Here the place where students receive their education – villages, small towns, cities, city centres, and cities elsewhere – intersect with the influence of the schooling sector, possibly compounding differences between population groups.

3.3.2 SCHOOL FACILITIES

Research literature has explored how school facilities such as ICT at school, resources and technology, and school funding, in accordance with PISA data could impact student reading literacy.

ICT at School

In this technology-driven era, there are several possible explanations for schools in Indonesia in making students aware of the importance of Information and Communication Technology (ICT) (Purnomo & Kusnandar, 2019). This awareness of ICT will make students digital actors who have more technical skills. School facilities concerning resources and technology owned by the school can be compatible with libraries, science experiment laboratories, and multimedia laboratories. These facilities are now essential to support the teaching and learning process. Good libraries can increase student motivation in reading and borrowing books, printed reading materials, and soft files or online materials.

As a result, these library facilities' existence will undoubtedly increase students' reading

interest and other school communities and library support to minimise barriers to understanding content in the classroom (Tunjung, 2009). With growing reading student interest, there is evidence of increased student interest based on the availability of computer laboratories (Pianfetti, 2001). The study shows that computer laboratory readiness affects the development of students' reading computer literacy. The author suggests that students can access and design e-books as online personal libraries. At the same time, students automatically develop their ICT literacy skills. Likewise, the existence of ICT itself in the school environment in Indonesia can be felt by students as the target of digital literacy learning (Sutriadi & Wulandari, 2014). In the future, students can become literate communities as they become a digitally literate generation. In these instances, students attend colleges that are heavily reliant on technology (Maria et al., 2013).

Resources and Technology

In this section, the discussion will explore how the existence of resources and technology impacts students' reading in Indonesia. If the ICT at school is about using and working with technology, the resources and technology are about the facility based on technology. Previous research on schools' facilitation of technology has emphasised that the quality of school resources supports students' achievement in reading. Bowers & Urick (2011) suggest that school facilities do not directly affect student achievement but have a positive effect on learning outcomes. This is because technology and resources are a means of delivery and a source of information, in other words, these resources are tools or devices that continue to increase the enthusiasm for learning.

Adhering to the 2018 PISA results, for example, according to the OECD report of the institution in charge of implementing the PISA test, which is one of the benchmarks for international students' reading abilities, reading achievement scores are still very low. Following the release, it can be inferred that reading skills and other component skills tested, such as math and science skills, are also still shallow scores. The release has confirmed that there are many problems to be solved. This makes it natural for the parties in the country to carry out a series of studies and re-evaluations to ascertain the causes and, at the same time, find solutions so that the achievement of future test results will increase. According to Petko et al (2017), the quality of education is closely related to mastery of technological literacy. They proved their hypothesis through an analysis of technological literacy skills, from attitudes and habits in adapting to technology, which impacted the achievement of PISA test results in 2012. Thus, the correlation between proficiency in reading score achievement is confirmed to have a close relationship with technological literacy skills (behaviour and habituation).

Technological systems often found in schools include teachers and students as users, learning information and content, supporting materials, tools, and machines, supporting energy, capital and assets, and learning opportunities (West & Graham, 2014). Because resources are limited, humans need to use them wisely and smartly. Today, the best technology equipment is interactive intelligent boards with touch screens, laptops and chrome books, tablets, computers, headphones, sound amplifiers, video cameras, and more (Leonhard, 2018).

According to Darling-Hammond (2000), the use of technology for students is a form of

genuine support by schools so that learning acceleration can be achieved easily. Students born in the digital age have different perceptions from teachers, born before the widespread adoption of computer technology. Likewise, more and more cutting-edge technology is being used as media in schools today, including social networking, online instruction, class discussion and wiki, online podcasting, interactive whiteboards, and mobile smartphones (Shim et al., 2011). For school teaching in the millennial era to be more attractive, there are many ways in which schools can get the most benefit from the latest technology that is being and will continue to be developed by the education support industry. When supposing that schools can use the smartphone devices and educational applications that they complete effectively, it will be possibly enough to help students prepare for their future learning to a higher level and enter the world of careers and vacations where the use of technology and work resources involves digital literacy skills (Ng, 2012).

Another reason for integrating technological devices into learning is to link technology, play learning, and learning objectives in such a way that each student's learning style has been personalised (Yang, 2013). By integrating technology facilities in the classroom, schools understand how to help the learning community so that student play and learning activities remain integrated. This is the characteristic reality of students who enjoy learning while playing and exploring the world in a fun way but are still connected to learning. For this reason, awareness of technology and other resources is highly appropriate and productive (Wu et al., 2013). To facilitate the application of technology for the success of student learning in the current technological era, according to Román Carrasco & Murillo Torrecilla (2012), the learning climate of the current era must be supported by technological resources based on the positive contribution made to student

learning success in school, so that the development of learning technology devices can have a significant impact on student learning and reading literacy.

Although the PISA study includes three elements as Mathematics, Reading, and Science, this study will try to obtain various findings and field evidence related to the decline in Reading and the factors causing it. Especially by proficiency in technological literacy, which today has become the key to solving various problems; problems both in the world of work and in lectures (Biancarosa & Griffiths, 2012). Various thoughts have been given to the digital aspect of technological literacy, which is one solution that can be relied upon to improve Indonesian education in general and reading skills in particular (Mujtahid et al., 2021). The debate about why technology was created in education continues. Data proves technology has indeed been and should be used to back up educational developments even though technology in Indonesia has not been applied following the needs and demands of the teaching world (Putro & Lee, 2017).

Therefore, the role of technology today must be recognised as having encouraged the acceleration of reading skills in a global context. In Indonesian context, according to Sasmoko et al. (2019), technology has not played its most fundamental role in solving learning problems in the Indonesian context, especially in reading subjects. This is because this technological machine, or what is often called an artificial intelligence machine, according to the parties, allows students to improve reading skills, namely by familiarising every student, teacher, and parent with various technological models to make reading progress successful. Technology has become a daily thing for people, especially students, and digital-based learning in Indonesian contexts (Liza &

Andriyanti, 2020). They categorise digital or technology as still dominated by things outside of learning activities, especially reading. If returning to the teacher's role, applying this digital-based learning method is one perfect solution recommended by government policy through curriculum content that presents digital-based materials and multimedia facilities (Muslem & Abbas, 2017).

In addition to the effectiveness of these facilities, according to Darling-Hammond (2000), school use of technology allows for the easy acceleration of learning. It is widely agreed that students are the generation born after technology existed, so they have a different perception from their teachers, born before technology existed.

School Funding

Funding support can be one key consideration influencing the educational process at school, especially in teaching and learning. Hoffman et al. (2013) discuss the variance of school finance systems that affect student reading achievement. The writers compare two conditions of adequate and inadequate funding that have an essential link to student achievement. Based on the study, there are significant effects on student achievement in schools that meet sufficient funding support; the student score is higher than that of schools with insufficient funding. Correspondingly, Gage et al. (2014) identify the school funding support in nine states in the United States. The writers give evidence that the availability of financial support within schools improves student outcomes. This is because the budget has been allocated effectively for running all programs for educational purposes.

Allocation of School Funds Education financing is an essential and inseparable component in implementing the teaching and learning process in schools (Chutgar & Kanjee, 2009). In the framework of forming the potential of human resources, the effective and efficient use of education budgets or funding can produce appropriate and successful educational outcomes. A key to successful education development lies in the ability of human resources to manage available funds. Using the funds, basic needs and priority scales of education development programs are expected to be covered gradually and continuously based on the plan (Commission, 2011). There is a significant portion of school funding earmarked for the teaching and learning process, including teacher and school employee compensation. As well, the funding will support the following areas: book funds, ICT media, energy, oil, diesel, telephones, caregivers, secretaries, office supplies, transportation, school guards, maintenance, and organizations. (Bulturbayevich et al., 2021).

Paying the salaries of teachers and other school staff is the most significant expense in managing school funds. If calculated precisely, the school unit fund can be obtained, for example, in primary schools: IDR 900 thousand per student every year. Likewise, junior high schools: IDR 1.1 million per student every year. Senior high school: IDR 1.5 million per student every year (Wendy, 2020). This is calculated as allocating salaries for teachers, school leaders, school management staff, substitute teachers, teacher salaries, additional courses, libraries, materials and stationery, and remedial, and unexpected education costs. Other routine spending problems, school obligations for cleanliness, annual allowances, security and insurance for instructors, and other learning resources need backup funds (Ramadhan, 2019).

3.3.3 ASSESSMENT

The impact of assessments on the achievement of PISA test results in each year has been widely discussed in various scientific contexts. However, some findings in the form of study evidence have underlined that an assessment or evaluation at the school level that is not of high quality impacts the achievement of students' final learning outcomes (Black et al., 2006). The same thing was also expressed by Hock et al. (2017). They prove an impact on comprehensive reading skills on final exam tests at the school level. Many studies demonstrate an impact between the assessment carried out with all the weaknesses, resulting in the poor achievement of Indonesian students in the examinations for each bachelor or grade promotion (Dubeck & Gove, 2015). For example, a study conducted at both the school and university levels found that weaknesses in the implementation of the assessment had resulted in low achievement of learning outcomes at the school level (Fonner et al., 2014). These findings also confirm several previous studies in several countries where students also experienced a decline in their test results due to poor implementation of assessments by schools (Singer & Alexander, 2017).

However, the authors can argue that the weaknesses found in assessments in Indonesia have surprisingly convinced researchers that the decline in student learning outcomes in schools has been proven by the assessment system's weakness (Hadna & Kartika, 2017). This is what is done every year, even though the government constantly evaluates and revises the implementation of the national assessment every five years. This poor result occurs from a conventional and computerised easement (Retnawati, 2015). This indicates that the government's efforts are continuously being carried out, but weaknesses still require ongoing study. Compared to studies

in developed countries, students who receive comprehensive assessment treatment carried out by their schools tend to work on reading questions related to international tests efficiently and more productively (Darmawan et al., 2020). The author believes that the low achievement of the final grade is closely related to the weak system of implementing the assessment, which is carried out every year in schools when changing classes and at each level of education.

The same study was also proven by Mullis & Martin (2021), who have proven that the assessment, carried out in a very planned and measured manner, impacts the high achievement of students' academic results. This is because the validity of the implementation of the assessment and the results can test or evaluate what they have learned before (McGrath et al., 2018). This is also supported by a recent study where an unprepared assessment eventually gave birth to weaknesses in terms of problem formulation or also did not reflect on what students had achieved (Costley, 2007), resulting in errors in programming the continuation of further learning, so that also has an impact on the achievement of final exam results.

Assessment in schooling includes utilising exact information on understudy, figuring out how to consummate projects, and improving understudy learning (Stitt-Bergh et al., 2018). In the interim, Jones & Gorra (2013) considers assessment to be a thorough evaluation, and the utilisation of information on instructive projects is completed to improve understudy learning and advancement. To find out about assessment, it is essential to comprehend evaluation and its application in its utilisation. Still, Luyten (2006) defines assessment as an interaction where information is gathered and compared to a preconceived aim or goal regarding the implementation

of education. The examination is the way toward estimating execution. It additionally tests understudies' information. Subsequently, all tests are evaluations. However, all appraisals are not tests (Panadero & Jonsson, 2013).

Aside from the capacity for evaluation and comprehension in training, the assessment has a principal objective in schools. As stated in Gardner (2012), evaluation in a learning climate expects to gather applicable data about understudy accomplishment or progress or decide understudy revenue in assessing the learning interaction. As instructors, for example, educators and analysts, it is essential to realise why school-based appraisals are significant. The appropriate response is because evaluation permits the educator to perceive what advanced kids are making, and it additionally gives data to the instructor, which assists the educator with arranging how to help understudies gain further headway. To see the evaluation capacity, Wiliam (2011) investigation of what assessment is in realising will make a more profound comprehension of the assessment utilised. Besides, instructors should uphold school arranging since evaluation helps schools set future targets and estimate their exhibitions.

Since trustworthiness is an indispensable piece of instructing, it decides if instructive objectives are met or not. Besides, evaluation impacts choices about grades, arrangement, progress, instructional necessities, educational plan, and, at times, financing (Yorke, 2003). Overall, planned evaluations can empower dynamic adapting to help educators work with understudies, particularly while conveying creativity and drawing in assessment. Similarly, evaluation additionally helps understudies in self and companion assessment; for instance, it can develop various abilities, like

reflection, basic reasoning, and mindfulness - just as furnish understudies with a comprehension of the appraisal interaction. Since educators use evaluation in their course programs, they should know about the various kinds of assessment regularly utilised by instructors and learning. The accompanying rules for various evaluation models, like analytic, developmental, break, and summative. The four models fill a need. They accompany essential objectives, such as evaluations to encourage guidance that advances educating and getting the hang of, illuminating understudies regarding their advancement, and instructing rehearses. Moreover, the evaluation additionally works as an assessment of understudy learning results.

3.3.4 SCHOOL MANAGEMENT

For schools to be effective, schools need systemic and sustainable management. According to Blau & Presser (2013), schools effective in the current technology era are schools with a principal staff management base. Schools can increase efficiency and effectiveness with data management systems. This means that schools with a management system that will help students, parents, and teachers are continuously connected to modern management system services. The intended system ensures the school is safe for students and the whole daily management school is connected to synergistic data-based services (Blau & Hameiri, 2017). The attention of school management focuses on leadership and school climate variables in line with PISA questionnaires that are classified based on leadership and school climate.

Leadership

The attention of school management focuses on leadership and school climate variables. Leadership means a principal can manage the school system which leads to students' reading improvement. Effective leadership is reflected by good management to cope with teachers, staff, and school administration to support students' educational process deliberated by (Stiggins & Duke, 2008). The authors have promoted that a principal should function as both instructional leaders and instrumental people. Being instructional leaders, the principals support teachers in developing teaching-learning in the class and administration staff in having well-organised school management systems, while instrumental persons are both teachers and administration staff. However, as an instructional leader, a principal must ensure that the planned and ongoing school programs are implemented effectively. Thus, it is called a practical leadership skill.

Leadership at school can have a significant impact on students' reading achievement (Hallinger et al., 1996; Silva et al., 2011). When a principal prioritises literacy, students are more likely to improve their reading skills. Effective principals can create a culture of literacy by providing resources, setting goals, and ensuring that students receive high-quality instruction. Promoting reading throughout the schools includes creating a school-wide program, encouraging students to read at home, and providing access to a variety of reading materials. Additionally, principals can support teachers by providing development opportunities that focus on literacy instruction.

Carudin (2011) characterises the principal's responsibilities, especially in Indonesia, as a

leader who can delegate tasks, improve personnel's willingness, deliver two-way communication, and stand as guidance rather than a boss. Additionally, a principal provides a unique character of personality knowledge, experiences, and at the same time, administrative oversight. These practical leadership skills will be crucial not only in giving motivation teachers to improve their teaching but also in providing the correct strategies for the problems that might have appeared in the teaching process; further, in the administrative area, an effective principal will lead their staff in performing various tasks and serving their functions. The research also suggests that motivation can be enhanced by asking all teachers and staff together they provide a convenient work atmosphere, encourage each other, set a physical environment, and provide a resource centre to accommodate a variety of learning resources. In the end, effective leadership means giving rewards to the person for what they have accomplished. Bowring-Carr (1997) affirms that the principals' role will be incorporated with providing activities for students to have a good environment and learning opportunities that lead to happy learning in student reading achievement.

School Climate

The agenda for reading literacy may be incorporated with how well the learning environment helps promote students' success and happiness, namely the school climate (Bowring-Carr, 1997). Community participation, collegial leadership, instructor professionalism, academic press, and physical environment are all aspects of school climate ability and facilities (Geleta, 2017; Ogamba et al., 2017). Geleta (2017), whose study is in secondary schools in Ethiopia, mentions that school climate has a significant and positive relationship with student achievement.

Likewise, even though there is a mediated variable of parent involvement, Alhosani & Singh (2017) find that school climate and leadership influence student academic performance.

Other evidence confirms a very close relationship between discipline, school organisational climate, learning support, and school regulations oriented towards learning success. This is the main component of school governance oriented to learning productivity, which describes the model and school system that increases learning achievement to the maximum, categorised as a school with a developed and conducive climate (Greely, 2017). Because the climate of the school organisation is perceived as shared by members of the school organisation (Simon et al., 2015). Characteristics of school climate according to the PISA standard (Gimenez et al., 2018) are the level of service quality and school conditions as understood in several dimensions, including those enjoyed by students who have an impact on school equity relationships and disciplinary characteristics among the school community (Day et al., 2016). Others are experienced by the principal, such as the morale of educators and the behaviour of fellow teachers, including association and academic service behaviour. The school's disciplinary climate and student adaptation to learning and other dimensions exist in teaching and other academic services. In this case, it is in student relations in the classroom and disciplinary climate conditions, teaching staff, and students assessed in the excellent category by PISA. Therefore, the PISA test provides appropriate and professional strategies and measures of school environment climate (Klieme, 2020).

The exploration reveals the impact of a healthy environment in schools on student learning from nature and the alternation of human events. According to Nisbett & Ross (1991), human enhancement is a proximal communication path between humans and the environment. Therefore, the implementation of a disciplined and conducive school result from a combination of family background and a school environment that provides an educational aura characterised by conducive conditions. This will inevitably affect student learning and student relationships with other students and the community around the school. In general, this method will be part of the prerequisites for school residents to learn from a productive school climate that supports maximum learning (Stewart, 2008).

The school's physical and biological viewpoints generally underline the meaning of conditions, while the hazard and force model further separates natural hazards and defensive variables in the alternation of individual events (de Haan, 2013). Danger factors, for example, a powerless family foundation, hurt student learning outcomes. Interestingly, the defence element strengthens students' strengths by offsetting or redirecting the unfavourable impact of harmful factors. In simple terms, the elements of school defence that can have a high impact on learning through the creation of a conducive school environment (Baker, 2012) so that it benefits the educational community that can provide firm compensation for student learning at this time are part of the forces that support the school, namely the climate that supports learning so that no matter how difficult the level of learning, students can slowly follow it and produce the desired learning (Schmidt et al., 2009).

Considering the regular communication and interaction in schools and the elements of school defence in adequate learning settings, it has been previously predicted that improvements in the learning environment and work-related reading work will undoubtedly have an impact on students' proficiency in doing assignments and maximum family support (Berkowitz et al., 2015). Therefore, the foundation of student family resilience is also something that can improve the quality of learning, while an effective school environment will also appear in defence of the learning component, which is the best solution to improve students' reading. Various healthy environments and the promised impact of the educational environment on academic performance have always been one thing that must be achieved to provide what students want. Finally, a good school environment balance will make educational performance continue to lead to students, families, and schools (LaRocque et al., 2011).

Various influences of conducive educational environment on students' learning achievement, especially reading achievement, can be influenced by specific things, and the impact is very significant in various learning program activities in schools (Wilder, 2014). It has been proven that all programs designed in schools have a very significant and measurable impact on the achievement of student performance. They assumed that educators have a higher relationship commitment with students and that the arrangement of a conducive school environment will provide a very effective and enjoyable learning atmosphere (Maxwell-Stuart et al., 2018). The results of previous studies stated that students could study in peace if essential factors such as finances in the family, learning orientation, the dedication of educators, and matters related to the spirit of learning all have a very significant impact. Related to the achievement of reading,

conducive school conditions will undoubtedly impact the ease with which students learn. Highly dedicated teachers who create good relationships between teachers and teachers, students and students, all of which impact reading achievement. Another impact of the learning method is learning support facilities (Pons, 2017). There are a variety of regulations that discipline teaching from teachers to students, this is conveyed by a study that indicates the implications of students' opinions on the school environment (Lingard, 2010). As a result, student achievement is good in languages where there is reading, as well as in other fields of study. The 2018 PISA database states that several countries such as China, England, and Korea have very high Mathematics and Reading scores compared to schools that do not apply discipline and a conducive school environment, this is undoubtedly a significant element in the implementation of strengthening student learning so that they can be more productive, especially in reading learning—and followed by other lessons (Fenanlampir et al., 2019).

3.4 READING LITERACY FACTOR FROM STUDENT

In the reading process, the student-related factors that significantly supports students reading achievement include individual characteristic (gender), home facilities (number of books and ICT at home), and reading activities (reading preparation, reading engagement, reading outside school, past reading, and reading for educational career).

3.4.1. INDIVIDUAL CHARACTERISTICS (GENDER)

Several studies have investigated the influence of gender differences on reading as an

academic activity. Rubin (1993), in the study of gender patterns regarding student reading achievement, assumes that gender differences can produce a gap in students' achievement in reading texts. Another study by Ladipo & Gbotosho (2015) investigated reading habits and reading proficiency based on the different gender. The findings report a gender disparity in the student's academic achievement but not in their reading habits. The studies have been a pointer to the fact that gender has a relationship with academic achievement including reading literacy.

The PISA exam program has long been used as a source of information on the progress of educational program implementation and efforts to equalise learning rights and is used to understand education in many countries to make the world's students compete with each other to improve the quality of their education (Pereyra et al., 2011). The results achieved through the PISA event are reported annually in a quantitative assessment that relies on deviations of 100 across all OECD countries in several other areas of study being measured, namely mathematics, problem-solving and reading (Jerrim et al., 2017). Their annual report also presents differences in results by gender, which are reviewed annually. The 2015 report, for example, made reading the preferred field of study and, in the following year, made the field of mathematics a few years later shift to science (Maltese & Tai, 2010). Behind it all, some things are decided for each of these achievements with a more detailed explanation of how the survey was carried out and a focus on what competencies each participant has, which is in great demand. If we look at the 2016 story, it is assessed not only on knowledge but also on developing science skills, which also impacts reading ability. Then the question arises about what can 2017 report on reading achievement scores with gender differences. (Adams & Simmons, 2019). Indeed, every year we can continue to focus

on student reading reports and examine whether gender differences affect reading learning scores. Previous reports show that female students often outperform male students in questions and answers in reading tests and other components. One of the shows distinguishing between females and men is reading interest (Reardon et al., 2018). For example, the findings of the 2015 PISA study, which focused heavily on reading, reported that the knowledge and life skills of the participants with the highest scores were also densely populated by female students. When viewed from the number of countries involved, female students outperformed male students. The lucky points are indeed on the side of female students who outperform the average in all participating countries (Robinson & Lubienski, 2011).

The difference in reading performance between male and female students has widened in recent years (OECD, 2010). Findings from PISA 2009 reconfirm that females are more engaged and better readers than males (Brozo et al., 2014; OECD, 2010). According to OECD (2010), in all countries, males and females are not less likely to report having different reading habits, especially when they read for pleasure. In the countries that took part in PISA 2009, most males and females attend the same classes and work with similar teachers. Males, however, are on average 39 points behind females in reading, the equivalent of one year of schooling. There is considerable variation in the size of the gender gap across countries. It suggests that males and females do not differ in their interest and aptitude for academic pursuits inherently, but rather that these differences are largely acquired and influenced by social factors (OECD, 2010). Even though PISA does not measure causation, it states that males can approach learning positively as females if they are actively engaged in reading at school and home using effective strategies for reading.

In the study, Solheim & Lundetræ (2018) asked both males and females, and the females claimed they did not want to stop reading. Therefore, a gap can be identified between the reading attitudes and behaviours of males and females.

Consistent with the earlier PISA cycles, it is indeed that reading proficiency is greater among female students than male students in participating countries. The difference in gender differences between males and females is stated once in the report of participants from Finland with a relatively high score of 51 points. This shows that male students in the film get low scores in separate places and not in other countries where males get high scores compared to females (Robinson & Lubienski, 2011). Reports on the average distribution of female reading achievement show very contrasting data between the sexes. For example, in the 2010 PISA report, 10% of the female participants scored at the highest level, which was level 5, while 10% of the males, which was level 1, performed below the combined reading literacy standard, which ranged between 1.3 to 3.5 for both girls and boys (Else-Quest et al., 2010). The substantial gender differences in reading tests from year to year can show a massive gap in reading interest in several students' countries of origin (Stoet & Geary, 2013). Hence, in general, reading performance did experience a downward trend, although not in a big way, which occurred between 2015 and 2018 with approximately 5 points in several countries that were participants in the PISA test (Potvin & Hasni, 2014).

Despite the fact that females perform better in reading than males, PISA (OECD, 2010) reveals that there are different results regarding reading diversity. Females are more likely than

males to read fiction frequently, as well as magazines. Yet, while 65% of males read newspapers for enjoyment regularly, only 59% of females do so. Though relatively few students claim to read comic books regularly, 27% of male students read comics several times a month or several times a week, compared with only 18% of female students. Considering this reality, it seems that the gender gap in reading scores between female and male students tends to be inconclusive statistically in most participating countries. There is a need therefore to conduct a test in the context of Indonesia.

3.4.2 HOME FACILITIES

Some studies have examined the impact that home facilities, such as the number of books and home educational resources, have on student reading literacy.

Number of Books

Home facilities, in this study, are classified into the number of books, ICT at home, and reading activities (reading preparation, reading engagement, reading outside school, and reading for education career). There is a tendency of having books, whether paper books or eBooks at home, to influence student learning as they improve their reading characteristics after getting more books at home (Johnson, 2016). The characteristics mentioned in the study such as reading strategies, learning control, and motivation. Specifically, Biretta & Hammer (2016) discuss having books at home as building a home literacy environment that develops learning abilities. Likewise,

Jackson (2016) values books at home to emerge literacy practices that impact student achievement in schools.

Recently, the decline in Australian student achievement in international student assessment tests has alerted many parties, especially the government through its policies, to some causes for discrepancies in results, which were identified as several factors behind the ever-present decline in scores (Hopfenbeck et al., 2018). Many findings state that one of the causes of the decline is the reduced number of reading materials such as books, magazines, and other materials among students (Adams, 2011). More precisely, students who follow the evaluation program can when a series of questions are asked, such as how many books are read in the family and the answers are correlated with the results from reading tests and others, the answer is that students have very few books compared to the number of books owned by students from countries with higher scores than students in Australia (Thomson et al., 2010). For a moment, this illustrates a correlation between the number of books students have at home and the scores found in recent years that they have taken trials for Asian children. However, it also shows that until 2015 was also very little (Feniger & Lefstein, 2014).

Because this drop in points indicates that children's reading achievement is currently still lacking, there should be a minimum of 50 books to be able to participate in reading activities when getting home from this school, a decline that correlates with achievement test results, especially on reading tests (Solheim & Lundetræ, 2018) —analysing reading texts, the tendency to decrease interest in reading results from the lack of book ownership related to the annual achievements

found by the PISA assessment team. The author wants to explain as well as explain the side of increasing the number of books at home, and it turns out that it has a significant influence on the motivation of parents who provide support for achieving reading test results both at school and in annual tests (Butler & Reynolds, 2014). However, in this digital era where technological devices do not seem to change the desire to read much, even though we understand that this book is not only in principle but in digital form, namely if we connect it, of course, digital books are not limited in number, but it is believed that very few read them. Several pieces of evidence show that ownership of books by students will directly impact improving students' reading skills from analysing to solving problems so that this has an impact on their success in reading events, especially international reading can (Warschauer & Matuchniak, 2010).

This latest study highlights that most students in America find books less available even though they differ from how Australia provides books to disadvantaged students. However, according to the study, indigenous children are the smallest community, which the government said had a positive evaluation in 2015 (Gillan et al., 2017). So currently, the ownership of books in the country continues to shrink with the assumption that they no longer need to buy books in principle but can get them from various electronic applications (Liu et al., 2020). To cut a long story short, the decline in children who have books at home has indeed been shown to reduce reading scores both at school and outside of school. This seems to be one factor among many. In addition, student achievement on school walls is also correlated with reading at home with a small number of books and time spent on social media activities and other game applications (Gil-Flores

et al., 2012). This will continue to impact the decline in student reading achievement in several countries tested.

Home Educational Resources

The study of Nelissen & Van den Bulck (2018) confirms this happens when students' digital skills instruct their parents as immigrants. They proved this in their study of how active children in technology were compared to parental people regarding media use in the family. The above is evidence of motivating student learning with resources supporting the search and processing of information or using technology to convey information or data. Examples of technology resources are interactive whiteboards, digital cameras, and scanners (Dilullo et al., 2011).

In addition to multimedia technology facilities, it turns out that many other factors influence the achievement of scores on the PISA test, in which every year, students from Indonesia become participants in the international level evaluation event (Ward, 2018). Another factor in question is, for example, all the conveniences that Indonesian students can find, such as the availability of learning tools that allow children to continue learning when they return to their family and community. In this case, the ability and support from parents to the needs of students to learn what is needed by students so that they can be helped to race to improve school learning achievement (Hollingworth et al., 2011). In other words, it can be related to how home education resources have a significant impact on the achievement of learning outcomes in general and the achievement of reading skills in particular. As understood together, the main objective of holding

PISA by the OECD is an inter-country student assessment event in which they compare students' achievements in every school in the world in terms of the three content subjects of mathematics, reading, and science (Sjøberg, 2015)—in particular, reading which is understood as reading performance which measures the capacity of students to understand and analyse any reading that is channelled in the aim of achieving high results by developing knowledge and self-potential through participation in a global society which will later get grades (Vázquez-Cano et al., 2020).

As explained above, the reading subject is one of the tests in the field of evaluation where the aspect of the ability to understand and apply the text separately has an obvious correlation with student learning activities in addition to studying in class with the teacher and friends (Lau & Ho, 2016). So, learning programs are held in schools formally to increase well-planned human resources, both aspects of knowledge, attitudes, and other skills, but interactions in schools with teachers and friends, of course, students have proven to be inadequate so far to be able to perform with good performance when they are dealing with international tests. The author believes that students certainly want additional support for learning resources outside of school in the form of all learning tools that support them to learn provided by the home and the community around where the students are (Hogan et al., 2018).

Talking about learning resources at home and their impact on reading skill results, Park, (2008) said that the literacy environment at home impacts students' reading. Park believes in this relationship by analysing his comparative study of 25 countries surveyed in an international education research and evaluation project. A similar relationship was also conveyed by Schlee et

al. (2009), who also said that the significant correlation between the social relationships of parents of students is the primary capital for the success of students' learning before they are sent to school. They found that treatment if the child was with parents in the family was a predictor in the achievement of children's academic scores after they entered school. Similar advice was coming from Espinosa et al. (2006), who also believe that parental support for student learning resources such as Technology at home will positively impact student learning outcomes when they study at school in the future. In the sense that learning resources such as Technology are also resources that have a significant impact on the achievement of student learning outcomes later when they have received exceptional learning in their respective schools.

3.4.3 READING ACTIVITIES

Reading activities, in this study, are categorised into reading preparation, reading engagement, reading outside school, and reading for an educational career.

Reading Engagement

The principle of reading involved requires a thorough examination of the characteristics of the person deeply involved in a task. Being absorbed in the physical, behavioural, and emotional effort is what it means to be involved (Taboada Barber et al., 2015). Similar to Ronimus et al. (2014), student engagement during reading classes based on digital game models impacts time, teacher appreciation, and distinctive reading challenges. Guthrie & Davis (2003) argue that readers are

now driven by motivation challenged by engagement in page-to-page classroom exercises but engaging with the concept of seeking understanding requires careful thinking about readers' characteristics in-depth in any content they wish to understand (Koehler & Mishra, 2009). In other words, engaging in reading must involve mental and emotional content, and situations that are not understood yet understood situations stand to increase readers' engagement in various ways. For example, teachers involve students in reading activities continuously on reading material that students like, to not force reading that students do not like, the teacher communicates the importance of reading through the engagement of personal reading materials, getting involved in priority reading content (Richardson & Morgan, 2003).

Reading Diversity

Many factors related to students' reading achievement, school achievement, and test results, including the PISA test, are carried out every year. According to Brozo et al. (2014), students' reading diversity is one of the most dominant factors in success in every test, including PISA. Diversity in Reading will undoubtedly make students engaged in reading the test material so that it is easier for students to complete the exam material. In line with that, Schoor (2016) also said that the utility of reading materials was a predictor of success on the PISA test, especially reading comprehension test materials. Other evidence of diversity in Reading includes students' initial motivation related to the desire to work on questions with enthusiasm.

Regarding the enthusiasm for various reading content, as evidence by the findings of Moses & Kelly (2018), students will continue to be enthusiastic if they like the test text. The development

of views on various reading tests will be more positive towards the test material (Lutz et al., 2006; Schiefele et al., 2012). Furthermore, Ho & Lau (2018) argue that diversity and engagement in reading material will increase students' effectiveness and satisfaction with reading test material. Likewise, the evidence of (Valenzuela et al. (2015) successfully prove how significant the role of various readings is and increases the achievement of the PISA international exam among Chilean students. Meanwhile, Hu & Yu (2021) saw the impact of ICT-based social media on increasing students' reading scores in the PISA exam. This means that when reading test materials are presented on a digital display, this will increase students' efficiency and satisfaction with reading questions. However, evidence from another study by Tavsancil et al. (2019) and Valijarvi et al. (2002) emphasise that several non-reading factors impact students' sense of satisfaction and success PISA test. Therefore, the author believes that all of the evidence of the studies above has shown that both the diverse reading factors and other reading factors have equally led a student to succeed in tests, including the PISA exam for Indonesian students and other countries (Suprpto, 2016).

Online Reading

Reading ability is very important in writing, interpreting, and discussing various reading texts when students take various tests at the education level, even in the PISA program, held every year (Argina et al., 2017). Reading skills can be influenced by many factors, including reading interest, cognitive development, and student attitudes, which can impact and hinder student progress from getting optimal learning outcomes. Therefore, comprehensive reading skills are needed to

successfully deal with various tasks both at school and in the world of work in the future (Akbaşlı et al., 2016).

To overcome the problem of the low PISA reading test results of students in Indonesia, a series of findings have suggested that online reading materials will provide a high understanding and increase students' critical reflection in dealing with various reading tests (Tanudjaya & Doorman, 2020). According to Lee & Wu (2012), students have different ways to approach tests, and most students today have habitual learning and work using online kinds of stuff that also have impacted the way they learn and take the test. This is because PISA tests are always carried out online. Hence, the most useful practice material is reading presented online because it is considered more effective than reading material in the paper for the current learning conditions in the increasingly automated digital era. Much research shows that texts processed online are more effective because nowadays, most students improve their cognitive skills online; for example, by online material, they are happy to read texts, and enthusiastically on touching screens children are more interested in being paper (Boettcher & Conrad, 2010).

People use Technology because they are learning nowadays using online streaming materials. When asked why online reading materials are more important, the answer is that Reading by strengthening students' imaginations is usually done creatively, so online materials are very reactive compared to papers students are more intentional in making their payments, they are used to online appearing which is easy to take home and easy to reread at any time (Lee & Wu, 2012). Reading experts also suggest that many practical activities can help improve students'

Reading to become participants who understand their reading skills better; for example, they are presented with highlight texts that can be done quickly online, and then they can also enchant the content on the internet.

Also, with proficiency in technology, they will quickly solve the problems they feel and understand common themes because reading presented online will usually be more flexible and make students enjoy understanding reading texts themselves (PISA 2009 Assessment Framework, 2009). Another advantage is that when reading online, usually, students at school quickly eliminate distractions around them and set the desired time. They quickly identify which Reading is faster and later manipulate the various online problems. They easily navigate and prepare notes and others so when compared to reapers, online materials are more flexible in answering their questions (Jerrim et al., 2017).

3.5 READING LITERACY FACTORS FROM TEACHERS

The teacher factors regarding reading literacy are selected by their professional activities, lesson activities and online activities.

3.5.1 PROFESSIONAL ACTIVITIES

Preparing teachers in today's era is not easy (Guo, 2013). This is one of the challenges of the teaching profession development, which will undoubtedly affect various elements in student life, for example, joining course or workshop, conference, observations, in-service training course,

and updating with technology. Carlisle et al., (2011) highlighted the importance of teachers' knowledge about early literacy and examined the influence of teachers' knowledge on students' reading achievement. For this background, the findings of Didion et al. (2020) about teachers should have adequate training in teacher professional development. A teacher professional development program is one means of ensuring that in-service teachers have access to current-based teaching methods. The result is a positive contribution of teacher professional development to student reading achievement. If teachers are not trained in high-quality performance, students who struggle to read will continue to fall behind.

Regarding teacher skills in technology, Owolabi et al., (2013) noted that teachers are individuals who must be able to transfer information and communication technology to students so that students have the prospect of the future being able to face the challenges of learning during the era of all e-learning. For this reason, the findings of Aldunate & Nussbaum (2013) about how teachers should adapt themselves to the technology area are absolute. Because being a teacher in the technology era is an era where humans are close to technology.

This is truly one of the challenges that present teachers in education as a big agenda. This challenge can be seen from the differences that appear in the digital era of teaching and learning activities where teachers are required to be more professional if given higher skills and insight. In the past, before information technology existed, students could only access information through teachers, and books, such as newspapers and magazines. Meanwhile, now, students can easily access information via the internet. Hence, if teachers are not adaptive, they will be left behind.

Thus Elijah (2006) noted that changes in academic performance standards in many parts of the world occur in line with developments in information communication technology and global economic growth. As Gómez-Fernández & Mediavilla (2021) said, it is undeniable that a series of studies have revealed a burdensome relationship between information and communication technologies increases the appearance of extraordinary academic performance. They admit that teachers' professionalism in information technology is a need that cannot be postponed any more, along with the increasing development of information technology in this digital era.

3.5.2 LESSON ACTIVITIES

Becker et al. (2010) mention that one primary external recognition of the learning process is how friendly teachers treat them. What is more, teachers also have a harmonious relationship with other teachers which is called teacher collaboration. A collaboration reflects on one teacher's design and works together with one or more teachers in preparing an ongoing cycle of teaching about reading; then, they commit to working together as a team (DuFour, 2004). Furthermore, Annenberg Institute for School Reform (2004 in Mediratta, 2007) investigates that collaboration such as designing, discussing, teaching, and reflecting on what teachers have done in the classroom might not directly improve the students' reading achievement. However, at least this will become a powerful opportunity to maintain the synergy connection to driven teachers to improve their practice to gain reading achievement.

It is noted that reading literacy is simulated by the capability of teachers in the classroom learning process. In their instruction, teachers let students have activities such as listening to book writers, sharing talks about particular books from a common theme, summarising books, and performing chosen characters from the book they have selected (Genick, 1997). One possible implication of this is that voracious students will become self-selective readers who can read and comprehend fully. Another variable that is significant to improve reading achievement under teaching and learning is teachers' most provided assessment. Assessment will enable the development of student reading comprehension regarding their skills and attitudes (Gerry Shiel, 2006). The primary purpose of assessment is to monitor students learning progress over time and evaluate the factors associated with their achievement regarding reading literacy; G Shiel & Cosgrove (2002) state that assessment will enable student reading comprehension, especially in skills attitudes.

Based on the Progress in International Reading Literacy Study (PIRLS) 2001, Hao & Johnson (2013) explore the association between testing activities and reading achievement. Findings vary depending on whether teachers used multiple-choice, brief essay composition, or oral communication tests. The outcomes display that each assessment type is valuable to new possibilities for providing reading strategies information to improve reading skills and scores. Meanwhile, Harris & Brown (2013) examine the peer- and self-assessment assumed to affect student learning positively. In line with the hypothesis, the study affirms that the assessment is undoubtedly essential, although there is an understanding that peer- and self-assessment might face many obstacles in implementing the classroom. However, it identifies students' opportunities

to have benefited by maintaining their communication about their reading activities with teachers and parents.

3.5.3 ONLINE ACTIVITIES

Preparing teachers in today's era is not easy (Guo, 2013). This is one of the challenges of the teaching profession in technological civilization development, which will undoubtedly affect various elements of student life. Regarding teacher skills in technology, Owolabi et al. (2013) noted that teachers are individuals who must be able to transfer information and communication technology to students so that students have the prospect of the future being able to face the challenges of learning during the era of all e-learning. For this reason, the findings of Aldunate & Nussbaum (2013) about how teachers should adapt themselves to the technology area are absolute. Because being a teacher in the technology era is an era where humans are close to technology.

This is truly one of the challenges that present teachers in education as a big agenda. This challenge can be seen from the differences that appear in the digital era of teaching and learning activities where teachers are required to be more professional if given higher skills and insight. In the past, before information technology existed, students could only access information through teachers, and books, such as newspapers and magazines. Meanwhile, now, students can easily access information via the internet. So if teachers are not adaptive in online activities, they will be left behind.

This difference shows that students in today's digital era have greater access to information due to technological developments. Therefore, the ability of children today is often referred to as the children of the millennial generation. Hoque et al. (2018) stated that the current generation is a digital generation that is proficient and passionate about information technology and various computer applications. The information accessed by this generation of netizens is not limited to information related to education but information related to their interests. This generation has several characteristics that can be seen in their daily life. According to Wiedmer (2015), these characteristics must do different generations through best practices in leading traditionalists, boomers generations, and generations of millennials and other secretin terms. They often communicate with all groups, primarily through social networks such as Facebook, Twitter, Whatsapp, and SMS. Through these media, they become freer to express themselves, whether they feel or think spontaneously.

3.6 READING LITERACY FROM PARENTS

Parent factors that constitute essential aspects of the family process were considered, including reading involvement, socio-cultural backgrounds such as mother and father education, parent income, and parent job.

3.6.1 READING INVOLVEMENT

The role of parents plays a pivotal factor in the student's success in education and schooling. In the previous study by Pinantoan (2012), parents' role will be beneficial in many ways

not only at home but also at schools for the growth of the school community. National Teacher Parent Association (as cited in Hoke-Chandler, 2015) reveals that based on any other background of the families; parents' involvement gives a positive effect on student achievement. In more detail, students who are engaged with their parents' attention in their learning activities frequently, tend to have a higher score. Likewise, National Parent Teacher Association 2008 discussed by Cunningham et al. (2012) also stated that the more extensive parent involvement, the greater the student benefits.

According to Walberg (cited in Davis, 1992), family circumstances are closely related to the performance of students at school, which acknowledges students' positive behaviours. A child with a better level of engagement with their parents at home first shows a better attitude and a higher level of achievement. There is also evidence that students with the highest reading achievement have parents who spend time reading to them (Schlee et al., 2009). It was stated by Pinantoan (2012) that parents usually have a greater influence on time and availability factors during children's learning than teachers do. A parent is a primary educator at home, while teachers are the primary educators at school. There is no doubt that home education has a fundamental role to play in children's future development, but education in schools has become a formal education. Even so, both parents and teachers have a duty and responsibility to ensure that their children are learning. In educating students, schools are generally responsible for continuing the education that has been provided at home, and therefore, the success or failure of a student's learning is determined by the influence of his or her parents' home education on the student.

3.6.2 PARENT'S SOCIO-CULTURAL BACKGROUND

Regarding socio-cultural background, this review considers parent education (mother and father education), parent income, and parent job. Emphasising the strength of mother and father education in students' success in learning, Muraina & Ajayi (2011) provide evidence in their study that parents' level of education was the most influential factor in student achievement. The better-educated parents, the higher grade of student achievement. In the PISA questionnaire, parent education is classified into mother education and father education which are predicted to have the same impact on student reading literacy.

Parent Education

In addition to the internal students mentioned above, Jung & Han (2013) also believe several factors outside of students. Supporting factors such as a multidimensional conducive family and school environment also include family socio-cultural and economic conditions, school model, reading culture, learning strategies, and participation of the educational community before children enter school (Farrington et al., 2012). Examples of the above factors are disclosed by Jehangir et al., (2015b), who said that there is a close relationship between sociocultural and family economic factors and student success in reading on the 2018 PISA test. They found that there was the participation of mothers and fathers in literacy school and preschool children who are successful in the future, including the educational status of family members, and socio-cultural and economic status of the family which also has an impact on students' reading achievement in various reading test events, both school and world test events (Perry & McConney, 2010).

Parent Income

Some studies have recorded the importance of parent income to students' success at schools. Those investigations confirm the relationship between family background socioeconomics and school performance has shown a great deal of study. Generally, the variable of parent income is perceived by what type of occupation and educational level the parents have. Based on the study by Akukwe & Schroeders (2016), the family background taken by socioeconomic, cultural, and social factors can be the predictors of German students' achievement in biology. Socioeconomic is not significant when cultural factors are combined, however, it remains significant when the social factors are taken into account. Another research by Heymann & Earle (2000) that focus on low-income parents seeks whether some problems of inadequate pay parent face significantly to parental involvement. The outcome presents that poor parents tend to be difficulty in helping their children's needs. In more detail, parents living in poverty have less chance to involve with children at home. The existence of a parent's job is considered one factor in the quality of successful students.

Emphasising the importance of the occupation to student achievement, Ajayi & Muraina (2011) conduct a study on secondary school students in Nigeria. According to the study, there is a distinguished score between secondary school students whose parents work as farmers and in professional or managerial occupations. Farmers in Nigeria are classified as having low-income occupational status, while professional and managerial jobs are high-rank occupational statuses. The study provides evidence that the higher the rank status of the parents, the better grade of student achievement. The reason is that parents with high-rank occupational status might have

better income to support students with learning materials and no need to think about basic necessities than their counterparts in lower-ranking jobs such as farmers since they still prioritise providing food and shelter.

If it is related to the demands on how PISA measures students' Reading on exams, then reading performance, for the PISA test program, measures skills in understanding texts, using information, and reflecting on reading to answer questions before students develop their potential, and participate in the real world. Outside the test. PISA does measure the average score as a benchmark for evaluation measures (Fleischman et al., 2010). Meanwhile, reading skills assessed in PISA include evaluation of reading literacy developed by PISA on three characteristics of the text – including the entire reading text; process – students' cognitive abilities, how students are involved with the test material; and scenarios – students' abilities in the broad context of the ongoing Reading or text objectives (Spruyt et al., 2021). This is closely related to the commitment and effort of every state school for education and training so that students can succeed on PISA tests such as reading questions (Lusardi, 2015).

For this reason, there are findings related to the allocation of education funds per capita for each country so there is a significant correlation between the allocation of funds for schools, including reading programs, and students' PISA test results (Goldstein, 2004). In other words, countries that sacrifice less for school activities will have the lowest PISA results. On the other hand, countries that spend large amounts of money tend to get PISA achievements that make their country proud (Sjøberg, 2015).

3.7 READING STATES

Reading states are thought to have an impact on the prediction of reading literacy in this study. In this manner, schools, students, teachers, and parents are designed to go along with reading states namely reading strategies, reading confidence, and reading time.

3.7.1 READING STRATEGIES

Reading proficiency in the national language for Indonesian students is a mandatory skill following the institutional mandate that has been written down in the national education curriculum. So, mastering these skills is essential to enter the career world (Salikin et al., 2017). Efforts to improve reading skills have been regulated and measured since students entered school, an integral part of the school and college curriculum (Mappiasse & Sihes, 2014). However, very few schools and college graduates can adequately master reading skills. This skill is the most challenging part of reading well for students and those already working (Dardjito, 2019). Today, even school-level students are relied on to master complex reading texts and successfully answer high-level questions that require autonomous comprehensiveness with multiple sources of reading assistance. Therefore, schools through teachers must develop students' reading skills more comprehensively and productively. This is now a critical educational task, especially since the world has entered an era of competition in education and work (Khosiyono et al., 2021).

Thus, teaching must be innovated with the latest methods regularly, which is considered a solution to improve the achievement of test results and be ready to work by utilising academic skills, especially reading skills in both national and international languages (Sofo et al., 2012). The

essential thing of this study is to show the proper procedures related to more effective strategies to improve students' reading skills both when taking exams and competency tests such as PISA (Rutkowski, 2015). Therefore, schools hope for assistance with inappropriate strategies and methods to teach reading to their students to choose more exciting teaching methodologies. This is very reasonable that most of the methods so far have been inaccessible so many students cannot answer reading challenges. This is evidenced by many experiments revealing confusion when students take the PISA test (Fenanlampir et al., 2019). Students are overwhelmed with successful reading learning strategies, and the parties' commitment to Indonesian education stakeholders (Andrews, 2021).

Significant further studies in reading strategy to be successful in many tests are needed, especially for Indonesian children who struggle with foreign and national languages. Because a variety of innovative strategies and methods will bring innovation that will improve the skills of Indonesian students at the international level (Andrews, 2021; Debeer et al., 2014), evidence from the study of reading strategies suggests that "studying learning strategies" should be started at a young age so that their low achievers will rise later, including those who are bilingual, so that they are prepared to enter reading strategy guidance as early as possible so as not to fall behind (Santibañez & Fagioli, 2016). Furthermore, other findings believe that encouraging students' various strategies for reading well can make it easier for them to balance the entrance to a reliable intellectual future. However, the main problem that often confronts schools is the large gap for students in understanding various texts when entering international tests such as PISA and other reading olympiads (Zuckerman et al., 2013).

3.7.2 READING CONFIDENCE

Reading success cannot be separated from a reader's belief in reading fluently, which a reader uses when he faces reading tasks both in an academic context and when reading in everyday life (Monobe et al., 2017). Confidence in reading activity is part of the social cognitive attitude expressed when humans are supported by skills between behaviour, ability factors, and the environment in which they are located (Kleitman & Gibson, 2011). Therefore, the behaviour of reading with confidence is a mental or connection skill that occurs because of the talents they have. This is supported by Colenbrander et al. (2022), who believe that reading confidence can be developed early. In other words, reading self-confidence is an affective attitude that impacts reading skills and abilities marked by cognitive fluency and reading achievement both in academics and in the career world (Kettler, 2014).

Furthermore, reading Confidence is also one of the most important aspects of personality in students' lives (Tannir, Abir; Al-Hroub, 2008). Students who have high self-confidence in reading material are confident in their abilities and have expectations; even when expectations do not come true, they still think positively and accept them. Rogach et al. (2018) state that "trust is a positive expectation that another will not through words, action, or decision-act opportunistically." Students' Confidence in their studies will lead to success on exams because they still have positive thinking that other people will not act opportunistically through words, actions, or decisions. In addition, Geske et al., (2021) define that self-confidence in readers can overcome the risk of failure in the thoughtful way when they read with excellent fit and high enthusiasm and love for reading. It is also when they understand what they are reading and thinking

(Sumerfield, 2017). It is better when students do not have confidence in their reading. It could be because of low ability, or it could be that they only have high hopes for luck (Baker et al., 2010).

Theoretically, children's desire to read scientifically has been predicted to succeed in their studies. This is very true because reading Confidence and high motivation to read from elementary school and college are closely related to reading success (Guthrie et al., 2007). This also has an impact on the final achievement of education. This is because reading activities are the core work of academic assignments. This includes motivation and confidence in reading, which is also related to reading depth, number of readings, and reading enthusiasm, which also impacts reading ability (Tsou, 2011). In other words, the higher student's confidence in reading, the higher the sense of absorption and the ability to handle reading at a high level. For example, in final exams and exams such as the international PISA test, which is understood to have a relatively high level of challenge and the volume of reading material is relatively high and different from ordinary daily Reading (Hanushek et al., 2013).

Likewise, the other impact of educational support and social life on reading Confidence is very significant. For example, students who interact every day in an educational, and social environment and finally, their reading confidence will be higher. Automatically when he faces big tasks and challenges both in academic exams and other competitive events, this will effectively impact reading confidence and impact reading exams such as the PISA exam (Borgonovi & Pal, 2016). So, to strengthen reading confidence, the role of a learning environment such as a conducive classroom will undoubtedly impact individual students, which will increase their reading habits.

Therefore, the impact of all of that will undoubtedly be motivated by different reading motivations from one child to another. For example, when Indonesian has a less academic social environment, their motivation to face reading tasks and their confidence riding will be lower than the confidence rating of students who adapt and interact with the academic environment (Pekrun, 2021). Thus, an intellectual connection to reading comprehension and reading Confidence will automatically impact success when he faces challenges in various exams and selections at higher stages such as the PISA exam (Cheema & Skultety, 2017).

3.7.3 READING TIME

Field study evidence has confirmed that many factors influence student achievement in reading skills. One is the factor of wanting to read. In this section, the author will describe the results of a review of various scientific views and perspectives on how reading time affects students' reading achievement on the PISA exam. In general, the results of their study have convinced many educators and educational researchers that the time spent reading students at school will be very beneficial for classroom practice, and will significantly affect students' reading success (Grabe et al., 2019). The relatively little time spent in reading practice during reading class significantly affects the achievement of reading results. As a result, students cannot reap the benefits of their reading achievement both for exams and reading activities for non-grading (Collins et al., 2014). The correlation between the time spent practising reading, and the achievement of comprehensive Reading is very much related because reading success will undoubtedly impact the growth and development of students reading. This is a relatively strong

relationship between reading practice time and student achievement in reading (Lockwood et al., 2010).

When viewed from the average, wise students spend more time practising reading on a wide variety of readings and seeing reading activities as a pleasure endeavour will have more satisfying results in the realm of mixed reading literacy on the PISA exam. Then if asked how long it takes to read successfully, like at school and home? For the condition of students in Indonesia, they spend very little time on reading literacy exercises (Torppa et al., 2018). For example, it was found that only 6 per cent of their day was spent reading on average. Even though the correct portion is according to UNESCO recommendations, for example, between 4 to 6 hours a day if students want to be successful in reading both school and casual reading (Bybee & McCrae, 2011), to be able to achieve the goal of reading achievement, students should concentrate more on reading time, both for reading academic assignments and daily Reading. Unfortunately, students have to spend most of their time reading, but those readers are not trained in academically correct reading to get high marks (Duke, 2004). This perspective, according to Perfetti (2007), is that Reading has become the right reason and has been proven to improve students' abilities ranging from increasing vocabulary to training children to be good at reading comprehension and enabling them to become more successful individuals (Torppa et al., 2018). Other studies, such as Schlee et al. (2009), showed that reading texts such as books or magazines can enrich new vocabulary by up to 75%.

Seeing the reality in Indonesia, students should spend quite a long time reading any book to increase Confidence in their reading skills (Nugrahanto & Zuchdi, 2019). However, Jehangir et

al. (2015) proved that most students did not spend enough time reading school material or other Reading. According to Anandari & Iswandari (2019), students should spend about 15 minutes or 0.5 hours reading a day after school. Baker et al. (2004) even said that 85% of teachers expect their students to read every day. However, most students only read for less than 15 minutes (Akbaşlı et al., 2016). Likewise, the length of time students uses on reading activities in class, but they do not even increase their reading time to 30 minutes to sharpen their understanding of reading material in both school exams and other texts (Arıkan et al., 2018).

3.8 SUMMARY

Research indicates that a person's reading literacy depends on a variety of background characteristics. The PISA program has systematically gathered information about how students, parents, teachers, and schools all play a role in how reading literacy is measured among adolescents. According to the literature reviews above, schools, students, teachers, and parents have influenced reading literacy in PISA. Student factors include gender, home facilities, and reading activities. Teacher factors are measured by professional activities, lesson activities, and online activities. Additionally, parent factors are based on reading involvement, parent socio-cultural background including mother and father education, parent income, and parent job.

It has been shown that school factors play an important role in supporting student literacy in reading. The factors are based on school sectors, school facilities, resources and technology, assessment, and school management. The school sectors in Indonesia are divided into two types of namely public schools (by the government) and private schools (by non-government)

coordinated by MoECRT and MoRA. School facilities provide ICT at school, resources and technology, and school funding. All three elements of school facilities contribute to student achievement in reading. The assessment, even though some studies indicate that Indonesian test results have declined as a result of poor assessments by schools, the assessment still contributes as a determining factor for student achievement in reading. School management, focusing on leadership and school climate, is in alignment with the increase in student reading literacy as the more effective the school management, the higher the student achievement.

It is believed that student factors such as individual characteristics, gender, home facilities, and reading activity affect reading literacy. Gender differences can produce a gap in student achievement in reading text. In terms of home facilities including books and educational materials, there is a tendency for students to benefit from having more books and teaching tools available at home as their learning improves after access to more resources. In the study, some reading activities contributed to reading literacy, including reading engagement, reading diversity, and online reading. As students engage in more reading activities, they are shown to perform better at reading tasks.

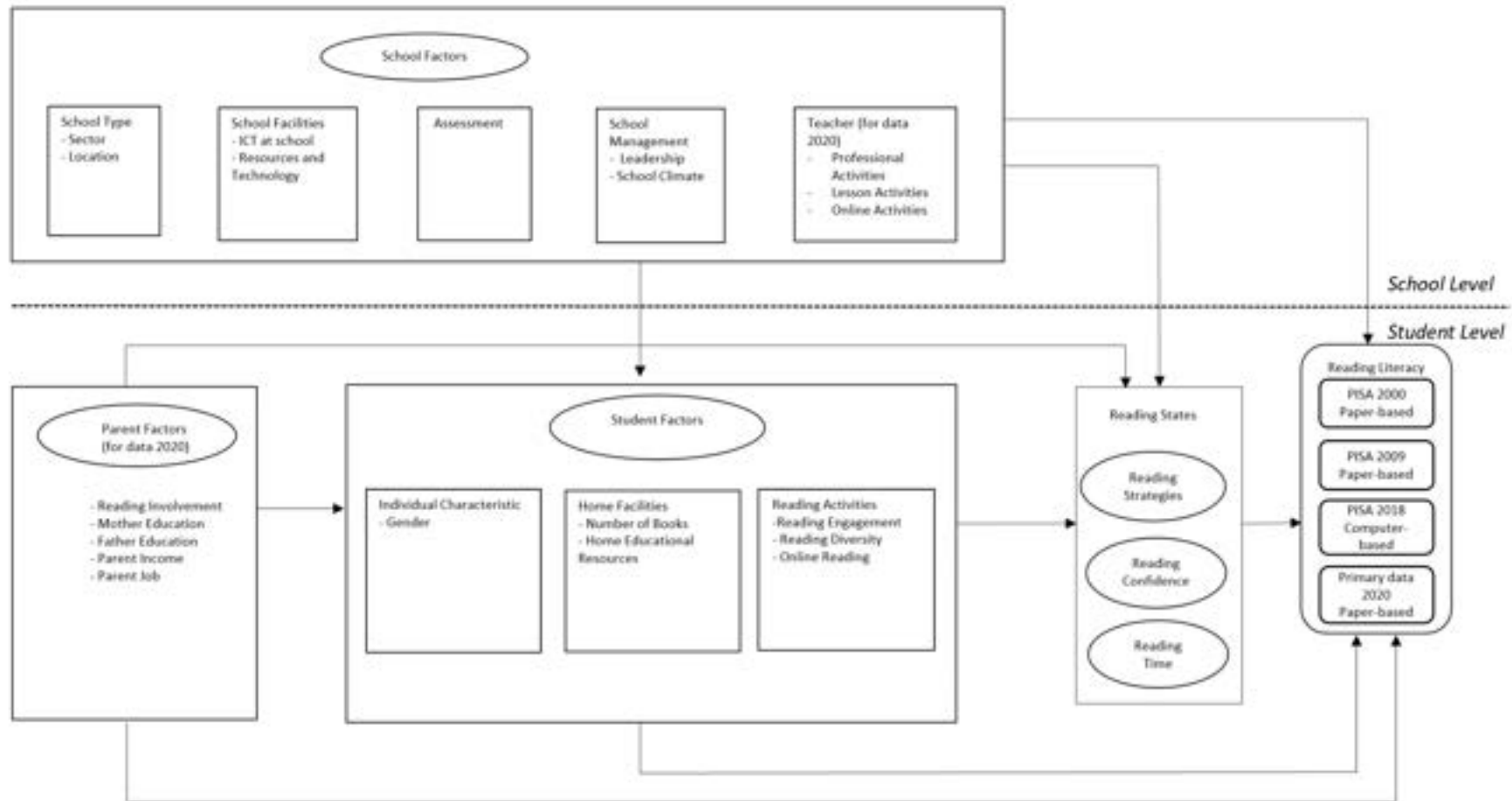
The teacher factors are professional activities and reading for work. As the digital era continues to develop, professional activities are the greatest challenge facing teachers today. Research shows that teachers who lack knowledge of high-quality performance will not be able to help students who struggle to read proficiently. This also applies to teacher reading for work, because of a teacher reading more often as part of their work, students are more likely to succeed.

Various factors pertaining to the parent were examined, including reading involvement and social-cultural backgrounds such as the mother's and father's education levels, income levels, and parent job. Parental involvement has a positive effect on students to a greater extent. Also, the greater the degree of parent education, the greater the benefits for the students. Likewise, the high outcome of the parents indicates less difficulty in assisting with their children's educational needs. Additionally, the presence of a parent's job is considered a factor in the quality of a successful student.

Schools, students, teachers, and parents are designed to go along with the reading states that include reading strategies, reading confidence, and reading time. The four factors and the reading states are intertwined with each other to have increasing reading literacy. Accordingly, in this study, reading states are assumed to have an impact on predicting reading literacy. Also at the same time, within this relationship pattern, reading states are assumed to have the effect of mediating factors between schools, students, teachers, and parents. All the factors mentioned in this study are presented in the framework below (see Figure 3.1).

Figure 3.1

Conceptual framework of the study exploring the predictors of reading literacy in Indonesia



Chapter 4

Research Methodology

4.1. INTRODUCTION

In this chapter, the research methodology includes research design, general methodological considerations, data collection, data organisation including how the instruments are gathered from the PISA Data in each cycle and data analysis. This study utilises quantitative strategies and a correlational approach by analysing secondary data (PISA Data 2000, 2009, and 2018) and primary data. Detailed descriptions of each section will be presented, followed by a discussion of the limitations of the study.

Reading achievement in Indonesia has generally declined since 2000 when it first participated in PISA. In Indonesia, reading is not a specific subject in a school curriculum, but rather is an essential skill integrated with a number of other subjects such as Bahasa Indonesia, English, Social Sciences, Natural Sciences, and Mathematics, there is a domain in PISA Test. Besides the cognitive tests, PISA also collected additional information related to schools', teachers', parents', and students' characteristics and perceptions that are related to student's cognitive ability. Therefore, the main research topics in this field are reading literacy and the factors associated with reading ability.

The main focus of this study was to explore the predictors of Indonesian reading literacy based on PISA data (in 2000, 2009, and 2018) and the survey in 2020 and to compare the patterns of relationships between paper-based and computer-based performance. In this study, a quantitative method was used based on the research problems addressed in general that fell within the domain of factors of reading achievement based on PISA data. This approach is used

to confirm the validity and reliability of the constructs included in this study and to examine the relationships that exist among those constructs (Creswell & Creswell, 2018).

Primary data and secondary data were collected for this study. The study used secondary data from PISA, as well as primary data collected in 2020 concerning the reading questionnaire and cognitive test. Secondary data from PISA 2000, 2009, and 2018 student and school questionnaires were used to examine how schools and students interrelate, which might affect student achievement. The study also used primary data collected in 2020 in a follow-up study with questionnaires adopted from PISA 2018 as the latest test. Hence, in the primary data, the data sets are similar to those in 2018. However, there are additional PISA questionnaires for teachers and parents in the 2020 follow-up data (see Chapter 3). This primary data made it possible to examine the interrelationships among students', schools', teachers', and parents' related factors that might impact student achievement. With all of the data, the study investigated the differences in a relationship (in that multiyear) between based-text reading and computer-based reading and their impacts change over time from 2000 to 2020. Before collecting the primary data, ethics approval was granted by the ethics committee and consent was sought by asking principals, teachers, and parents for consent since students as participants were under the age of 18. Primary data collection was conducted by using the PISA test 2018 which teacher and parent responses were included. Since there was no data on teachers and parents in previous PISA data, this primary data collection aimed to gather new information that could have an impact on students' attitudes towards reading activities. Primary data collection was conducted in 11 junior high schools in Yogyakarta city, Indonesia.

Data organisations discussed several factors that may affect students' reading literacy in Indonesia and general methodological considerations. These factors were based on PISA Data 2000, 2009, and 2018 and most of which had been proposed in the recent associated

literature, were classified into two groups namely: school-level factors and student-level factors.

Two additional factors namely the teacher and parent factor were only added to the student level in Data 2020 since Indonesian teachers and parents have not participated in PISA Test.

The factors in each category are as follows:

1. School Factors (school-level)
 - a. School Sector
 - b. School Facilities: ICT at school and resources and technology
 - c. Assessment
 - d. School Management: leadership and school climate
2. Student Factors (student-level)
 - a. Individual characteristics (gender)
 - b. Home Facilities: number of books and home educational resources
 - c. Reading Activities: reading engagement, reading diversity, and online reading
 - d. Reading States: reading strategies, reading confidence, and reading time
3. Parent Factors - for follow-up data 2020 (student-level)
 - a. Reading Involvement
 - b. Mother education
 - c. Father education
 - d. Parent income
 - e. Parent job
4. Teacher Factors – for follow-up data 2020
 - a. Professional activities
 - b. Lesson Activities
 - c. Online Activities

Data analysis described statistical procedures employed in the study. These statistical procedures include the ones used to validate the instruments included in this study as well as those used to model the relationships that exist within and between the scales or factors measured by the instruments. Confirmatory Factor Analysis (CFA) and Rasch Modelling are used during the validation and scoring processes. While Structural Equation Modelling (SEM), and Hierarchical Linear Modelling (HLM) are used to examine the associations between the factors and reading literacy.

This study investigates the factors at the student, teacher, and school levels, their interrelationships and their impacts on students' reading literacy performance based on PISA

data in 2000, 2009, 2018, and follow-up 2020. To obtain accurate estimates for the subsequent analyses, it is necessary to specify the instrument used to measure each construct. Likewise, to ensure the current study contributes to the existing literature and the PISA Technical Report in each cycle incorporates all the aspects of predictors of reading literacy. It is then in particular regarding the need to repeatedly investigate the same variables over time.

4.2. RESEARCH DESIGN

This study adopted purely quantitative strategies and a correlational approach by analysing secondary data (PISA Data 2000, 2009, and 2018) and primary data (follow-up data 2020). A quantitative approach is generally used to relate existing theories that predict relationships among variables using specific research instruments (Creswell, 2014). Bryman (2018) describes a quantitative method as a collection of numerical data, as well as a view of theory and research as deductive and a preference for a natural science approach and an objectivist interpretation of social reality. The numerical data are derived from the compilation of questionnaires from PISA and the follow-up 2020 data. These questionnaires were used to obtain a description of the trends within a population by examining a sample of the population (Creswell, 2012).

A correlational study, whereas, is a study that aims to explore relationships among variables (Gall and Borg, 2007). In a correlational study, there are predictors and criterions variables. As the predictor variable is used to forecast the criterion or outcome variable, the criterion or outcome variable is the variable predicted by the predictor variable (Creswell, 2012). The predictor variables of the current study are at the student level and school level for 2000, 2009, and 2018 datasets. Student-level factors are gender, number of books, home educational resources, reading engagement, reading diversity, and online reading. In addition

to the student level for the 2020 follow-up data, there are parent reading involvement, mother education, father education, and parent income. The reason why these variables were selected is related to the nature of the current study and the characteristics of the students. School-related factors are sector, ICT at school, resources and technology, assessment, leadership, and school climate. For the 2020 follow-up data, teacher-level factors are added, which include teachers' professional activities, lesson activities, and online activities. The same as the factors at the student level, the reason for the choice of these factors was related to the nature of many school components of the reading material. The criterion variable of this study is reading literacy score in PISA 2000, 2009, and 2018 also the follow-up 2020 datasets.

The main focus of this study was to explore the student, parent, and school factors and reading states (reading attitudes, reading strategies, and reading confidence) and their relationships and impacts on student reading literacy in Indonesia based on PISA 2000, 2009, 2018 and follow up study conducted in 2020. To test the construct validity of all variables in the instruments, Confirmatory Factor Analysis (CFA) was employed. A correlational research design is used in data analysis to find out the degree of association between two or more variables of scores (Creswell, 2012). In this study, an elaborated correlational study was applied to determine the relationship among variables found in Structural Equation Model (SEM) and Hierarchical Linear Model (HLM). SEM was used to investigate the influential factors in reading literacy and the relationship among factors. HLM was used to analyse the impacts of contexts on the student (individual), parents, and schools.

4.3 GENERAL METHODOLOGICAL CONSIDERATIONS

To ensure that the most appropriate techniques are utilised when analysing the data for this study, a few general methodologies issues must be considered. The techniques include

statistical procedures assisted by statistical software that was created purposely for each procedure to explore the predictors of Indonesian reading literacy based on PISA Data (in 2000, 2009, and 2018) and the survey in 2020. The general methodologies issues that must be considered prior to selecting the appropriate analyses for the purpose of this study include data preparation, missing values, dummy coding, the notion of causality, and the level of analysis.

4.3.1 PISA DATA PREPARATION

Preparation of the PISA database requires several procedures to ensure the quality of the data. The PISA database contains the full set of responses from individual students, school principals, teachers, and parents. Some stages to be considered prior to use PISA Data include generating data on the PISA website, merging the PISA data files, using sampling weights, using plausible values, and creating SAS (Statistical Analysis System) or SPSS (Statistical Package for the Social Science) syntax.

The first step in preparing the PISA dataset is generating purposively data files on the PISA website (<https://www.oecd.org>). The files available on the website include questionnaires, data files in ASCII format, codebooks, compendia and SAS and SPSS data files. For PISA 2000 and 2009, all data files are in text format and SAS or SPSS syntax files are downloadable. It is recommended that before starting the analysis, saving and running the PISA data files and SAS or SPSS in year-specific folders are important. However, for PISA data 2018, data files are available in SAS for SPSS format that can be downloaded directly from the website. The main PISA data files are students, schools, and cognitive test datasets, while additional datasets such as parent and teacher datasets are offered on particular years. In general, there are no data on either the parents or the teachers in 2000, only on the parents in 2009, and both on the parents and the teachers in 2018. However, since these additional datasets are offered to be

selected by each participant country, not all of them opt to use them, including Indonesia. Thus, there are no data on Indonesian parents and teachers since the beginning of joining the PISA Test in 2000.

The student data files contain responses to the questionnaires such as responses for each student, plausible values for the cognitive domains, scores on questionnaire indices, weights and replicate weights. School data files consist of information provided by the principals of participating schools through the school questionnaire. Teacher questionnaires are collected and stored in the teacher data files, whereas parent questionnaires are stored in the parental data file. There are two types of cognitive item response data files. The coded cognitive item response data file includes coded responses (full credit, partial credit, and non-credit), while the scored cognitive item response data file contains score values instead of categories (in which non-credit is scored 0, and full credit is usually scored 1). In PISA 2018, the cognitive test became computer-based instead of paper-based in PISA 2000 and 2009. Hence, the data contain additional information regarding students' test-taking behaviours. This includes the number of raw responses, the amount of time students spent on the test, as well as the number of steps students took before giving their final responses.

Merging the data is the second step in preparing PISA data files before the analysis process. It is necessary to merge the PISA data files to perform specific analyses effectively, especially for creating school-level estimation. Before merging the data files, it is important to select and store PISA data based on the country used in this recent study. As the current study uses data from Indonesia, these data were selected according to the 3-character code of the country, which in this case is denoted by 360. Once data is stored based on the country, the following step is merging student and school files. There are slight differences in the names of the variables in the PISA test in every cycle:

- In PISA Data 2000, to merge the student data file with the school data file, use the school code 5-character which variable name is SCHOOLID and the student identity code 5-character which variable name is STIDSTD.
- In PISA Data 2009, to merge the student data file with the school data file, use the school code 5-character which variable name is SCHOOLID and the student identity code 5-character which variable name is StIDStd.
- In PISA Data 2018, to merge the student data file with the school data file, use the school code 8-character which variable name is CNTSCHID and the student identity code 8-character which variable name is CNTSTUDID.

The next step of preparing PISA data files is using replicate weights and plausible values (PV). Because PISA collects data from a sample instead of a population of 15-year-old students, the sample has been drawn to avoid bias in the selection of the procedure. Statistical analysis of a sample provides an estimate of the true parameter of the population. Completing the standard error of the sample statistic determines how closely the sample statistic matches the true statistic for the entire population. The replicate estimates are then compared with the whole sample estimate to estimate the sampling variance. In PISA, 80 replicated samples are computed, and for all of them, a set of weights are computed as well. In practice, the replicate weights in which PISA data denoted by w_fstr1 to w_fstr80 in PISA data 2000 and 2009 cycle and W_FSTURWT1 to W_FSTURWT80 in PISA 2018. That standard error then is calculated as the square root of the difference between the original sample estimate and the replicated sample estimate.

Generally, plausible values (PV) are used to infer the ability of an individual based on their performance at an assessment. Multiple imputations are used to generate plausible values

based on the student's answers to the subset of test questions assigned to them randomly and their answers to the background questionnaires. According to <https://www.oecd.org>, in the context of data analysis, PV has important implications: (a) it corresponds to distinct draws in the distribution of student abilities, therefore, to conduct an accurate analysis, all statistics from one PV cycle must be averaged; (b) PV should not be averaged at student-level, hence, ensuring the computation of PV accurately is important.

The final stage of preparing PISA Data is creating SAS or SPSS syntax through software provided by International Association for the Evaluation of Educational Achievement - Data Processing and Research Center (IEA-DPC) namely IDB Analyzer. The software is a Windows-based program that is capable of generating SAS code or SPSS syntax for use in PISA data analysis.

4.3.2 MISSING VALUES

An estimate of missing data should be performed once the data files have been downloaded from the PISA website. In surveys based on educational research, missing data are common, and how these data are handled can significantly influence the results of analyses based on such data (Cheema, 2014). The concept of missing values is crucial to the successful management of data. When missing values are not dealt with correctly, the study may end with inaccurate inferences about the data. Consequently, the results obtained will differ from those in which missing values are present. In the case of nonresponses to certain questions, the respondent is unable to respond, and the reasons for the missing data are varied such as due to the absence of participants or lack of knowledge (Tanguma, 2000). The lack of a response would be considered missing data.

PISA contains two categories of variables: the collected variables (directly collected from students and schools) and the derived variables (calculated by combining the collected variables), but the computation process in the current study only considers the collected ones.

Based on <https://www.oecd.org>, in PISA data, the data includes several categories : (a) missing or blank, which indicates the respondent has not answered the question by the survey design or finished the task early without viewing the question; (b) No response/omit, implies that The respondent was allowed to answer the question, but did not do so; (c) Invalid, indicates the respondent might answer more than one choice; (d) Not applicable, implies that a printing problem or a torn booklet prevented the determination of the response; (e) Not reached, used in the cognitive test, indicates that there may have been a time constraint and the student did not complete the item in question; and (f) Valid skip, shows that the question could not be answered because the respondent was instructed to skip it in response to another question.

4.3.3 DUMMY CODING

School sectors represented categorical-level independent variables, which have severely limited use in data analysis. This is often the case with categorical variables that use Likert scale types, a rating system used in survey questionnaires to measure attitudes, opinions, or perceptions. Field (2013, p.419) mentions that these “cannot be distinguished using a single variable coded with zeros and ones but must be represented groups using zeros and ones”. Therefore, dummy coding was used. The dummy variable was used in a statistical technique that replaces nominal-level independent variables with new codes, so it ran like regression analysis. Otherwise, statistical methods could not calculate those original categorical-level variables due to differences in the type of variables. The Likert scale type needed to be converted into dichotomous variables (0 and 1). First, select one of the categories to which we

can compare to others later. Secondly, the variables must be separated into several categories before recoding them. Lastly, a dummy variable was created to represent each of the other categories. While a category was coded, the others were coded 0. Using the dummy variable, we were able to estimate the differences between schools. In addition, it was beneficial to investigate how the school factors (level-2) affected the other independent variables. Thus, dummy variables were not run in level-1 for nominal or categorical variables (Goldstein, 1999 as cited in Ben, 2010; Hardy, 2012).

4.3.4 LEVEL OF ANALYSIS

Data collected in this study consist of only school-level and student-level data for PISA 2000, 2009, and 2018. However, in the 2020 follow-up study, additional teacher-level data were also collected. Therefore, the data collected in the 2020 follow-up study are at three different levels, school, teacher, and student levels. These data are hierarchical in nature with the individual students nested within the schools. For 2020 data, the students are nested within classrooms, and classrooms are nested within schools. The model of student reading literacy achievement as a result is influenced by certain variables at the student, teacher, and school levels. Nevertheless, combining two or three levels of data into one dataset could create some problems and bias (Raudenbush & Bryk, 2002). It is then important to consider the level of analysis. Typically, two methods are commonly used to deal with the issue of difference in the levels, namely aggregation and disaggregation of data.

4.4 DATA COLLECTION

Two methods for data collection were used in this study. Data were collected through (a) secondary data that had been provided by the OECD as the provider of the PISA test and (b) primary data by survey using the PISA instrument in 2018. There were four kinds of

questionnaires employed in the survey: (a) principal questionnaire represented as school data, (b) student questionnaire, (c) teacher questionnaire, and (d) parent questionnaire. All questionnaires had been developed using existing instruments to measure the factors examined in this study. For secondary data collection, the PISA test provided data for Indonesian schools and students. Teacher and parent data was collected in the survey as primary data collection in 2020. In all datasets, test items are formed as a mixture of multiple-choice questions and questions required to be constructed by participants.

4.4.1 ETHICS APPROVAL

Before collecting primary data, it was necessary to seek ethics approval from the Human Research and Ethics Committee (HREC) of the University of Adelaide. Subsequently, approval from the Technical Service Unit, Department of Education, Youth, and Sports in Yogyakarta city was sought. It also provided the process of applying PISA Data and data collection in selected 11 (eleven) high schools in Yogyakarta area. The study consists of several constructs that were presented in the operationalisation and instrumentation section. In addition to ethics approval and participation approval, the study requires considerable paperwork to inform all relevant educational authorities about the rationale and methodology involved in the study. Furthermore, as part of gaining ethics approval, it was also required that informed consent be obtained from each participant in the study and that the confidentiality of the research is maintained. For participants under 18 years old, their parent's or guardians' consent was obtained as well.

The HREC granted permission for this study to proceed on the 13th of December 2019 (project number H-2019-249). The approval from the Technical Service Unit, Department of Education, Youth, and Sports was obtained on 23 January 2020 (approval number

B/1723/UN34.11/PT.01.04/2019). Once the ethics and a permission letter were approved, the researcher gave the information regarding the proposed research to the respondents in a form of a participant information sheet, asked for their availability to participate), and asked their preference for confidentiality through the signatory of a consent form before data collection. Among the conditions for the approval of this study, the school authorities asked for a report on the results of the data analysis.

4.4.2 SECONDARY DATA

This study aimed to investigate the influential predictors of reading achievement based on PISA Data in Indonesia that focuses on reading tests every nine years from the period of 2000 until 2018. Therefore, all data in this study came from the PISA for Indonesia in three periods (2000, 2015, and 2018) conducted by the OECD. The participants of this study were 15-year-old students who were nearing the end of their compulsory education and who participated in PISA studies from various sectors of schools. Drawing upon background considerations, factors were divided into two levels: students and schools. In more detail, the school level consists of school sectors (government/public schools and nongovernment schools (private and religious schools) and other school sectors differentiated by areas namely: villages, small town, town, city, city center, and elsewhere categories. While student level was classified by parent factors (reading involvement, mother's education, father's education, parents' income, and parent's job), and individual factors: individual characteristic (gender), home facilities (number of books and ICT at home), and reading activities (reading perception, reading engagement, reading outside school, past reading, and reading for education career).

Secondary data referred to data that was collected by someone else for some other purpose that can be re-analysed to address the new research questions with different and better

statistical techniques than the original data; Glass 1976 in (Secondary data analysis : an introduction, 1984)(Church, 2002) explains some considerations related to using secondary data analysis such as flexibility in designing a further experiment that fit the research questions under investigation without identifying a problem in the first. This study that found that using PISA as secondary data would improve with direct knowledge of PISA data reported, without planning new methods to evaluate research questions. In addition, the good reason for using secondary data was that there was no data collection, so it will save time and budget (Koziol & Arthur, n.d.).

This study was a descriptive study and correlational approach in which the PISA 2000, 2009, and 2018 tests were conducted with the participation of the 15-year-old age group. All students in the 15-year-old age group studying in the 9th and 10th grades are the universe. As seen in Table 4.1, 7368 students from 290 schools participated in PISA 2000, 5136 students from 183 participated in PISA 2009, and 12098 students from 399 schools participated in PISA 2018 in Indonesia (OECD). All participants were girls and boys who are students from public and private schools in Indonesia. These participants were selected for voluntary and anonymous random sampling during data collection. The two-stratified sampling method was used to select the random sample in all years taking geographic regions and school types. Hence, they are called representative samples.

Table 4.1

The number of samples in PISA 2000, 2009, and 2018

Year	Total Student	Total School
2000	7368	290
2009	5136	183
2018	12098	397

4.4.3 PRIMARY DATA AS A FOLLOW-UP STUDY

A survey using PISA questionnaires was conducted in 2020 as a follow-up study and required primary data gathering. Questionnaires have been translated into Bahasa Indonesia by Pusat Kurikulum (Curriculum Center) under the Ministry of Education and Culture and answers to questions by students have been translated by English teachers in each school. Data collection concerns the factor affecting reading literacy based on schools, parents, and students, so some samples were applied to survey principals, teachers, parents, and students. The primary data collection is conducted in the city of Yogyakarta, located in the centre of Java, Indonesia. The city consists of 14 districts, with 17 public junior high schools and 49 private junior high schools, 26 public senior high schools and 66 private senior high schools. In this study, special-need schools that do not use the standard curriculum, are excluded. Figure 4.1 the highlighted red regions represent the city of Yogyakarta.

Figure 4.1

Location map of the primary data collection as 2020 follow-up data in this study



The participants were invited to give responses to the questionnaire. In this case, the sample is located at 11 secondary schools in Yogyakarta city, Indonesia. Known as an "Education City" with more than a hundred higher education institutions, Yogyakarta was purportedly chosen as the subject. These particular groups were selected based on the purposive sampling technique. Purposive sampling is one the types of non-probability sampling in which the samples are collected with their purpose in a process that does not give any chances of the probability of the element or group of elements being selected in the sample (Vehovar et al., 2016). The group of schools was noticed as a secondary school that was randomly selected as participants of the PISA Test in 2018. Of each group of schools, there were randomly selected 1 principal, 3 teachers, 50 students and 50 parents as respondents so the total should be 11 principals, 33 teachers, 550 students, and 550 parents. During data collection, several attempts have been made to get 550 students and parents as participants. However, a technical problem such as the inability to fill out the form made the number of participants decrease to 534. The details are shown in Table 4.2.

The age of the students was 15 years old. Teachers' age range was 25-65 years old. School principals' age range will be 25-70 years old. Parents' age will be 35-70 years old. In collecting these primary data, the participants used the questionnaires and assessments developed by PISA 2018 as the latest PISA. All PISA questionnaires and the questionnaire protocol in Indonesia were conducted in *Bahasa Indonesia*.

Table 4.2

Sample sizes for the 2020 follow-up study

No.	School	Principals	Teachers	Parents	Students
1.	Public Junior High School A	1	3	48	48
2.	Public Junior High School B	1	3	48	48
3.	Public Junior High School C	1	3	49	49
4.	Private Junior High School A	1	3	50	50
5.	Private Junior High School B	1	3	47	47
6.	Private Junior High School C	1	3	50	50
7.	Public Senior High School A	1	3	48	48
8.	Public Senior High School B	1	3	45	45
9.	Private Senior High School A	1	3	50	50
10.	Private Senior High School B	1	3	49	49
11.	Private Senior High School C	1	3	50	50
	Total	11	33	534	534

4.5 DATA ORGANISATION

Data organisation explores how the instruments are gathered from the PISA Data in each cycle. All questionnaires and diagnostic tests were authorised and organised by the Organisation for Economic Cooperation and Development (OECD). All items had been standardised by the OECD but some were removed by the researcher as they were not in line with the study purposes. The questionnaires provided by PISA used in this study were designed to determine what factors influence and impact students' reading literacy based on PISA 2000, 2009, and 2018. It was also used to investigate the different relationships (in those periods) between text-based and computer-based over time from 2000 to 2018. All items and variables were carefully selected from the available literature which was appropriate for this study. From PISA Data 2000, 2009, and 2018, there were two types of questionnaires, including school and student. Meanwhile, there were four types of questionnaires from the data collected for 2020: school, student, teacher, and parent.

The term 'variable' refers to the manifest variable, while the terms 'scale' and 'construct' are interchangeable concerning the latent variable. The first type of instrument used in this study is a questionnaire administered to schools. It was structured into the school sector, school facilities (ICT at school, resources and technology, and school funding), assessment, and school management (leadership and school climate). The second type of instrument employed in this study includes student questionnaires for data from 2000, 2009, and 2018 and additional instruments for teachers and parents for data in 2020.

4.5.1 SCHOOL FACTOR

The PISA data on schools was provided by the principals. In the study, the variables of school factors included the school sector; school facilities, such as ICT at school, resources and technology, and school fund; assessment; and school management, such as leadership and school climate.

School sector

The variable of the school sector gives the type of school that is based on its management, namely public and private schools. The school sector in this study consists of two variables namely [sector] and [location]. A public school refers to a school managed directly or indirectly by a public education authority, government agency, or governing board appointed by the government or elected by the public franchise. Whereas a private school is a school managed directly or indirectly by a non-government organisation, for example, a church, trade union, business, or other private institutions.

Additionally, the second variable of the school sector is school location that describes the community in which the school is located. The variable [sector] in each cycle has the same label and values in which 1 is for public and 2 is for private. However, [location] has different

values, especially when comparing PISA 2000 with 6 categories to PISA 2009, 2018 and follow-up 2020, all of which have the same five categories. The values are: 1 is for a village, hamlet, or rural area or fewer than 3,000 people, 2 is for a small town or 3,000 to about 15,000 people, 3 is for a town or 100,000 to about 1,000,000 people, 5 is for close to the centre of a city with over 1,000,000 people, and 6 is for elsewhere in a city with over 1,000,000 people. Basically category 6 in PISA 2000 is then combined into category 5 in later cycles.

School Facilities: ICT at School and Resources and Technology

a. ICT at School

There are different questions concerning ICT at schools [ict] in each cycle of PISA. In PISA 2000, the goal of the set of questions is to gather information about the number of computers in the school for different purposes. Within PISA 2009, the following set of three questions is intended to collect data regarding the ratio of students to computers. Then in PISA 2018, which is the same as follow-up data in 2020, the set of questions is to gather information on the school's capacity to enhance learning and teaching using digital devices.

b. Resources and Technology

These resources and technology [tech] include the quality of schools' educational resources and physical infrastructure. School principals were asked to report how shortage of equipment in the school was hindering their school's capability [tech] based on the categories 'not at all', 'very little', 'to some extent' and 'a lot'. Three questions of [tech] have been selected, including instructional materials, computers for instruction and instructional materials in the library, since these questions also appeared in PISA 2000 and 2009. Nonetheless, in

PISA 2018, there is only one question that is the same, namely the capacity of instruction to be hindered by the materials available.

Assessment

A questionnaire was sent to the principals asking them to indicate whether or not the 15-year-old students' assessments are used for various purposes. The variable of assessment [asment] in each PISA cycle consists of six identical questions as follows: 1) informing parents about progress; 2) making decisions about students' retention or promotion; 3) grouping students for instructional purposes; 4) comparing with the district or national performance; 5) monitoring the school's yearly progress; and 6) judging teachers' effectiveness.

As in PISA 2009, PISA 2018 also includes two additional questions to measure the following purposes: 7) identifying aspects of the instruction or the curriculum, and 8) comparing the school with other schools. In addition, three more new questions were introduced in PISA 2018 to guide students' learning, adapt teaching to the student's needs and awarding certificates to students. The index used for assessments was calculated as the sum of 'Yes' and 'No' responses to these items.

School Management

a. Leadership

The school leadership concept was included for the first time in PISA 2009, The leadership variable [lead] provides information on the active participation of the principal in school affairs. In PISA 2009, the scale is based on fourteen items and its response categories vary from 'never', 'seldom', 'quite often', and 'very often'. Greater scores on this index indicate greater involvement of school leadership in school activities. However, the ten

leadership questions in PISA 2018 differ significantly from those in PISA 2009. There was also a difference in the responses which ranged from 'Yes, this is mandatory', 'Yes, based on school initiatives', and 'No'.

b. School Climate

PISA estimates the school climate [climate] based on principals' perceptions of teacher- and student-related factors that are detrimental to the school's climate. This index is derived from 15-year-olds' opinions regarding what hinders them in their learning when they are in school. The [TEACBEHA] represents the item parameter estimates for the principal's perceptions of teacher-related factors and [STUDBEHA] represents the principal's perceptions of student-related factors. Four categories of response on a four-point scale namely 'not at all', 'very little', 'to some extent' and 'a lot was used', and the responses were inverted before scaling.

Scale scores are standardised Warm estimates. For [TEACBEHA], positive responses mean that the perception of teacher-related factors does not hinder the learning of 15-year-olds, whereas negative responses indicate schools where it is perceived that teacher-related factors hinder the learning of 15-year-olds. For [STUDBEHA], positive values imply that student-related factors do not hinder the learning of 15-year-olds, whereas negative values show schools in which there is a perception that student-related factors hinder the learning of 15-year-olds.

4.5.2 STUDENT FACTORS

Individual Characteristic

There are some basic demographics in the PISA questionnaires such as date of birth, grade at school, gender, family structure, and a number of siblings. However, the individual characteristic variables used in this study is gender [gender]. The [gender] include the number of 15-year-old females with code 1 and male with code 2.

Home Facilities: Number of Books and Home Educational Resources

Among students' reading activities, information concerning the number of books at home [books] and home educational resources [hedres] has received much attention as an indicator of family wealth.

a. Number of Books

Students reported the availability of books at home [books] which does not include magazines, newspapers, or schoolbooks varying from no books to more than 500 books. PISA 2000 has seven categories of responses, as opposed to other cycles (PISA 2009 and 2018) which have six (see Table 4.3).

Table 4.3

The variable of the number of books in each PISA cycle [books]

Year	Label	Responses
PISA 2000	Q37 (ST37Q01) How many books are there in your home?	1 = None 2 = 1 – 10 books 3 = 11 – 50 books 4 = 51 – 100 books 5 = 102 – 250 books 6 = 251 – 500 books 7 = more than 500 books
PISA 2009	Q22 – [ST22Q01]	1 = 0 – 10 books 2 = 11 – 25 books

	How many books are there in your home?	3 = 26 – 100 books 4 = 101 – 200 books 5 = 201 – 500 books 6 = more than 500 books
PISA 2018 and follow-up 2020	[ST013Q01] How many books are there in your home?	1 = 0 – 10 books 2 = 11 – 25 books 3 = 26 – 100 books 4 = 101 – 200 books 5 = 201 – 500 books 6 = more than 500 books

b. Home Educational Resources

The index of home educational resources [hedres] is based on the items measuring the existence of educational resources at home. In PISA 2000, 2009, 2018 and follow-up 2020 students have reported on the availability of household items [hedres] at their home such as dictionary, study place, desk, textbook, and software. Additionally, the questionnaire in PISA 2009 and 2018 added items namely technical reference books and computers. The value responses (1= Yes, 2= No) were reverse coded so that a higher level indicates the presence of the indicator.

Reading Activities: Reading Engagement, Reading Diversity, and Online Reading

A total of four indicators related to individual reading-related activities of the students were also included in the Student Questionnaire. There are reading engagement [engread], reading diversity [divread], and reading from online sources [online].

a. Reading Engagement

PISA's index of reading engagement [engread] was determined by students' level of agreement (OECD, 2000). The WLE scores of [engread] have been equated so that they can be

compared directly with those reported in previous PISA assessments. There are four response categories ranging from ‘Strongly disagree’, ‘Disagree’, ‘Agree’, to ‘Strongly Disagree’. Some items are positively and negatively worded. Items that are negatively worded were reverse scored a higher score on this derived variable indicates higher levels of enjoyment of reading. It is believed that positive values indicate more positive attitudes toward reading and negative values indicate fewer positive attitudes towards reading.

For PISA 2000, the negatively worded questions are [ST35Q01], [ST35Q04], [ST35Q06], [ST35Q08], and [ST35Q09]. For PISA 2009, the negatively worded questions are [ST24Q01], [ST24Q04], [ST24Q06], [ST24Q08], and [ST24Q09]. In addition, for PISA 2018 and follow-up 2020 data, the negatively worded questions are [ST160Q01IA], [ST160Q04IA], and [ST160Q05IA]. There are a decreasing number of items in the 2018 cycle while there are 9 items in PISA 2000 and 2009, but it only 5 items in PISA 2018 (see Table 4.4).

Table 4.4

The variable of reading engagement [engread] in each PISA cycle

Year	Label	Responses
PISA 2000	Q35 How much do you disagree or agree with these statements about reading? [ST35Q01] I read only if I have to [ST35Q02] Reading is one of my favourite hobbies [ST35Q03] I like talking about books with other people [ST35Q04] I find it hard to finish books [ST35Q05] I feel happy if I receive a book as a present [ST35Q06] For me, reading is a waste of time [ST35Q07] I enjoy going to a bookstore or a library [ST35Q08] I read only to get the information that I need [ST35Q09] I cannot still and read for more than a few minutes	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree
PISA 2009	Q24 How much do you agree or disagree with these statements about reading? [ST24Q01] I read only if I have to	1 = Strongly disagree 2 = Disagree 3 = Agree

	[ST24Q02] Reading is one of my favourite hobbies [ST24Q03] I like talking about books with other people [ST24Q04] I find it hard to finish books [ST24Q05] I feel happy if I receive a book as a present [ST24Q06] For me, reading is a waste of time [ST24Q07] I enjoy going to a bookstore or a library [ST24Q08] I read only to get information that I need [ST24Q09] I cannot still and read for more than a few minutes	4 = Strongly Agree
PISA 2018 and follow-up 2020	ST160 How much do you agree or disagree with these statements about reading? [ST160Q01IA] I read only if I have to. [ST160Q02IA] Reading is one of my favourite hobbies. [ST160Q03IA] I like talking about books with other people. [ST160Q04IA] For me, reading is a waste of time. [ST160Q05IA] I read only to get information that I need.	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly Agree

b. Reading Diversity

PISA's reading diversity index [divread] is derived from dichotomised student reports on the frequency of reading (never to a few times a year versus about once a month or more often) they read: magazines, comic, books, fictions, non-fiction books, email and web pages, and newspaper. It is interpreted as an indicator of the variety of student reading sources.

c. Online Reading

PISA 2000 did not measure students' involvement in online reading [online] as in PISA 2009 and 2018. In PISA 2009, basically seven items are measuring online reading activities including reading emails, chat online, reading online news, using a dictionary online, searching information about specific topics, taking part in online group discussions, and searching for practical information such as schedules, events, tips, or recipe. However, there is one item that

is no longer available in PISA 2018 as the question of the use of the dictionary online item has been eliminated. Five response categories are varying from 1 to 5 namely ‘I don’t know what it is’, ‘Never or almost never’, ‘Several times a month’, ‘Several times a week’, and ‘Several times a day’. A higher score on the response indicates a higher level of online reading activities.

4.5.3 READING STATES

Reading states include strategies for reading [stra], confidence in reading [confi], and time spent in reading [retime].

a. Reading Strategies

PISA 2000 did not include an index of reading strategies, but PISA 2009 and 2018 did. The reading strategies in PISA 2009 and 2018 were divided into two item categories, namely memorisation and summarise. The PISA index of memorisation strategies is based on students' responses to the six items, while the summary reflects the five items. A six-point scale with the response categories 1 with ‘not useful at all’ to 6 with ‘very useful’. The higher the score indicates the higher the levels of reading strategies.

b. Reading Confidence

Students reported their confidence in reading in PISA 2000 and 2018 even though the items and responses in each cycle were different. In PISA 2000, there are seven items concerning confidence in reading homework. In PISA 2018, there are seven items concerning confidence in reading text. In PISA 2000, there is a four-point scale with the response ‘never’, ‘sometimes’, ‘most of the time’, and ‘always’. While in PISA 2018, there is a four-point scale with ‘strongly disagree’, ‘disagree’, ‘agree’, and ‘strongly agree’. Both cycles show a bigger score of the response indicate the higher levels of students’ reading confidence.

c. Reading Time

The index of time spent in reading [retime] was measured in all PISA cycles. This reading spent for enjoyment includes diverse kinds of reading can be books, magazines, newspapers, websites, blogs, or emails. Five categories are reported ranging from ‘I do not read for enjoyment’, ‘30 minutes or less each day’, ‘More than 30 minutes to less than 60 minutes each day’, ‘1 to 2 hours each day’, and ‘More than 2 hours each day’.

4.5.4 PARENT FACTORS FOR 2020 FOLLOW-UP STUDY

The variables for parent factors that are only for 2020 follow-up data are derived from parents’ responses (reading involvement and parent income) and students’ responses (parental education and parent job). PISA 2018 measured the current parental engagement in learning at home PA003 with response categories ranging from “never or hardly ever”, “once or twice a year”, “once or twice a week”, to “every day or almost every day”. One more variable is the parent income PA042, which is a measure of household income classified into six income categories in the Rupiah currency.

Students’ responses to questions [ST005] and [ST007] are regarding parental education and [ST014] and [ST015] concerning parent jobs. Parental education is one of the many factors that influence educational outcomes that can be determined from family background variables. There has been an argument that parental education is a more relevant factor in influencing students’ outcomes than parental occupation (OCED, 2012). The variable parental education consists of mother and father education which asks for the highest level of schooling completed by them. ISCED level 1 refers to primary education, ISCED level 2 to lower secondary, ISCED level 3B or 3C to vocational/pre-vocational upper secondary, and ISCED level 3A to upper

secondary. Whereas the variable of parent job has open-ended questions on which students mention the main job of their parents. All parent factor variables are shown in Table 4.5.

Table 4.5

The variables of parent factor for 2020 follow-up data used in the study

Variables	Label	Responses
Reading Involvement	PA003 How often do you or someone else in your home do the following things with your child? [PA003Q02TA] Discuss how well my child is doing at school [PA003Q02TA] Eat <the main meal> with my child around a table [PA003Q03TA] Spend time just talking to my child [PA003Q04HA] Help my child with his/her reading and writing homework [PA003Q05IA] Discuss political or social issues [PA003Q06IA] Go to a bookstore or library with my child [PA003Q07IA] Talk with my child about what he/she is reading on his/her own	1 = Never or hardly ever 2 = Once or twice a year 3 = Once or twice a month 4 = Once or twice a week 5 = Every day or almost every day
Mother Education	[ST005] What is the <highest level of schooling> completed by your mother?	1 = <ISCED level 3A> 2 = <ISCED level 3B, 3C> 3 = <ISCED level 2> 4 = <ISCED level 1> 5 = She did not complete <ISCED level 1>
Father Education	[ST007] What is the <highest level of schooling> completed by your father?	1 = <ISCED level 3A> 2 = <ISCED level 3B, 3C> 3 = <ISCED level 2> 4 = <ISCED level 1> 5 = She did not complete <ISCED level 1>
Parent Income	[PA042] What is your annual household income?	1 = less than Rp 500,000 2 = Rp 500,000 and less than Rp 1,000,000 3 = Rp 1,000,000 and less than Rp 2,500,000 4 = Rp 2,500,000 and less than 5,000,000 5 = Rp 5,000,000 and less than Rp 10,000,000 6 = more than Rp 10,000,000
Parent Job	ST014 - [ST014Q01TA] What is your mother's main job? ST015 - [ST015Q01TA] What is your father's main job?	Open-ended response

4.5.5 TEACHER FACTORS FOR 2020 FOLLOW-UP STUDY

The teacher factor for the 2020 follow-up data addresses two questions about teachers' professional improvement and teacher reading time. The teacher professional [TC193] implies that a teacher had attended professional activities besides teaching as the main responsibility such as courses or workshops (for example on subject matter or methods and/or other education-related topics), education conferences or seminars (where teachers and/or researchers present their research results and discuss educational issues), observation visits to other schools, observation visits to business premises, public organisations, non-governmental organisations, and in-service training courses in business premises, public organisations, non-governmental organisations.

Teacher lesson activities [TC166] refer to what activities the teacher has taught based specifically on the use of the internet, for example, how to use keywords and search engines, how to determine whether information can be trusted, how to compare web pages, how to understand the consequences of making information public, the use of short descriptions on links, the detection of bias, and the detection of spam. Meanwhile, the teacher online activities [TC176] refers to how often the teachers spend online for reading activities including reading emails, chat online, reading online news, searching information about particular topic, taking part in online group discussion, and searching for practical information online. All teacher factor variables are shown in Table 4.6.

Table 4.6

The variables of teacher factor for 2020 follow-up data used in the study

Variables	Label	Responses
Professional	TC193 During the last 12 months, did you participate in any of the following professional development activities? [TC193Q01HA] Courses/workshops [TC193Q02HA] Education conferences or seminars [TC193Q03HA] Observation visits to other schools [TC193Q04HA] Observation visits to business premises [TC193Q05HA] In-service training courses on business premises	1 = Yes 2 = No
Lesson Activities	[TC166] In your lessons, have you ever taught any of the following things? [TC166Q01HA] How to use keywords using a search engine such as <Google©>, <Yahoo©>, etc. [TC176Q02HA] How to decide whether to trust information from the Internet [TC176Q03HA] How to compare different web pages and decide what information is more relevant for the students' schoolwork [TC176Q04HA] To understand the consequences of making information publicly available online on <Facebook©>, <Instagram©>, etc. [TC176Q05HA] How to use the short description below the links in the list of results of a search [TC176Q06HA] How to detect whether the information is subjective or biased [TC176Q07HA] How to detect phishing or spam emails	1 = Yes 2 = No
Online Activities	TC176 How often are you involved in the following reading activities? [TC176Q01HA] Reading emails [TC176Q02HA] <Chat on line> (e.g. <Whatsapp®>, <Messenger®>) [TC176Q03HA] Reading online news [TC176Q05HA] Searching information online to learn about a particular topic [TC176Q06HA] Taking part in online group discussions or forums	1 = I don't know what it is 2 = Never or almost never 3 = Several times a month 4 = Several times a week 5 = Several times a day

	[TC176Q07HA] Searching for practical information online (e.g. schedule, events, tips, recipes)	

4.6 DATA ANALYSIS / STATISTICAL PROCEDURES EMPLOYED IN THE STUDY

In this study, the response of students to the PISA student questionnaire was used while independent variables were determined. The achievement scores, as dependant variables, of the reading test were estimated from the answer to open-ended and multiple-choice questions in the purpose of determining reading skills.

Several statistical procedures were undertaken in this study. These statistical procedures were performed through different software packages, which were designed specifically for each of those procedures. This study proposed to explore the predictors of reading literacy achievement in Indonesia based on PISA data. Therefore, the use of these statistical procedures in this study was extremely critical to assess the validity and reliability of the result.

The data were analysed by some software: IBM SPSS 25, MPlus7, Conquest, and HLM Basic 8. IBM SPSS 25 software was used to enter the data and analyse the descriptive statistics. While the software of MPlus was applied to test the construct validity of the instruments as well as the relationships of the factors measured by these instruments.

Furthermore, by the utility of the instrument used to gather data related to this study, the Conquest software employed the analysis of the Rasch model. The nested relationship of the variables was examined using HLM by MPlus software to estimate a wide range of models. Further, HLM analysis was utilised to investigate the effect on schools, parents, and students. The conceptual framework will be shown in Figure 4.2. and Figure 4.3.

4.6.1 DESCRIPTIVE ANALYSIS

Generally, descriptive analysis is a way of presenting data. It refers to procedures used to describe the basic features of data and summarise data in the study (Black et al., 2006; Cronk, 2018). As the PISA database and follow-up data contain responses from students, school principals, teachers, and parents, a brief explanation of possible patterns is necessary to help explain how the data meets all the conditions.

All PISA cycle and follow-up data collect data from a sample, not from the whole population of 15-year-old students. By using descriptive statistics, it is possible to infer what the general population may think based on the sample data. With descriptive statistics, all sample data are simply presented in quantitative descriptions in a manageable form. Specifically, since all PISA data sets measured a large number of people, the descriptive analysis helps to simplify large amounts of data sensibly. In this study, the descriptive analysis is mainly presented to measure the frequency of a count and central tendency including mean, median, and mode.

The descriptive analysis in this study is conducted using IBM SPSS 23. An initial descriptive analysis is used as preliminary information that forms the basis for further analysis including confirmatory factor analysis, Rasch measurement, structural equation modelling, and hierarchical linear modelling.

4.6.2 CONFIRMATORY FACTOR ANALYSIS (CFA)

The concept of CFA is a confirmatory, theory-driven approach. Therefore, the analysis is planned based on theoretical relationships between observed and unobserved variables. When a CFA is conducted, researchers estimate a population covariance matrix and compare

it with the observed covariance matrix. In technical terms, the researcher is trying to minimize the difference between the estimated and observed matrices.

CFA is intended to test a curiosity scale that meets two psychometric criteria, namely validity and reliability. As Brown (2015) and O'Rourke & Hatcher (2013) stated, the construct validity and reliability of an instrument can be determined through CFA. Likewise, Hair et al. (2019) posit that CFA can be used to test construct validity as well as construct reliability. Also, according to Hill & Hughes (2007), CFA enables the identification of factors, variance, and relationships between latent constructs. As with CFA models, all variables and relationships should be supported by theory and/or prior research. It must meet the criteria of goodness of fit, validity, and reliability. In practice, if the scale had met the reliability criteria comprehensively, it would be feasible for the scale to be used to collect data to measure the student's curiosity.

The first to be considered in CFA is the fit test. The goodness-of-fit test measures how well a theoretical model fits the empirical model. For the evaluation of model fit, Hu & Bentler (1998) propose two criteria: the comparative fit index (CFI) and roots-mean-square error of approximation (RMSEA). Also, Gerbing & Anderson (1992) add three important criteria: p-value of χ^2 , normed fit index (NFI), and relative fit index (RFI). This study used the p-value of χ^2 , CFI, RMSEA, NFI, and RFI for the assumption testing. Good model fits are indicated by non-significant $\chi^2 < 3$, $RMSEA \leq 0.08$, and $CFI \geq 0.90$. If the result meets these criteria, this means that the theoretical model fits the data. Thus, it can be processed into the next analysis stage.

The second stage of CFA analysis is the determination of factor loading (λ) of each item. Factor loading is a correlation between each variable and the factor (Field, 2009). Factor

loading is a way to interpret the role of every variable in defining its factor. Therefore, a higher factor loading would make the variable more representative of the factor. Concerning this theory, the number of factor loading should be carefully considered. Hair et al. (2018) claim that a factor loading of 0.70 is practically significant. The CFA analysis is carried out using Mplus 7.1 software developed by Muthen and Muthen.

4.6.3 RASCH MEASUREMENT

The Rasch model, first developed by Georg Rasch, is a unidimensional measurement approach, with a set of requirements to satisfy basic measurement requirements (Rasch, 1960 as cited in An & Yu, 2021). It is also known as a psychometrical method for analysing ratings (categorical data) such as attitudes, opinions, and assessment tests as functions of the respondent's ability or attitudes (Tennant et al., 2004). Likewise, it is a psychometric procedure that is used to improve the precision of the construction of instruments, the monitoring of instrument quality, and the computation of results (Boone, 2016). In practice, the author said that a Rasch analysis allows researchers to construct alternative forms of measurement instruments, opening the possibility of modifying those instruments as students progress and change. Several education researchers are using Rasch techniques, but many continue to develop and validate instruments using classical test theory (CTT).

According to Keeves & Alagumalai (2005), the Rasch model incorporates item response theory (IRT), which enables it to analyse and scale both test and attitudinal data. Additionally, the authors emphasise that IRT has advanced over CTT, which is based on the true score theory and the raw score is determined by combining the true score and measurement error. Several limitations exist with the CTT: (1) a linear relationship is assumed between the latent variable and the observed scores; (2) a true score cannot be calculated without making

assumptions that are difficult to meet or cannot be estimated directly; and (3) parameter such as factor loading, discrimination, and reliability may vary depending on the particular sample. In contrast, IRT offers several advantages, in that it: (1) nonlinear relationships can be analysed and the true score can be estimated; (2) item parameters can be estimated independently of the sample used; (3) the researchers have the opportunity to select items that are by the desired model (4) researchers are able to derive more information about the measurement process by applying and generalizing concepts such as reliability and internal consistency. Thus, this study applies IRT.

Rasch model is used in this study to analyse and scale the school, student, teacher, and parent questionnaires. Besides being applied in the validation process, it is also used to examine the factor structures of items that have already been examined by CFA. Rasch analysis complements the CFA by enabling additional data analysis such as item fit in the validation process (Keeves et al., 1991). In practice, Rasch's methods aid in the analysis of the validity of the instrument and the consistency of reports. The data were fitted using it and used to measure if the instrument was appropriate for measuring. Accordingly, the fit between the data and the Rasch model will be examined to determine whether or not the item scale is valid (Al-Sabbah et al., 2010).

Originally, the Rasch model is formulated for dichotomous data, but now it extends into the rating scale model for polytomous data such as rating scale, partial credit, facet model, the Saltus model and the unfolding model (Andersen, 1977; Andrich, 1978; Keeves & Alagumalai, 2005). The Rasch analysis is carried out using Conquest 2.0 software developed by Australian Council for Education Research.

The Rasch model uses mathematical functions to determine the probability of a person's response to a question based on their ability level. It is thus the probability referred to as an item characteristic (Adams & Wu, 2002). The dichotomous model was designed for ordinal data with two categories, usually 1 or 0. In essence, the probability of a person's response to an item is a function of the difference between two model parameters, the location of the item (difficulty in assessing proficiency) and the location of the person (Dunne et al., 2012). Whereas, the partial credit model for polytomous data incorporates the ability to have different response levels for different items on the same test (van der Linden, 2004). Practically, there is a possibility of tests having one or more intermediate levels of success between complete failure and complete success.

The Rasch model for dichotomous data can be expressed as:

$$P_{ni} = \frac{e^{(\beta_n - \delta_i)}}{1 + e^{(\beta_n - \delta_i)}}$$

And for the Rasch model for polytomous data can be described as:

$$\ln\left(\frac{P_{nij}}{1 - P_{nij-1}}\right) = \beta_n - \delta_{ij}$$

Where,

P_{ni} = is the probability that person n will endorse item I which depends on the person's ability and the item's difficulty;

β_n = is the person n 's estimated ability on the latent variable scale;

δ_i = is the estimated difficulty of item i on the same latent variable scale.

4.6.4 STRUCTURAL EQUATION MODELING (SEM)

Structural Equation Modeling (SEM) is a statistical methodology that applies a confirmatory approach to the analysis of a structural theory relevant to a particular phenomenon, for example hypothesis testing (Byrne, 2013). Likewise, SEM is a combination of exploratory factor analysis and multiple regression (Ullman, 2001). Comparing SEM with CFA, SEM extends the possibility of latent variable associations, and it incorporates two components, namely the measurement model (being mainly the CFA) and the structural model.

The SEM signifies two critical aspects of the methods: (a) causal processes under examination are expressed as a series of structural equations (i.e. regression), and (b) that these structural relations can be visualized graphically to improve understanding of the theory under study (Byrne, 2013). SEM benefits in the behavioural sciences as researchers are sometimes interested in examining theoretical constructs which are not directly observable. These abstract phenomena are known as latent variables or factors, variables that are not observed directly or cannot be measured directly. It is then Latent variables must be operationally defined according to the behaviour that is believed to represent them. In the same way as the CFA analysis, the SEM analysis is conducted using Mplus 7.1 software developed by Muthen and Muthen.

4.6.5. HIERARCHICAL LINEAR MODEL (HLM)

According to Raudenbush and Bryk (2002), most social research employs hierarchical data structures to investigate characteristics, which are comprised of both individuals and groups. To be more specific, in this present study, students are considered at the individual level, whereas schools are considered at the group level, i.e., schools contain individuals within them. Both individuals and groups have variables. Thus, such data was called a hierarchical structure, with students nested within schools. Some methodological techniques had been

applied to hierarchical structure data, but these were limited to a simple statistical framework, incapable of adequately addressing the problems in the analysis. In practice, it may not apply a more generalised model. Studies of social characteristics often involve repeated observations of individuals within organizations (Raudenbush & Bryk, 2002). Accordingly, a study about interactions between students and schools would not be able to explain how schools affect student learning and how student-teacher relationships are influenced by schools, and possibly most importantly, by students. A large number of random coefficient regression models were created using the Hierarchical Linear Model (HLM) approach, allowing for meaningful interpretation of high-level variables such as students and schools. Further, HLM is employed in this present study to examine the possible interaction between school-level factors and student-level factors and factors at both levels and their influence on the outcome variables. The analysis is carried out using HLM 8.0 software (Raudenbush et al., 2004).

HLM refers to models with random coefficients, multilevel linear models, component covariance models, and unbalanced models with nested random effects. The hierarchical linear model is a linear model with a response variable whose value is not only influenced by a fixed variable, but also by random variables. In particular, HLM is well suited to the structure of most educational data, which is hierarchical, where students are nested within classrooms, and these classrooms are nested within schools (Cheung & Keesee, 2014). HLM captures two features in defining the model. First, the appropriate data for a hierarchical structure model, with first-level units nested within second-level units, second-level units nested within third-level units, and so on. Second, the model parameters have a structured hierarchy (Raudenbush & Bryk, 2002).

The HLM method allows an evaluation of the results achieved by each of the two possible analytic strategies for dealing with hierarchical data, namely disaggregation (bringing

level 2 data down to level 1) and aggregation (bringing level 1 data to level 2) (Osborne, 2000). As a part of a disaggregated analysis, the level 2 values were assigned to all students within a particular school. As such, during the aggregated analysis, once a dataset is hierarchically structured, all variables from level 1 were averaged up to the school level (level 2). However, these methods lead to bias and errors in estimating the precision and the meaning of each unit of analysis (Bryk & Raudenbush, 2002). As the authors highlight, this bias occurs when a variable is interpreted differently in its aggregated form than in its disaggregated form. When the aggregated variable is entered into the model as a predictor variable, the results may then be biased towards that meaning. Furthermore, these approaches ignore individual-level variance that is potentially meaningful for the outcome measure (Hofmann, 1991).

The hierarchical linear model is capable of handling the complex relationships described above. This method is specifically designed to overcome the problems associated with both the disaggregated and aggregated approaches. Likewise, this method is able to explicitly model both individual and group residuals, thus, recognising the partial interdependence in the behaviour of individuals within the same group. Furthermore, it allows one to examine both the lower-level unit variance and the higher-level unit variance in the outcome measure. Thus, the hierarchical linear model overcomes the limitations of the previous two approaches since they explicitly capture both within-group variance and between-group variance (Hofmann, 1991).

HLM models generally begin with a fully unconditional or null model, followed by the conditional model or predictors that are added to the model in a forward or backward elimination process for two-level and three-level models, respectively, depending upon the number of levels. Additionally, the overall fit of the model must be considered while the model is being constructed. As this study provides a two-level model (student-level and school-level),

the discussion below defines a null model and a two-level model with entering predictor variables.

The null model as it also refers to a fully unconditional or empty model is the simplest model without any predictors at each level and contains one fixed mean used to estimate the variance in an outcome at each level (Bryk & Raudenbush, 2002). Generally, the model is used as part of an HLM framework to establish a baseline, from which subsequent models can be compared, and to determine the extent to which variance is influenced by the group membership at level-2 (Anderson, 2012). In this recent study, the model provides the overall students' reading literacy scores in the typical school and between school variations and within the school between student variation. This allows the calculation of intra-class correlation that indicates what proportion of the total variation is at the school level and how similar students in the typical school are on the outcome. The conditional model is the higher-level model, with entering the predictors that theoretically interacted in a meaningful way in each level into the model simultaneously, from the lowest to the highest level, examining the predictors at each level of the unconditional model that explains variability across levels (Bryk & Raudenbush, 2002). In addition, the model is used to examine the model at different levels, as well as the effect of a specific predictor after a variety of demographic variables have been eliminated (Anderson, 2012). As a result, this recent study requires entering all variables into the model in the first block, running the analysis, adding the predictor variable of interest in the model, rerunning the analysis and testing the difference in model fit between the two models. Hence, unconditional and conditional are employed in this recent study.

An overview of a two-level general hierarchical linear model is presented in this section. The combination of level one and level two produces a mixed linear model with fixed and

random regression coefficients. In general, a two-level linear regression model defines independent variables at two levels: the student level (level 1), and the school level (level 2).

Level-1 model

In hierarchical linear models, the intercept and slopes of the level-1 model function as outcome variables in the level-2 model. Understanding the meaning of these outcome variables is essential. In the level-1 model, the intercept is determined by the location of the level-1 predictor variables. Assume that the study has data from j classes, with a different number of students i in each class. At the student level, the study has the outcome variable reading literacy score (Y), measured by the result that is scaled to fit approximately normal distributions, with means of around 500 score points and standard deviations of around 100 score points. The level-1 model can be represented by the following regression equations.

$$Y_{ij} = \beta_{0j} + \sum \beta_{qj} X_{qij} + r_{ij}$$

where:

Y_{ij} = outcome for students i in school j

X_{qij} = students' characteristics ,

r_{ij} = random error

β_{0j} = intercept

β_{qj} = regression coefficient indicating the magnitude of effects between each X_{qij} and the outcome in school j

Level-2 model

There are separate models at level-1 (students) for each level-2 unit (schools) for two-level hierarchical models. Based on Gill (2003), as they describe the effects within the context

of a single group, these models are known as within-unit models. At level-2, each regression coefficient, β_{0j} defined by the level-1 model, becomes the outcome variable to be predicted by the level-2 characteristics (Hox, 2010). The level-2 model can be shown as the following regression model equations:

$$\beta_{qj} = \theta_{q0} + \sum \theta_{qs} W_{sj} + U_{qj}$$

where:

β_{qj} = outcome variable

W_{sj} = school characteristics

U_{qj} = random error

θ_{q0} = intercept

θ_{qs} = regression slope indicating the magnitude of effects between each W_{sj} and the outcome β_{qj}

In this recent study, the students are nested within schools. The Y_{ij} will be substituted with reading literacy achievement score ($PV1READ_{ij}$). After reviewing extensive existing literature, two groups of variables, namely individual students and school, considered to be relevant to the Indonesian context of PISA data 2000, 2009, and 2018 were developed and included in the research framework (see Figure 4.2). Additionally, there are three groups of variables, namely student, teacher, and school, considered to be relevant to the context of follow-up 2020 data (see Figure 4.3). In PISA 2000, 2009, and 2018, school and student variables were hypothesised to have significant effects on reading achievement. While in follow-up 2020, it was hypothesised that school, student, and additional teacher variables would affect reading achievement. Student factors were estimated in level-1 where the outcome variable (reading achievement) was situated. Essentially, the outcome variable is always at the lowest level in the hierarchy. School factors were estimated at level-2 for PISA 2000, 2009,

and 2018. For the follow-up 2020 data, student and parent factors were estimated at level-1, teacher factors were estimated at level-2, and school factors were estimated at level-3.

Figure 4.2

The two-level HLM model assessing determinants of Indonesia reading achievement based on PISA 2000, 2009, and 2018

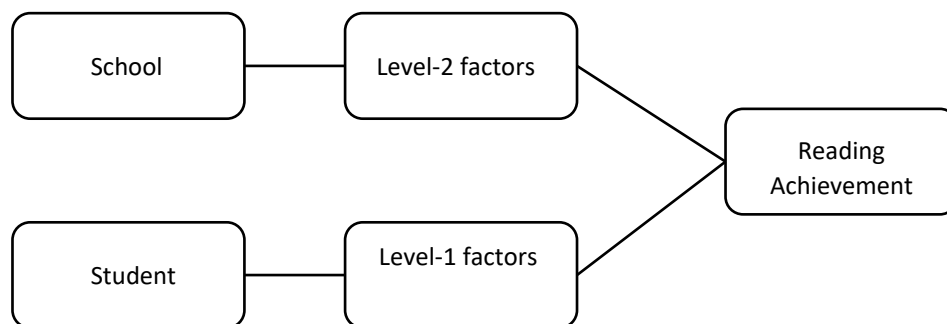
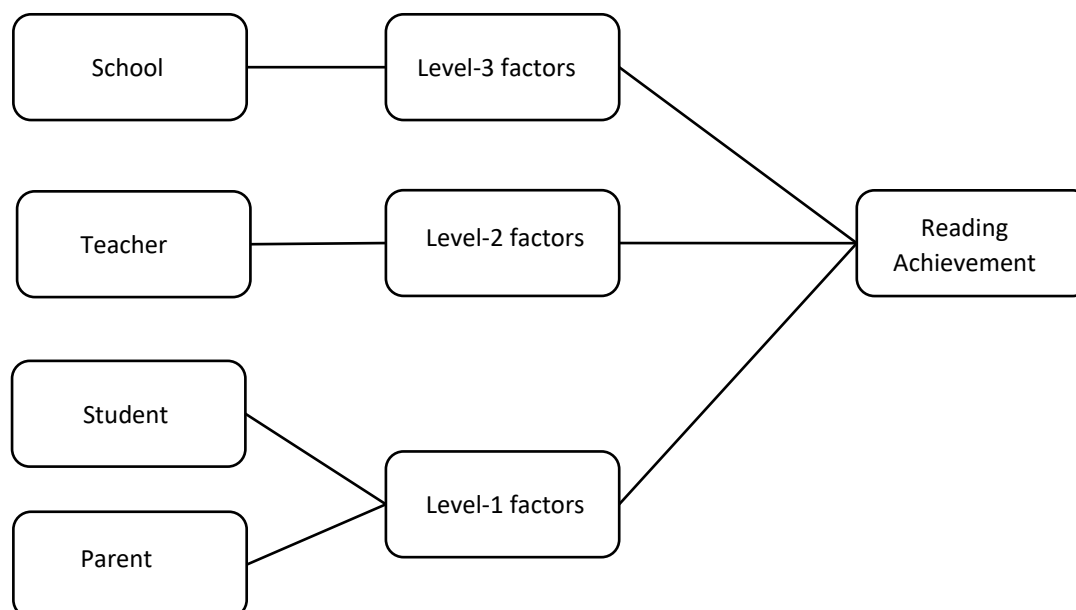


Figure 4.3

The three-level HLM model assessing determinants of Indonesia reading achievement based on 2020 follow-up data



4.7 LIMITATIONS OF THE STUDY

This study has several limitations regarding the research methodology. First, the study has limited outcomes in quantitative research. The PISA questionnaires entail the use of structured questionnaires containing closed-ended questions. Thus, this quantitative research leads to limited results. Consequently, the results may not fully represent the actual occurring, in a generalised form. Secondly, the study has an inability to control the environment, particularly when collecting primary data. Quantitative research methodology usually requires a large sample size. Nevertheless, since the schools selected for the study were determined by their participation in the most recent PISA 2018, the study could not control the number of schools as resources.

Additionally, the time factor is a limitation, as data collection in 2020 for this study was impacted by the Covid-19 pandemic. The primary data was collected in January – February 2020. Unfortunately, some of the information we received from students did not appear sufficient, and a second round of surveying was conducted to obtain more information (about ten items). Despite the study getting approval from principals to provide questionnaires through Google Docs, due to a pandemic in Indonesia that began in March 2020, the students were required to learn at home. As a result, some items cannot be filled by some students since they are difficult to complete promptly.

4.8 SUMMARY

The main focus of this study is to explore the predictors of Indonesian reading literacy based on PISA data (in 2000, 2009, and 2018) and the survey in 2020 and to compare the patterns of relationships between paper-based and computer-based performance. Throughout this chapter, the research methods used in this study are described and justified. Two set

questionnaires (student and school) for PISA data set of 2000, 2009, and 2018 and a cognitive test of reading for students are used as secondary data. Additionally, four set questionnaires (student, school, teacher, and parent) and adapted cognitive PISA 2018 test are used as primary data namely 2020 follow-up data.

The sample in all PISA cycles as secondary data consists of students in their 15th year old and the principals. Whereas the sample in 2020 follow-up data is also 15th year old students, their parents, the principals, and teachers of *Bahasa Indonesia*. There are 11 high schools in Yogyakarta city (5 junior high schools and 6 senior high schools) that are chosen by purposive sampling technique. These schools are noted as the randomly selected schools that took part in the PISA Test in 2018. The ethics approval is obtained from the HREC of The University of Adelaide. The approval for conducting data collection at the selected schools is also sought from the Technical Unit, Department of Education, Youth, and Sports in the city.

PISA questionnaires and diagnostic tests are authorised by OECD, which conducts the tests. Although all items had been standardised by OECD, but some are removed in the study as they were not in line with the study purposes. The variables and items for the study are carefully selected from the literature in order to meet the research objectives.

This study utilises quantitative strategies and a correlational approach by analysing secondary data (PISA Data 2000, 2009, and 2018) and primary data (follow-up data 2020). A variety of statistical techniques are employed including descriptive analysis, CFA, Rasch analysis, SEM, and HLM. Each technique uses a different type of analysis software. The descriptive analysis is conducted using IBM SPSS 23; the CFA and SEM analyses are carried out using MPlus 7.1 software; the Rasch analysis is carried out using Conquest 2.0 software; and the HLM analysis is carried out using HLM 8.2.

Chapter 5

Descriptive Analysis and Contextual Information

5.1 INTRODUCTION

This chapter presents and discusses the distribution of the general characteristics of the four sets of PISA Data 2000, 2009, 2018, and the 2020 follow-up data. There are two types of information contained in the report, school demographics that involve teachers as well as student demographics that involve parents. A frequency distribution, a percentage, and graphs are used to describe categorical variables, while means and standard deviations are used to describe continuous variables. This chapter contains several analyses conducted primarily with IBM SPSS 23 and a small proportion with IDB Analyzer Version 3.2. In this case, the IDB Analyzer was used to calculate Indonesia's reading achievement scores by sample weights and plausible values. As noted, PISA has a large scale and consists of hundreds of different variables formatted in SPSS files (Bialecki et al., 2017). In order to analyse large-scale data, sample weights and plausible values must be taken into consideration (The IEA International, 2016). A specific method must be presented by illustrating the correct syntax and demonstrating possible errors that may occur. Therefore, the software is used to combine and analyse data from PISA. Meanwhile, the descriptive analysis information in this section provides the basis for the next level of analysis which includes confirmatory factor analysis, structural equation modelling and hierarchical linear modelling.

The PISA sample does not equally represent the full student population equally (OECD, 2000). Sampling weights applied to compensate for differences in student selection

probabilities. Survey weights must be considered to avoid producing biased results. This variable is called W_FSTUWT as stated in the international data files. An estimate of the size of the target population is derived from the sum of these weights. Therefore, the weights provided in this study are appropriate for the analysis of data collected from all assessed students, including student questionnaires and reading performance data.

An international education assessment like PISA is designed to measure a population's knowledge and skills (OECD, 2009). As a result, their performance will not have any impact on either their school career or their professional career. The goal of reducing errors in inferences regarding a target population is more significant than the goal of reducing errors at an individual level in this situation. According to the PISA survey, students' performance is measured using plausible values that rely on the level of the population to measure the cognitive result of student performance. However, the individual level is also estimated, but only for questionnaires in which weighted likelihood estimates (WLE) are used. The WLE will then be compared with PVs for the purposes of estimating a range of population statistics. Thus, the PISA database only includes PVS for student performance and WLE for contextual indices derived from student, teacher, parent, and school questionnaires. Typically, five to ten PVs are drawn for each student, based on their performance on each scale. Using a mathematical model, PVs are calculated by computing distributions around reported values and lengths and assigning random values to each observation. From the average of the mean computed from each of the five plausible values, the plausible values were transformed to a scale with a mean of 500.

5.2 THE DISTRIBUTION OF THE PARTICIPANTS

A summary of the distribution of participants consists of student and school in PISA 2000, 2009, and 2018, as well as 2020 follow-up data before describing the student and school demographic. The information can be seen in Table 5.1 which differs by colour for each cycle. The reading achievement scores are presented according to gender in Table 5.2.

Table 5.1

Distribution of the Indonesian student and school according to each cycle

Total	Year 2000	Year 2009	Year 2018	Follow-up 2020
Student	7368	5136	12098	534
School	280	183	351	11

There has been a variation in the number of students participating in PISA studies from 2000 to 2018 and the 2020 follow-up study. In 2000, 7368 students were participating in PISA across 280 schools, and only 5136 participated in PISA 2009 across 183 schools, but the number increased substantially in 2018 to 12098 across 351 schools. In the follow-up 2020, as the data was collected in small clusters, it consists of 550 students, however, when the missing 16 data are excluded, there are only 534 students across 11 schools.

Following the cycle added in this study, the 2020 follow-up study increased reading achievement, as shown in a trend in Figure 5.1. It was observed that among 550 students using the same instrument as PISA 2018, the achievement score was 500, which was higher than it was in the other three PISA cycles. Meanwhile, a comparison of the achievement scores of males and females is presented in Figure 5.2. It can be seen that females received higher reading scores than males during the three cycles of PISA 2000, 2009, and 2018

(female 380.48 and male 360.29; female 419.80 and male 383.27; and female 383.43 and male 358.09, respectively). However, in the 2020 follow-up data, males got higher reading scores than females (females 481.72 and males 517.68).

Figure 5.1

Trends in performance in reading achievement over the cycles

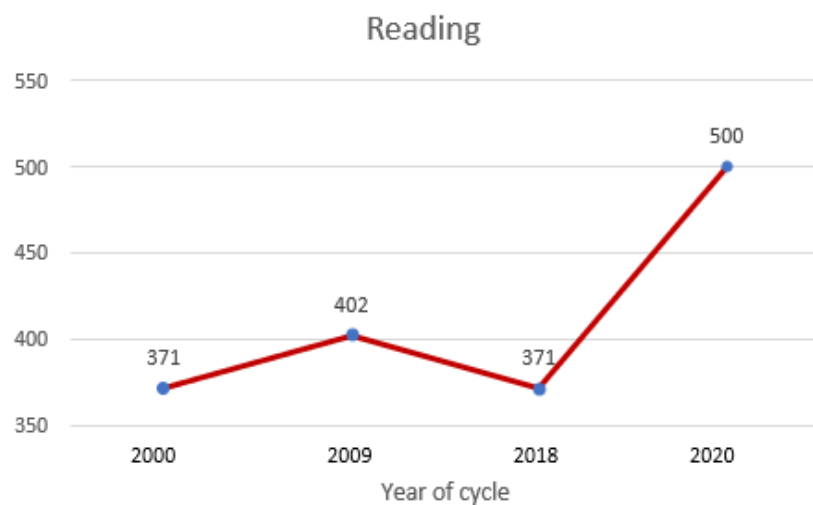
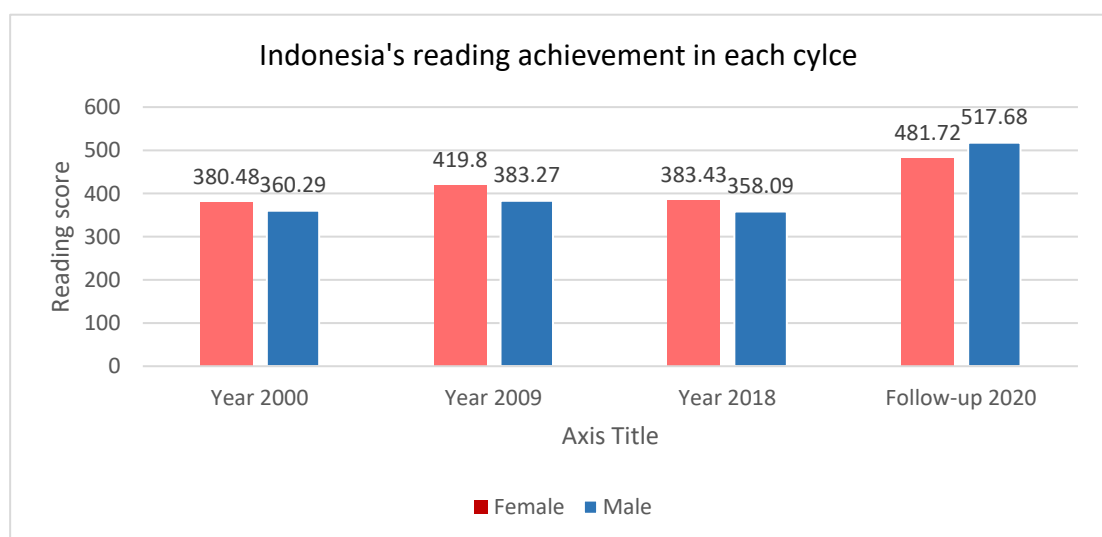


Figure 5.2

The Diagram of Indonesia's reading achievement scores in PISA 2000, 2009, 2018, and 2020 follow-up data



5.3 STUDENT DEMOGRAPHIC CHARACTERISTICS

PISA and the follow-up study's respondents consisted of students from Junior High and Senior High Schools in Indonesia who studied in Grades 7 to 12. The student demographic in these studies refers to individual characteristics according to gender, number of books, and time spent reading.

5.3.1 GENDER

In most cycles, the proportion of females and males in each cycle was almost equal, although females outnumbered males. PISA 2018 had the largest sample of 12,098 students, consisting of 15-year-old students, 6240 females (51.6%) and 5858 males (48.4%) in schools throughout Indonesia. Meanwhile, the least number of students came from the follow-up study in 2020 with only 534 students from the selected school in Yogyakarta city, of which 293 were females (54.9%) and 241 were males (45.1%). Table 5.2 shows the gender distribution of these respondents.

Table 5.2

Student gender distribution for Indonesian PISA 2000, 2009, 2018, and 2020 follow-up study

Year	Gender	Frequency	Per cent	Cumulative Percentage
2000	Female	3724	50.5	50.5
	Male	3644	49.5	100.0
	Total	7368	100.0	
2009	Female	2602	50.7	50.7
	Male	2534	49.3	100.0
	Total	5136	100.0	
2018	Female	6240	51.6	51.6
	Male	5858	48.4	100.0
	Total	12098	100.0	
2020	Female	293	54.9	54.9
	Male	241	45.1	100.0
	Total	534	96.7	

5.3.2 NUMBER OF BOOKS

The students in each cycle were asked to report the number of books at home. Information on students having books at home suggests that the more books they have, the higher their reading level will be. For convenience in the descriptive analysis, this variable was made into two figures: a table and a bar chart. Both Table 5.3 and Figure 5.3 provide information about the number of books that participants have at home in each cycle. However, Figure 5.3 focuses on the percentage of books as opposed to the number of books. Generally, most of the participants in every cycle have between 11 and 100 books at home, while the second group has no books to only 10 items.

Table 5.3

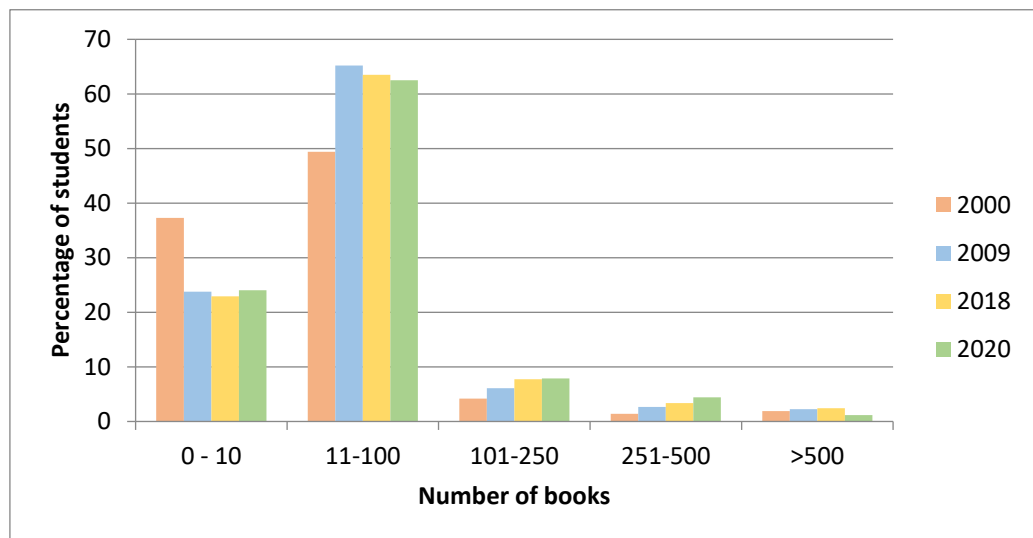
Students' number of books at home in each cycle

Total books	2000		2009		2018		2020	
0 - 10	2193	37.3 %	1184	23.8 %	1417	22.9 %	125	24.0 %
11-100	2904	49.4 %	3249	65.2 %	3925	63.5 %	325	62.5 %
101-250	247	4.2 %	304	6.1 %	479	3.4 %	41	7.9 %
251-500	82	1.4 %	133	2.7 %	209	3.4 %	23	4.4 %
>500	112	1.9 %	112	2.2 %	151	2.4 %	6	1.2 %

As seen in Figure 5.3, there is a greater number of people who own more than 101 books than those who have more than 251, and only a few students have more than 500 books in their homes.

Figure 5.3

The number of books that students have at home in each cycle

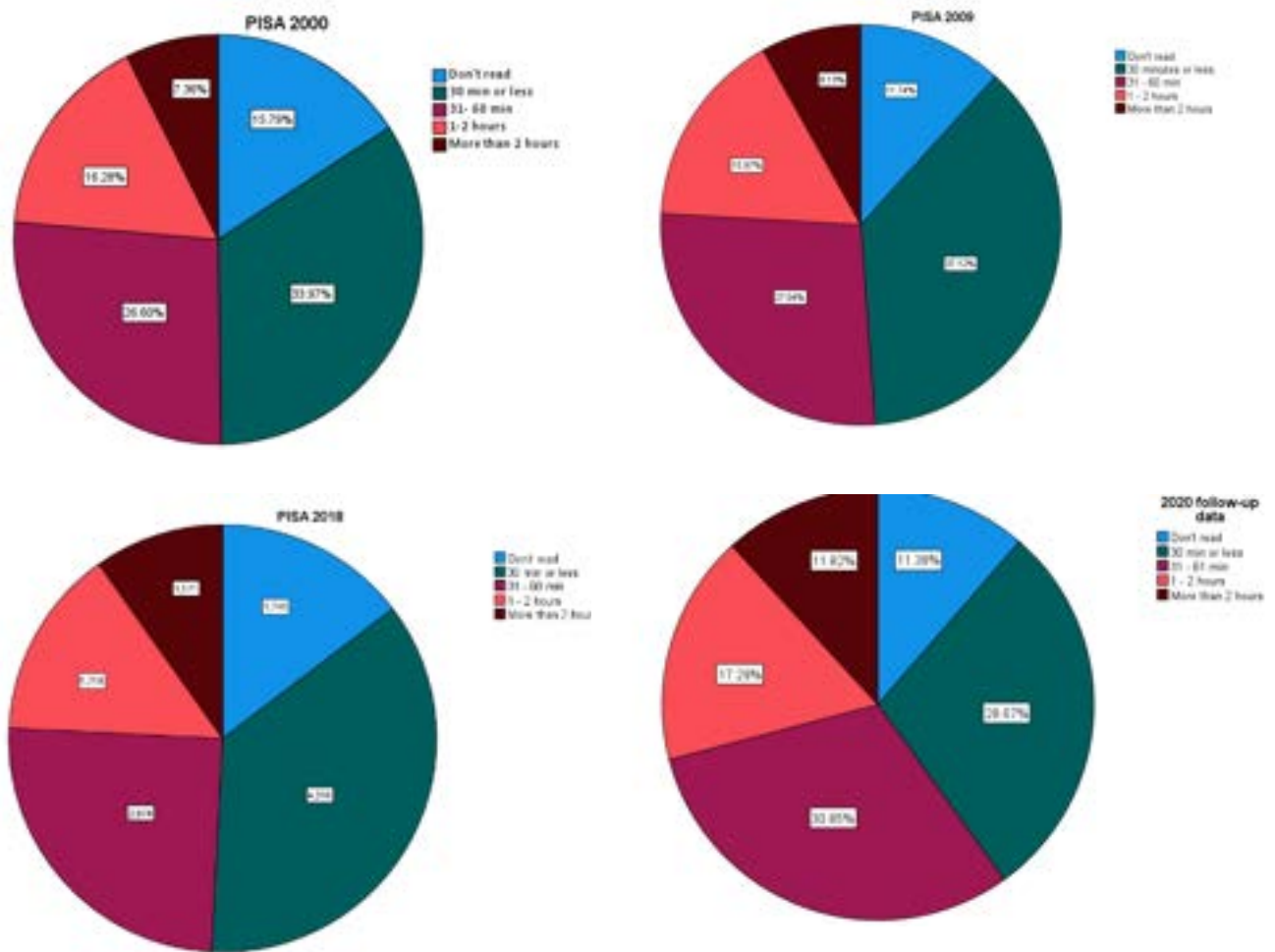


5.3.3 TIME SPENT ON READING

As part of the PISA survey and follow-up study, students were asked to report the amount of time they spend reading every day, ranging from minutes to more than 2 hours. As seen in Figure 5.4, the pattern seems to be the same throughout all PISA cycles, but not for follow-up data. The majority of students on all PISA cycles read every day for more than 30 minutes or less, and the second percentage of students read for 31 to 60 minutes. In the follow-up study, most students read more than 30 minutes to 60 minutes a day, followed by those who devoted less than 30 minutes each day to reading. Meanwhile, for the four data sets, a small percentage of the students read more than two hours a day.

Figure 5.4

Percentage of time spent reading in each cycle



5.4 SCHOOL DEMOGRAPHIC CHARACTERISTICS

Each school principal was asked to provide information regarding his/her school. School data include the type of school, ICT at school, school funding, and additional information on test language.

5.4.1. TYPE OF SCHOOLS

There are two types of schools used in this study: school sector and location. The school sector that PISA used to collect the data, namely public schools and private schools. Public schools refer to schools that are supported by Indonesian government funds, whereas private schools represent schools funded and maintained by private groups or organisations. The two sectors of schools in this study are also divided based on location. The location classification used in PISA is based on the National Centre of Educational Statistics (<https://nces.ed.gov/>), which is urban (city, city centre, and city elsewhere) and rural (village, small town, and town). A summary of the school involved in the study is presented in Table 5.4.

Table 5.4

Distribution of school community according to school type per cycle

Type of School	Frequency 2000		Per cent	Frequency 2009		Per cent	Frequency 2018		Per cent	Frequency 2020		Per cent
	Urban	Rural		Urban	Rural		Urban	Rural		Urban	Rural	
Public	24	124	52.9	15	70	46.4	52	170	63.2	4	1	45.5
Private	40	92	47.1	24	74	53.6	43	86	36.8	3	3	54.5
Total Schools	280			183			351			11		

Generally, most of the schools participating in PISA are in rural areas. In PISA 2000, about 280 schools were represented, with a proportion of 52.9% public and 47.1% private, 216 of these schools are in rural areas, and only 64 are in urban areas. A decreasing number of schools participated in the PISA 2009 study, with 183 participating but fewer public than private schools (46,4% compared to 53.6%). As of PISA 2018, there were 351 schools, almost double that of PISA 2009 and more than half were public schools (63.2%, compared to 36.8%). Same as in 2000, in both PISA 2009 and 2018, rural schools were more numerous,

with about 144 compared to just 39 in urban areas in 2009; and with about 256 compared to just 95 in urban areas in 2018. As only 11 schools participated in the PISA 2018 in Yogyakarta, follow-up data are being collected from only these schools for 2020. A fairly even distribution of public and private schools participated in the survey (45.5% versus 54.5%), with more participation from urban than rural areas, an opposite pattern from previous cycles.

5.4.2 ICT AT SCHOOLS

Each cycle of PISA consists of a different set of questions related to ICT in schools. In PISA 2000, principals were asked to provide information on the number of computers in their schools. During PISA 2009, they were asked three questions regarding the number of students to computers. As part of PISA 2018, which is the same as 2020 follow-up data, principals were required to provide information on a school's ability to improve learning and teaching through the use of digital devices such as the Internet, bandwidth, instruction device, computing capacity, and appropriate software.

Figure 5.5.

The number of computers according to school types in PISA 2000 and 2009

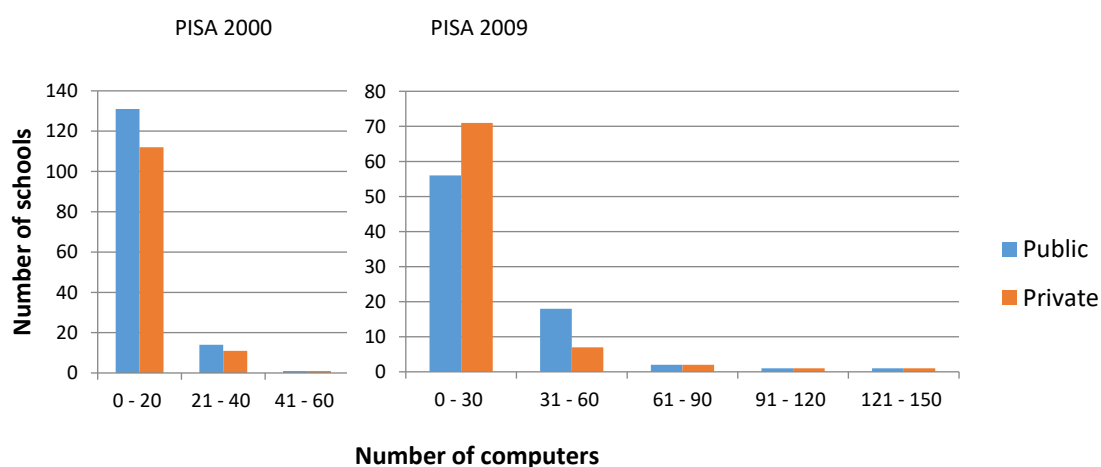


Figure 5.5 summarises information on the number of computers in each school as part of the ICT at school variable for each year of the PISA study. In PISA 2000 and PISA 2009, the pattern of use of computers for education is the same. During these periods, it is evident that both public and private schools have a few computers with less than 60 items.

Both the 2018 and 2020 surveys asked different questions about the use of ICT by schools and the responses are not equivalent to those in prior cycles (PISA 2000 and 2009). Response categories range from 'Strongly disagree' to 'Strongly agree'. As seen in Table 5.5, more than 45% of schools in 2018 agree, and more than 20% strongly agree, that the availability of the internet, bandwidth, devices for instruction, computing capacity, and adequate software is sufficient. Accordingly, most of the school participants are in a condition in which ICT is widely available. There was almost the same level of agreement in 2018 as in 2020, where more than 45% agreed that the internet, its speed, instruction devices, and computer capacity are sufficient. Nevertheless, there is a lack of sufficient software, as the principals reported disagree.

Table 5.5

The schools' rating for ICT at School on PISA 2018 and 2020 follow-up data

ICT at School in percentage	Strongly disagree		Disagree		Agree		Strongly agree	
	2018	2020	2018	2020	2018	2020	2018	2020
Internet is sufficient	6.2	0	14.5	9.1	55.2	63.6	24.2	27.3
The bandwidth or speed is sufficient	5.6	0	16.3	9.1	52.4	45.5	25.7	45.5
The digital device for instruction is sufficient	6.5	9.1	26.0	36.4	45.3	54.4	22.2	0
Sufficiently powerful in terms of computing capacity	5.9	0	24.5	27.3	48.1	72.7	21.5	0
The adequate software is sufficient	6.8	9.1	2.6	45.5	48.1	27.3	19.2	18.2

5.4.3 SCHOOL FUNDING

The data on school funding is presented in the following figures. There are four different sources of funding: government, student fees, donations, and others. Each source is presented in two figures of public and private schools.

As seen in Figure 5.6, most public schools received a higher share of government funding than private schools, about 60-100% compared to 0-40% for most private schools. The three PISA cycles indicated that the government's share of funds to public schools has increased yearly.

Figure 5.6

Funding from the government according to the type of schools

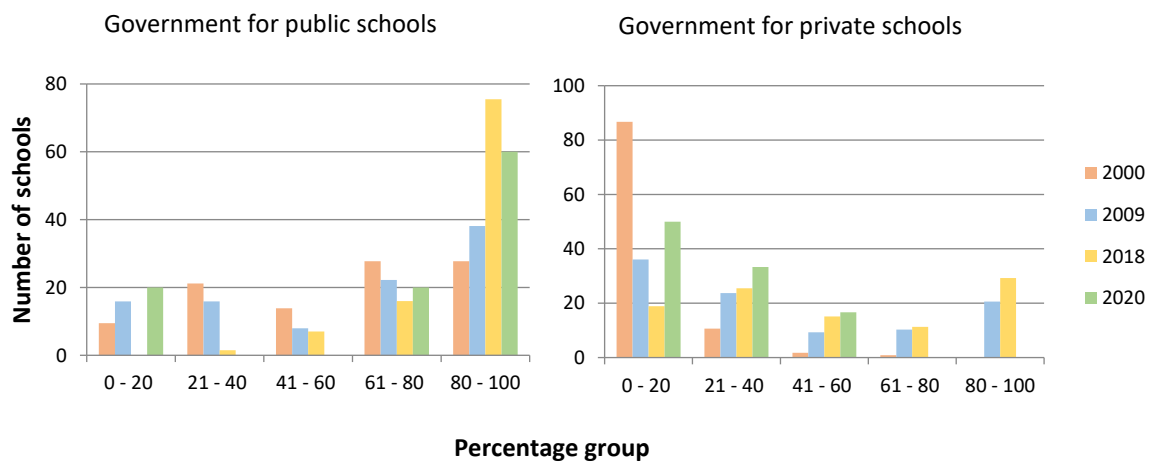


Figure 5.7 shows the number of school funds generated by student fees. In general, public school student fees ranged from 0-20%, whereas private school student fees ranged from 0-100%. It means that if a student attends a private school, the parent must pay different amounts depending on the school system, as some schools may rely on parents to run the schools.

Figure 5.7

Funding from student fees according to the type of schools

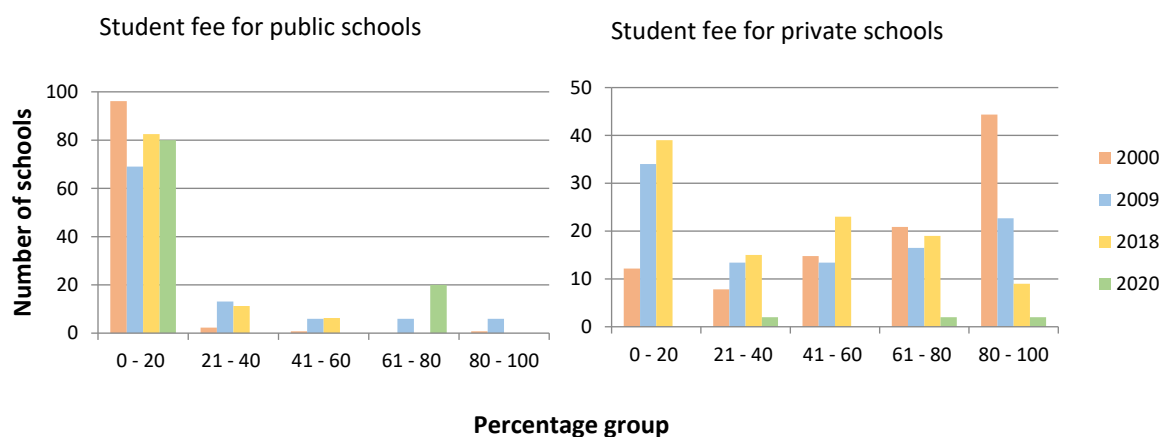
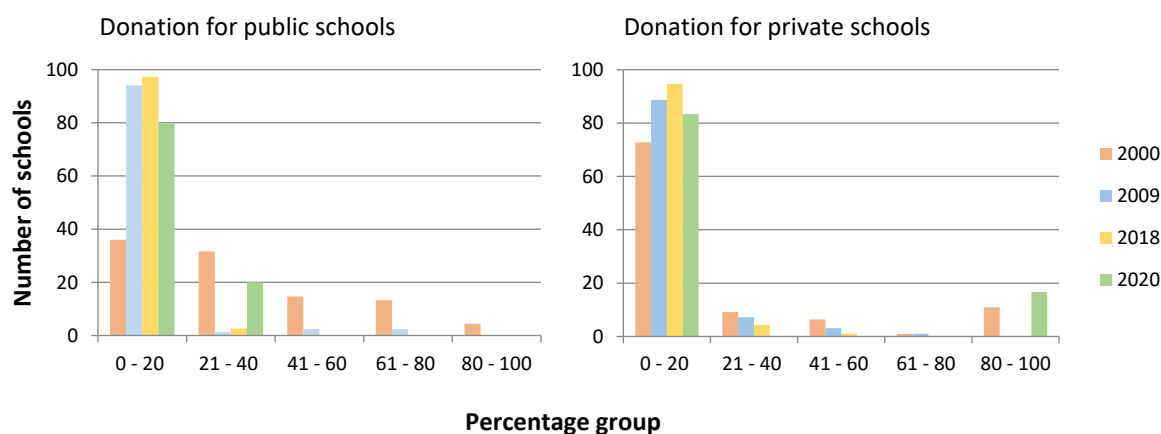


Figure 5.8 shows the school fund generated by donations, such as benefactors, bequests, sponsorships, and parent fundraising. For public schools, this pattern was similar to the pattern of funding from student fees, in which most public schools receive between 0 to 20 per cent. In the same way, private schools received an average of 0-20% of their school funding from donations.

Figure 5.8

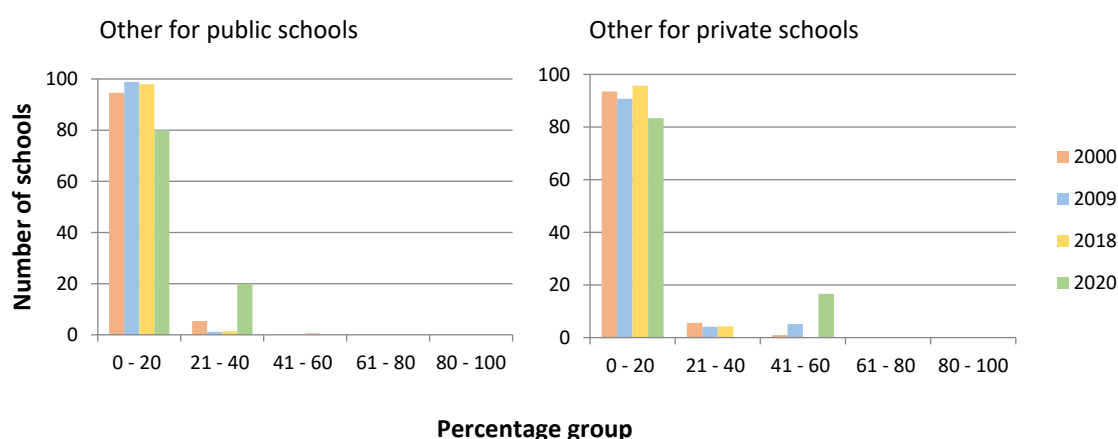
Funding from donations according to the type of schools



The last school source comes from others. Unfortunately, PISA did not provide further details about these sources. As shown in Figure 5.9, other sources of school funds are also included in the school fund. About 80 to 100 of both public and private schools claimed that they receive 0-20 per cent of their budgets from other sources in each cycle. In addition, schools in each cycle did not report that they received more than 60% of their funds from this type of source.

Figure 5.9

Funding from others according to the type of schools



5.5 TEACHER DEMOGRAPHIC INFORMATION

As part of the data collection for 2020, this study involved Bahasa Indonesia teachers from every selected school. Since the characteristics of the Bahasa Indonesia teacher may be associated with students' reading literacy, it is necessary to discuss the characteristics of the teachers in more detail. The following section presents the data on teacher respondents concerning their gender, age, academic qualification, number of years of experience, and time

spent reading. The 2020 follow-up data from 11 selected schools contain information on 33 teachers in total.

5.5.1 GENDER AND AGE

Among the 33 teachers involved in this study, 23 (69.7%) were female and 10 (30.3%) were male. Table 5.6 shows the gender distribution of these respondents.

Table 5.6

Teachers' Gender Distribution (n=33)

Gender	Frequency	Per cent
Female	23	69.7
Male	10	30.3
Total	33	100.0

Figure 5.10

Teacher's age group distribution (n=33)

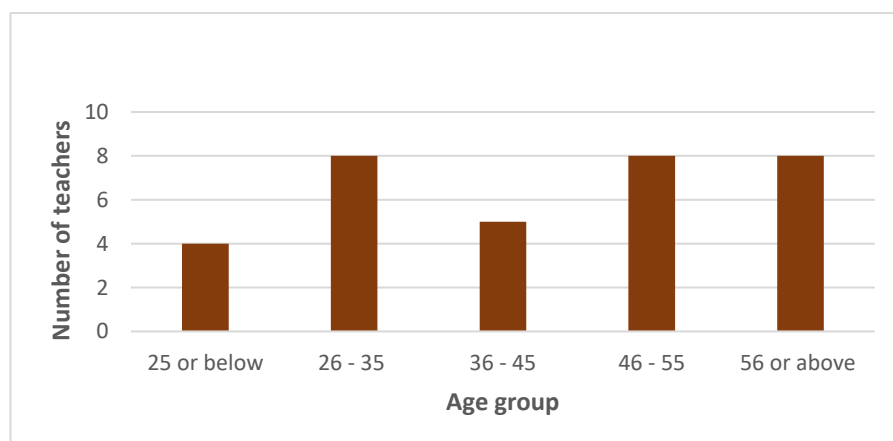


Figure 5.10 shows the age profile of the teachers involved in this study. Of 33 teachers were divided into five age categories, the average age ranged from under 25 years old to over 56 years old. A similar percentage of respondents (8 teachers) was found in three

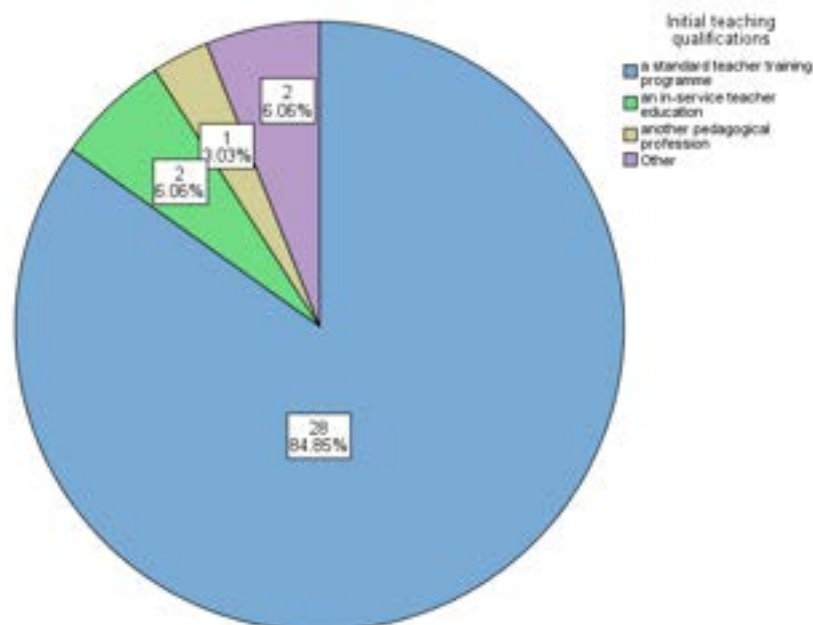
groups of ages ranging from 26 to 35, 46 to 55, and older than 56 years old. In the remaining two groups, there are six respondents aged 36 to 45 years and four respondents aged under 25 years.

5.5.2 TEACHING QUALIFICATION AND YEAR OF TEACHING EXPERIENCE

Among the 33 *Bahasa Indonesia* teachers as respondents in this study, the majority had a standard teacher training program obtained from an educational institution that qualified to educate or train teachers (n=28, 84.85%). Furthermore, in addition to two teachers (6.06%), one teacher (3.03%) attended a work-based teacher education or training program. The remaining two teachers (6.06%) attended training in a different pedagogical field. Figure 5.11 shows the distribution of the initial teaching qualifications of the teachers involved in this study.

Figure 5.11

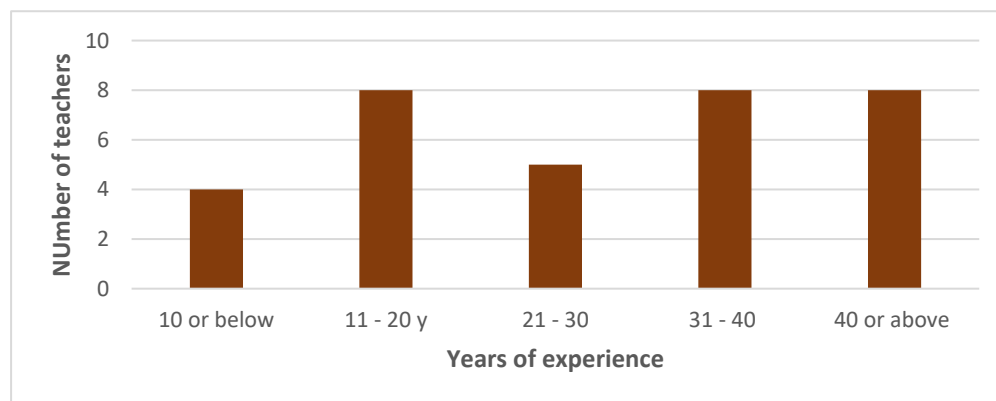
Teachers' initial teaching qualification



In terms of teaching experience in teaching *Bahasa Indonesia*, 33 teachers have different levels of long-term experience, ranging from less than 10 years to more than 40 years. In the same number of eight teachers with 11 to 20 years of experience, 31 to 40 years of experience, and more than 40 years of experience. Furthermore, five teachers have been teaching for 21 to 30 years. As for the remaining four teachers, they have less than 10 years of experience teaching *Bahasa Indonesia*. Figure 5.12 shows the years of experience of the teachers teaching *Bahasa Indonesia*.

Figure 5.12

Teachers' years of experience in teaching Bahasa Indonesia



5.5.3. TIME SPENT ON READING

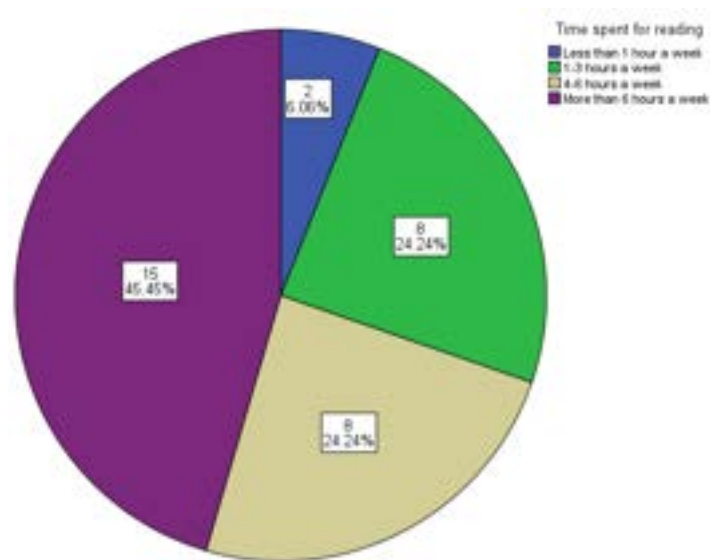
Teachers were asked how much time they spent reading outside of work hours each week. The response ranged from less than one hour, one to three hours, four to six hours and more than 6 hours a week. Figure 5.13 shows teachers' time spent reading.

Of the 33 teachers, almost half of them read outside work hours for approximately 6 hours a week (n=15, 45.45%). It indicated that they might read for at least one hour a day. A similar proportion of teachers (n=8, 24.24%) read between one and three hours a week and between four and six hours a week. The remaining number of teachers read less than one

hour a week (n=2, 6.06%). It was somewhat surprising that there are still teachers who read very little during the course of the week.

Figure 5.13

Teachers' time spent reading



5.6 PARENT DEMOGRAPHIC INFORMATION

Besides teachers, during the 2020 follow-up data collection, parents of selected students were requested to complete questionnaires regarding their involvement in students' reading activities. Parents' demographic information included their education, income, and employment. However, the student answers the questions regarding the education and employment of the mother and father, whereas the income is provided by the parents.

The data of parents as respondents are presented in Table 5.7. Of 534 parents, 6 were listed as missing, which means that 6 students were unable to have their parents fill out the questionnaire. The proportion of parents who were female guardians (n=320, 59.9%) was

higher than that of male guardians (n=149, 27.9%). The remaining 59 respondents (11%), classified as other, completed the questionnaires on behalf of their parents.

Table 5.7

Parents who complete the questionnaires

Parents	Frequency	Per cent	Valid Percent	Cumulative Percent
Mother or other female guardian	320	59.9	62.0	60.6
Father or other male guardian	149	27.9	28.2	88.8
Others	59	11.0	11.2	100
Total	528	98.9	100	
Missing	6	1.1		
TOTAL	534	100		

5.6.1 MOTHER AND FATHER EDUCATION

By asking students to provide their mother and father's highest level of education as well as their latest academic qualification, this study received their mother and father's education demographics. In PISA, international academic qualifications are based on the International Standard Classification of Education/ISCED (United Nations Educational Scientific and Cultural Organization, 2011). There are ISCED level 0 to level 8: level 0 – Early childhood education; level 1 – Primary education; level 2 – Lower secondary education; level 3 – Upper secondary education; level 4 – post-secondary non-tertiary education; level 5 – Short-cycle tertiary education; level 6 – Bachelor's or equivalent level; level 7 – Master's or equivalent level, and level 8 – Doctoral or equivalent level.

Table 5.8 presents the parents' highest level of schooling provided by students. Of 534 data, there were 52 mothers and 51 fathers who were unidentified about their educational level, which was then treated as missing data. According to the table, the higher the level, the

more parents are present. A total of four mothers and seven fathers did not complete ISCED level 1 or primary education, in contrast to 360 mothers and 352 fathers who completed their schooling until upper secondary education (ISCED level 3A). In Indonesia, it is equivalent to the senior high school level.

Table 5.8

Parents' highest level of schooling

Level Schooling	Frequency		Per cent		Valid Percent	
	Mother	Father	Mother	Father	Mother	Father
ISCED level 3A	360	352	67.4	65.9	74.7	72.9
ISCED level 3B, 3C	49	51	9.2	9.6	10.2	10.6
ISCED level 2	39	44	7.3	8.2	8.1	9.1
ISCED level 1	30	29	5.6	5.4	6.2	6.0
Did not complete ISCED level 1	4	7	0.7	1.3	0.8	1.4
Total	482	483	90.3	90.4	100	100
Missing values	52	51	9.7	9.6		
Total	534	534	100	100		

The following table presents the parent education qualification from ISCED level 5 to level 8. Students were requested to tick 'Yes' in the questionnaire if their mother and father have each qualification. The ISCED level 5 – short-cycle tertiary education, is equivalent to the Diploma in Indonesia, which includes one year, two years, three years, and four years of study.

Table 5.9

The number of parents with their qualification

ISCED 5		ISCED 6		ISCED 7		ISCED 8	
Mother	Father	Mother	Father	Mother	Father	Mother	Father
67	82	36	50	177	181	8	15

By Table 5.9, the most academic qualification that Indonesian parents possess is ISCED 7; therefore, these parents possess a master's degree. Of 534 data, 67 mothers and 82 fathers reached education until their Diploma (ISCED 5). In addition, only 36 mothers and 50 fathers had a bachelor's degree as the highest level of education. Surprisingly, 177 students have a mother who holds a master's degree and 181 have a father who holds one. It seems that attaining an education as high as a master's degree instead of a bachelor's degree is becoming increasingly commonplace today. Meanwhile, at the highest education level, ISCED 8, there were 8 students whose mothers had completed their education to the level of a Doctorate, and 15 whose fathers had completed the same.

5.6.2 PARENT INCOME

The study also asked parents to provide information on their annual household income. In this case, the number of incomes is converted into Rupiah (Rp), the Indonesian currency. Six groups were present, ranging in size from less than Rp 500,000 to more than Rp 10,000,000 per month. A summary of the parent's monthly household income is presented in Table 5.10.

Table 5.10

Parents' monthly household income

Monthly income	Frequency	Per cent	Valid Percent	Cumulative Percent
Less than Rp. 500,000	24	4.5	4.5	4.5
Rp. 500,000 or more but less than Rp. 1,000,000	31	5.8	5.8	10.3
Rp. 1,000,000 or more but less than Rp. 2,500,000	68	12.7	12.7	23.0
Rp. 2,500,000 or more but less than Rp. 5,000,000	81	15.2	15.2	38.2
Rp. 5,000,000 or more but less than Rp. 10,000,000	90	16.9	16.9	55.1
Rp. 10,000,000 or more	146	27.3	27.3	82.4
Missing values	94	17.6	17.6	100.0
Total	534	100.0	100.0	

Of 534 parents, there were 94 who did not respond to their monthly income, so these were treated as missing data. In the table, it is evident that the greater the income, the greater the number of parents. In Yogyakarta city, the place where the 2020 follow-up data are collected, the minimum wage is Rp. 2,150,000 per month. There are 55 parents who have income below the minimum wage for their region, according to the table. Parents with incomes below Rp 500,000 ranked the worst (n=24, 4.5%), followed by parents with incomes between Rp 500,000 and Rp 1,000,000 (n=31, 5.8%). Another 68 parents (12.7%) live between Rp. 1,000,000 and Rp. 2,500,000. It is estimated that 59.4% of the parents in the three groups (n=317) earn more than the minimum wage each month. In other words, more than half of the total students live in families that have an income sufficient to support themselves.

5.7 SUMMARY

The results present in this chapter provide a description of the demographics of students, schools, teachers, and parents, as well as a description of the scales used in the study. The demographics of students and schools are provided in all four cycles, but the demographics of teachers and parents are provided only in the 2020 follow-up study. Participants in three cycles of PISA (years 2000, 2009, and 2018) are from different cities in Indonesia, however, the participants in the follow-up study in 2020 came from Yogyakarta. The number of females and males for all cycles is almost equal. Nevertheless, for teachers, two-thirds of the teachers were females. In addition, two-thirds of the parents who completed the questionnaires are mothers or female guardians as opposed to fathers or male guardians. For schools, it is found that the majority of schools were located in rural areas, including villages, small towns, and towns. There is a fairly even distribution of public and private schools participating in the survey.

According to student demographic information concerning the number of books at home, it is common for a student to have between 11 and 100 books at home, followed by fewer than ten books. In terms of reading time, the majority of students read 30 minutes or less per day, followed by 31 to 60 minutes per day. In addition, it is rare for a student to spend more than two hours reading each day.

The results from schools show that in 2000 and 2009, both public and private schools have a few computers. Contrary to this, the majority of school participants in 2018 and 2020 are in a situation where ICT was widely available. In terms of school funding, the results indicate that among the four funding sources (government, student fees, donations, and others), public schools receive a greater budget than private schools, however, private schools are dependent on student fees for their operation.

A majority of teachers possess a teacher training program obtain from an educational institution that is qualified to educate or train teachers. There is an almost even proportion of teachers with less than ten years of teaching experience and teachers with more than 40 years of experience in teaching Bahasa Indonesia. In terms of time spent reading, most teachers read more than six hours each week, followed by four to six hours weekly.

Among the data presented by the parents are their highest level of academic education and their monthly income. It is found that a greater percentage of parents completed their formal education up to the upper secondary level, which is equivalent to senior high school in Indonesia. At the higher level of education, the number of mothers and fathers holding master's degrees is more than those holding bachelor's degrees at the higher level of education. There are a few parents who had only a very small monthly income. As well, there are more than half of the total number of parents earn more than the regional minimum wage, which means that students live in a sufficiently supportive environment.

Demographic background information and descriptive analysis provide the basis for subsequent analyses, particularly at the student, teacher, and school levels.

Chapter 6

Instrument Validation: Confirmatory Factor Analysis

6.1 INTRODUCTION

This study examines factors at the student-, school-, and teacher-levels and analyses their relationships with regard to reading literacy of Indonesian students in accordance with the PISA test. The paradigm is based on the view available in the literature that students, schools, teachers, and parents' characteristics as predictors of Indonesian reading literacy. As discussed in Chapter 5, the analysis examines students and schools in the first three PISA cycles (2000, 2009, and 2018), whereas in the 2020 follow-up data, the analysis examines students, schools, teachers, and parents, in which parent belongs to the student-level. To examine the students, schools, teachers, and parents and the relevant relationships, it is necessary to employ the scale that encompasses constructs related to reading achievement outcomes. In PISA, questions to assess students, schools, teachers, and parents are selected from a larger pool based on theoretical considerations and prior research (OECD, 2019). Likewise in the previous chapter, all questions are clearly defined and operationalised from abstract concepts. Even so, it is necessary to test the validity and reliability of the constructs to determine whether they were good indicators of the latent variables and fit, particularly in the Indonesian context. Furthermore, establishing the validity and reliability of the constructs used in this study is essential for providing accurate estimates when analysing student-, school-, and teacher-level models. It is therefore necessary to examine the constructs employed in the instruments. Instruments use in the analysis include student-, school-, and teacher-level instruments. At the student-level, instruments uses include student questionnaires, student reading

achievement tests, and parent questionnaires. The school instrument applies the school questionnaire, while the teacher instrument applies the teacher questionnaire. In Table 6.1, the details of the questionnaires used in this study are presented.

Table 6.1

The questionnaires used for student-, teacher-, and school-level in the study

Cycle	Student-level	Teacher-level	School-level
PISA 2000	1. Student questionnaire PISA 2000 2. Reading test PISA 2000	-	School questionnaire PISA 2000
PISA 2009	1. Student questionnaire PISA 2009 2. Reading test PISA 2009	-	School questionnaire PISA 2009
PISA 2018	1. Student questionnaire PISA 2018 2. Reading test PISA 2018	-	School questionnaire PISA 2018
2020 follow-up study	1. Student questionnaire PISA 2018 2. Reading test PISA 2018 3. Parent questionnaire PISA 2018	Teacher questionnaire PISA 2018	School questionnaire PISA 2018

As shown in the table that each cycle referred to its year of scale except for 2020 follow-up study that adopted PISA 2018. The constructs used in all questionnaires have a variety of scale, Likert scale, polytomous, and dichotomous scale. CFA allows the study to confirm the structures of the observed responses and the relationship between them and their latent traits. Accordingly, these structures will be used for further Rasch analysis as described in the following chapter. In addition, this measurement model provides a full specification of the structural theory of the Structural Equation Modelling (SEM) model based on the CFA measurement model.

In general, the construct cannot be directly measured or observed, thus they are treated as latent variables. Meanwhile, items on the constructs represent observed indicators of the latent

condition. The school-level data consist of multiple latent variables or constructs which include curriculum, ICT at school, resources and technology, assessment, leadership, and school climate. Each construct has different items namely observed variable. For example, the scale of assessment has six observed variables: parent information, promotion decisions, instructional grouping, national comparison, progress monitoring, and teacher effectiveness. It is essential to establish the measurement model before proceeding with further SEM analyses. When the SEM model is poorly fitted, it indicates that the measurement model is miss specified than that the structural model is not established well (Brown, 2015). Therefore, CFA was applied in this study. When the CFA fits well, and more observed variables are available, further estimates of latent variables can be obtained using SEM model based on CFA.

To validate the instruments or construct, Confirmatory Factor Analysis (CFA) is applied. The CFA in this study was performed with data analysis software namely Mplus 7.1. CFA is used to verify the factor structures of a set of observed variables (Brown, 2015; Byrne, 2013; Chen et al., 2019). CFA was used to test the construct validity of the instrument, including the convergent validity. The assessment of convergent validity is performed using factor loadings, the average variance extracted (AVE), and composite reliability (CR) (Shrestha, 2021). AVE measures the variance a construct takes compared to the variance due to measurement errors (Fornell & Larcker, 1981). The AVE is the sum of squared loadings divided by the number of items.

A CR is calculated by comparing several indicators of a construct that are in agreement with each other (Shrestha, 2021). AVE and CR have a range of 0 to 1, with a higher value indicating higher reliability. If the AVE exceeds or equals 0.5, the validity of the model is confirmed. Meanwhile, the values of CR between 0.6 and 0.7 are acceptable, although a value higher than 0.7 is best. If the AVE is less than 0.5, but the CR is greater than 0.6, convergent

validity is still adequate according to (Fornell & Larcker, 1981). A CR can be derived for each construct by summing the squares of completely standardised factor loadings divided by the sum plus variance of the error term.

Regarding the data preparation, the data were selected from the PISA questionnaires in a file using IBM SPSS 26 before conducting the analysis of CFA. Also, for the CFA analysis, Mplus 7.1 was employed to produce a graphical image of each scale and generating the fit indices values for the constructs and the factor loadings. The chapter describes the validation thoroughly for each cycle from the year 2000 to 2020. It begins with student-level data first, followed by school-level data, except for the 2020 follow up study that included with teacher-level and parent data on student-level data. The ensuing section is devoted mainly to describing the scores response, factor loadings, and a fit of each scale. After which, the diagram of the structure is presented.

6.2 VALIDITY IN CFA

In Mplus, the Root Mean Square Error of Approximation (RMSEA), the Comparative-Fit-Index (CFI), and the Tucker-Lewis-Index (TLI) are given and checked by confirmatory factor analysis via χ^2 / df , RMSEA, CFI and TLI values (Hu & Bentler, 1999). The CFI index lies between 0 and 1. When the index is bigger than 0.8 the model is acceptable. In this study, if the value bigger than 0.8 indicates that is a good model. TLI has the same meaning as Comparative-Fit-Index (CFI), its range is from 0 to 1. When the TLI or CFI is between 0.8 and 0.9, the model is acceptable. In this study, if TLI and CFI > 0.9, the model fits the data very well. A RMSEA < 0.05 shows an adequate model. When the value of RMSEA on the tested model is smaller than 0.08, the fit of the model is acceptable. On the other hand, the model is unacceptable when the

value is bigger than 0.1. The model data fit was examined by referring to the indices indicated in Table 6.2.

Table 6.2

Acceptable Levels of Goodness of Fit Indices

Fit Indices	Acceptable Fit	Good Fit
χ^2	$2 df < \chi^2 \leq 3df$	$0 < \chi^2 \leq 2df$
χ^2 / df	$2 < \chi^2 / df \leq 8df$	$0 < \chi^2 / df \leq 2$
RMSEA	$0.05 < RMSEA \leq 0.09$	$0 \leq RMSEA \leq 0.05$
CFI	$0.80 \leq NNFI \leq 0.90$	$0.90 \leq NNFI \leq 1.00$
TLI	$0.80 \leq CFI \leq 0.90$	$0.90 \leq CFI \leq 1.00$

Beside the fit of the model, another result of CFA in this study is the determination of factor loading (λ) of each item. The factor loading explains the correlation between the observed variables and latent variables. The observed variables with factor loadings of at least above the cut-off value (0.30) are often regarded as strong indicators or salient variables (Brown, 2015; Wang, 2009). The factor loadings were built by the original observed variables in the syntax. The factor loading is free to vary (Brown, 2015). If the conditions are not met (the factor loading is ≤ 0.3), substantive considerations allow for the measurement to be revised to conform the model. In addition, the convergence validity of the constructs for the content coverage measure based on the AVE, with 0.5 as a cut-off value (Hair et al., 2010). The AVE indicates the percentage of the variance interpreted by the latent factors. Besides assessing the validity of the constructs, the study also assessed the reliability of the constructs through CR values. Explicitly, the CR value indicates internal consistency of a construct, with 0.6 as a cut-off value (Hair et al., 2010). The present study applied PISA questionnaires from three cycles, in which a longitudinal study was conducted later

using the same factor from each questionnaire. In this case, if factor loadings were below the cut-off value in one cycle and acceptable in other cycles, the instruments were to remain without being deleted for comparative purposes.

6.3 MEASURES OF STUDENT-LEVEL FACTORS

Generally, the constructs from student questionnaires in this study involves gender, home facilities (the sub-construct are number of books and home educational resource), reading activities (the sub-constructs are reading engagement, reading diversity, and online reading) and reading states (the sub-constructs are reading strategies, reading confidence and reading time). However, there is a slightly difference in the sub-constructs for each cycle. PISA 2000 did not include sub-construct for online reading as part of scale reading activities and reading strategies as part of scale reading states. Meanwhile, in PISA 2009 did not include a sub-construct of reading confidence in the scale of reading states.

In CFA, only construct with observed variables is allowed to be analysed. For PISA 2000, the student-level consists of constructs including *home educational resources [hedres]*, *reading engagement [engread]*, *reading diversity [divread]*, and *reading confidence [confi]*. For PISA 2009, the constructs involved are *home educational resources [hedres]*, *reading engagement [engread]*, *reading diversity [divread]*, *online reading [online]*, and *reading strategies [stra]*. For PISA 2018, the constructs involved are *home educational resources [hedres]*, *reading engagement [engread]*, *reading diversity [divread]*, *online reading [online]*, *reading strategies [stra]* and *reading confidence [confi]*. Table 6.3 summarises the student constructs used in CFA.

Table 6.3

The student-level constructs used in CFA Analysis

Student constructs	2000	2009	2018	2020
home educational resources [hedres]	hedres	hedres	hedres	hedres
reading engagement [engread]	engread	engread	engread	engread
reading diversity [divread]	divread	divread	divread	divread
online reading [online]	-	online	online	online
reading strategies [stra]	-	stra	stra	stra
reading confidence [confi]	confi	-	confi	confi

6.3.1 HOME EDUCATIONAL RESOURCES

Responses were scored on a dichotomous scale of Yes=1 and No=2 in order to assess whether resources at home are available. There were seven selected items in total in regard to home educational resources for reading literacy such as desk, study place, computer, software, textbooks, reference book, and dictionary. Reference books and dictionaries are not included in PISA 2000, so there are only five items: desk, study place, computer, software, and textbooks.

Table 6.4 presents the descriptive statistics and construct validity for home educational resources for PISA 2000, 2009, 2018, and 2020 follow-up data. The mean scores indicate that the scores within four cycles have remained stable, despite the fact that PISA 2009 has recorded the highest mean scores for all items. Since the codes are 1 and 2, the closer the mean to 1 the higher the proportion of students who answer Yes=1 and vice versa. The highest mean score was item ‘software’ in PISA 2000 (M=1.478), ‘software’ in PISA 2009 (M=1.841), ‘reference’ in PISA 2018 (M=1.776) and also in 2020 follow-up data (M=1.709). It can be reported that the most

common item students had at home in 2000 and 2009 was software and a reference book in 2018 and 2020.

As seen in the Table 6.4 that the result of this analysis confirms that factor loadings values of all items in this scale were above the cut-off value (0.30). In each of the four cycles, the 'study place' had the highest factor loadings in 2000 (0.755), 'computer' in 2009 (0.916), 'software' in 2008 (0.860) and 'desk' in 2020 (0.801). On the other hand, the lowest were the item 'software' in 2000 (0.415), the item 'references' in 2009 (0.361), in 2018 (0.367), and in 2020 (0.347).

According to the convergence validity of the constructs using the AVE with a cut-off value of 0.5, all the AVE estimates were below the cut-off value (0.5). As most of the factor loading did not reach 0.7, when the AVE score was calculated, the results were below the cut-off value of 0.5: PISA 2000 was 0.329, PISA 2009 was 0.383, PISA 2018 was 0.363, and 2020 follow-up was 0.362. It means the percentage of variance interpreted by home educational resources constructs in four cycles were close to 40%. Meanwhile, the reliability of the constructs through CR values, with 0.6 as a cut-off value, indicates that all CR value for four cycles above the cut-off value (0.6). The highest CR value of home educational resources was in PISA 2009 (CR=0.794), followed by the value in 2020 data (CR=0.790), PISA 2018 (CR=0.782), and PISA 2000 (CR=0.695).

About model fit, according to Table 6.5, the CFI and TLI were within an acceptable fit (0.8 – 0.9) and within a good fit (0.9 – 1.0). Likewise, the RMSEA values were within the range of an acceptable (0.05 – 0.09) and good fit (0.00 – 0.05). The lowest RMSEA value was in PISA 2000 (RMSEA= 0.017) while the greatest was in PISA 2018 (RMSEA=0.086). Thus, results showed that the final CFA model in each cycle for the scale of home educational resources [hedres]

provided good fit to the data. Figure 6.1 shows the factor loading model of the scale of home educational resources over the cycles.

Table 6.4

Descriptive Statistics and Construct Validity for Home educational resources for PISA 2000, 2009, 2018, and 2020 follow-up

Description	Variable Name	2000		Variable Name	2009		Variable Name	2018		Variable Name	2020		Factor Loadings			
		Mean	SE		Mean	SE		Mean	SE		Mean	SE	2000	2009	2018	2020
Software	ST21Q03	1.478	0.006	ST20Q05	1.841	0.005	ST11Q05TA	1.667	0.004	ST11Q05TA	1.491	0.022	0.415	0.087	0.860	0.560
Dictionary	ST21Q05	1.162	0.004	ST20Q12	1.058	0.003	ST11Q12TA	1.061	0.002	ST11Q12TA	1.085	0.024	0.430	0.524	0.496	0.537
Study place	ST21Q06	1.249	0.005	ST20Q03	1.402	0.007	ST11Q03TA	1.338	0.004	ST11Q03TA	1.227	0.027	0.755	0.467	0.477	0.670
Desk	ST21Q07	1.266	0.005	ST20Q01	1.231	0.005	ST11Q01TA	1.237	0.004	ST11Q01TA	1.115	0.014	0.713	0.513	0.519	0.801
Textbooks	ST21Q08	1.045	0.002	ST20Q10	1.094	0.004	ST11Q10TA	1.089	0.003	ST11Q10TA	1.097	0.013	0.456	0.411	0.429	0.678
References				ST20Q11	1.811	0.006	ST11Q11TA	1.776	0.004	ST11Q11TA	1.709	0.021		0.361	0.367	0.347
Computer				ST20Q03	1.798	0.006	ST11Q04TA	1.586	0.005	ST11Q04TA	1.400	0.022		0.916	0.858	0.511
Average Variance Extracted (AVE)													0.329	0.383	0.363	0.362
Construct Reliability (CR)													0.695	0.794	0.782	0.790

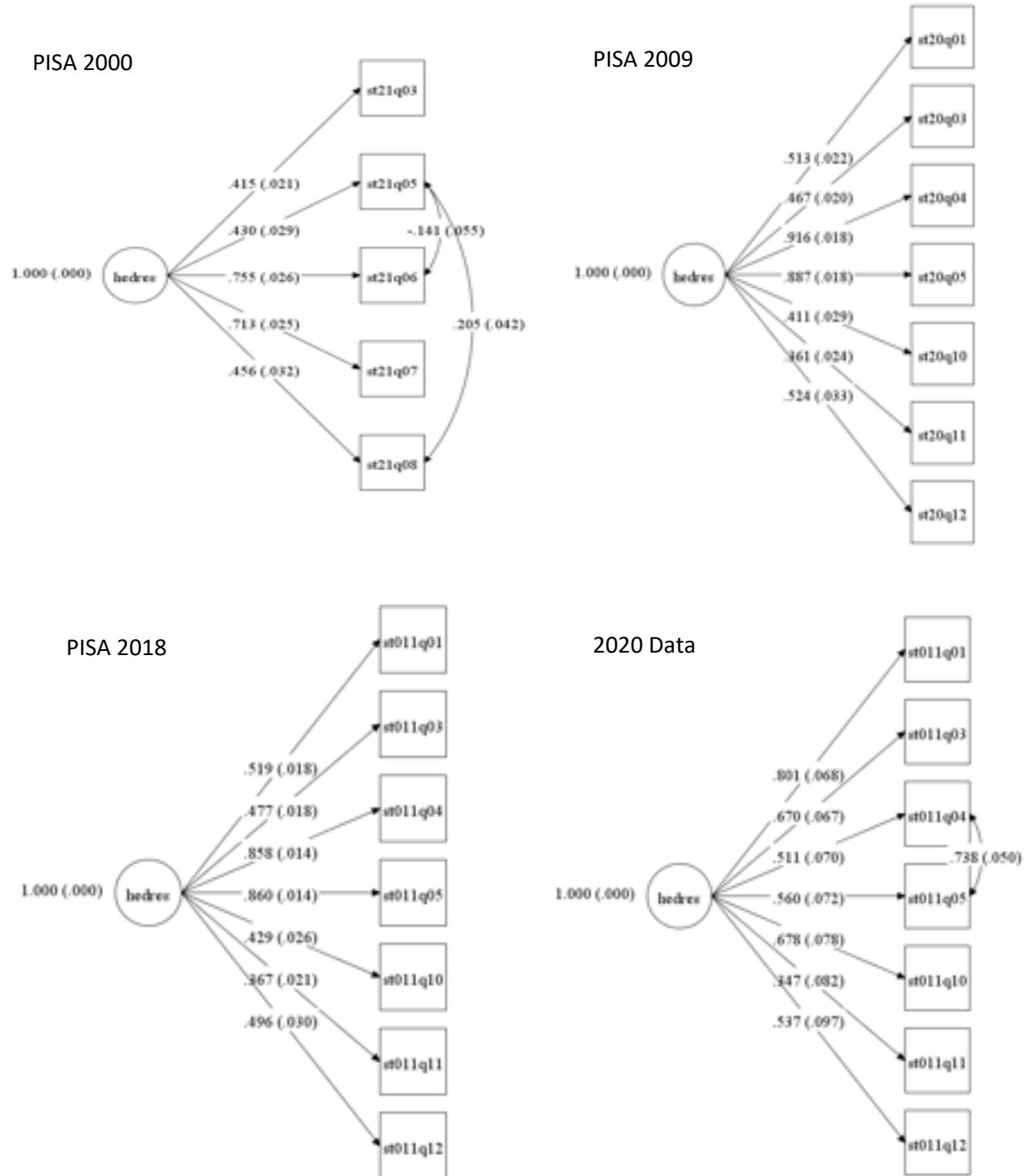
Table 6.5

Model Fit for Home educational resources for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	<i>df</i>	χ^2 / df	RMSEA	CFI	TLI
2000	2187.311	10	218.731	0.017	0.997	0.991
2009	6562.480	21	312.499	0.078	0.933	0.899
2018	7492.881	21	356.804	0.086	0.917	0.875
2020	795.993	21	37.904	0.028	0.993	0.989

Figure 6. 1

Factor model of home educational resources in PISA 2000, 2009, 2018, and 2020 follow-up data



6.3.2 READING ENGAGEMENT [ENGREAD]

Four-point Likert-scale responses were ranging from 1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree. As there were both positively and negatively worded items, the reverse scores needed to be computed for negatively worded items, so the higher score on the observed variables reflected a greater level of enjoyment of reading. As seen in Table 6.6, in PISA 2000, from a total of nine items, five items were positively worded and four were negatively worded. In PISA 2009, from a total of eleven items, seven items were positively worded and four were negatively worded. In PISA 2018 and 2020 follow-up data with a total of five items, three items were positively worded and two were negatively worded.

Table 6.6

Variable name for positively and negatively worded on reading engagement

Description	Worded	Variable Name			
		2000	2009	2018	2020
Only if I have to	Negative	ST35Q01	ST24Q01	ST160Q01IA	ST160Q01IA
Favourite hobby	Positive	ST35Q02	ST24Q02	ST160Q02IA	ST160Q02IA
Talking about books	Positive	ST35Q03	ST24Q03	ST160Q03IA	ST160Q03IA
Hard to finish	Negative	ST35Q04	ST24Q04		
Feel happy	Positive	ST35Q05	ST24Q05		
Waste of time	Negative	ST35Q06	ST24Q06	ST160Q04IA	ST160Q04IA
Enjoy library	Positive	ST35Q07	ST24Q07		
For information	Positive	ST35Q08	ST24Q08	ST160Q05IA	ST160Q05IA
Few minutes only	Negative	ST35Q09	ST24Q09		
Express opinions	Positive		ST24Q10		
Exchange books	Positive		ST24Q11		

The descriptive statistics and construct validity for home educational resources for PISA 2000, 2009, 2018, and 2020 follow-up data are presented in Table 6.7. The majority of mean scores exceeded two, indicating greater agreement regarding reading engagement. After recoding the

negatively worded, there was one meaning can be derived. The greater values were believed to indicate students enjoyed toward reading engagement more. On the other hand, the fewer values were believed to indicate students enjoyed less reading engagement. PISA 2000, PISA 2009, and PISA 2018 were all characterised by decreasing scores within three cycles, but in 2020 follow-up data, scores were back on the rise. The highest mean score was item 'Waste of time' in PISA 2000 (M=3.443), 'Feel happy' in PISA 2009 (M=3.072), 'Favourite hobby' in PISA 2018 (M=2.824), and 'For information' in 2020 follow-up data (M=3.519). Most students, in 2000, agreed that reading is a waste of time, but in 2009 they agreed that reading makes them happy, in 2018 they considered reading as a favorite hobby, and in 2020 they regarded reading as a method for seeking information.

It can be seen from the Table 6.7 that the results of this analysis confirmed that not all items in this scale had factor loadings above the cut-off value (0.30). Among the four cycle, PISA 2009 and 2020 follow-up data had all the factor loadings above the cut-off value (0.30). In PISA 2009, the highest was 'Favourite hobby' (0.685) and the lowest was 'Only if I have to' (0.312). While in 2020 follow-up data, the highest was 'For information' (0.695) and the lowest was 'Only if I have to' (0.316). On the other hand, in PISA 2000, three items were below the cut-off value: 'Hard to finish' (0.218), 'For information' (0.161) and 'Few minutes only' (0.202), with the highest value was 'Waste of time' (0.987). Those items were retained for compatibility reasons, as they were acceptable in the other three cycles. Moreover, in PISA 2018, one item was below the cut-off value (0.30) namely 'Talking about books' (0.244) and the highest value was 'Waste of time' (0.730).

According to the convergent validity of the constructs using the AVE in Table 6.7, all the AVE estimates were below the cut-off value (0.5). Since the factor loading for most factors did

not reach 0.7, the AVE score was below the cut-off value. As most of the factor loading were less than 0.7, the AVE also less than 0.5: PISA 2000 was 0.342, PISA 2009 was 0.262, PISA 2018 was 0.345, and 2020 follow-up was 0.307. This means all percentage of variance interpreted by reading engagement scale in four cycles were close to 40%. Meanwhile, the reliability of the constructs through CR values, with 0.6 as a cut-off value, indicates that all CR value for four cycles above the cut-off value (0.6). The highest CR value of reading enjoyment was in PISA 2000 (CR=0.738), followed by PISA 2000 (CR=0.727), PISA 2018 (CR=0.702), and 2020 follow-up data (CR=0.673).

In term of model fit, according to Table 6.8, the CFI and TLI among the four cycles were within 0.8 – 0.9 while RMSEA value were not all within the range (0.00 – 0.09). PISA 2000 had a CFI of 0.884 and a TLI of 0.818, but the RMSEA value was big (0.122). A similar pattern was found in the 2020 follow-up data, with a CFI of 0.890 and a TLI of 0.816, indicating an acceptable fit, but a high RMSEA value (0.112). PISA 2009 had a CFI of 0.897 and a TLI of 0.871, indicating an acceptable fit, and the RMSEA value (0.078) was within the range of acceptable fit. Meanwhile, PISA 2018 had a CFI of 0.999 and a TLI of 0.997 indicating a good fit with RMSEA value (0.086) was also within the range of acceptable fit. Figure 6.2 shows the factor loading model of the scale of reading enjoyment [engread] over the cycles.

Table 6.7

Descriptive Statistics and Construct Validity for Reading engagement for PISA 2000, 2009, 2018, and 2020 follow-up

Description	Variable Name	2000		Variable Name	2009		Variable Name	2018		Variable Name	2020		Factor Loadings			
		Mean	SE		Mean	SE		Mean	SE		Mean	SE	2000	2009	2018	2020
Only if I have to Favourite hobby Talking books Hard to finish Feel happy Waste of time Enjoy library For information Few minutes Express opinions Exchange books	ST35Q01	3.327	0.008	ST24Q01	2.140	0.110	ST160Q01IA	2.143	0.007	ST160Q01IA	3.022	0.039	0.338	0.312	0.724	0.316
	ST35Q02	3.127	0.007	ST24Q02	2.904	0.009	ST160Q02IA	2.824	0.007	ST160Q02IA	3.243	0.027	0.770	0.685	0.440	0.577
	ST35Q03	2.975	0.008	ST24Q03	2.821	0.009	ST160Q03IA	2.741	0.006	ST160Q03IA	3.132	0.026	0.605	0.489	0.244	0.670
	ST35Q04	2.832	0.009	ST24Q04	2.319	0.010							0.218	0.303		
	ST35Q05	3.172	0.008	ST24Q05	3.072	0.009							0.675	0.559		
	ST35Q06	3.443	0.008	ST24Q06	1.502	0.009	ST160Q04IA	1.748	0.007	ST160Q04IA	1.521	0.034	0.987	0.577	0.730	0.413
	ST35Q07	3.071	0.008	ST24Q07	2.920	0.009							0.698	0.683		
	ST35Q08	2.462	0.010	ST24Q08	2.534	0.010	ST160Q05IA	2.565	0.007	ST160Q05IA	3.519	0.031	0.146	0.389	0.642	0.695
	ST35Q09	2.906	0.010	ST24Q09	2.176	0.010							0.144	0.371		
				ST24Q10	2.809	0.009								0.543		
				ST24Q11	2.963	0.009								0.534		
Average Variance Extracted (AVE)													0.342	0.262	0.345	0.307
Construct Reliability (CR)													0.780	0.727	0.702	0.673

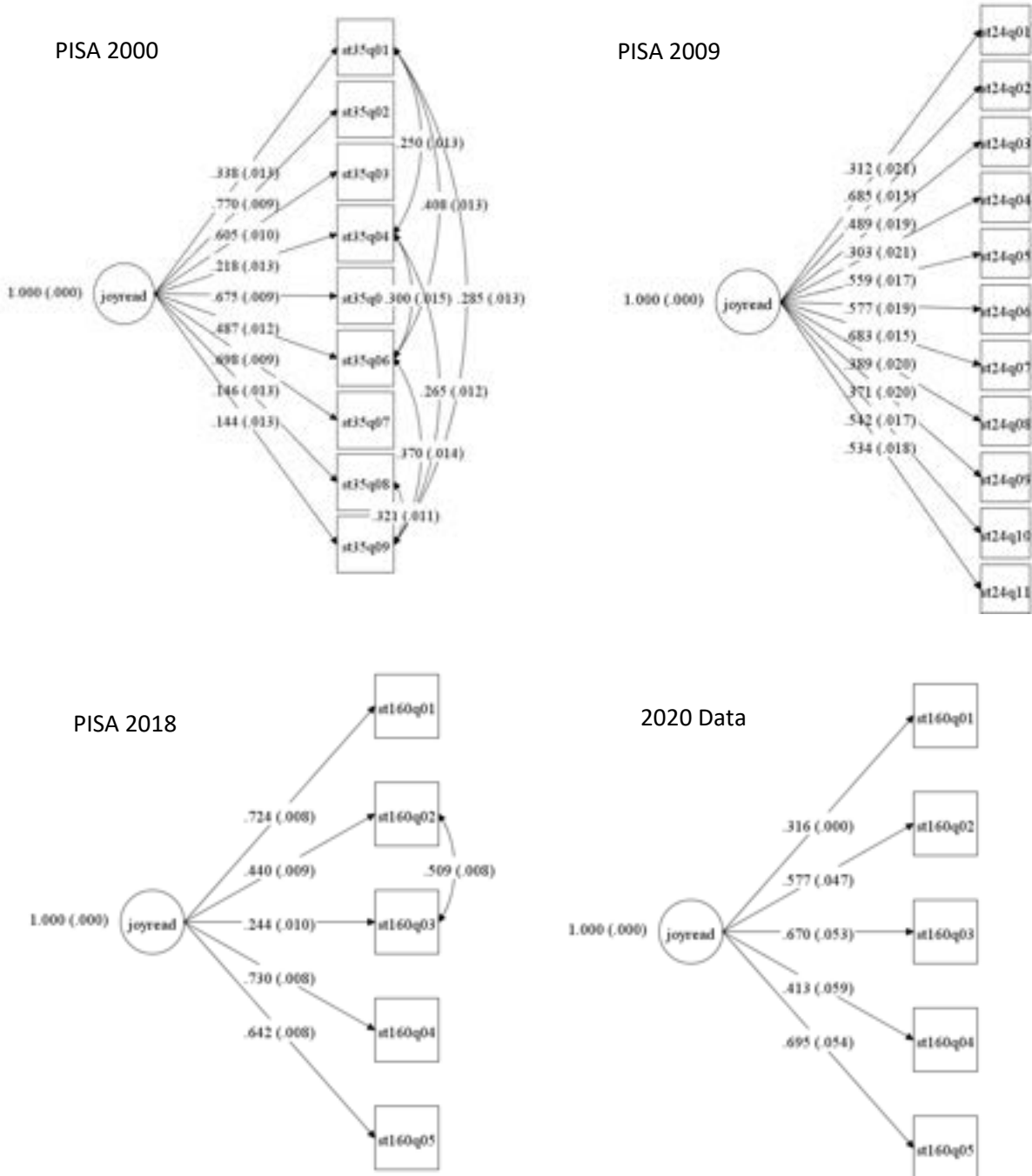
Table 6.8

Model Fit for Reading engagement for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	df	χ^2 / df	RMSEA	CFI	TLI
2000	20338.829	36	564.967	0.091	0.943	0.898
2009	7174.474	55	130.445	0.081	0.897	0.871
2018	20150.175	10	2015.018	0.023	0.999	0.997
2020	361.004	10	36.10	0.088	0.955	0.887

Figure 6.2

Factor model of reading enjoyment in PISA 2000, 2009, 2018, and 2020 follow-up data



6.3.3 READING DIVERSITY [DIVREAD]

Responses were scored on a five Likert scale ranging from Never or hardly ever=1, A few times a year=2, About one a month=3, Several to Several times a week=5 indicating the frequency the student read for several reading materials. As part of PISA 2000, six items of reading materials were assessed: magazines, comics, fictions, non-fictions, e-mail and web, and newspapers. Nonetheless, in other three cycles the item of 'Email & web' was removed from the student questionnaire. Therefore, the reading diversity constructs for PISA 2009, 2018, and 2020 were composed of five items reading materials: magazines, comics, fictions, non-fictions, and newspapers.

The descriptive statistics and construct validity for reading diversity for PISA 2000, 2009, 2018, and 2020 follow-up data are presented in Table 6.9. As a result of the mean scores, in 2000, it was determined that 'newspapers' were the most frequently read for reading material (M=3.877). Meanwhile, 'email and web' was the least popular reading options in 2000 (M=1.577). A similar trend was shown in 2009, with 'newspapers' being the most frequently read reading material (M=3.792), whereas the least popular reading material were 'non-fictions' (M=2.758). In 2018, among the reading materials reported, 'fictions' ranked the most frequently read for reading material (M=3.571) while 'magazines' ranked the least (M=2.639). The most frequently read reading material in 2020 was newspapers (M=4.489), while comics had the least frequency of reading (M=2.280).

As shown in Table 6.9, the results of this analysis confirmed that not all items in this scale had factor loadings above the cut-off value (0.30), especially in PISA 2000 and 2020 follow-up data. In PISA 2000, one item below the cut-off value (0.30) was 'email and web' (0.293) and the

highest factor loading was 'magazines' (0.708). Furthermore, in the 2020 follow-up data, 'newspapers' (0.016) was one item below the cut-off value, while 'fictions' (0.834) was the item with the highest value of factor loading. In contrast, PISA 2009 and 2018 had all the factor loadings above the cut-off value (0.30). In PISA 2009, the highest was 'magazines' (0.684) and the lowest was 'non-fictions' (0.415). While in 2018, the highest was 'Comics' (0.769) and the lowest was 'newspapers' (0.480). In order to ensure comparability, items below the cut-off value were retained since they had been accepted in other cycles.

The validity of the constructs using the AVE can be seen in Table 6.9, where all the AVE estimates were below the cut-off value (0.5). Since the factor loading for most factors did not reach 0.7, the AVE score was below the cut-off value. As most of the factor loading were less than 0.7, the AVE also less than 0.5: PISA 2000 was 0.307, PISA 2009 was 0.330, PISA 2018 was 0.471, and 2020 follow-up was 0.332. This means all percentage of variance interpreted by reading diversity scale in three cycles of PISA 2000, 2009, and 2020 data were close to 40%, while they were close to 50% in PISA 2018. Meanwhile, the reliability of the constructs through CR values, with 0.6 as a cut-off value, indicates that all CR value for four cycles above the cut-off value (0.6). The highest CR value of reading diversity was in PISA 2018 (CR=0.813), followed by PISA 2000 (CR=0.713), PISA 2009 (CR=0.704), and 2020 follow-up data (CR=0.659).

Table 6.10 shows in terms of model fit based on the CFI, TLI, and RMSEA values. The CFI and TLI among the four cycles were within the range of a good fit (0.90 – 1.00) and the RMSEA value were all within the range of an acceptable fit (0.05 – 0.09). PISA 2000 had a CFI of 0.947 and a TLI of 0.901, indicating a good fit, the RMSEA value was in an acceptable fit (0.082). Likewise in PISA 2009, with a CFI of 0.966 and a TLI of 0.931, indicating a good fit, the

RMSEA value was in an acceptable fit (0.074). Additionally in PISA 2018, a CFI of 0.933 and a TLI of 0.977, indicating a good fit, the RMSEA value (0.059) was within the range of acceptable fit. Lastly, 2020 follow-up data had a CFI of 0.964 and a TLI of 0.929 indicating a good fit with RMSEA value (0.074) was within the range of acceptable fit. Figure 6.3 shows the factor loading model of the scale of reading diversity [divread] over the cycles.

Figure 6.3

Factor model of reading diversity in PISA 2000, 2009, 2018, and 2020 follow-up data

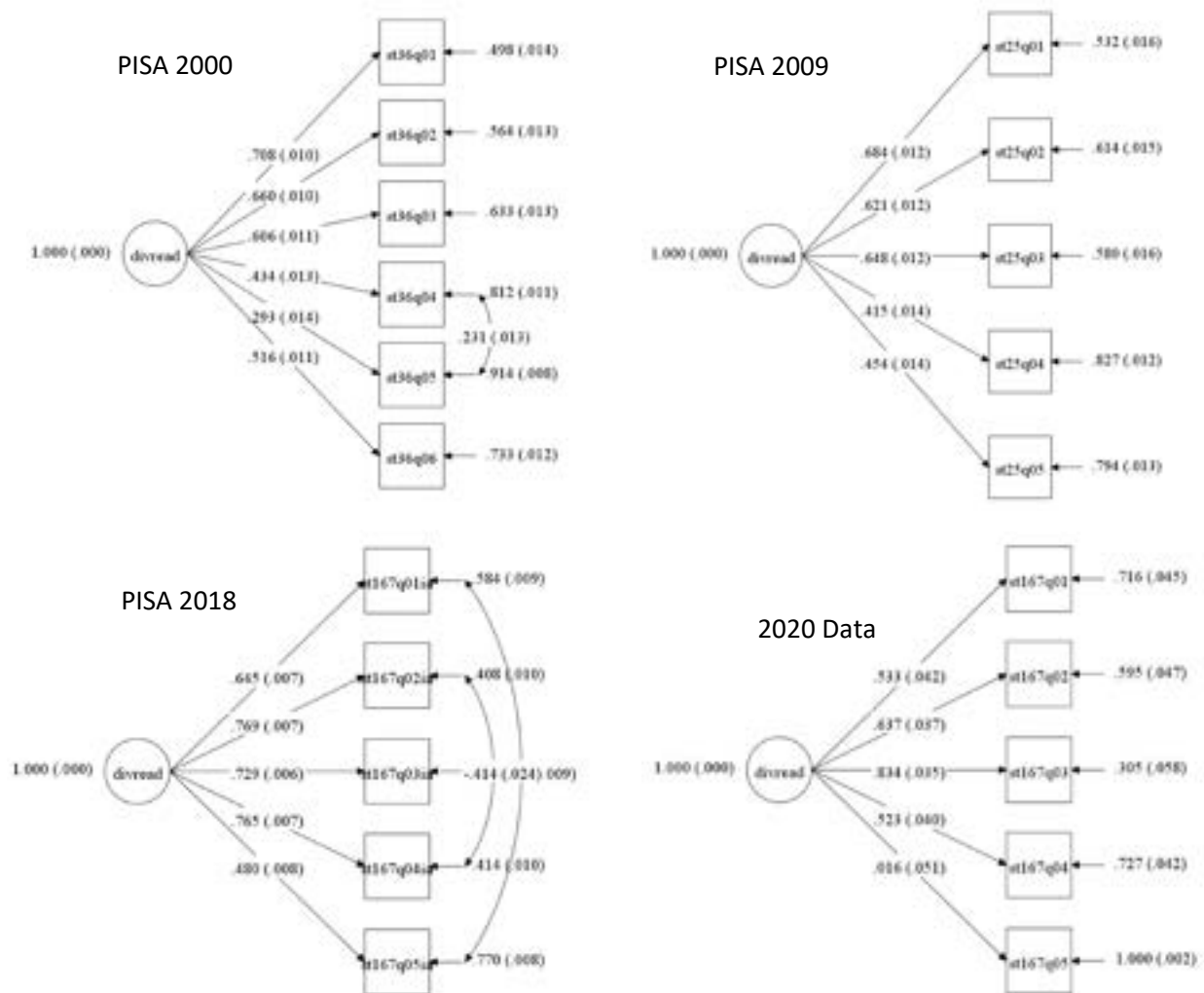


Table 6.9

Descriptive Statistics and Construct Validity for Reading diversity for PISA 2000, 2009, 2018, and 2020 follow-up

Description	Variable	2000		Variable	2009		Variable	2018		Variable	2020		Factor Loadings					
	Name	Mean	SE		Name	Mean		SE	Name		Mean	SE	Name	Mean	SE	2000	2009	2018
Magazines	ST3601	3.258	0.019	ST25Q01	3.389	0.018	ST167Q01IA	2.639	0.012	ST167Q01IA	3.243	0.057	0.708	0.684	0.645	0.533		
Comics	ST3602	2.930	0.019		3.315	0.019		ST167Q02IA	3.171		0.013	ST167Q02IA	2.280	0.063	0.660	0.621	0.769	0.637
Fictions	ST3603	2.752	0.019		3.543	0.018		ST167Q03IA	3.571		0.012	ST167Q03IA	2.881	0.061	0.606	0.648	0.729	0.834
Non-fictions	ST3604	2.163	0.018		2.758	0.021		ST167Q04IA	3.050		0.013	ST167Q04IA	3.501	0.058	0.434	0.415	0.765	0.523
Email Web	ST3605	1.577	0.014	ST25Q05	3.792	0.019	ST167Q05IA	2.900	0.013	ST167Q05IA	4.489	0.059	0.293	0.454	0.480	0.016		
Newspapers	ST3606	3.877	0.017										0.516					
Average Variance Extracted (AVE)													0.307	0.330	0.471	0.332		
Construct Reliability (CR)													0.713	0.704	0.813	0.659		

Table 6.10

Model Fit for Reading diversity for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	df	χ^2 / df	RMSEA	CFI	TLI
2000	6916.853	15	461.123	0.082	0.947	0.901
2009	4050.855	10	405.085	0.074	0.966	0.931
2018	18234.465	10	1823.446	0.059	0.993	0.977
2020	404.125	10	40.412	0.074	0.964	0.929

6.3.4 ONLINE READING [ONLINE]

As reading online was not measured in PISA 2000, the data were derived from the three follow-up cycles of PISA 2009, 2018, and 2020 follow-up data. Responses were scored on a five Likert scale ranging from I don't know what it is=1, Never or almost never=2, Several times a month=3, Several times a week=4, and Several times a day=5. This scale indicates the different types of activities that students participate in online such as reading emails, chatting online, reading online news, using an online dictionary or encyclopedia, searching information to learn about particular topic, taking part in online group discussion or forums, and searching for practical information online. The item of 'using an online dictionary or encyclopedia' was removed from the PISA 2018 data, so it is not included in the 2020 data either. It was, therefore, there were seven items of the online reading scale in PISA 2009 and six items were in PISA 2018 and 2020 follow-up data.

Table 6.11 presents the descriptive statistics and construct validity for online reading for PISA 2000, 2009, 2018, and 2020 follow-up data. According to the mean scores in PISA 2009, students were most frequently searching online for information on 'a particular topic' (M=2.645), while participating in online 'group discussions' (M=2.173) was the least common. Furthermore, as reported by PISA 2018, students were most likely to search online for information regarding 'chat online' (M=4.467), whereas 'reading emails' (M=2.799) was the least common online activity. In addition, for 2020 follow-up data, students were also most frequently searching online for information on 'chat online' (M=4.688), but the least common online activity was 'group discussions' (M=3.222).

Table 6.11 also shows the results of factor loading analysis. Among PISA 2009, 2018, and 2020 data, all factor loadings were above the cut-off value (0.30). The highest factor loading value in PISA 2009 was searching for information ‘learn about particular topic’ (0.808), while the lowest value was ‘particular topic’ (0.556). PISA 2018 followed the same pattern with the highest factor loading being 'particular topic' (0.838), but the lowest factor loading being 'reading emails' (0.504). Also, for 2020 follow-up data, the highest factor loading value was 'particular topic' (0.888), while the lowest value was ‘group discussions’ (0.476).

In addition to Table 6.11, it provides evidence of the validity of the constructs using the AVE. The AVE estimate for PISA 2009 was below the cut-off value (0.5), whereas the estimates for PISA 2018 and 2020 data were above the cut-off value (0.5). Since the factor loadings for most items in PISA 2009 did not reach 0.7, the AVE score was less than 0.5. It means the percentage of variance interpreted by online reading scale in PISA 2009 were close to 40%. On the other hand, most of the factor loadings in PISA 2018 and 2020 data reached 0.7, the AVE score was more than 0.5: AVE of PISA 2018 was 0.509 and AVE of 2020 was 0.511. It means the percentage of variance interpreted by online reading constructs in PISA 2018 and 2020 data were approximately 50%. Meanwhile, the reliability of the constructs through CR values, with 0.6 as a cut-off value, indicates that all CR value for PISA 2009, 2018 and 2020 follow-up data were above the cut-off value (0.6). The highest CR value of online reading scale was in PISA 2009 (CR=0.867), followed by PISA 2018 (CR=0.858), and 2020 follow-up data (CR=0.856).

The fit of the model based on the CFI, TLI, and RMSEA values is presented in Table 6.12. The CFI and TLI among the three cycles (PISA 2009, PISA 2018, and 2020 follow-up data) were within the range of a good fit (0.90 – 1.00). However, only in PISA 2018 had the RMSEA value within the range of an acceptable fit (0.05 – 0.09). PISA 2009 had a CFI of 0.945 and a TLI of 0.918, indicating a good fit, but the RMSEA value was not within the range (RMSEA=0.106). However, in PISA 2018, with a CFI of 0.977 and a TLI of 0.971, indicating a good fit, the RMSEA value was in an acceptable fit (0.079). 2020 follow-up data had a CFI of 0.948 and a TLI of 0.914 indicating a good fit, but RMSEA value was not within the range (RMSEA=0.124). In Figure 6.3, the factor loading model for online reading [online] over the three periods of PISA 2009, 2018, and 2020 follow-up data is illustrated.

Figure 6.4

Factor model of online reading in PISA 2009, 2018, and 2020 follow-up data

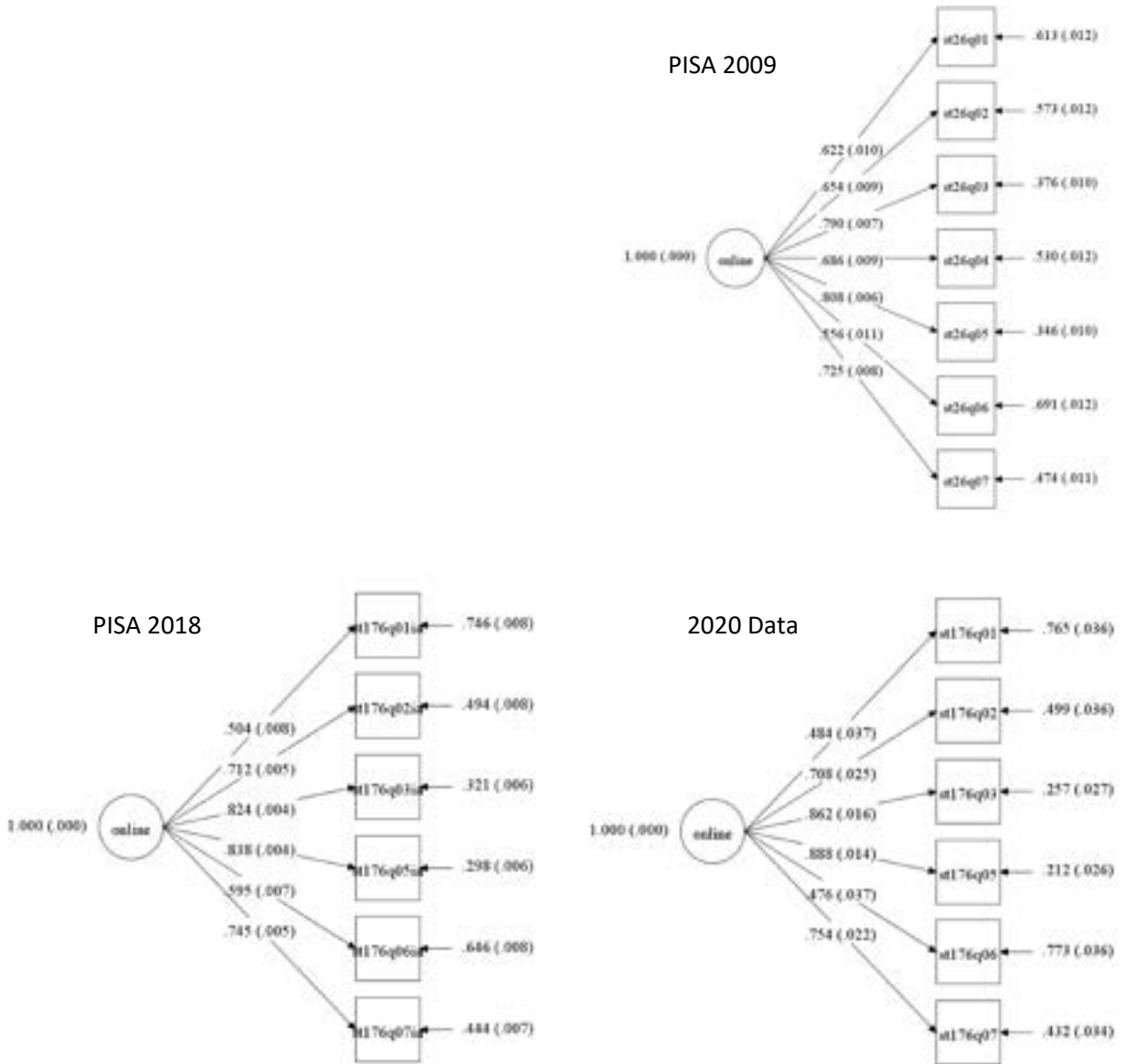


Table 6.11

Descriptive Statistics and Construct Validity for Online reading for PISA 2009, 2018, and 2020 follow-up

Description	2000		Variable Name	2009		Variable Name	2018		Variable Name	2020		Factor Loadings			
	Mean	SE		Mean	SE		Mean	SE		Mean	SE	2000	2009	2018	2020
Reading emails			ST26Q01	2.448	0.015	ST176Q01IA	2.799	0.011	ST176Q01IA	3.293	0.065		0.622	0.504	0.484
Chat online			ST26Q02	2.248	0.014	ST176Q02IA	4.467	0.010	ST176Q02IA	4.688	0.708		0.654	0.712	0.708
Reading news			ST26Q03	2.624	0.015	ST176Q03IA	4.017	0.011	ST176Q03IA	4.447	0.862		0.790	0.824	0.862
Using dictionary			ST26Q04	2.217	0.013								0.686		
Particular topic			ST26Q05	2.645	0.015	ST176Q05IA	3.983	0.011	ST176Q05IA	4.226	0.888		0.808	0.838	0.888
Group discussions			ST26Q06	2.173	0.012	ST176Q06IA	3.273	0.013	ST176Q06IA	3.222	0.476		0.556	0.595	0.476
Practical inform.			ST26Q07	2.523	0.014	ST176Q07IA	3.836	0.011	ST176Q07IA	4.034	0.754		0.725	0.745	0.754
Average Variance Extracted (AVE)													0.485	0.509	0.511
Construct Reliability (CR)													0.867	0.858	0.856

Table 6.12

Model Fit for Online reading for PISA 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	df	χ^2 / df	RMSEA	CFI	TLI
2000						
2009	14519.529	21	691.406	0.106	0.945	0.918
2018	29147.511	15	1943.167	0.079	0.977	0.961
2020	1366.674	15	91.112	0.124	0.948	0.914

6.3.5 READING STRATEGIES [STRA]

As reading strategies scale was not measured in PISA 2000, the data were derived from the three follow-up cycles of PISA 2009, 2018, and 2020 follow-up data. The scale of reading strategies from student questionnaires consisted of two sub-constructs: memorisation strategy and summarising strategy. Six items were included in the subscale of memorising, while five items were included in the subscale of summarising. Responses were scored using Likert scale ranged from 1 to 6, with 'Not useful at all' being the lowest score and 'Very useful' being the highest.

Being part of the reading strategies scale [stra], Table 6.13 and Table 6.14 provide information for the sub-scale of memorisation strategies. This sub-scale had six items: I concentrate on the parts of the text that are easy to understand (easy to understand); I quickly read through the text twice (read twice); After reading the text, I discuss its content with other people (discuss content); I underline important parts of the text (underline); I summarise the text in my own words (summarise); and I read the text aloud to another person (read aloud).

Table 6.13 presents the descriptive statistics and construct validity for the sub-scale of memorisation strategies. It was indicated that the higher the mean score for a memorisation strategy, the more likely the students were to believe that the strategy is useful. Based on the mean scores in PISA 2009, the highest value that the students believed the strategy is useful was the strategy 'underline important parts' (M=5.040) while the lowest was 'read aloud' (M=2.749). Similar results were found in PISA 2018, where the strategy 'underline important parts' was deemed most useful by students (M=4.534), while 'read aloud' was deemed least useful (M=3.252).

Meanwhile, according to the 2020 data, the highest value the students regarded as useful was 'easy to understand' ($M=4.530$), while the lowest value was 'read aloud' ($M=3.597$).

Based on the results of the factor loading analysis, shown in Table 6.13, most of the factor loadings were above the cut-off value (0.30), while only one item was below 0.30 in PISA 2009. As 'discuss content' (0.679) had the highest factor loading value in PISA 2009, 'read aloud' scored 0.216, which was below the cut-off (0.30) but retained for comparability reason to other cycles. The highest factor loading in PISA 2018 was found in 'underline important parts' (0.778), while the lowest was found in 'read aloud' (0.517). Additionally, the highest factor loading value in 2020 follow-up data was 'read aloud' (0.892), while the lowest value was 'easy to understand' (0.780).

Continuing Table 6.13, the validity of the constructs using the AVE and the reliability using the CR are presented. The AVE estimates for PISA 2009 and 2018 were below the cut-off value (0.5), whereas the estimate for 2020 data was above the cut-off value (0.5). Since the factor loadings for most items in PISA 2009 and 2018 did not reach 0.7, the AVE score was less than 0.5 (AVE of PISA 2009 was 0.330 and AVE of PISA 2018 was 0.484). It means the percentage of variance interpreted by memorisation strategies sub-constructs in PISA 2018 and 2020 data were close to 40%. Conversely, all factor loadings in 2020 data reached 0.7 resulting in the AVE score being more than 0.5 (AVE=0.701). It means that in 2020 data, memorisation sub-scale accounted for approximately 70% of variance. Meanwhile, the reliability of the constructs through CR values, with 0.6 as a cut-off value, indicates that all CR value for PISA 2009, 2018 and 2020 follow-up data were above the cut-off value (0.6). The highest CR value of the sub-scale of memorisation strategies scale was in 2020 follow-up data (CR=0.933), followed by PISA 2018 (CR=0.847), and PISA 2009 (CR=0.731).

Table 6.14 provides the fit of the model based on the CFI, TLI, and RMSEA values of memorisation strategies sub-scale. In all three cycles (PISA 2009, PISA 2018, and 2020 follow-up data), the CFI and TLI were within the range of a good fit (0.90 - 1.00). Nonetheless, only in PISA 2009 had the RMSEA value within the range of an acceptable fit (0.05 – 0.09). PISA 2009 had a CFI of 0.962 and a TLI of 0.928, indicating a good fit, the RMSEA value was in an acceptable fit (0.074). PISA 2018 had a CFI of 0.942 and a TLI of 0.904, indicating a good fit, but the RMSEA value was not within the range (RMSEA=0.119). In 2020 follow-up data had a CFI of 0.944 and a TLI of 0.907 indicating a good fit, but RMSEA value was not within the range (RMSEA=0.174). Figure 6.5 illustrates the factor loading model for the scale of reading strategies regarding memorisation over the three periods of PISA 2009, 2018, and 2020 follow-up data.

Figure 6.5

Factor model of Reading strategies (memorisation) in PISA 2009, 2018, and 2020 data

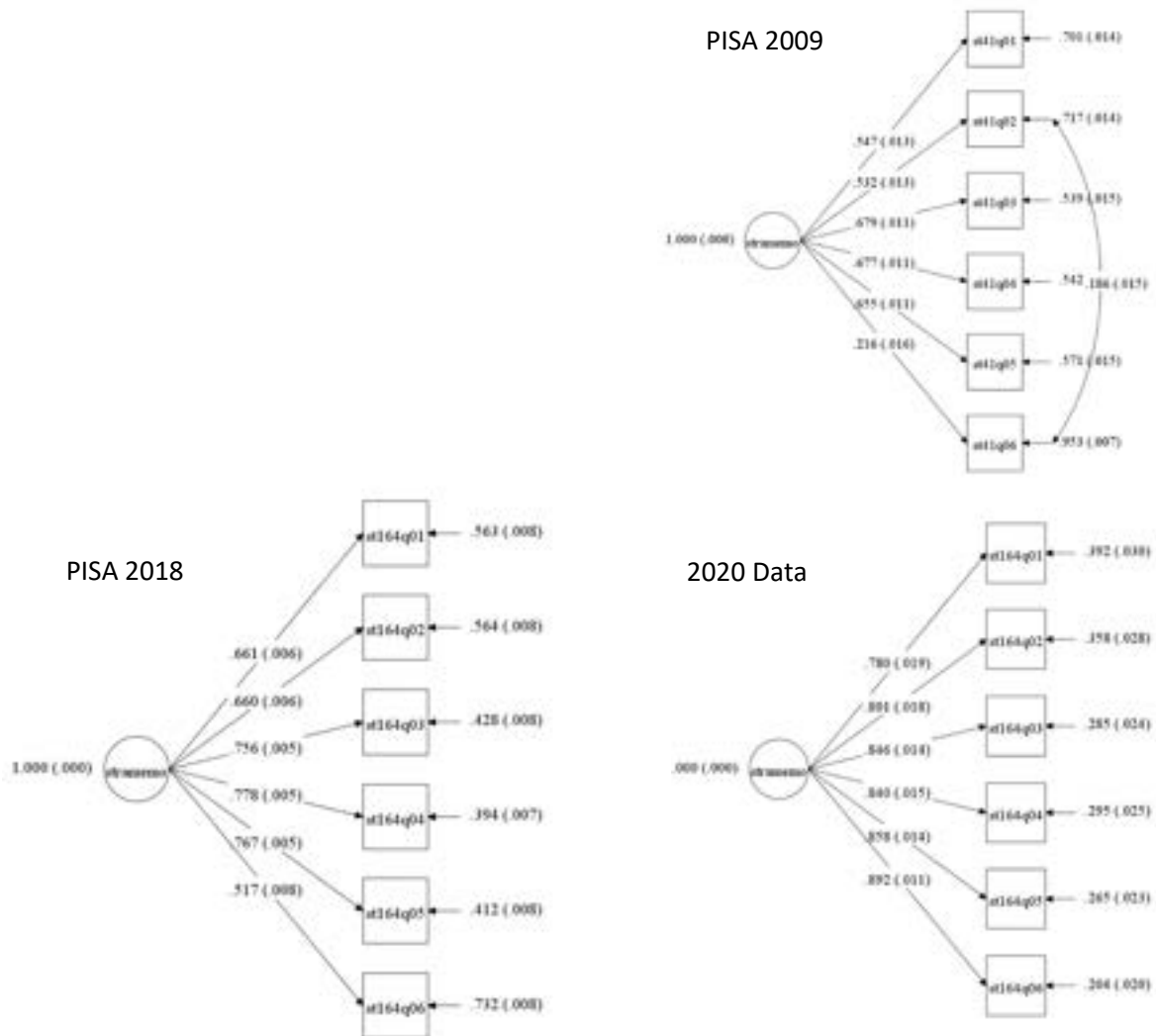


Table 6.13

Descriptive Statistics and Construct Validity for Reading strategies (memorisation) for PISA 2009, 2018, and 2020 follow-up

Description	2000		Variable Name	2009 Mean	SE	Variable Name	2018 Mean	SE	Variable Name	2020		Factor Loadings			
	Mean	SE								Mean	SE	2000	2009	2018	2020
Easy to understand Read twice Discuss content Underline Summarise Read aloud			ST41Q01	4.685	0.022	ST164Q01IA	4.297	0.016	ST164Q01IA	4.530	0.045		0.547	0.661	0.780
			ST41Q02	3.994	0.024	ST164Q02IA	3.596	0.015	ST164Q02IA	4.300	0.049		0.532	0.660	0.801
			ST41Q03	4.495	0.023	ST164Q03IA	3.973	0.016	ST164Q03IA	3.948	0.054		0.679	0.756	0.846
			ST41Q04	5.040	0.020	ST164Q04IA	4.534	0.015	ST164Q04IA	4.174	0.049		0.677	0.778	0.840
			ST41Q05	4.575	0.022	ST164Q05IA	4.266	0.016	ST164Q05IA	4.076	0.050		0.655	0.767	0.858
			ST41Q06	2.749	0.026	ST164Q06IA	3.252	0.017	ST164Q06IA	3.597	0.055		0.216	0.517	0.892
Average Variance Extracted (AVE)													0.330	0.484	0.701
Construct Reliability (CR)													0.731	0.847	0.933

Table 6.14

Model Fit for Reading strategies (memorisation) for PISA 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	df	χ^2 / df	RMSEA	CFI	TLI
2000						
2009	5546.297	15	369.75	0.074	0.962	0.928
2018	26368.978	15	1757.932	0.119	0.942	0.904
2020	2551.193	15	170.067	0.174	0.944	0.907

Being another part of the reading strategies scale [stra], Table 6.15 and Table 6.16 provide information for the sub-scale of summarising strategies. This sub-scale had five items: I write a summary, then I check that each paragraph is covered in the summary because the content of each paragraph should be included (check paragraph); I try to copy out accurately as many sentences as possible (copy accurately); Before writing the summary, I read the text as many times as possible (reading many times); I carefully check whether the most important facts in the text are represented in the summary (check facts); and I read through the text, underlining the most important sentences, then I write them in my own words as a summary (write own words).

Table 6.15 presents the descriptive statistics and construct validity for the sub-scale of summarising strategies. According to the mean scores in PISA 2009, the highest value that the students believed the strategy is useful was the strategy ‘checks facts’ (M=5.032) while the lowest was ‘copy accurately’ (M=3.833). Meanwhile in PISA 2018, the strategy ‘write own words’ was believed to be most useful by students (M=4.585), while ‘copy accurately’ was to be least useful (M=3.430). The highest value that students viewed as useful in 2020 follow-up data was 'check paragraph' (M=4.335), while the lowest value was 'write own words' (M=3.622).

Continuing Table 6.15 that shows the results of the factor loading analysis, all factor loadings for the sub-scale of summarising strategies were above the cut-off value (0.30). ‘Check paragraph’ was the highest factor loading value in PISA 2009 (0.700), while ‘copy accurately’ was the lowest value (0.494). The highest factor loading in PISA 2018 was found in 'reading many times' (0.793), while the lowest was found in 'copy accurately' (0.663). Meanwhile, the highest

factor loading value in 2020 follow-up data was 'check facts' (0.888), while the lowest value was 'check paragraph' (0.782).

Table 6.15 also provides information regarding the validity of the constructs using the AVE and the reliability based on the CR. The AVE estimate for PISA 2009 was below the cut-off value (0.5), whereas the estimates for PISA 2018 and 2020 data were above the cut-off value (0.5). Since the factor loadings for most items in PISA 2009 did not reach 0.7, the AVE score was less than 0.5 (AVE=0.394). It means the percentage of variance interpreted by summarising strategies sub-constructs in PISA 2009 data were close to 40%. Contrariwise, all factor loadings in PISA 2018 and 2020 data reached 0.7 resulting in the AVE score being more than 0.5 (AVE of PISA 2018 was 0.549 and AVE of 2020 data was 0.702). It means that in PISA 2018 and 2020 data, summarising sub-scale accounted for approximately 50% and 70% of variance. In term of the reliability of the constructs through CR values, with 0.6 as a cut-off value, indicates that all CR value for PISA 2009, 2018 and 2020 follow-up data were above the cut-off value (0.6). The highest CR value of the sub-scale of summarising strategies scale was in 2020 follow-up data (CR=0.921), followed by PISA 2018 (CR=0.858), and PISA 2009 (CR=0.762).

The fit of the model based on the CFI, TLI, and RMSEA values of summarising strategies sub-scale were presented in Table 6.16. In all three cycles (PISA 2009, PISA 2018, and 2020 follow-up data), the CFI and TLI were within the range of a good fit (0.90 - 1.00). Nonetheless, only in PISA 2009 had the RMSEA value within the range of an acceptable fit (0.05 – 0.09). PISA 2009 had a CFI of 0.975 and a TLI of 0.938, indicating a good fit, the RMSEA value was in an acceptable fit (0.088). PISA 2018 had a CFI of 0.969 and a TLI of 0.923, indicating a good fit, but the RMSEA value was not within the range (RMSEA=0.134). In 2020 follow-up data had a CFI

of 0.968 and a TLI of 0.936 indicating a good fit, but RMSEA value was not within the range either (RMSEA=0.153). Figure 6.6 illustrates the factor loading model for the scale of reading strategies regarding summarising over the three periods of PISA 2009, 2018, and 2020 follow-up data.

Figure 6.6

Factor model of Reading strategies (summarising) in PISA 2009, 2018, and 2020 data

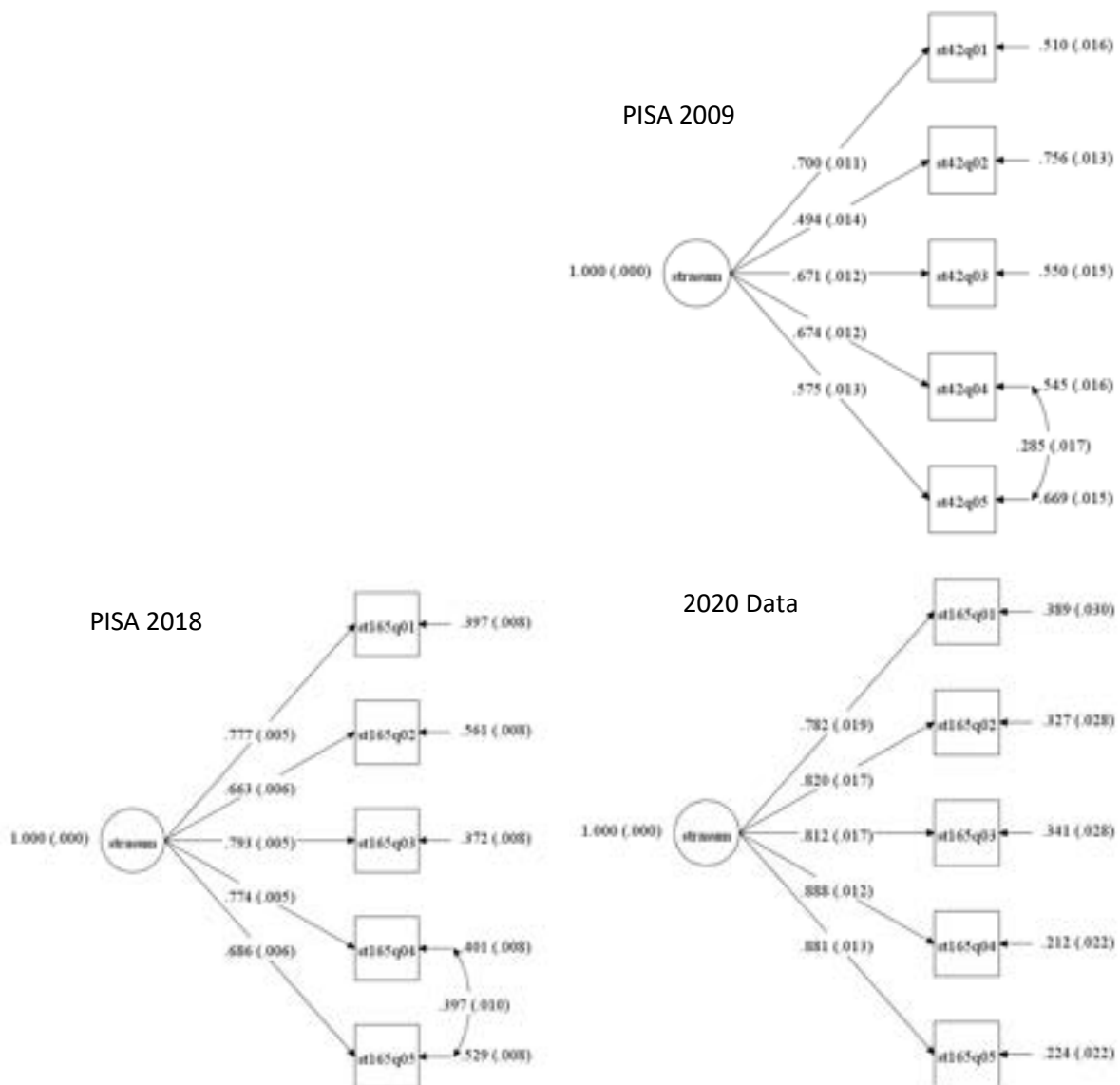


Table 6.15

Descriptive Statistics and Construct Validity for Reading strategies (summarising) for PISA 2009, 2018, and 2020 follow-up

Description	2000		Variable Name	2009		Variable Name	2018		Variable Name	2020		Factor Loadings			
	Mean	SE		Mean	SE		Mean	SE		Mean	SE	2000	2009	2018	2020
Check paragraph Copy accurately Reading many times Check facts Write own words			ST42Q01	4.546	0.023	ST165Q01IA	3.994	0.016	ST165Q01IA	4.335	0.047		0.700	0.777	0.782
			ST42Q02	3.833	0.025	ST165Q02IA	3.430	0.016	ST165Q02IA	4.149	0.049		0.494	0.663	0.820
			ST42Q03	4.538	0.022	ST165Q03IA	4.078	0.015	ST165Q03IA	3.941	0.054		0.671	0.793	0.812
			ST42Q04	5.032	0.019	ST165Q04IA	4.495	0.015	ST165Q04IA	3.947	0.052		0.674	0.774	0.888
			ST42Q05	5.006	0.021	ST165Q05IA	4.585	0.015	ST165Q05IA	3.622	0.054		0.575	0.686	0.881
Average Variance Extracted (AVE)													0.394	0.549	0.702
Construct Reliability (CR)													0.762	0.858	0.921

Table 6.16

Model Fit for Reading strategies (summarising) for PISA 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	df	χ^2 / df	RMSEA	CFI	TLI
2000						
2009	5995.260	10	599.526	0.088	0.975	0.938
2018	27767.936	10	2776.794	0.134	0.969	0.923
2020	1933.417	10	193.342	0.153	0.968	0.936

6.3.6 READING CONFIDENCE [CONFI]

The scale measuring reading confidence from student questionnaires had different items in each cycle. PISA 2000 had seven items, PISA 2009 had four items, and PISA 2018 along with 2020 follow-up data had six items. There were also differences in the scale responses.

In PISA 2000, four-point Likert-scale responses measuring reading confidence were scored ranging from 1=Never, 2=Sometimes, 3=Most of the time, and 4=Always measuring reading confidence. Higher scores indicated that the student was more frequently engaged in reading confidence-building activities. The seven items were: I complete my homework on time (I complete on time); I do my homework while watching television (I do watch TV); My teachers grade my homework (Teachers' grade); I finish my homework during the school day (Homework at school); My teachers make useful comments on my homework (Teachers' comment)I am given interesting homework (interesting), and; My homework is counted as part of my marks (Is counted in marks).

In PISA 2009, four-point Likert-scale responses measuring reading confidence were scored ranging from 1=Almost never, 2=Sometimes, 3=Often, and 4=Almost always. Higher scores indicated that the student was more frequently engaged in reading confidence-building activities. The four items were: when I study, I check if I understand what I have read (Check if understand); When I study, I try to figure out which concepts I still haven't really understood (Figure out); When I study, I make sure that I remember the most important points in the texts (Important points), and; When I study and I don't understand something, I look for additional information to clarify this (Additional information).

In PISA 2018 and 2020 follow-up data, four-point Likert-scale responses measuring reading confidence were scored ranging from 1=Strongly disagree, 2=Disagree, 3=Agree, and 4=Strongly disagree. As there were both positively and negatively worded items, the reverse score needed to be computed for negatively worded items, so the higher score on the observed variables reflected a greater level of confidence of reading. From a total of six items, three items were positively worded and three were negatively worded. The three positively worded items were: I am a good reader; I am able to understand difficult texts (I understand), and; I read fluently. Meanwhile, the three negatively worded items were: I have always difficulty with reading (I have difficulty); I have to read a text several times before completely understanding it (I have to read a text), and; I find it difficult to answer question about a text (I find difficult to answer). After recoding the negatively worded, there was one meaning can be derived. The greater values were believed to indicate students were confident toward reading more. On the other hand, the fewer values were believed to indicate students confident less toward reading.

The descriptive statistics and construct validity for reading confidence for PISA 2000, 2009, 2018, and 2020 follow-up data are presented in Table 6.17. According to the mean scores in PISA 2000, the highest value that the students were confidence in reading was 'Teachers' grade' (M=2.946) while the lowest was 'I do watch tv' (M=1.892). The mean score in PISA 2009 showed that the activity 'I check if I understand' was the highest value that students expressed confidence in reading (M=2.723), while the activity 'Additional information' had the lowest value (M=2.458). Students' highest level of confidence in reading in 2018 was 'I read fluently' (M=2.172), whereas their lowest value was 'I have difficulty' (M=3.622). Additionally, in the 2020 follow-up data, the

highest value that the students were confident about reading was ‘I am a good reader’ (M=2.989), while the lowest was ‘I have difficulty’ (M=1.874).

The results of the factor loading analysis were also can be seen in Table 6.17. According to the table, all items in PISA 2009 and 2018 had factor loadings for reading confidence scale were above the cut-off value (0.30). The highest factor loading in PISA 2009 was ‘figure out’ (0.616) while the lowest was ‘Additional information’ (0.497). In PISA 2018, the highest value was ‘I have difficulty’ (0.778) while the ‘I find difficult to answer’ (0.518). However, there were two items in PISA 2000 and one item in 2020 data that the factor loadings were below the cut-off value (0.30). These two items in PISA 2000 were removed since they cannot be compared to other cycles, while one item in 2020 was retained since it can be compared to cycle 2018. In PISA 2009, the highest value was ‘Teachers’ comment’ (0.540), while two item below 0.30 were ‘I do watch tv’ (0.013) and ‘Homework at school’ (0.017). Meanwhile, in 2020 data, the highest value was ‘I read fluently’ (0.903) while one item below 0.3 was ‘I find difficult to answer’ (0.115).

Continuing Table 6.17 provides information regarding the validity of the reading confidence constructs using the AVE and the reliability based on the CR. In terms of reading confidence, only the AVE estimate in 2020 data was above the cut-off value (0.5), while AVE estimates in the other three cycles were below the cut-off value (0.5). Since the factor loadings for most items in PISA 2000, 2009, and 2018 did not reach 0.7, the AVE score was less than 0.5 (AVE of PISA 2000 was 0.173; AVE of PISA 2009 was 0.306; AVE of PISA 2018 was 0.484). This indicates that the percentage of variance interpreted by reading confidence constructs in PISA 2000 was close to 20%, and that it was close to 40% in PISA 2009 and 2018. Contrariwise, all factor loadings in 2020 data reached 0.7 resulting in the AVE score being more than 0.5 (AVE=0.587). It

means that 2020 data, reading confidence scale accounted for close to 60% of variance. In term of the reliability of the constructs through CR values, with 0.6 as a cut-off value, indicates that the CR value for PISA 2000 was below the cut-off value (CR=0.517). Meanwhile, for three other cycles in PISA 2009, 2018, and 2020 data were above the cut-off value (0.6). Among those three cycles, the highest CR value of the reading confidence scale was in 2020 follow-up data (CR=0.882), followed by PISA 2018 (CR=0.847), and PISA 2009 (CR=0.637).

The fit of the model based on the CFI, TLI, and RMSEA values of reading confidence scale were presented in Table 6.18. Among all four cycles, all the CFI and TLI were within the range of a good fit (0.90 - 1.00). The RMSEA value of PISA 2000, 2009, and 2020 was within the range of a good fit (0.00 – 0.05) and an acceptable fit (0.05 - 0.09), however, it was not the case for PISA 2018. PISA 2000 had a CFI of 0.949 and a TLI of 0.911, indicating a good fit, the RMSEA value was in a good fit (0.05). PISA 2009 had a CFI of 1.000 and a TLI of 0.999, indicating a good fit, the RMSEA value was in a good fit (0.008). PISA 2018 had a CFI of 0.942 and a TLI of 0.904, indicating a good fit, but the RMSEA value was not within the range (RMSEA=0.119). In 2020 follow-up data had a CFI of 0.930 and a TLI of 0.989 indicating a good fit, the RMSEA value was in an acceptable fit (RMSEA=0.054). Figure 6.7 illustrates the factor loading model for the scale of student reading confidence regarding summarising over the cycles.

Table 6.17

Descriptive Statistics and Construct Validity for Reading confidence for PISA 2000, 2009, 2018, and 2020 follow-up

Description	Variable 2000			Variable 2009			Variable 2018			Variable 2020			Factor Loadings			
	Name	Mean	SE	Name	Mean	SE	Name	Mean	SE	Name	Mean	SE	2000	2009	2018	2020
I complete on time	ST32Q01	2.724	0.010										0.358			
I do watch TV	ST32Q02	1.892	0.010										0.031			
Teachers' grade	ST32Q03	2.946	0.010										0.498			
Homework at school	ST32Q04	1.929	0.009										0.017			
Teachers' comment	ST32Q05	2.666	0.011										0.540			
Is interesting	ST32Q06	2.252	0.010										0.523			
Is counted in mark	ST32Q07	2.919	0.011										0.521			
Check if understand				ST27Q06	2.723	0.010								0.537		
Figure out				ST27Q09	2.701	0.011								0.616		
Important points				ST27Q11	2.666	0.010								0.556		
Additional info.				ST27Q13	2.458	0.011								0.497		
I am a good reader							ST161Q01IA	2.826	0.006	ST161Q01IA	2.980	0.028			0.661	0.833
I understand							ST161Q02IA	2.662	0.006	ST161Q02IA	2.950	0.029			0.660	0.861
I read fluently							ST161Q03IA	3.181	0.005	ST161Q03IA	2.934	0.029			0.756	0.903
I have difficulty							ST161Q04IA	2.172	0.007	ST161Q04IA	1.874	0.027			0.778	0.788
I have to read a text							ST161Q05IA	2.833	0.006	ST161Q05IA	2.040	0.030			0.767	0.797
I find difficult to answer							ST161Q06IA	2.297	0.006	ST161Q06IA	1.979	0.03			0.518	0.115
Average Variance Extracted (AVE)													0.173	0.306	0.484	0.587

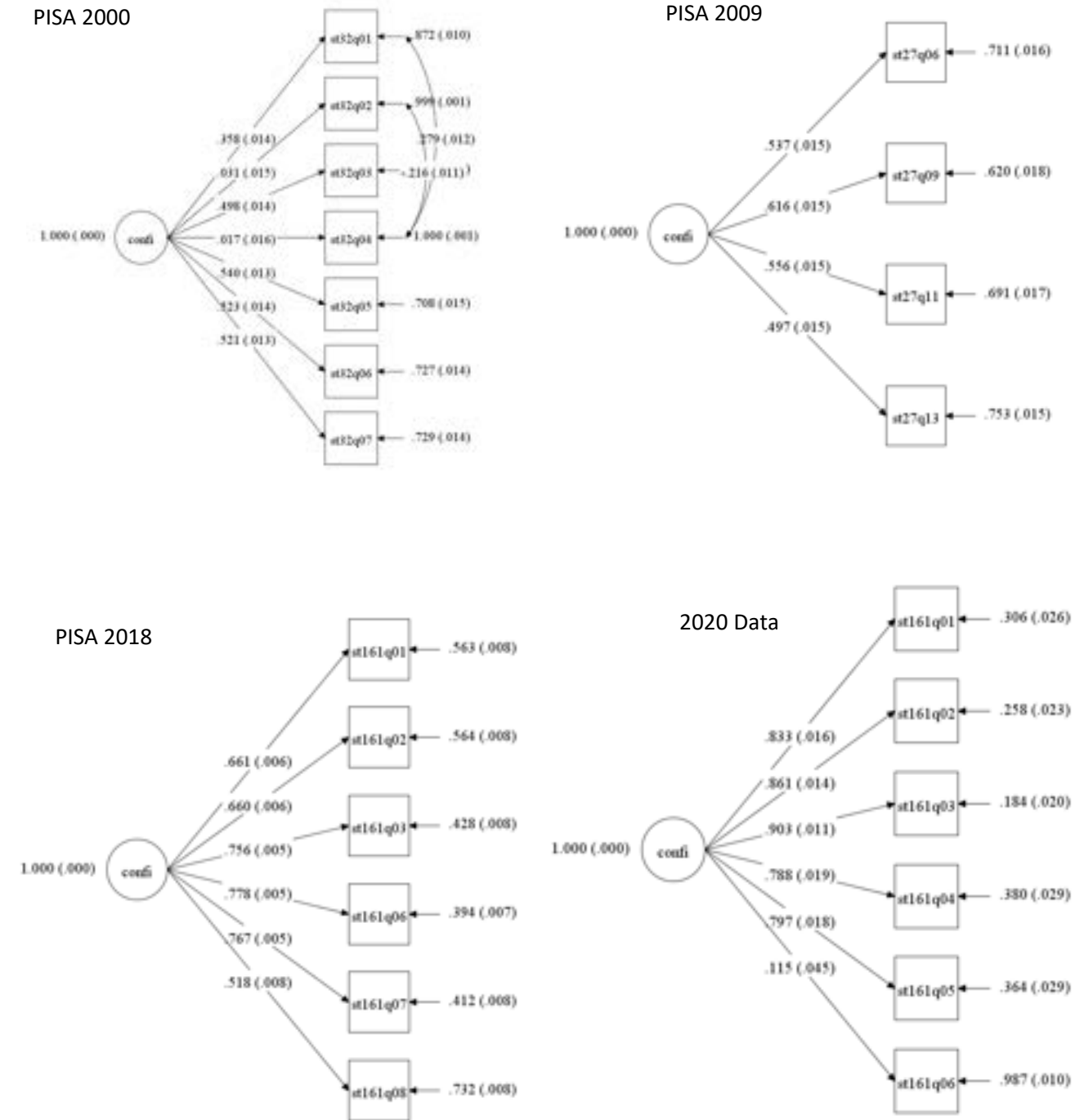
Table 6.18

Model Fit for Reading confidence for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	<i>df</i>	χ^2 / df	RMSEA	CFI	TLI
2000	4069.359	21	193.779	0.050	0.949	0.911
2009	2247.913	6	374.652	0.008	1.000	0.999
2018	26375.914	15	1758.394	0.119	0.942	0.904
2020	1901.990	15	126.799	0.052	0.930	0.989

Figure 6.7

Factor model of Reading confidence in PISA 2000, 2009, 2018, and 2020 data



6.4 MEASURES OF SCHOOL-LEVEL FACTORS

Generally, the constructs from school questionnaires in this study involved school facilities school facilities (the sub-constructs are ICT at school and resources and technology), assessment, and school management (the sub-constructs are leadership and school climate). However, there was a slightly difference in the sub-constructs for each cycle. PISA 2000 did not include subconstructs for leadership as part of scale school management. Additionally, each cycle had different variables such as scale ICT at school and leadership.

In CFA, only scale with observed variables is allowed to be analysed. For PISA 2000, the school-level consists of constructs including *ict at school [ict]*, *resources and technology [tech]*, *assessment [asment]*, and *school climate [climate]*. For PISA 2009, PISA 2018, and 2020 follow-up data, the constructs involved are *ict at school [ict]*, *resources and technology [tech]*, *assessment [asment]*, *leadership [lead]*, and *school climate [climate]*. Table 6.19 summarises the school constructs used in CFA.

Table 6.19

The student-level constructs used in CFA Analysis

School constructs	2000	2009	2018	2020
ict at school [ict]	ict	ict	ict	ict
resources and technology [tech]	tech	tech	tech	tech
assessment [asment]	asment	asment	asment	asment
Leadership [lead]	lead	lead	lead	lead
school climate [climate]	climate	climate	climate	climate

6.4.1 ICT AT SCHOOL [ICT]

The scale of ICT at school differed between cycles as well as the variables included. PISA 2000 had six items, PISA 2009 had three items, and PISA 2018 along with 2020 follow-up data had five items. In PISA 2000, responses were scored on the number of computers in the schools. The six items were: Computers altogether; Computers to students; Computers to teacher; Computers administration staff; Connected to the internet/world wide web, and; Connected to a local area network (LAN). In PISA 2009, three items were scored regarding the ratio of students to computers. The three items were: Total number of students, computers available for educational purposes (computers education), and computers are connected to the internet/world wide web (computer with LAN). There is only one item that is the same between PISA 2000 (SC13Q05) and PISA 2009 (SC10Q03) regarding the number of computers connected to internet/world wide web. Whereas in PISA 2018 and 2020 follow-up data, responses were scored on a five Likert scale ranging from Strongly agree=1, Disagree=2, Agree=3, and Strongly Agree=4 regarding a school's capacity to enhance learning and teaching through the use of digital devices. The five items were: The number of digital devices connected to the Internet is sufficient (internet); The school's internet bandwidth or speed is sufficient (bandwidth); The number of digital devices for instruction is sufficient (digital instruction); Digital devices at the school are sufficiently powerful in terms of computing capacity (computing capacity), and; The availability of adequate software is sufficient (software).

Table 6.20 provides the descriptive statistics and construct validity for ICT at school for PISA 2000, 2009, 2018, and follow-up study. In PISA 2000, the higher mean score indicated that

there is more availability of ICT for the purposes mentioned in the variable of the scale. The highest availability was the number of ‘computer altogether’ (M=6.762) followed by ‘computers for students’ (M=5.023) while the least availability was ‘computers with LAN (M=0.314). PISA 2009 showed that among the availability of computers for education and computers with LAN, ‘computer education’ (M=19.792) was higher than ‘computer with LAN’ (M=11.201). Meanwhile, in the PISA 2018 and 2020 follow-up data, the higher mean score indicated that principals were more likely to agree to the schools’ capacity in the use of digital devices in their schools. The highest mean score was ‘software’ (M=3.014) in PISA 2018 and ‘bandwidth’ (M=3.364) in 2020 data. While the lowest mean score was ‘computing capacity’ (M=2.799) in PISA 2018, and ‘digital instruction’ (M=2.455) in 2020 data.

A table displaying the results of factor loading analysis for ICT at school scale is provided in Table 6.20. As can be seen from the table, all items in all cycles had factor loadings above the cut-off value (0.30). The highest factor loading in PISA 2000 was ‘computers altogether’ (0.884) while the lowest was ‘computer with LAN’ (0.321). In PISA 2009, the highest factor loading was attributed to ‘computer education’ (0.971), whereas the lowest factor loading was attributed to ‘total student’ (0.579). As of PISA 2018, the highest factor loading was ‘computing capacity’ (0.929), while the lowest factor loading was ‘bandwidth’ (0.758). In the 2020 follow-up data, ‘digital instruction’ had the highest factor loading (0.951), while ‘internet’ had the lowest factor loading (0.841).

A continuation of Table 6.21 provides information regarding the validity of the constructs of ICT at school based on AVE value and the reliability based on CR value. According to the analysis, only the AVE value in PISA 2000 was below the cut-off value (0.5), while AVE estimates

in the other three cycles (PISA 2009, 2018, and 2020 data) were above the cut-off value (0.5). Since the factor loadings for PISA 2000 did not reach 0.7, the AVE score was less than 0.5 (AVE=0.356). It means that PISA 2000, ICT at school scale accounted for close to 40% of variance. On the other hand, all factor loadings in PISA 2009, 2018 and 2020 data reached 0.7 resulting in the AVE score being more than 0.5 (AVE of PISA 2009 was 0.687; AVE of PISA 2018 was 0.754; AVE of PISA 2020 data was 0.754). This indicates that the percentage of variance interpreted by ICT at school constructs in PISA 2009 was close to 70%, and that the percentage was approximately 75% in PISA 2018 and 2020 data. In term of the reliability of the constructs through CR values, with 0.6 as a cut-off value, indicates that the CR value for all four cycles were above the cut-off value. Among those four cycles, the highest CR value of the ICT at school scale was in PISA 2018 (CR=0.939), followed by PISA 2020 data (CR=0.938), PISA 2009 (CR=0.863) and PISA 2000 (CR=0.749).

Table 6.20

Descriptive Statistics and Construct Validity for ICT at school for PISA 2000, 2009, 2018, and 2020 follow-up

Description	Variable Name	2000		Variable Name	2009		Variable Name	2018		Variable Name	2020		Factor Loadings			
		Mean	SE		Mean	SE		Mean	SE		Mean	SE	2000	2009	2018	2020
Computers altogether	SC13Q01	6.762	0.689										0.884			
Computers students	SC13Q02	5.023	0.581										0.737			
Computers teachers	SC13Q03	0.499	0.056										0.489			
Computers admin	SC13Q04	1.027	0.063										0.492			
Computer with Web	SC13Q05	0.388	0.100	SC10Q03	11.201	1.480							0.474	0.885		
Computer with LAN	SC13Q06	0.314	0.133										0.321			
Total student				SC10Q01	159.985	9.141								0.579		
Computers education				SC10Q02	19.792	1.659								0.971		
Internet is sufficient							SC155Q01IA	2.984	0.043	SC155Q01IA	3.182	0.182			0.857	0.841
Internet bandwidth							SC155Q02IA	2.835	0.044	SC155Q02IA	3.364	0.203			0.758	0.935
Digital instruction							SC155Q03IA	2.855	0.046	SC155Q03IA	2.455	0.207			0.922	0.951
Computing capacity							SC155Q04IA	2.799	0.045	SC155Q04IA	2.727	0.141			0.929	0.730
Software is sufficient							SC155Q05IA	3.014	0.045	SC155Q05IA	2.545	0.282			0.866	0.867
Average Variance Extracted (AVE)													0.356	0.687	0.754	0.754
Construct Reliability (CR)													0.749	0.863	0.939	0.938

Table 6.21

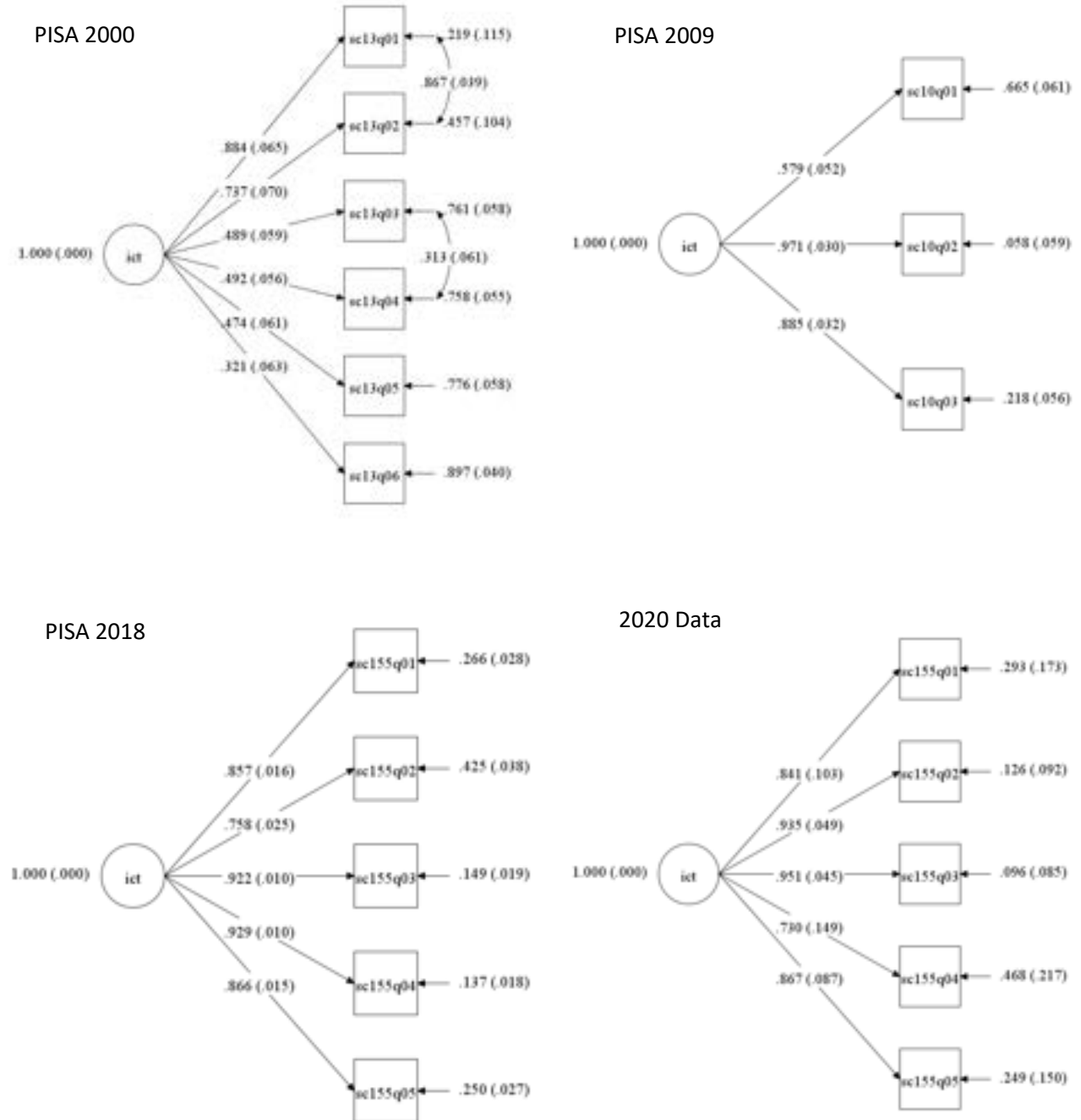
Model Fit for ICT at school for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	<i>df</i>	χ^2 / df	RMSEA	CFI	TLI
2000	785.769	15	52.385	0.058	0.991	0.981
2009	313.514	3	104.505	0.000	1.000	1.000
2018	1547.923	10	154.792	0.142	0.978	0.956
2020	59.095	10	5.909	0.245	0.933	0.866

The fit of the model based on the CFI, TLI, and RMSEA values of the scale of ICT at school were provided in Table 6.20. Among all four cycles, all the CFI and TLI were within the range of a good fit (0.90 - 1.00) and acceptable fit (0.80 – 0.90). The RMSEA value of PISA 2000 was within the range of a good fit (0.00 – 0.05) and PISA 2009 was within an acceptable fit (0.05 – 0.09). However, the RMSEA of PISA 2018 and 2020 data were not within the range (0.00 – 0.09). PISA 2000 had a CFI of 0.991 and a TLI of 0.981, indicating a good fit, the RMSEA value was in an acceptable fit (0.058). PISA 2009 had a CFI of 1.000 and a TLI of 1.000, indicating a good fit, the RMSEA value was in a good fit (0.000). PISA 2018 had a CFI of 0.978 and a TLI of 0.956, indicating a good fit, but the RMSEA value was not within the range (RMSEA=0.142). In 2020 follow-up data had a CFI of 0.933 indicating a good fit and a TLI of 0.866 indicating an acceptable fit, the RMSEA value was not within the range (RMSEA=0.245). Figure 6.8 illustrates the factor loading model for the scale of ICT at school [ict] over the cycles.

Figure 6.8

Factor model of ICT at school in PISA 2000, 2009, 2018, and 2020 data



6.4.2 RESOURCES AND TECHNOLOGY [TECH]

Over the four cycles, some item variables regarding the scale of resources and technology differed. In all cycles, responses were scored on a four Likert-scale ranging from Not at all=1, Very little=2, To some extent=3, and A lot=4 regarding to the learning that hindered by some resources and technology. In PISA 2000, the items included poor condition of buildings (poor buildings), poor heating, cooling and or lighting system (poor lighting), lack of instructional space (inadequate space), lack of instructional material (lack of materials), not enough computers for instruction (lack of computers), lack of instructional materials in the library (poor library materials), lack of multi-media resources for instruction (poor multimedia), inadequate science laboratory (poor laboratory tools), and inadequate facilities for fine arts (poor fine arts). As PISA 2000 had nine items, five of which were the same as items on the scale in PISA 2009, which also had three additional items. Those five items were: shortage or inadequacy of science laboratory equipment (poor laboratory tools), shortage or inadequacy of instructional materials (lack of materials), shortage or inadequacy of computers for instruction (lack of computers), shortage or inadequacy of library materials (poor library materials), and shortage or inadequacy of audio-visual resources (poor multimedia). Whereas the three additional items in PISA 2009 were: a lack of other support personnel (lack of personnel), lack of inadequacy of internet connectivity (lack of internet), and shortage or inadequacy of computer software for instruction (lack of software). Furthermore, PISA 2018 and 2020 follow-up data revealed only three items. One item was the same as in PISA 2000 (poor buildings), one item was the same as in both PISA 2000 and 2009 (lack of materials), and another one item was the same as in PISA 2009 (lack of personnel).

The descriptive statistics and construct validity for the scale of resources and technology for PISA 2000, 2009, 2018, and 2020 follow-up data were presented in Table 6.22. The higher the mean score indicated the more the school learning hindered by resources and technology tools. Based on analysis, the highest mean score in PISA 2000 was ‘poor laboratory tools’ (M=2.949) and the lowest mean score was ‘poor lighting’ (M=1.097). It means that schools’ learning in 2000 was hindered most by poor laboratory tools. As a result of PISA 2009, the highest mean score in PISA 2009 was ‘poor multimedia’ (M=3.054) and the lowest mean score was ‘lack of personnel’ (M=2.447). It indicates that schools’ learning in 2009 was hindered most by the lack of personnel or staff. The highest mean score among three items in PISA 2018 was ‘poor buildings’ (M=2.515) and the lowest was ‘lack of personnel’ (M=2.069). Further, in 2020 data, the highest mean score was ‘poor buildings’ (M=2.727) and the lowest mean score was ‘lack of personnel’ (M=2.090). In other word, schools’ learning in 2018 and 2020 were hindered the most by poor buildings.

Continuing Table 2.22 displays the results of factor loading analysis for resources and technology scale over the cycles. The table shows that most factor loadings over the four cycles were above the cut-off value (0.30), with the exception of one item in 2020 follow-up data. The highest factor loading in PISA 2000 was ‘poor library materials’ (0.891) while the lowest was ‘poor buildings’ (0.366). In PISA 2009, the highest factor loading was ‘lack of software’ (0.856) while the lowest was ‘lack of personnel’ (0.523). As of PISA 2018, the highest factor was ‘lack of materials’ (0.808) and the lowest was ‘lack of personnel’ (0.485). In 2020 follow-up data, one item of ‘poor buildings’ was below 0.3 (0.240) while the highest factor loading was ‘lack of materials’ (0.801). In this case, an item below the cut-off value was retained as it can be compared to the items that were acceptable in cycles 2000 and 2018.

Table 6.22

Descriptive Statistics and Construct Validity for Resources and technology for PISA 2000, 2009, 2018, and 2020 follow-up

Description	Variable Name	2000		Variable Name	2009		Variable Name	2018		Variable Name	2020		Factor Loadings			
		Mean	SE		Mean	SE		Mean	SE		Mean	SE	2000	2009	2018	2020
Poor buildings	SC11Q01	2.001	0.065				SC017Q08NA	2.515	0.057	SC017Q08NA	2.727	0.211	0.366		0.770	0.240
Poor lighting	SC11Q02	1.097	0.065										0.390			
Inadequate space	SC11Q03	1.978	0.069										0.398			
Lack of materials	SC11Q04	2.816	0.066	SC11Q08	2.662	0.077	SC017Q06NA	2.482	0.057	SC017Q06NA	2.364	0.244	0.746	0.538	0.808	0.801
Lack of computers	SC11Q05	2.686	0.074	SC11Q09	2.989	0.079							0.556	0.801		
Poor library materials	SC11Q06	2.745	0.063	SC11Q12	2.994	0.072							0.891	0.576		
Poor multimedia	SC11Q07	2.773	0.061	SC11Q13	3.054	0.074							0.863	0.745		
Poor laboratory tools	SC11Q08	2.949	0.063	SC11Q07	2.953	0.075							0.773	0.539		
Poor fine art	SC11Q09	2.821	0.062										0.670			
Lack of personnel				SC11Q06	2.447	0.074	SC017Q04NA	2.069	0.051	SC017Q04NA	2.090	0.237		0.523	0.485	0.516
Lack of internet				SC11Q10	2.849	0.088								0.686		
Lack of software				SC11Q11	2.970	0.079								0.856		
Average Variance Extracted (AVE)													0.433	0.448	0.494	0.322
Construct Reliability (CR)													0.862	0.863	0.737	0.514

Table 6.23

Model Fit for Resources and technology for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	<i>df</i>	χ^2 / df	RMSEA	CFI	TLI
2000	1540.399	36	42.789	0.118	0.936	0.903
2009	616.327	28	22.012	0.095	0.947	0.922
2018	233.208	3	77.736	0.000	1.000	1.000
2020	30.842	3	10.280	0.000	1.000	1.000

A table displaying the results in terms of the validity of the constructs of resources and technology using AVE value and the reliability of the constructs using CR value is presented in Table 6.23. The analysis revealed that all AVE scores over the cycles were below the cut-off value (0.5). AVE of PISA 2000 was 0.433, AVE of PISA 2009 was 0.448, AVE of PISA 2018 was 0.494, and AVE of 2020 data was 0.32. In all cycles, the factor loadings did not reach 0.7, resulting in AVE scores less than 0.5. These results indicate that the percentage of variance interpreted by resources and technology constructs in three cycles (PISA 2000, 2009, and 2018) were close to 40% and in 2020 data was close to 30%. Regarding the reliability analysis based on CR values, three cycles (PISA 2000, 2009, and 2018) achieved scores above the cut-off value (0.6), but not 2020 data. Among three cycles reached 0.6, the highest was in PISA 2000 (CR=0.862), followed by PISA 2009 (CR=0.863) and PISA 2018 (CR=0.737). However, since 2020 data had AVE closed to 30%, the CR was also less than 0.6 (CR=0.514).

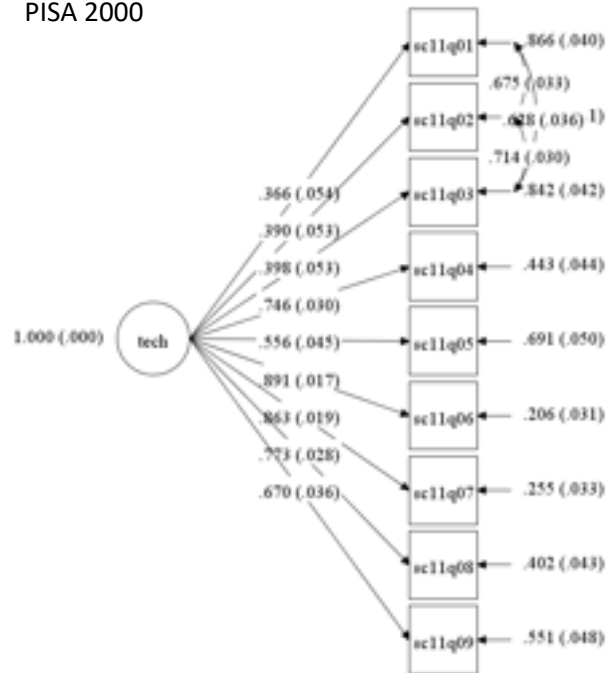
The fit of the model based on the CFI, TLI, and RMSEA values of the scale of resources and technology are provided in Table 6.23. In all four cycles, the CFI and TLI values were within the range of a good fit (0.90 – 1.00). The RMSEA value of PISA 2000 was not within the range (0.00 - 0.09), however, value of PISA 2009 was within the range of an acceptable fit (0.05 - 0.09). Additionally, PISA 2018 and 2020 data were within the range of a good fit (0.00 - 0.05). PISA 2009 had a CFI of 0.947 and a TLI of 0.922, indicating a good fit, the RMSEA value was 0.095, indicating an acceptable fit. PISA 2018 had a CFI of 1.000 and a TLI of 1.000, indicating a good fit, the RMSEA value was 0.000, indicating a good fit. Similarly, 2020 data had a CFI of 1.000 and a TLI of 1.000, indicating a good fit, the RMSEA value was 0.000, indicating a good fit. Figure

6.9 illustrates the factor loading model for the scale of resources and technology [tech] over the cycles.

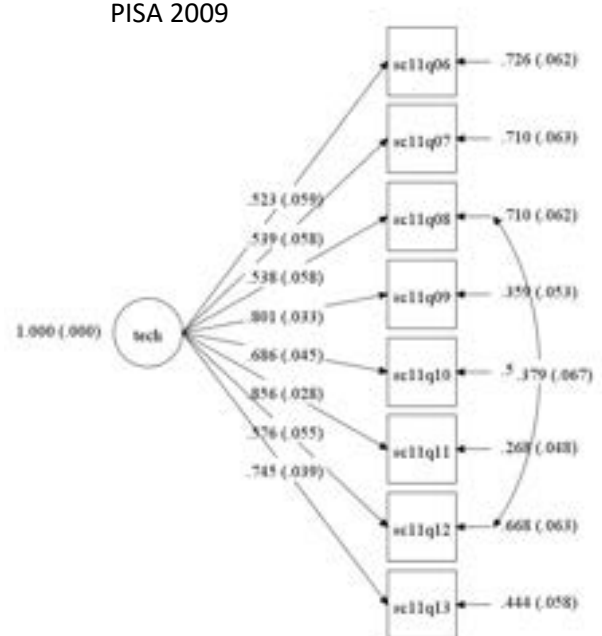
Figure 6.9

Factor model of Resources and technology in PISA 2000, 2009, 2018, and 2020 data

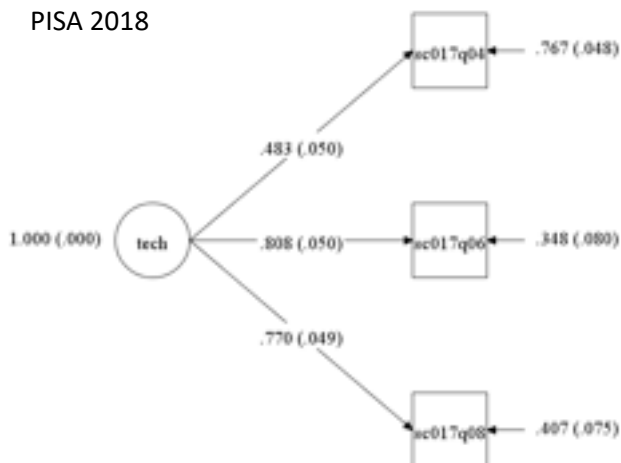
PISA 2000



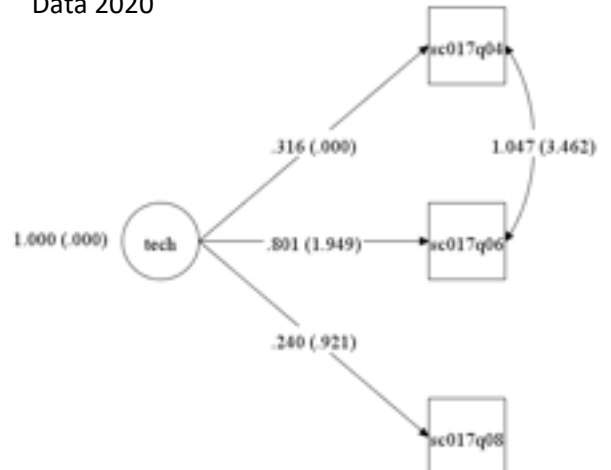
PISA 2009



PISA 2018



Data 2020



6.4.3 ASSESSMENT [ASMENT]

The scale of assessment was scored on a dichotomous scale with Yes=1 and No=2 indicating the types of assessments used in schools based on PISA 2000, 2009, 2018, and 2020 follow-up data. PISA 2000 had six items, whereas PISA 2009, 2018, and 2020 had eight items as two additional items were added. The scale of assessment in PISA 2000 stated that the students' assessment used for several purposes including to inform parents about their child's progress (parent information), to make decisions about students' retention or promotion (promotion), to group students for instructional purposes (instructional group), to compare the school to <district or national> performance (national comparison), to monitor the school's progress from year to year (progress monitoring), and to make judgements about teacher's effectiveness (teachers' effectiveness). The two additional items in PISA 2009, 2018, and 2020 data were to identify aspects of instruction or the curriculum that could be improved (for curriculum) and compare the school with other school (other schools).

Table 6.24 presents the descriptive statistics and construct validity for assessment for PISA 2000, 2009, 2018, and 2020 follow-up data. As it can be seen from the table that most of the mean scores had increased over the cycles. Since the codes are 1 and 2, the closer the mean to 1 the higher the proportion of schools who answer Yes=1 and vice versa. PISA 2000 (M=1.249), PISA 2009 (M=1.203), and PISA 2018 (M=1.340) reported the highest mean score for item 'national comparison'. In the 2020 follow-up data, however, two items shared the highest scores, namely 'promotion' (M=1.455) and 'other schools' (M=1.455).

Additionally, Table 6.24 provides information on the factor loading of the scale of assessment. All factor loadings for assessment scale in PISA 2000 and 2009 were above the cut off value (0.30). The highest value in PISA 2000 was ‘progress monitoring’ (0.974) and the lowest was ‘instructional group’ (0.363). The highest value in PISA 2009 was for 'parents' promotion (0.967), while the lowest value was for 'instructional group' (0.581). Nonetheless, among eight items in PISA 2018, one item of ‘instructional group’ (0.296) was below the cut-ff value (0.30) while the highest value in this period was ‘progress monitoring’ (0.693). Meanwhile, in 2020 data, there were two items below the cut-off value (0.30) namely ‘instructional group’ (0.249) and ‘curriculum’ (0.056), while the highest value was ‘national comparison’ (0.966). All items below the cut-off value were retained for comparability purposes as the same item were acceptable in other cycles.

Continuing Table 6.24 shows the validity of the constructs using the AVE with a cut-off value of 0.5. The AVE values in PISA 2000 (0.574) and 2009 (0.736) were above the cut-off value (0.5), while the values were below 0.5 for PISA 2018 (0.250) and 2020 data (0.376). As the factor loading did not reach 0.7 in PISA 2018 and 2020 data, when the AVE score was calculated, the results were below the cut-off value (0.5). The result gave the meaning that the percentage of variance interpreted by assessment constructs in PISA 2000 and 2009 were close to 60% and 70% respectively. On the other hand, the percentage of variance interpreted by assessment constructs in PISA 2018 and 2020 data were less than 40%. In term of the reliability of the constructs through CR values, with 0.6 as a cut-off value, indicates that all CR value for four cycles above the cut-off value (0.6). The highest CR value of assessment was in PISA 2009 (CR=0.956), followed by the value in PISA 2000 (CR=0.881), 2020 data (CR=0.786), and PISA 2018 (CR=0.710).

In regard to model fit, according to Table 6.25, the CFI and TLI were within an acceptable fit (0.8 – 0.9) and within a good fit (0.9 – 1.0). Additionally, the RMSEA values were within the range of an acceptable (0.05 – 0.09) except for PISA 2000. PISA 2000 had a CFI of 0.921 and a TLI of 0.868, the RMSEA value was 0.106. Figure 6.10 shows the factor loading model of the scale of assessment [asment] over the cycles.

Table 6.24

Descriptive Statistics and Construct Validity for Assessment for PISA 2000, 2009, 2018, and 2020 follow-up

Description	Variable 2000			Variable 2009			Variable 2018			Variable 2020			Factor Loadings			
	Name	Mean	SE	Name	Mean	SE	Name	Mean	SE	Name	Mean	SE	2000	2009	2018	2020
Parent information	SC18Q01	1.007	0.005	SC16Q01	1.006	0.006	SC154Q02	1.032	0.010	SC154Q02	1.273	0.141	0.908	0.967	0.476	0.912
Promotion	SC18Q02	1.003	0.003	SC16Q02	1.066	0.019	SC154Q03	1.201	0.022	SC154Q03	1.455	0.157	0.733	0.761	0.441	0.325
Instructional group.	SC18Q03	1.211	0.024	SC16Q03	1.132	0.025	SC154Q04	1.247	0.023	SC154Q04	1.364	0.152	0.363	0.581	0.296	0.249
National compar.	SC18Q04	1.249	0.026	SC16Q04	1.203	0.030	SC154Q05	1.340	0.026	SC154Q05	1.273	0.141	0.505	0.878	0.359	0.966
Progress monitoring	SC18Q05	1.021	0.008	SC16Q05	1.016	0.009	SC154Q06	1.047	0.011	SC154Q06	1.273	0.141	0.974	0.923	0.693	0.625
Teachers' effective.	SC18Q06	1.031	0.010	SC16Q06	1.022	0.011	SC154Q07	1.106	0.017	SC154Q07	1.273	0.152	0.865	0.931	0.580	0.447
Curriculum				SC16Q07	1.016	0.009	SC154Q08	1.047	0.011	SC154Q08	1.364	0.152		0.894	0.655	0.056
Other schools				SC16Q08	1.148	0.026	SC154Q10	1.325	0.025	SC154Q10	1.455	0.157		0.863	0.338	0.696
Average Variance Extracted (AVE)													0.574	0.736	0.250	0.376
Construct Reliability (CR)													0.881	0.956	0.710	0.786

Table 6.25

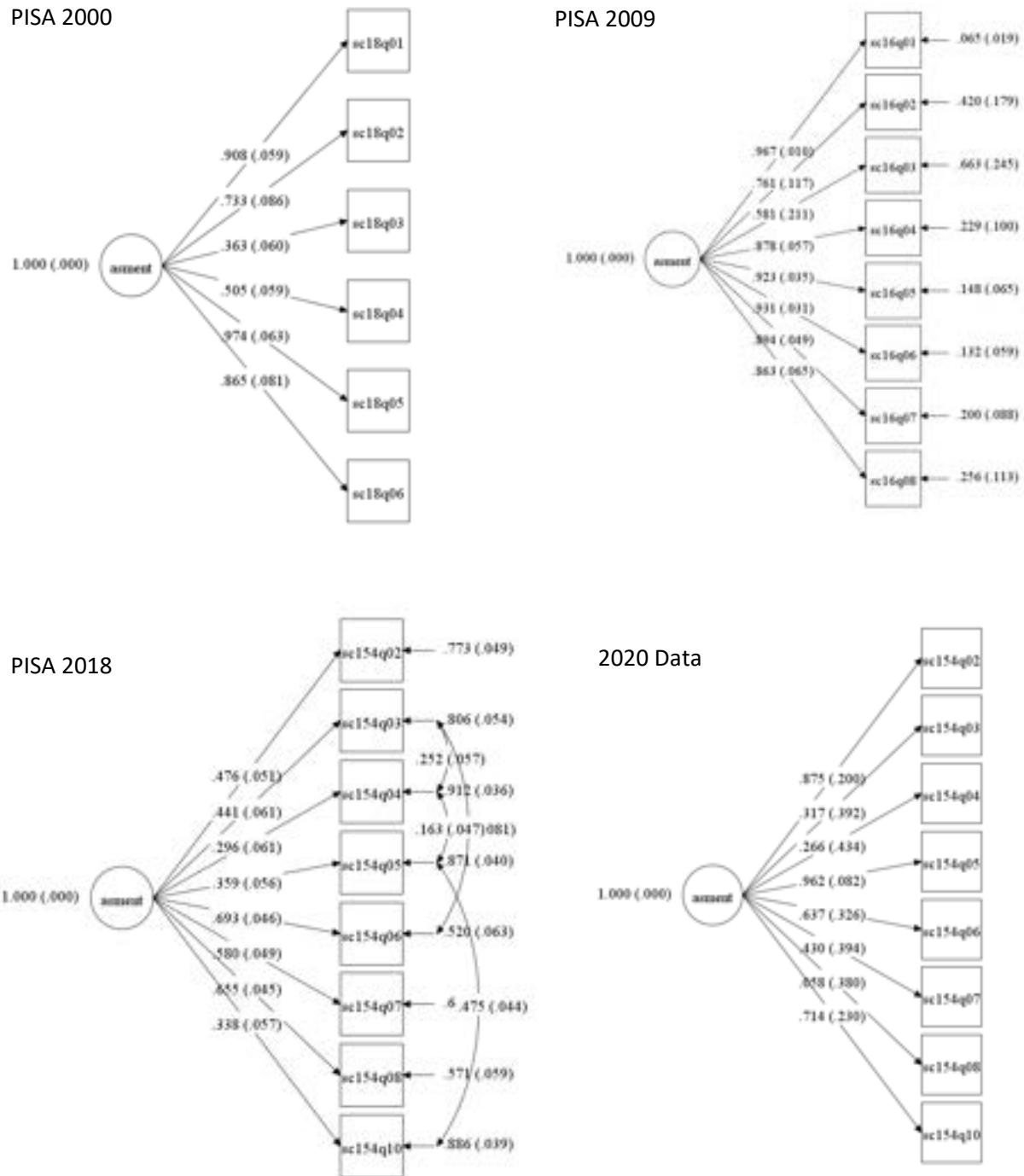
Model Fit for Assessment for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	df	χ^2 / df	RMSEA	CFI	TLI
2000	388.027	15	25.868	0.106	0.921	0.868
2009	262.131	28	9.321	0.060	0.945	0.922

2018	559.698	28	19.989	0.089	0.919	0.859
2020	39.032	28	1.394	0.081	0.871	0.820

Figure 6.10

Factor model of Assessment in PISA 2000, 2009, 2018, and 2020 data



6.4.4 LEADERSHIP [LEAD]

The scale of leadership from school questionnaires were only provided in PISA 2009, 2018, and 2020 data. In addition, there were differences between each cycle in terms of both the item variables and the responses.

PISA 2009 consisted of fourteen items using a four-point Likert scale, responses ranged from Never=1, Seldom=2, Quite often=3, and Very often=4 to indicate the frequency of school leadership activities. The higher the mean scores indicated the more frequent the leadership activities. The item variables were: I make sure that the professional development activities of teachers are in accordance with the teaching goals of the school (Professional development); I ensure that teachers work according to the school's educational goals (Education goals); I observe instruction in classrooms (Observe in classroom); I use student performance results to develop the school's educational goals (Student performance); I give teachers suggestions as to how they can improve their teaching (Give suggestion); I monitor students' work (Monitor students' work); When a teacher has problems in his/her classroom, I take the initiative to discuss matters (Teacher's problem); I inform teachers about possibilities for updating their knowledge and skills (Teachers updating skill); I check to see whether classroom activities are in keeping with our educational goals (Classroom goals); I take exam results into account in decisions regarding curriculum development (Exam results); I ensure that there is clarity concerning the responsibility for coordinating the curriculum (Curriculum responsibility); When a teacher brings up a classroom problem, we solve the problem together (Classroom problem); I pay attention to disruptive behaviour in classrooms (Disruptive behaviour), and; I take over lessons from teachers who are unexpectedly absent (Take over lessons).

Meanwhile, PISA 2018 and 2020 follow-up data consisted of ten items using a three-point Likert scale. Responses were scored from 1=Yes, based on district or ministry policies, 2=Yes, based on school initiative, and 3=No to indicate whether leadership opportunities are available at school based on centre policies or only at the school. The item variables consisted of: Internal evaluation/Self-evaluation (Internal evaluation); External evaluation; Written specification of the school's curricular profile and educational goals (School's profile); Written specification of student performance standards (Student performance); Systematic recording of data such as teacher or student attendance and professional development (Teacher student attendance); Systematic recording of student test results and graduation rates (Student test result); Seeking written feedback from students e.g. regarding lessons, teachers or resources (Feedback from student); Teacher mentoring; Regular consultation aimed at school improvement with one or more experts over a period of at least six months (Regular consultation), and; Implementation of a standardised policy for reading subjects i.e. school curriculum with shared instructional materials accompanied by staff development and training (Standardised policy).

Table 6.26 presents the descriptive statistics and construct validity for ICT at school for PISA 2009, 2018, and 2020 data. In PISA 2009, the highest mean score was 'education goals' (M=3.399), followed by 'professional development' (M=3.239) while the lowest score was 'take over lessons' (M=2.587). It was determined that leadership activities of 'education goals' occurred frequently in the schools, while 'take over lessons' occurred the least frequently in 2009. The highest mean score in PISA 2018 was 'regular consultation' (M=1.817), followed by 'feedback from students' (M=1.814), while the lowest score was 'internal evaluation' (M=1.444). Since the codes consists of two Yes (code 1 and 2) and No (code 3), the closer the mean to 3 the higher

proportion of the schools who answer Yes=1 (this is mandatory, e.g. based on district or ministry policies). Likewise, the closer the mean to 2 the higher proportion of the schools who answer Yes=2 (based on school initiatives). On the contrary, the closer the mean to 3 the higher the proportion of schools who answer No=3. This pattern of meaning used in PISA 2018 was similar to that used in the 2020 follow-up data. Among 2020 data, two items received the highest mean scores: 'feedback from students' (M=1.727) and 'regular consultation' (M=1.727). Also, two items received the lowest mean scores: 'external evaluation' (M=1.364) and 'school's profile' (M=1.364).

The result of factor loading analysis for leadership scale is presented in Table 6.26. According to the table, all factor loadings in PISA 2009 and 2018 were above the cut-off value (0.30) and on item in 2020 data was below the cut-off value (0.30). Among fourteen items in PISA 2009, the highest factor loading was 'classroom problem' (0.680) while the lowest was 'take over lessons' (0.398). Furthermore, among ten items in PISA 2018, the highest factor loading was 'teacher mentoring' (0.705) while the lowest was 'external evaluation' (0.401). Comparatively, the highest factor loading in 2020 data was found in 'regular consultation' (0.918), but an item below 0.3 was found in 'teacher student attendance' (0.022). The item that was below the cut-off value was retained since it is comparable to the item that was acceptable in cycle 2018.

A continuation of Table 6.26 demonstrates the validity and reliability of the leadership scale based on the AVE value and the CR value. Based on the analysis, all the AVE values in PISA 2009, 2018, and 2020 data were below the cut-off value (0.5). Considering that the factor loadings for all three cycles were less than 0.7, the AVE scores were less than 0.5 (AVE of PISA 2009 was 0.325, AVE of PISA 2018 was 0.401, and AVE of 2020 data was 0.450). This indicates

that the percentage of variance interpreted by leadership at school constructs in PISA 2009, 2018, and 2020 data were close to 40%. Regarding reliability based on CR values, all three cycles of CR values exceeded the cut-off value (0.6). On the leadership scale, the highest CR value was found in the 2020 data (CR=0.872), while PISA 2009 and 2018 both shared the same value (CR=0.868).

Table 6.27 presents the fit of the model based on CFI, TLI, and RMSEA values for the leadership scale. As a result of comparing three cycles of PISA 2009, 2018, and 2020 data, the CFIs were within the range of a good fit (0.90 – 1.00), the TLI were within the range of an acceptable (0.80 – 0.90) and a good fit (0.90 – 1.00), and the RMSEA values were within the range of an acceptable fit (0.05 - 0.09). PISA 2009 had a CFI of 0.914 and a TLI of 0.893, the RMSEA value was 0.072. PISA 2018 had a CFI of 0.917 and a TLI of 0.891, the RMSEA value was 0.093. 2020 data had a CFI of 0.952 and a TLI of 0.930, the RMSEA value was 0.077. Figure 6.11 illustrates the factor loading model for the scale of leadership [lead] for the comparison periods of PISA 2009, 2018, and 2020 data.

Table 6.26

Descriptive Statistics and Construct Validity for Leadership for PISA 2000, 2009, 2018, and 2020 follow-up

Description	2000		Variable Name	2009		Variable Name	2018		Variable Name	2020		Factor Loadings			
	Mean	SE		Mean	SE		Mean	SE		Mean	SE	2000	2009	2018	2020
Prof. development			SC26Q01	3.239	0.042								0.489		
Education goals			SC26Q02	3.399	0.038								0.460		
Observe in classroom			SC26Q03	3.071	0.041								0.649		
Student performance			SC26Q04	3.109	0.042								0.586		
Give suggestions			SC26Q05	3.437	0.038								0.521		
Monitor students' work			SC26Q06	2.918	0.050								0.600		
Teacher's problem			SC26Q07	3.143	0.043								0.667		
Teachers updating skill			SC26Q08	3.322	0.044								0.481		
Goals - classroom			SC26Q09	3.235	0.042								0.575		
Exam results			SC26Q10	3.197	0.038								0.599		
Curriculum Respons.			SC26Q11	3.262	0.041								0.653		
Classroom problem			SC26Q12	3.026	0.049								0.680		
Disruptive behaviour			SC26Q13	3.262	0.042								0.533		
Take over lessons			SC26Q14	2.587	0.055								0.398		
Internal evaluation						SC037Q01	1.444	0.029	SC037Q01	1.454	0.157			0.575	0.801
External evaluation						SC037Q02	1.582	0.037	SC037Q02	1.364	0.152			0.401	0.414
School's profile						SC037Q03	1.505	0.031	SC037Q03	1.364	0.152			0.605	0.871
Student performance						SC037Q04	1.656	0.034	SC037Q04	1.636	0.203			0.668	0.831
Teacher student attend.						SC037Q05	1.478	0.030	SC037Q05	1.478	0.157			0.692	0.022
Student test results						SC037Q06	1.475	0.029	SC037Q06	1.545	0.157			0.702	0.767
Feedback from students						SC037Q07	1.814	0.030	SC037Q07	1.727	0.141			0.663	0.691
Teacher mentoring						SC037Q08	1.533	0.029	SC037Q08	1.636	0.152			0.705	0.381
Regular consultation						SC037Q09	1.817	0.032	SC037Q09	1.727	0.195			0.615	0.918
Standardised policy						SC037Q10	1.683	0.033	SC037Q10	1.545	0.157			0.649	0.425
Average Variance Extracted (AVE)													0.325	0.401	0.450

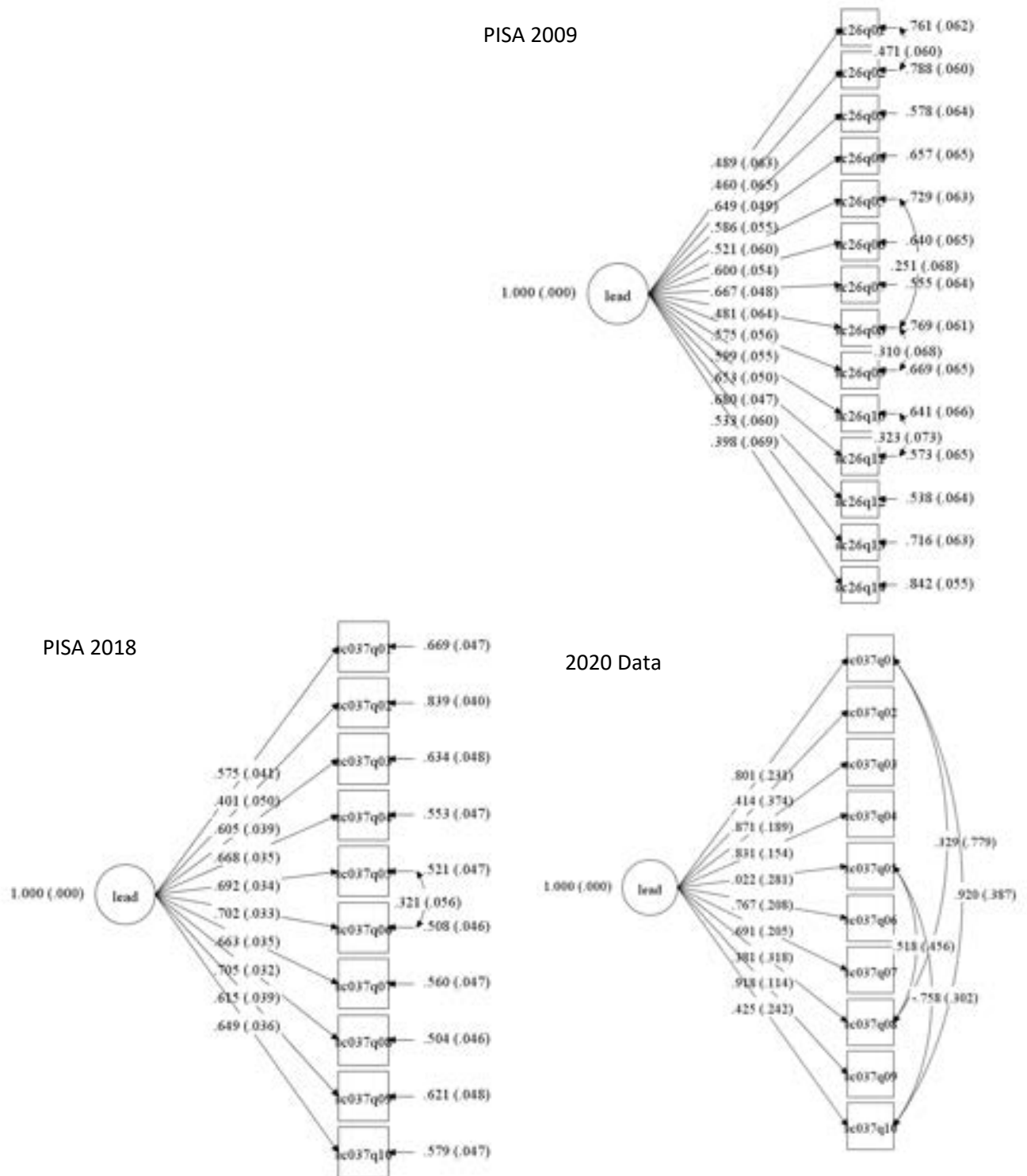
Table 6.27

Model Fit for Leadership for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	<i>df</i>	χ^2 / df	RMSEA	CFI	TLI
2000						
2009	904.367	91	9.938	0.072	0.914	0.893
2018	1251.128	45	27.803	0.093	0.917	0.891
2020	86.899	45	1.931	0.077	0.952	0.930

Figure 6.11

Factor model of Leadership in PISA 2000, 2009, 2018, and 2020 data



6.4.5 SCHOOL CLIMATE [CLIMATE]

The scale of school climate in school questionnaires involved two sub-constructs: school climate regarding teacher (climate teachers) and school climate regarding student (climate students). Responses were scored on a four-point Likert scale ranging from Not at all=1, Very little=2, To some extent=3, and A lot=4 indicating the proportion of activities that occur in schools regarding teachers and students. Within the climate teachers sub-scale, PISA 2000 contained seven items, whereas in 2009, 2018, and 2020, there were five items consistent with PISA 2000. Meanwhile, within the climate students sub-scale, all the four cycles contained six items.

The variable items for climate teachers sub-scale were: low expectations of teacher (low expectations); poor student-teacher relations (student-teacher relations); teachers not meeting individual students' needs (ignoring students); teacher absenteeism; staff resisting change (resisting change); teachers being too strict with students (teachers' strictness), and; students not being encouraged to achieve their full potential (lack of encouragement). The five items that were similar to PISA 2009, 2008, and 2020 data were ignoring students; teacher absenteeism; resisting change, teachers' strictness, and; lack of encouragement.

Table 6.28 presents the descriptive statistics and construct validity for climate teacher sub-scale for all cycles in this study. In PISA 2000, the highest mean score was 'teacher absenteeism' (M=2.287) while the lowest was 'low expectations' (M=1.718). It was indicated in 2000, the climate that teacher absenteeism was the most frequent in schools, in contrast to low expectations of teachers. Furthermore, in PISA 2009, the highest mean score was 'lack of encouragement' (M=2.226) while the lowest mean score was 'student teacher relations' (M=1.319). It indicated

that in 2009, the climate that students no being encouraged to achieve their full potential was the most frequent in schools, in contrast to poor student-teacher relations. Additionally, in PISA 2018, the highest mean score was ‘teachers’ strictness’ (M=1.855) while the lowest mean score was ‘resisting change’ (M=1.274). This indicated that in 2018, the climate that teachers being too strict with students was the most frequent in schools, in contrast to staff resisting change. Lastly, for 2020 data, the highest mean score was ‘teacher strictness’ (M=1.909) while there were two lowest mean scores namely ‘ignoring students’ (M=1.545) and ‘teacher absenteeism’ (M=1.545). This determined that during 2020, teachers being too strict with students was the most frequent in schools, in contrast to both teachers not meeting individual students’ needs and teacher absenteeism.

Continuing Table 2.28 displays the results of factor loading analysis regarding climate teachers sub-scale. It was noted that all factor loadings in all cycles were above the cut-off value (0.30). The highest value in PISA 2000 was ‘teacher absenteeism’ (M=2.287) while the lowest was ‘low expectations’ (M=). For PISA 2009, the highest mean score was ‘ignoring student’ (M=0.728) while the lowest mean score was ‘resisting change’ (M=0.456). Based on PISA 2018, the highest mean score was ‘teacher absenteeism’ (M=0.788) while the lowest mean score was ‘teachers’ strictness’ (M=0.388). Then for 2020 data, the highest mean score was ‘teacher absenteeism’ (M=0.976) while the lowest mean score was ‘ignoring students’ (M=0.316).

Table 2.28 also provides the result analysis of validity using AVE value and reliability using CR value. With an AVE cut-off value of 0.5, only PISA 2000 had an AVE value of 0.5, whereas all other cycles had an AVE value below 0.5 (AVE of PISA 2000 was 0.510, AVE of PISA 2009 was 0.327, AVE of PISA 2018 was 0.435, and AVE of 2020 data was 0.447).

Considering that the factor loadings for PISA 2009, 2018, and 2020 data were less than 0.7, the AVE scores were less than 0.5. This indicates that the percentage of variance interpreted by climate teachers sub-scale at school was more than 50% for PISA 2000 and close to 40% for PISA 2009, 2018, and 2020 data. Meanwhile, for the reliability using CR with a cut-off value of 0.6 results in all cycles reaching this value. Among four cycles, the highest CR value was found in PISA 2000 (CR=0.887), followed by PISA 2018 (CR=0.787), PISA 2009 (CR=0.767) and 2020 data (CR=0.761).

The fit of the model based on the CFI, TLI, and RMSEA values of the sub-scale of climate teachers were presented in Table 6.29. Among four cycles, a good fit (0.09 - 1.00) was found for the CFI and TLI of three cycles in PISA (2000, 2009, and 2018) while the RMSEA values were within acceptable (0.05 - 0.09) and good fit (0 - 0.05) ranges. However, in 2020 follow-up data the CFI, TLI, and RMSEA value were not within the range of any fit with a CFI of 0.790 and TLI of 0.580, and RMSEA value of 0.572. PISA 2000 had a CFI of 0.982 and a TLI of 0.973 indicating a good fit, and the RMSEA value was within an acceptable fit (RMSEA=0.063). Further, PISA 2009, had a CFI of 0.989 and a TLI of 0.983 indicating a good fit, and the RMSEA value was within a good fit (RMSEA=0.032). Further, PISA 2018, had a CFI of 0.997 and a TLI of 0.995 indicating a good fit, and the RMSEA value was within a good fit (RMSEA=0.026). Figure 6.12 displays the factor loading model for the sub-scale of climate teachers, part of school climate scale [climate] for over the cycles of PISA 2000, 2009, 2018, and 2020 follow-up data.

Table 6.28

Descriptive Statistics and Construct Validity for School Climate (teacher) for PISA 2000, 2009, 2018, and 2020 follow-up

Description	Variable Name	2000		Variable Name	2009		Variable Name	2018		Variable Name	2020		Factor Loadings			
		Mean	SE		Mean	SE		Mean	SE		Mean	SE	2000	2009	2018	2020
Low expectations	SC19Q01	1.718	0.054	SC17Q01	1.574	0.056							0.557	0.464		
Stud-teach relations	SC19Q03	1.781	0.056	SC17Q03	1.319	0.043							0.800	0.516		
Ignoring students	SC19Q07	2.163	0.051	SC17Q05	1.693	0.051	SC061Q06	1.648	0.039	SC061Q06	1.545	0.157	0.582	0.728	0.730	0.316
Teacher absenteeism	SC19Q08	2.287	0.057	SC17Q06	1.462	0.043	SC061Q07	1.688	0.036	SC061Q07	1.545	0.157	0.742	0.564	0.788	0.976
Resisting change	SC19Q11	1.723	0.049	SC17Q09	1.490	0.050	SC061Q08	1.274	0.031	SC061Q08	1.818	0.263	0.676	0.456	0.637	0.356
Teachers' strictness	SC19Q14	1.923	0.056	SC17Q11	1.462	0.045	SC061Q09	1.855	0.045	SC061Q09	1.909	0.163	0.864	0.703	0.388	0.358
Lack of encourage.	SC19Q16	1.894	0.060	SC17Q13	2.226	0.070	SC061Q10	1.614	0.041	SC061Q10	1.727	0.195	0.728	0.509	0.683	0.962
Average Variance Extracted (AVE)													0.510	0.327	0.435	0.447
Construct Reliability (CR)													0.887	0.767	0.787	0.761

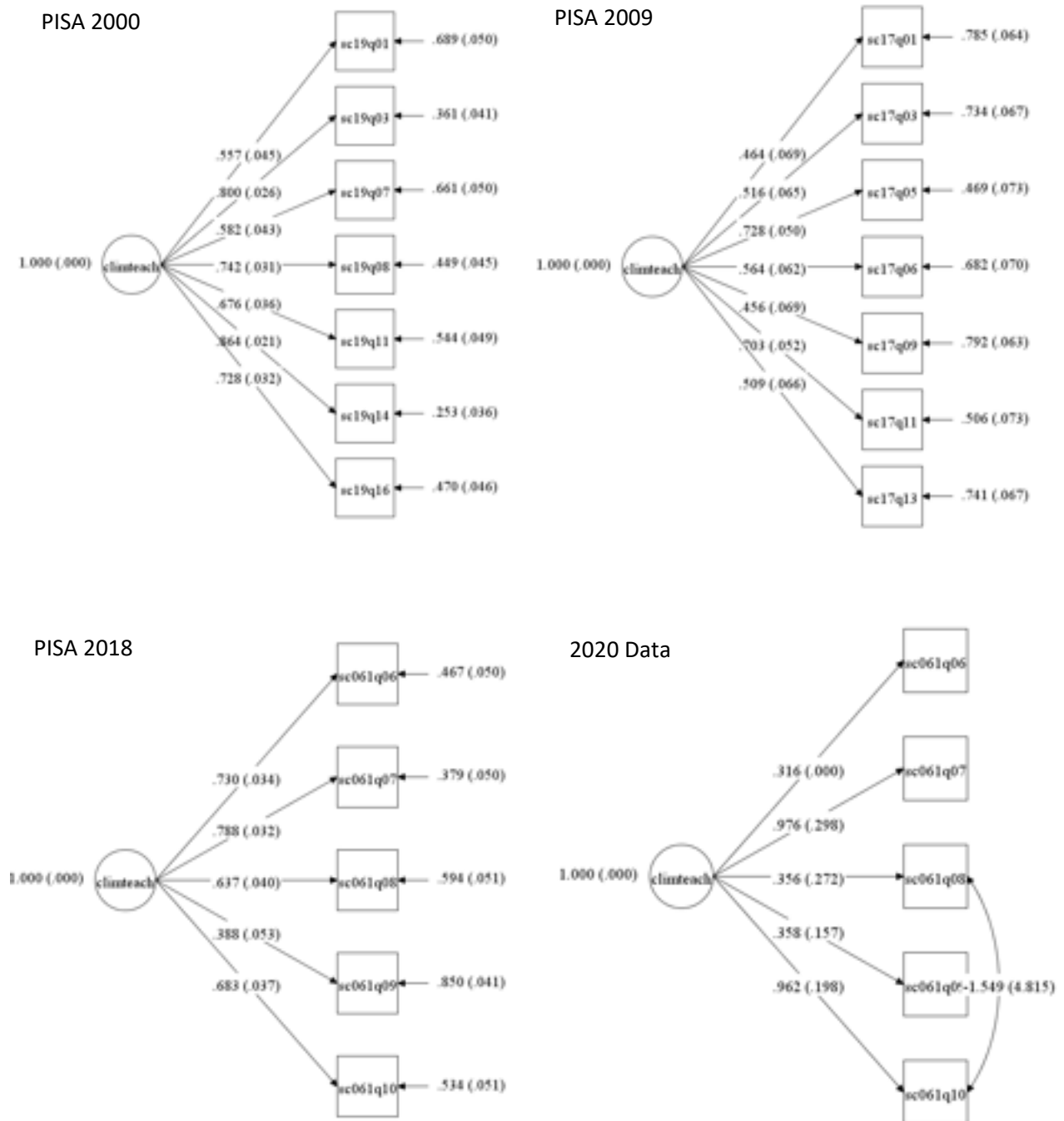
Table 6.29

Model Fit for School Climate (teacher) for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	<i>df</i>	χ^2 / df	RMSEA	CFI	TLI
2000	897.711	21	42.748	0.063	0.982	0.973
2009	259.338	21	12.349	0.032	0.989	0.983
2018	451.552	10	45.155	0.026	0.997	0.995
2020	95.713	10	9.571	0.572	0.790	0.580

Figure 6.12

Factor model of School climate (teacher) in PISA 2000, 2009, 2018, and 2020 data



The variable items for climate teachers sub-scale were: student absenteeism (absenteeism); disruption of classes by students disrupting of class (disrupting class); students skipping classes (skipping classes); students lacking respect for teachers (lack of respect); the use of alcohol or illegal drugs (use of alcohol), and; students intimidating or bullying other students (bullying).

Table 6.30 presents the descriptive statistics and construct validity for climate students for all cycles in this study. In PISA 2000, the highest mean score was 'student absenteeism' (M=2.439) while the lowest was 'use of alcohol' (M=1.693). Likewise, in PISA 2009, the highest mean score was 'student absenteeism' (M=2.253) while the lowest mean score was 'use of alcohol' (M=1.126). Additionally, in PISA 2018, the highest mean score was 'disrupting of class' (M=2.240) while the lowest mean score was 'student absenteeism' (M=1.110). In line with PISA 2018, the highest mean score for 2020 was "disrupting class" (M=1.727), but 'lack of respect' had the same (M=1.727), while 'use of alcohol' had the lowest (M=1.182). All results were determined that the climate that student absenteeism was the most frequent in schools in 2000 and 2009 while disruption of classes by students disrupting of class was the most frequent in schools in 2018 and 2020. Over the four cycles, however, there was a climate in which the use of alcohol and illegal drugs by students was the least prevalent.

Table 6.30

Descriptive Statistics and Construct Validity for School Climate (student) for PISA 2000, 2009, 2018, and 2020 follow-up

Description	Variable	2000		Variable	2009		Variable	2018		Variable	2020		Factor Loadings			
	Name	Mean	SE	Name	Mean	SE	Name	Mean	SE	Name	Mean	SE	2000	2009	2018	2020
Absenteeism Disrupting class Skipping class Lack of respect Use of alcohol Bullying	SC19Q02	2.439	0.059	SC17Q02	2.253	0.049	SC061Q01	2.030	0.039	SC061Q01	1.545	0.247	0.587	0.612	0.627	0.758
	SC19Q06	1.910	0.047	SC17Q04	1.747	0.049	SC061Q11	2.240	0.039	SC061Q11	1.727	0.237	0.694	0.530	0.678	0.811
	SC19Q09	2.384	0.054	SC17Q07	1.945	0.048	SC061Q02	1.834	0.040	SC061Q02	1.636	0.152	0.753	0.692	0.615	0.989
	SC19Q10	1.968	0.054	SC17Q08	1.714	0.054	SC061Q03	1.759	0.039	SC061Q03	1.727	0.141	0.787	0.715	0.760	0.736
	SC19Q13	1.693	0.069	SC17Q10	1.126	0.032	SC061Q04	1.110	0.022	SC061Q04	1.182	0.122	0.807	0.333	0.516	0.052
	SC19Q15	1.873	0.050	SC17Q12	1.385	0.044	SC061Q05	1.451	0.034	SC061Q05	1.636	0.152	0.828	0.507	0.621	0.326
Average Variance Extracted (AVE)													0.558	0.336	0.410	0.477
Construct Reliability (CR)													0.882	0.742	0.805	0.811

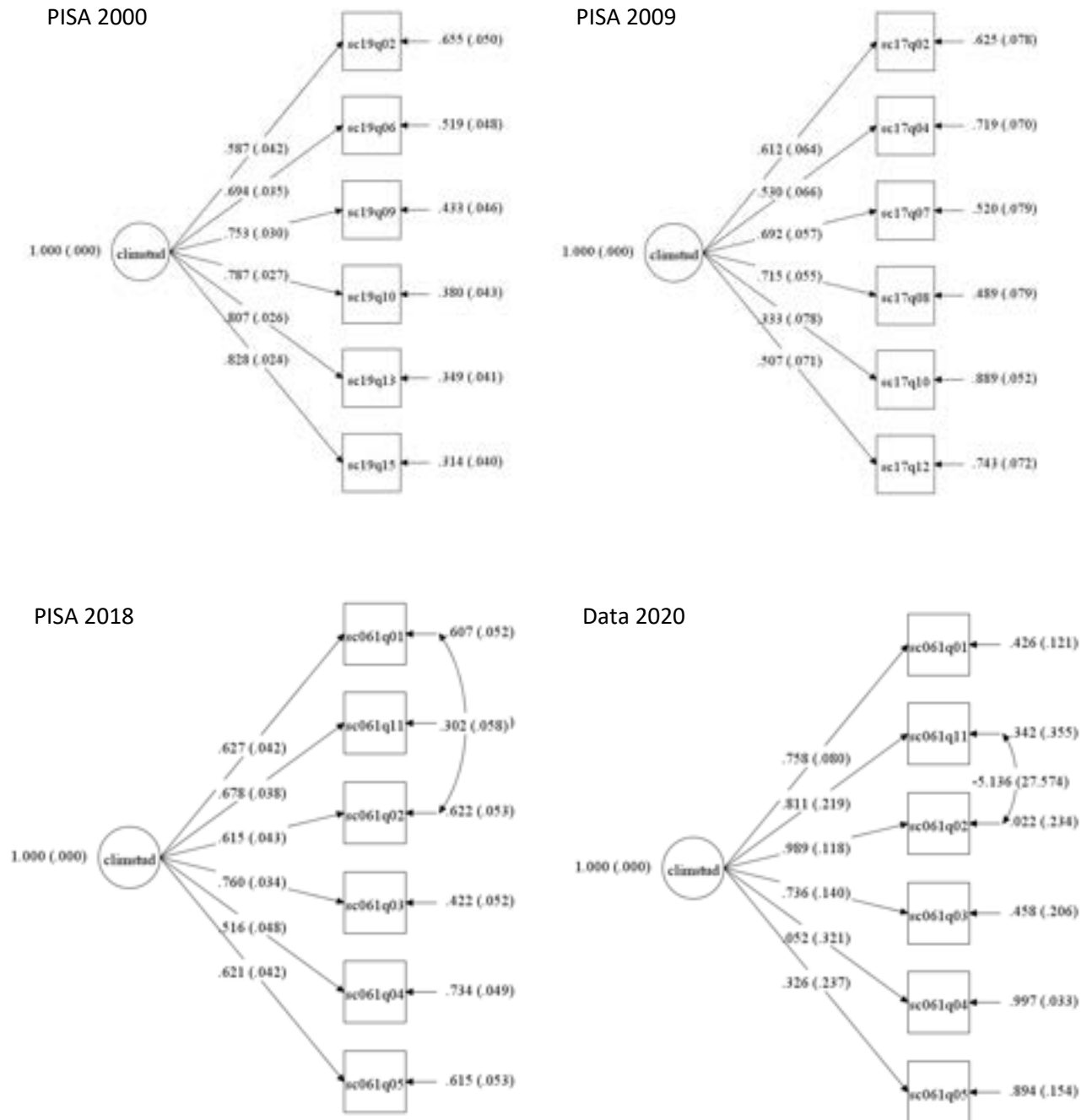
Table 6.31

Model Fit for School Climate (student) for PISA 2000, 2009, 2018, and 2020 follow-up

PISA Cycle	χ^2	df	χ^2 / df	RMSEA	CFI	TLI
2000	844.648	15	56.310	0.096	0.971	0.952
2009	234.100	15	15.607	0.126	0.882	0.803
2018	595.335	15	39.689	0.094	0.959	0.922
2020	34.280	15	2.285	0.153	0.879	0.799

Figure 6.13

Factor model of School climate (student) in PISA 2000, 2009, 2018, and 2020 data



6.5 READING INVOLVEMENT BY PARENT

In this study, the scale from the parent questionnaire is only based on data from 2020 follow-up as Indonesia did not include parents in PISA 2000, 2009, and 2018. In terms of the CFA instrument validation, only the scale of reading involvement was examined. There were seven items on the scale regarding the frequency with which parents engage their children in reading activities with them. Responses were score on a five-point Likert scale ranging from 1=Never or hardly ever, 2=Once or twice a year, 3=Once or twice a month, and 4=Once or twice a week, and 5=Every day or almost every day. The seven items were: Discuss how well my child is doing at school; Eat <the main meal> with my child around a table; Spend time just talking to my child; Help my child with his/her reading and writing homework; Discuss political or social issues; Go to a bookstore or library with my child; and Talk with my child about what he/she is reading on his/her own.

Table 6.32 provides the descriptive statistics and construct validity for reading involvement scale by parent factor in 2020. The greater mean scores were believed to indicate that parents were more frequently involved in their children's reading activities. Based on the results, the highest mean score was 'spend time just talking' (M=3.857) while the lowest score was 'go to a bookstore or library' (M=2.798). It was indicated as of 2020, the most prevalent reading involvement by parent was spending time just talking with children, as opposed to going to a bookstore or library.

Table 6.32 also presents the results of factor loading analysis for reading involvement scale by parent. As can be seen from the table, all items in this scale had factor loadings above the cut-off value (0.30). The highest value was 'help reading and writing homework' (0.778) while the

lowest was ‘discuss political or social issues’ (0.460). Continuing the same table, the validity of the scale using AVE value and the reliability using CR value is presented. The AVE value for reading involvement scale by parent was below the cut-off value (0.5). As most of the factor loading did not reach 0.7, the AVE score was less than 0.5 (AVE=0.381). This indicates that the percentage of variance interpreted by reading involvement by parent was close to 40%. For the reliability of the scale, with 0.6 as a cut-off value, indicates that the CR was above the cut-off value (CR=0.807).

In terms of the fit of the model based on CFI, TLI, and RMSEA values of the scale of reading by parent is provided in Table 6.33. The scale had a CFI of 0.93 indicating a good fit (0.90 – 1.00) and a TLI of 0.807 indicating an acceptable fit (0.80 – 0.90). However, the RMSEA value was not within the range of fit (0.05 – 0.09). Figure 6.14 illustrates the factor loading model for the reading involvement scale by parent in 2020 follow-up data.

Table 6.32

Reading involvement by parent for items and factor loading 2020 follow-up data

Variable Name	Description	Mean	SE	Factor loading
PA003Q01	Discuss how well my child at school	4.209	0.931	0.624
PA003Q02	Eat around a table	4.452	0.946	0.555
PA003Q03	Spend time just talking	4.650	0.692	0.553
PA003Q04	Help reading and writing homework	3.857	1.156	0.778
PA003Q05	Discuss political or social issues	3.198	1.254	0.460
PA003Q06	Go to a bookstore or library	2.798	1.081	0.555
PA003Q07	Talk about reading	3.769	1.147	0.735
Average Variance Extracted (AVE)				0.381
Construct Reliability (CR)				0.807

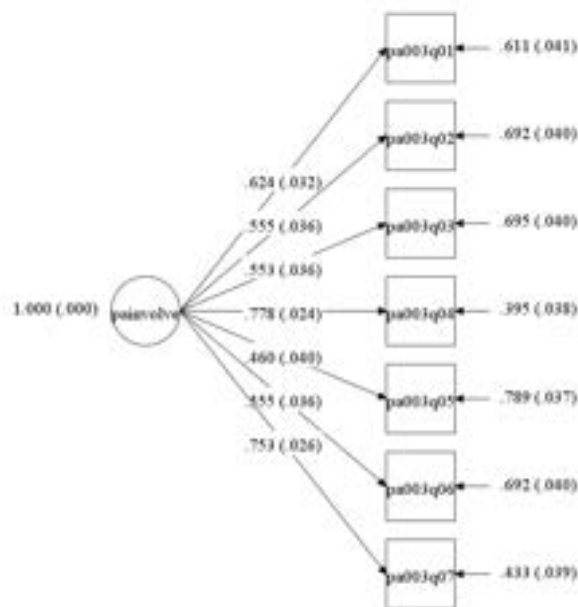
Table 6.33

Fit indices for CFA models in reading involvement by parent 2020 follow-up data

χ^2	df	χ^2 / df	RMSEA	CFI	TLI
1007.827	21	47.992	0.115	0.903	0.855

Figure 6.14

Factor model of CFA in reading involvement by parent2020 follow-up data



6.6 MEASURES OF TEACHER-LEVEL FACTORS

The scale of teachers in this study was derived from teacher questionnaire that include in the 2020 follow-up study. In regard to CFA instrument validation, there are three constructs of teachers were examined consists of professional, teacher online, and teacher lesson.

6.6.1 PROFESSIONAL [TPROF]

Responses were scored on a dichotomous scale of Yes=1 and No=2 in order to assess whether teacher participate on professional activities during the last 12 months. There were five items in total in regard to professional scale of teacher: Courses/workshops e.g. on subject matter or methods and/or other education-related topics (courses/workshops); Education conferences or seminars, where teachers and/or researchers present their research results and discuss educational issues (education conference); Observation visits to other schools (visit to other school); Observation visits to business premises, public organisations, non-governmental organisations (visit to business premises), and; In-service training courses in business premises, public, organisations, non-governmental organisations (In-service training course).

Table 6.34 displays the descriptive statistics and construct validity for professional scale by teacher in 2020. Since the codes are 1 and 2, the closer the mean to 1 the higher the proportion of teacher who answer Yes=1 and vice versa. Based on the results, the highest mean score was ‘visit to business promises etc’ (M=1.818), while the lowest was ‘courses/workshop’ (M=1.030). According to the survey, among the professional activities in the scale, teachers participated the most in observation visits to business premises, public organisations, and non-governmental organisations, as opposed to joining coursework during the last 12 months of 2020.

Additionally, Table 6.34 also presents the results of factor loading analysis for professional scale by teacher. As can be seen from the table, the factor loadings with a cut-off value (0.30), one item of ‘course/workshop’ (0.290) was below 0.3 and this is removed. The highest value was ‘visit to other school’ (0.857). Continuing the same table, the validity of the scale using AVE value and the reliability using CR value is presented. The AVE value for professional scale by teacher, with

0.5 as a cut-off value, indicated that the AVE value was below the cut-off value (AVE=0.314) as most of the factor loadings were less than 0.7. This indicates that the percentage of variance interpreted by professional by teacher was close to 30%. For the reliability of the scale, with 0.6 as a cut-off value, indicates that the CR was above the cut-off value (CR=0.665).

The fit of the model based on CFI, TLI, and RMSEA values of the scale of professional by teacher is provided in Table 6.35. The scale had a CFI of 1.00 and a TLI of 1.00. indicating a good fit (0.90 – 1.00). Likewise, the RMSEA value was within the range of fit (0.00 – 0.05) indicating a good fit. Figure 6.15 illustrates the factor loading model for the reading involvement scale by parent in 2020 follow-up data.

Table 6.34

Professional activities by teacher for items and factor loading 2020 follow-up data

Item	Description	Mean	SE	Factor loading
TC193Q01	Courses/workshops	1.030	0.030	0.290
TC193Q02	Education conferences	1.333	0.083	0.624
TC193Q03	Visit to other schools	1.636	0.085	0.857
TC193Q04	Visit to business premises etc	1.818	0.068	0.346
TC193Q05	In-service training courses	1.606	0.086	0.492
Average Variance Extracted (AVE)				0.314
Construct Reliability (CR)				0.665

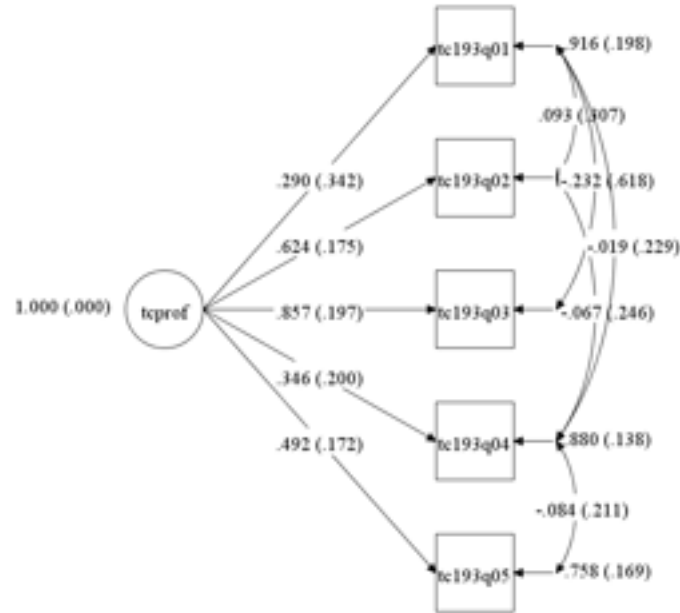
Table 6.35

Fit indices for CFA models in professional activities by teacher 2020 follow-up data

χ^2	df	χ^2 / df	RMSEA	CFI	TLI
23.415	10	2.341	0.000	1.000	1.000

Figure 6.15

Factor model of CFA in professional activities by teacher 2020 follow-up data



6.6.2 TEACHER ONLINE [TONLINE]

The scale of teacher online was derived from teacher questionnaire for 2020 follow-up data. Responses were score on a five-point Likert scale ranging from 1=I don't know what it is, 2=Never or almost never, 3=Several times a month, and 4=Several times a week, and 5=Several times a day. There were seven items regarding this how often a teacher involved in reading activities. The items were: Reading emails; Chat online e.g. Whatsapp, Messenger; Reading online news; Searching information online to learn about a particular topic (particular topic); Taking part in online group discussions or forums (group discussion), and; Searching for practical information online e.g schedules, events, tips, recipes (practical information).

Table 6.36 presents the descriptive statistics and construct validity for teacher online scale in 2020. The greater mean scores were believed to indicate that teachers were more frequently involved in their reading activities. Based on the results, the highest mean score was ‘chat online’ (M=4.667) while the lowest score was ‘reading emails’ (M=3.455). It was indicated as of 2020, the most prevalent teacher online activity was chatting online such as using Whatsapp, as opposed to reading emails.

Table 6.36 also presents the results of factor loading analysis for teacher online. As can be seen from the table, all the factor loadings with a cut-off value (0.30) were above the value. The highest value was ‘particular topics’ (0.881), while the lowest factor was ‘chat on line’ (0.621). Continuing the same table, the validity of the scale using AVE value and the reliability using CR value is presented. The AVE value for teacher online scale, with 0.5 as a cut-off value, indicated that the AVE value was above the cut-off value (AVE=0.565) This indicates that the percentage of variance interpreted by teacher online was approximately 50%. The reliability of the scale, with 0.6 as a cut-off value, indicates that the CR was above the cut-off value (CR=0.885).

Table 6.36

Teacher online activities for items and factor loading 2020 follow-up data

Item	Description	Mean	SE	Factor loading
TC176Q01HA	Reading emails	3.455	0.145	0.732
TC176Q02HA	Chat online	4.667	0.120	0.621
TC176Q03HA	Online news	4.394	0.123	0.817
TC176Q05HA	Particular topics	4.545	0.116	0.881
TC176Q06HA	Group discussion	3.758	0.195	0.644
TC176Q07HA	Practical information	4.364	0.122	0.780
Average Variance Extracted (AVE)				0.565
Construct Reliability (CR)				0.885

Table 6.37

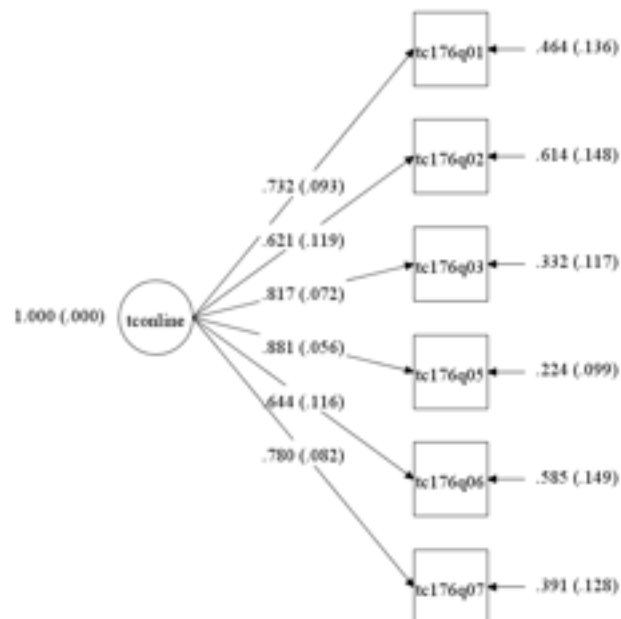
Fit indices for CFA models in teacher online activities 2020 follow-up data

χ^2	<i>df</i>	χ^2 / df	RMSEA	CFI	TLI
115.448	15	7.696	0.166	0.918	0.863

The fit of the model based on CFI, TLI, and RMSEA values of the scale of teacher online was provided in Table 6.37. The scale had a CFI of 0.918 indicating a good fit and a TLI of 0.863 indicating an acceptable fit. However, the RMSEA value was not within the range of fit (RMSEA=0.166). Figure 6.16 illustrates the factor loading model for teacher online in 2020 follow-up data.

Figure 6.16

Factor model of CFA in teacher online activities 2020 follow-up data



6.6.3 TEACHER LESSON [TLESSON]

Responses were scored on a dichotomous scale of Yes=1 and No=2 in order to assess whether teachers were using several tools on their lesson. There were seven items in total in regard to teacher lesson scale: How to use keywords when using a search engine such as google, yahoo, etc (using search engine); How to decide whether to trust information from the Internet (Trust internet); How to compare different web pages and decide what information is more relevant for the students' schoolwork (compare different web); To understand the consequences of making information publicly available online on e.g. Facebook, Instagram, etc (understand publicly); How to use the short description below the links in the list of result of a search (use links); How to detect whether the information is subjective or biased (detect biased information), and; How to detect phishing or spam emails (detect phishing or spam email).

Table 6.38 presents the descriptive statistics and construct validity for teacher lesson activity scale in 2020. Since the codes are 1 and 2, the closer the mean to 1 the higher the proportion of teacher who answer Yes=1 and vice versa. Based on the results, the highest mean score was 'detect phishing or spams' (M=1.545), while the lowest was 'trust internet' (M=1.030). It was indicated that among the teacher lesson activities in the scale, teachers used the most on how to detect phishing or spam emails in their lesson, as opposed to how to decide whether to trust information from the Internet in 2020.

Further, Table 6.38 provides the results of factor loading analysis for teacher lesson scale. As can be seen from the table, the factor loadings with a cut-off value (0.30), one item of 'trust internet' (0.071) was below 0.3 which has been removed for the purposes of the next analysis. The highest value was 'understand publicly' (0.707). Continuing the same table, the validity of the

scale using AVE value and the reliability using CR value is presented. The AVE value for teacher lesson scale by teacher, with 0.5 as a cut-off value, indicated that the AVE value was below the cut-off value (AVE=0.353) as most of the factor loadings were less than 0.7. This indicates that the percentage of variance interpreted by teacher lesson was close to 30%. For the reliability of the scale, with 0.6 as a cut-off value, indicates that the CR was above the cut-off value (CR=0.771).

Table 6.38

Teacher lesson activities for items and factor loading 2020 follow-up data

Item	Description	Mean	SE	Factor loading
TC166Q01HA	Using a search engine	1.182	0.068	0.658
TC166Q02HA	Trust internet	1.030	0.030	0.071
TC166Q03HA	Compare different web	1.152	0.063	0.705
TC166Q04HA	Understand publicly	1.273	0.079	0.707
TC166Q05HA	Use links	1.273	0.079	0.632
TC166Q06HA	Detect biased information	1.303	0.081	0.571
TC166Q07HA	Detect phishing or spams	1.545	0.088	0.559
Average Variance Extracted (AVE)				0.353
Construct Reliability (CR)				0.771

Table 6.39

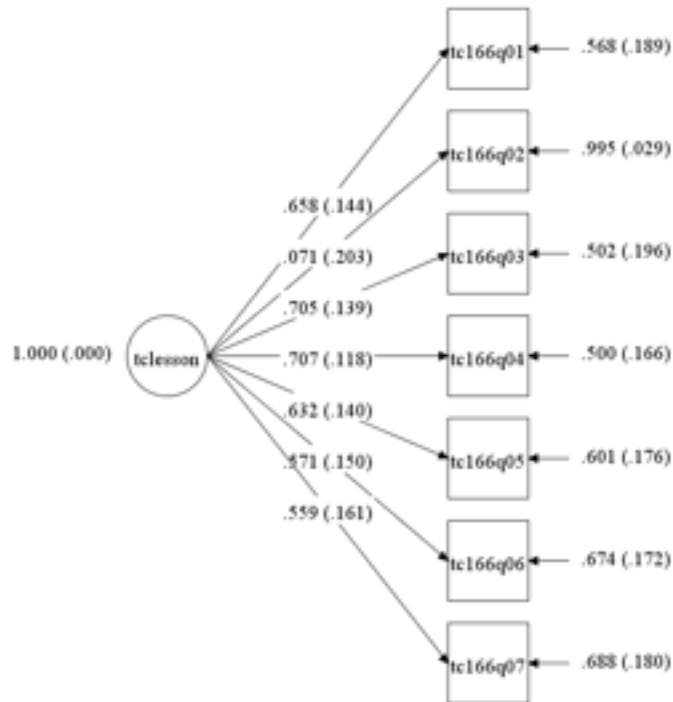
Fit indices for CFA models in teacher lesson activities 2020 follow-up data

χ^2	df	χ^2 / df	RMSEA	CFI	TLI
53.237	10	1.884	0.160	0.883	0.805

The fit of the model based on CFI, TLI, and RMSEA values of the scale of teacher lesson was provided in Table 6.36. The scale had a CFI of 0.883 and a TLI of 0.805 indicating an acceptable fit. However, the RMSEA value was not within the range of fit (RMSEA=0.160). Figure 6.17 illustrates the factor loading model for teacher online in 2020 follow-up data.

Figure 6.17

Factor model of CFA in teacher lesson activities 2020 follow-up data



6.7 SUMMARY

The chapter discusses instrument validation of the constructs employed in questionnaires administered to students and schools for three cycles of PISA Data (PISA 2000, 2009, and 2018) and to students, teachers, and schools for 2020 follow-up data. To determine whether the constructs of the questions are good indicators of the latent variables and fit, it is necessary to test their validity and reliability, particularly in relation to Indonesia.

Confirmatory factor analysis (CFA) is used in the current study to examine a scale's construct validity and reliability using the estimation of Average Variance Extracted (AVE) and Construct reliability (CR) values. Furthermore, this study conducts an item fit analysis to examine the CFI, TLI, and RMSEA value for each item. Through CFA, the constructs in this study are mostly adapted, validated, and confirmed based on their theories and structures that led to the final scale structure being based on the model. As the foregoing analyses validated the constructs at the level of structure, the next chapter discusses the validation at the item level. Using the item fit analysis on Rasch analysis to examine the INFIT MNSQ for each item, the items are examined as to whether they conform to the requirements of good fit items.

Chapter 7

Rasch Analysis: Validation Items and Equating Method

7.1 INTRODUCTION

As the preceding analyses validated the constructs at the level of structure, the next chapter discusses the validation at the item level. As discussed in the previous chapter (Chapter 6), the constructs employed were validated at the scale level by examining the structure using Confirmatory Factor Analysis (CFA). In CFA, the results have confirmed the structure of the constructs since the theories underpinning are already established. The purpose of validation was to determine whether a construct accurately measures what it is intended to measure. As a result of the CFA, the constructs are used to look at the factor loading for each item and confirm to meet the needs of the investigation. Validation reveals that the construct used is compatible with the context in which respondents are situated. After the macro-level analysis, the constructs are examined on a micro-level, that is on an item level.

The constructs used in this study were adapted from existing PISA questionnaires and, therefore, validation is warranted. As a national and cultural instrument, PISA requires not only extensive translation into various languages and its verification, but it also assumes that similar characteristics, attitudes, and perceptions have been measured in different national and cultural contexts (Schulz, 2003). Likewise, PISA questionnaires contain constructs derived from Likert-scale items that are used to measure perceptions, beliefs, or attitudes. The items selected are unidimensional (only one construct is being measured by the scale) and have a high level of

internal consistency. To determine whether an item meets the requirements, that so-called good item, an appropriate model is required. The model that can be used is a simplest form of the item response theory (IRT) model. As defined by IRT, the logistic model is a set of mathematical models designed to describe the performance of examinees during testing and how their performance relates to the abilities and capabilities that are measured by the items of the test. (Hambleton et al., 1993; Kang & Cohen, 2007). The type of IRT model appropriate in this study is Rasch model allows for direct measurement of student performance, thus ensuring the level of rigor in student assessments using an interval scale.

Therefore, this study conducts the Rasch analysis of each construct to verify whether the data already been validated in CFA fit the Rasch model. In this chapter, the Rasch analysis is employed to examine the items at the item level and verify the extent of the structures of the construct by assessing how well the data fit the model, which have been already confirmed in the CFA analysis in the previous chapter, fit the Rasch model, that is, the 'ideal measurement model'. The Rasch analysis utilises the rating scale model comparison fit. The rating scale model is an extension to Rasch's simple logistic model and is suitable when Likert-style items are used (Adams et al., 2017). During this process, the items are evaluated in order to determine if they comply with the requirements, specifications, or standards of a good item. Thus, in this study, the Rasch model, which specifies the qualities of a good item, is applied to the data.

7.2 CASE FIT

As part of the analysis in this study, Rasch model is used to examine item fit to ensure that the instrument is functioning properly. It examines the item weighted fit mean square to see

how well an item in each construct fit the ‘ideal Rasch measurement model’. Item fit can be determined by examining the in fit statistics, called the weighted mean square (Information Weighted Fit Mean Square/INFIT MNSQ). The INFIT MNSQ is a basis for model fitting items or non-fitting items. This study choose the 0.60 to 1.4 logit range for the survey questionnaires provided by Linacre & Wright (1993). An MNSQ value substantially less than 1.0 indicates overfitting, which may result in inflated statistics, while an MNSQ value exceeding 1.0 indicates underfitting. Based on the mean square values, in item reduction, the misfitting items should be deleted, and the analysis of category is then performed on the remaining items. However, if items have the INFIT MNSQ inside the acceptable range and show item delta in order, these items should be carefully examined as to whether they appear to measure what is needed for this study or not. It is necessary to take caution and thoroughly examine the list of items before removing any misfitting items as they may contain valuable information to substantiate the study. The following section presents the results of the item fit analysis.

In this study, Rasch analysis based on the rating scale model was undertaken using the Conquest 4.0 statistical software package by Wu, Adams, Wilson and Haldane (2007). The Rasch model for dichotomous and polytomous items (Andrich, 1978; Rasch 1960) is used to estimate item and person parameters of PISA data. In the interpretation of fit, some preliminary points are emphasised. There are several statistics included in the Rasch analysis result table, including the estimates and their standard errors, mean square fit statistics (Outfit and Infit), the class interval and t-value statistics. For assessing the fit of the items, the Infit mean square statistic is preferred for this study, since it better indicates the ability or capability of the individual who is relatively close to the difficulty level. Theoretically, those items with Infit

mean square statistics outside the acceptable range of 0.6 to 1.4 should be removed. There is a higher degree of sensitivity to outliers in the outfit statistics (Engelhard & Wind, 2019; Wu et al., 2016). The mean square statistics INFIT are expected to be 1.0. A value of Infit greater than 1.0 indicates that the responses are more variable than expected, which is referred to as noise and bias (Engelhard, 2022). On the other hand, items with an Infit less than 1.0 indicate less variation and may indicate the redundancy of the item, which are not considered as a problem since they are not sensitive to errors in items. However, some items resulted in values that were not a good fit, but they were retained. The decision was made after careful analysis of the other criteria parameters as well as the nature of the item statement in terms of its overall importance to the constructs. When deemed acceptable, the items' relevance outweighed the poor fit and were thus retained.

On the logit scale, each item's estimate specifies a 'difficulty' that it is set to 0.0. In this study with survey questionnaire items, a positive logit construct indicates that respondents are having difficulty agreeing with the statements. The negative logit construct, on the other hand, indicates that respondents are finding the statement easy to endorse. The standard errors in the estimates provided an indicator of the precision of the measure.

7.3 RASCH ANALYSIS FOR THE CONSTRUCTS FROM STUDENT QUESTIONNAIRES

Several constructs from student questionnaires are included in the Rasch analysis, as well as the CFA analysis, including home educational resources, reading engagement, reading diversity, online reading, reading strategies, and reading confidence. This analysis was

conducted using the same data as that used in the CFA analysis, including the negatively worded items for which the codes had already been reversed.

7.3.1. HOME EDUCATIONAL RESOURCES

Home educational resources construct consists of six items in PISA 2000 and eight items in PISA 2009, 2018, and 2020 data. The study used the rating scale for dichotomous modelling to conduct the item analysis for this construct as the responses included yes and no. Table 7.1 presents overall information whether the data show acceptable fit to the model.

The mean square fit statistics were examined first. In PISA 2000, the Infit values ranged from 0.96 to 1.08. There were two items where the Infit values were higher than 1.0: ‘internet’ (1.01) and ‘dictionary’ (1.09) which indicated that they were more varied than expected. While those with fit indices lower than 1.0: ‘software’ (0.99), ‘study place’ (0.98), ‘desk’ (0.96) and ‘textbooks’ (0.99) implying that there was less variation in the responses than expected. In PISA 2009, the Infit values ranged from 0.93 to 1.11. There were four items higher than 1.0: ‘dictionary’ (1.11), ‘textbooks’ (1.00), ‘references’ (1.18), and ‘computers’ (1.02). As compared to those with fit indices lower than 1.0, ‘software’ (0.93), ‘internet’ (0.94), ‘study place’ (0.97), and ‘desk’ (0.97). In PISA 2018, the Infit values ranged from 0.92 to 0.99 with no item scored higher than 1.0. As a result, those with fit indices lower than 1.0 were all items (software, internet, dictionary, study place, desk, textbooks, reference, and computer). In 2020 data, the Infit values ranged from 0.92 to 1.08. There were three items higher than 1.0: ‘dictionary’ (1.04), ‘references’ (1.08), and ‘computers’ (1.00). While those with fit indices lower than 1.0 were ‘software’ (0.95), ‘internet’ (0.92), ‘study place’ (0.99), ‘desk’ (0.94), and textbooks (0.95).

In regard to the t-value, for PISA 2000, the item of ‘dictionary’ had a t-value greater than 5.0 ($t=13.6$). It means that ‘dictionary’ was not referred as a good fit item. For PISA 2009, 2018, and 2020 data, all items were below 5.0 and indicative of the adequate fit of the items.

Regarding to the estimates and standard errors of measurement for the items in home educational resources, the estimates of the items measure indicate the position of the items on the logit construct. Responses were scored on a dichotomous scale of Yes=1 and No=2 in order to assess whether resources at home are available. In PISA 2000, the estimate’s statistics, item ‘textbooks’ ($\delta=1.160$) appeared to be the most difficult item to say yes of no. Meanwhile, item ‘internet’ ($\delta= -1.933$) appeared to be the easiest. The standard errors were small and were indicative of precision in the measure. Similarly, in PISA 2009, the item 'textbooks' ($\delta= 1.292$) also appeared to be the hardest to say yes or no, while the item 'internet' ($\delta= 1.624$) appeared to be the easiest. Also, the standard errors were small and were indicative of high precision. In PISA 2018, it appears that item 'textbooks' ($\delta= 2.259$) was also the most difficult to say yes or no, while item 'references' ($\delta= -2.014$) was the easiest. Its standard errors were also small, indicating precision in the measure. In 2020 follow-up data, item ‘dictionary’ ($\delta= 1.887$) was the most the most difficult item to say yes or no, while item ‘references’ ($\delta= -2.058$) was the easiest. However, the standard errors were high that indicative of less precision in the measure.

As shown in Table 7.1, all items in four constructs of home educational resources were within acceptable range, indicating that the data adequately fit the standard Rasch Model. Table 7.1 also records the confidence interval (CI) and t-value of the item on home educational resources. These were also used to assess good fit and are complementary to Infit. Nonetheless,

more emphasis is given to Infit values. Both measures indicated adequate fit of the items to the home educational resources in PISA 2000, 2009, 2018, and 2020 follow-up data.

Table 7.1

Estimates and Mean Square Fit of the items of Home educational resources for PISA 2000, 2009, 2018, and 2020 follow-up

Items	PISA2000						PISA 2009					
	Estimates	S.E	Mean Square Fit		C.I	t	Estimates	S.E	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Software	0.055	0.019	0.99	0.99	(0.98, 1.02)	-1.2	-1.259	0.022	1.02	0.93	(0.96, 1.04)	1.0
Internet	-1.933	0.020	1.01	1.01	(0.97, 1.03)	1.0	-1.624	0.023	0.82	0.94	(0.95, 1.05)	-2.4
Dictionary	-0.727	0.018	1.09	1.08	(0.99, 1.01)	13.6	0.853	0.070	1.14	1.11	(0.98, 1.02)	10.3
Study place	0.945	0.021	0.95	0.98	(0.97, 1.03)	-1.0	0.782	0.020	0.96	0.97	(0.98, 1.02)	-3.1
Desk	0.500	0.020	0.93	0.96	(0.97, 1.03)	-2.8	0.317	0.020	0.97	0.97	(0.98, 1.02)	-3.0
Textbooks	1.160	0.044	0.96	0.99	(0.96, 1.04)	-0.3	1.292	0.021	1.02	1.00	(0.97, 1.03)	-0.1
References							0.568	0.021	1.18	1.15	(0.98, 1.02)	15.0
Computer							-0.418	0.021	1.02	1.01	(0.98, 1.02)	1.0
Items	PISA 2018						2020 Data					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Software	-1.364	0.019	0.89	0.92	(0.98, 1.02)	-8.5	-0.939	0.072	0.92	0.95	(0.92, 1.08)	-1.2
Internet	-0.357	0.018	0.98	0.99	(0.99, 1.01)	-1.5	0.436	0.077	0.82	0.92	(0.88, 1.12)	-1.4
Dictionary	2.672	0.066	1.00	0.98	(0.94, 1.06)	-0.5	1.887	0.088	1.43	1.04	(0.76, 1.24)	0.3
Study place	0.307	0.019	0.95	0.97	(0.98, 1.02)	-2.9	0.697	0.079	1.19	0.99	(0.87, 1.13)	-0.2
Desk	0.904	0.020	0.91	0.97	(0.98, 1.02)	-2.5	1.538	0.085	0.67	0.94	(0.81, 1.19)	-0.5
Textbooks	2.259	0.026	1.04	0.99	(0.95, 1.05)	-0.2	1.788	0.087	0.83	0.95	(0.78, 1.22)	-0.4
References	-2.014	0.021	1.03	0.99	(0.97, 1.03)	-0.4	-2.058	0.076	1.48	1.08	(0.90, 1.10)	1.5
Computer	-0.937	0.018	0.95	0.97	(0.98, 1.02)	-5.0	-0.464	0.073	1.04	1.00	(0.92, 1.08)	-0.0

7.3.2. READING ENGAGEMENT

The reading engagement construct consists of nine items in PISA 2000, eleven items in PISA 2009, and five items in PISA 2018 and 2020 follow-up data. The study used rating scale modelling for polytomous to conduct the item analysis for this construct as the responses ranging from 1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree. Table 7.2 shows overall information whether the data show acceptable fit to the model.

The mean square fit statistics were first examined. According to PISA 2000, the Infit values ranged from 0.94 to 1.05. There were five items where the Infit values were higher than 1.0: ‘Only if I have to’ (1.03), ‘Favourite hobby’ (1.05), ‘Talking about books’ (1.40), ‘Hard to finish’ (1.00), and ‘Enjoy library’ (1.03) which indicated that they were more varied than expected. While those with fit indices lower than 1.0 were four items: ‘Feel happy’ (0.98), ‘Waste of time’ (0.98), ‘For information’ (0.99) and ‘Few minutes only’ (0.94) implied that there was less variation in the responses than expected. In PISA 2009 with eleven items, Moreover, the Infit values ranged from 0.80 to 1.35. There were four items higher than 1.0: ‘Only if I have to’ (1.35), ‘Waste of time’ (1.31), ‘Enjoy library’ (1.18), and ‘Few minutes only’ (1.11). As compared to those with fit indices lower than 1.0 were ‘Favourite hobby’ (0.93), ‘Talking about books’ (0.79), ‘Hard to finish’ (0.89), and ‘Feel happy’ (0.87), ‘Express opinion’ (0.97) and ‘Exchange books’ (0.80). In PISA 2018 the Infit values ranged from 0.97 to 1.01, with only five items, there were two items scored higher than 1.0: ‘Favourite hobby’ (1.05) and ‘Talking about books’ (1.01). While those with fit indices lower than 1.0 were “Only if I have to’ (0.98), ‘Waste of time’ (0.97) ad ‘For information’ (0.98). Meanwhile, in 2020 data, Further, the Infit values ranged from 0.96 to 1.11. There are two items were higher than 1.0: ‘Waste of time’ (1.11) and

“For information” (1.03), and three items with fit indices lower than 1.0 were “Only if I have to” (0.98), “Favourite hobby” (0.97), and “Talking about books” (0.96).

Based on the t-value, the PISA 2000, 2018, and 2020 follow-up data had a t-value below 5.0, indicating a good fit between items and indicative of the adequate fit of the items. However, in PISA 2009, there were four items had a t-value greater than 5.0: “Only if I have to” (19.1), “Waste of time” (18.3), “Enjoy library” (8.1), and “Few minutes only” (6.1). These indicated that those items were not referred as good fit items.

Regarding to the estimate’s statistics that indicative the position of the items on the logit construct, in PISA 2000, item ‘Feel happy’ ($\delta = 0.541$) appeared to be the hardest to agree with. Meanwhile, item ‘Waste of time’ ($\delta = -0.467$) appeared to be the easiest item to agree with. The standard errors were small and were indicative of precision in the measure. In PISA 2009, the item 'For information' ($\delta = 0.448$) appeared to be the most difficult item to agree with, while the item 'Enjoy library' ($\delta = -0.402$) appeared to be the easiest. Also, the standard errors were small and were indicative of high precision. In PISA 2018, it appears that item 'Favourite hobby' ($\delta = 0.643$) was the most difficult item to agree with, while item 'Waste if time' ($\delta = -0.853$) was the easiest. Its standard errors were also small, indicating precision in the measure. Similarly, in 2020 follow-up data, item ‘Favourite hobby’ ($\delta = 0.734$) was the most difficult statement to agree with, while item ‘Waste of time’ ($\delta = -1.605$) was the easiest. As compared with the other three PISA cycles, however, the standard errors were higher, indicative of less precision in the measure.

According to Table 7.2, all items in four constructs of reading engagement were within acceptable range, indicating that the data adequately fit the standard Rasch Model. The

confidence intervals (CI) and t-value for reading engagement construct are also provided. Both measures indicated adequate fit of the items to the reading engagement in PISA 2000, 2009, 2018, and 2020 follow-up data.

Table 7.2

Estimates and Mean Square Fit of the items of Reading engagement for PISA 2000, 2009, 2018, and 2020 follow-up

Items	Estimates	S.E.	PISA 2000				PISA 2009					
			Mean Square		C.I	t	Estimates	S.E	Mean Square Fit		C.I	t
			Fit						Outfit	Infit		
Only if I have to	-0.301	0.010	1.02	1.03	(0.97, 1.03)	1.8	0.025	0.012	1.55	1.35	(0.97, 1.03)	19.1
Favourite hobby	0.215	0.009	1.06	1.05	(0.98, 1.02)	4.0	-0.171	0.012	0.85	0.93	(0.97, 1.03)	-4.4
Talking books	0.338	0.010	1.12	1.40	(0.97, 1.03)	-0.8	0.243	0.013	0.76	0.79	(0.96, 1.04)	-12.4
Hard to finish	0.036	0.010	1.00	1.00	(0.97, 1.03)	-0.0	-0.135	0.013	0.84	0.89	(0.97, 1.03)	-6.7
Feel happy	0.541	0.010	0.98	0.98	(0.97, 1.03)	-1.6	0.151	0.012	0.83	0.87	(0.97, 1.03)	-8.0
Waste of time	-0.467	0.009	1.04	0.98	(0.97, 1.03)	3.1	-0.314	0.012	1.20	1.31	(0.97, 1.03)	18.3
Enjoy library	0.045	0.009	1.03	1.03	(0.98, 1.02)	2.1	-0.402	0.012	1.02	1.13	(0.97, 1.03)	8.1
For information	-0.175	0.009	0.99	0.99	(0.98, 1.02)	-1.0	0.448	0.013	1.01	1.02	(0.97, 1.03)	1.0
Few minutes only	-0.232	0.027	0.94	0.94	(0.97, 1.03)	-4.4	-0.149	0.013	1.10	1.11	(0.97, 1.03)	6.1
Express opinions							-0.086	0.013	0.85	0.97	(0.97, 1.03)	-1.9
Exchange books							0.391	0.039	0.79	0.80	(0.97, 1.04)	-11.5
Items	Estimates	S.E.	PISA 2018				2020 Data					
			Mean Square		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Fit						Outfit	Infit		
Only if I have to	-0.468	0.009	0.98	0.98	(0.98, 1.02)	-1.8	0.051	0.044	0.99	0.98	(0.87, 1.13)	-0.3
Favourite hobby	0.643	0.009	1.05	1.05	(0.97, 1.03)	3.9	0.734	0.052	0.96	0.97	(0.86, 1.14)	-0.4
Talking books	0.462	0.009	1.01	1.01	(0.97, 1.03)	1.0	0.255	0.052	0.96	0.96	(0.81, 1.19)	-0.4
Hard to finish												
Feel happy												
Waste of time	-0.853	0.009	0.97	0.97	(0.97, 1.03)	-1.8	-1.605	0.046	1.16	1.11	(0.83, 1.17)	1.2
Enjoy library												
For information	0.216	0.018	0.98	0.98	(0.98, 1.02)	-1.7	0.564	0.097	1.07	1.03	(0.81, 1.19)	0.4
Few minutes only												
Express opinions												
Exchange books												

7.3.3 READING DIVERSITY

Six items in PISA 2000 and five items in PISA 2009, 2018, and 2020 follow-up data were examined in reading diversity construct. The study used rating scale modelling to conduct the item analysis for this construct as the responses ranging Never or hardly ever=1, A few times a year=2, About one a month=3, Several to Several times a week=5 indicating the frequency the student read for several reading materials. The overall information whether the data show acceptable fit to the model is recorded in Table 7.3.

The mean square fit statistics that were first examined shows that there were three items in PISA 2000 where the Infit values were higher than 1.0: ‘Non-fictions’ (1.00), ‘Email & Web’ (1.10), and ‘Newspaper’ (1.12) which indicated that they were more varied than expected. Accordingly, items with fit indices lower than 1.0 include: ‘Magazines’ (0.96), ‘Comics’ (0.98), and ‘Fictions’ (0.92), which may indicate that the responses were less varied than expected, which may not provide meaningful information. Moreover, the Outfit values ranged from 0.89 to 1.16 while the Infit values ranged from 0.92 to 1.12. In PISA 2009, among five items there were two items higher than 1.0: ‘Non-fictions’ (1.11) and ‘Newspaper’ (1.12). As compared to those with fit indices lower than 1.0 were ‘Magazines’ (0.94), ‘Comics’ (0.91), and ‘Fictions’ (0.91). In addition, the Outfit values ranged from 0.88 to 1.13 while the Infit values ranged from 0.91 to 1.12. In PISA 2018, there were three items scored higher than 1.0: ‘Comics’ (1.00), ‘Newspaper’ (1.00), and ‘Newspaper’ (1.18). While those with fit indices lower than 1.0 were ‘Magazines’ (0.94) and ‘Newspaper’ (0.92). Additionally, the Outfit values ranged from 0.89 to 1.21 while the Infit values ranged from 0.92 to 1.18. Meanwhile, in 2020 data, two items were higher than

1.0: ‘Non-fictions’ (1.05) and ‘Newspaper’ (1.21), and three items with fit indices lower than 1.0 were ‘Magazines’ (0.91), ‘Comics’ (0.93), and ‘Fictions’ (0.93). Furthermore, the Outfit values ranged from 0.81 to 1.32 while the Infit values ranged from 0.81 to 1.21.

A t-value below 5.0, indicating a good fit between items and indicative of the adequate fit of the items. However, in PISA 2000, there were two items had a t-value greater than 5.0: ‘Email & Web’ (5.6) and ‘Newspaper’ (9.0). Similarly in PISA 2009, there were two items with a t-value greater than 5.0: ‘Non-fictions’ (6.4) and ‘Newspaper’ (7.3). Meanwhile in PISA 2018, one item of ‘Newspapers’ (14.3) that had t-value more than 5.0. All items in 2020 data, however, were below 5.0 and indicative was referred to as good fit items.

The estimate’s statistics indicates the position of the items on the logit construct. Based on Table 7.3, item ‘Newspaper’ ($\delta = 0.290$) appeared to be the most difficult statement to endorse in PISA 2000 while item ‘Magazines’ ($\delta = -0.392$) appeared to be the easiest item to agree with. The standard errors were small and were indicative of precision in the measure. Similarly in PISA 2009, the item ‘Newspapers’ ($\delta = 0.238$) appeared to be the most difficult item to endorse, while the item ‘Magazines’ ($\delta = -0.209$) appeared to be the easiest. Also, the standard errors were small and were indicative of high precision. Meanwhile in PISA 2018, it appeared that item ‘Fictions’ ($\delta = 0.485$) was the most difficult item to endorse, while item ‘Magazines’ ($\delta = -0.392$) was the easiest. Its standard errors were also small, indicating precision in the measure. Item ‘Newspapers’ ($\delta = 0.455$) was also the most difficult statement to endorse in 2020 data, while the easiest item was ‘Comics’ ($\delta = -0.650$). As compared with the other three PISA cycles, however, the standard errors were higher, indicative of less precision in the measure.

Overall, table 7.3 indicates that all items in the four constructs of reading engagement were within acceptable ranges, indicating that the data fit Rasch model. Additionally, the confidence intervals (CI) and t-value for reading diversity construct are also provided. PISA 2000, 2009, 2018, and 2020 follow-up data indicated adequate fit between the items to the reading diversity in both measures.

Table 7.3

Estimates and Mean Square Fit of the items of Reading diversity for PISA 2000, 2009, 2018, and 2020 follow-up

Items	PISA2000						PISA 2009					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Magazines	0.044	0.006	0.94	0.96	(0.97, 1.03)	-2.6	-0.209	0.009	0.93	0.94	(0.97, 1.03)	-3.5
Comics	0.150	0.006	0.96	0.98	(0.97, 1.03)	-1.7	0.015	0.008	0.89	0.91	(0.97, 1.03)	-5.6
Fictions	0.103	0.006	0.89	0.92	(0.97, 1.03)	-6.0	0.118	0.008	0.88	0.91	(0.97, 1.03)	-5.8
Non-fictions	-0.155	0.006	0.95	1.00	(0.97, 1.03)	0.1	-0.161	0.008	1.13	1.11	(0.97, 1.03)	6.4
Email & Web	-0.431	0.007	1.03	1.10	(0.97, 1.03)	5.6						
Newspapers	0.290	0.014	1.16	1.12	(0.97, 1.03)	9.0	0.238	0.017	1.10	1.12	(0.97, 1.03)	7.3
Items	PISA 2018						2020 Data					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Magazines	-0.392	0.006	0.93	0.94	(0.98, 1.02)	-5.0	0.081	0.030	0.89	0.91	(0.89, 1.11)	-1.7
Comics	0.110	0.006	0.99	1.00	(0.98, 1.02)	-0.3	-0.650	0.029	0.92	0.93	(0.89, 1.12)	-1.1
Fictions	0.485	0.006	0.89	0.92	(0.98, 1.02)	-6.4	-0.187	0.029	0.81	0.81	(0.89, 1.11)	-3.6
Non-fictions	-0.052	0.006	0.98	1.00	(0.98, 1.02)	-0.1	0.300	0.030	1.00	1.05	(0.89, 1.11)	0.8
Email & Web												
Newspapers	-0.151	0.012	1.20	1.18	(0.98, 1.02)	14.3	0.455	0.059	1.32	1.21	(0.89, 1.12)	3.1

7.3.4. ONLINE READING

The online reading construct available only for PISA 2009, 2018, and 2020 follow-up data consisted of seven items in PISA 2009 and six items in PISA 2018 and 2020 data. The responses ranged from I don't know what it is=1, Never or almost never=2, Several times a month=3, Several times a week=4, and Several times a day=5, indicating the different types of activities that students participate in online.

As the mean square fit statistics were first examined, PISA 2009 had two items where the Infit values were higher than 1.0: 'Reading emails' (1.38), and 'Practical information' (1.10) which indicated that they were more varied than expected. Those with fit indices lower than 1.0 were five items: 'Chat online' (0.94), 'Reading news' (0.94), 'Using dictionary' (0.91), 'Particular topic' (0.95) and 'Group discussion' (0.91) implied that there was less variation in the responses than expected. In addition, the Outfit values ranged from 0.88 to 1.68 while the Infit values ranged from 0.91 to 1.38. In PISA 2018, there were two items higher than 1.0: 'Reading emails' (1.26) and 'Group discussion' (1.15). In comparison to those with fit indices less than 1.0 were 'Chat online' (0.98), 'Reading news' (0.85), 'Particular topic' (0.82), and 'Practical information' (0.93). Moreover, the Outfit values ranged from 0.79 to 1.27 while the Infit values ranged from 0.82 to 1.26. Meanwhile, in 2020 data, three items were higher than 1.0: 'Reading emails' (1.28), 'Chat online' (1.21), and 'Group discussion' (1.16). Additionally, the Outfit values ranged from 0.68 to 1.26 while the Infit values ranged from 0.71 to 1.28.

Based on the t-value below 5.0, signifying a good fit, one item of 'Reading emails' had a t-value greater than 5.0 in PISA 2009 ($t= 19.0$) and PISA 2018 ($t= 19.6$). These indicated that

those items were not referred as good fit items. Meanwhile in 2020 data, all items had t-value below 5.0, indicating a good fit between items and indicative of the adequate fit of the items.

The estimate's statistics that indicative the position of the items on the logit construct, in PISA 2009, item 'Reading emails' ($\delta = 0.734$) appeared to be the most difficult statement to endorse in terms on how often they read online. Meanwhile, item 'Practical information' ($\delta = -0.258$) appeared to be the easiest item to endorse. The standard errors were small and were indicative of precision in the measure. In PISA 2018, the item 'Chat online' ($\delta = 0.744$) appeared to be the most difficult item to endorse, while the item 'Reading emails' ($\delta = -0.999$) appeared to be the easiest. Also, the standard errors were small and were indicative of high precision. Conversely, in 2020 data, item 'Chat online' ($\delta = 0.824$) was the most difficult item to endorse, while item 'Reading emails' ($\delta = -0.946$) was the easiest to decide how often they read online. However, the standard errors were higher in this cycle than in the other two, indicating of less precision in the measure.

The overall information whether the data show acceptable fit to the model was presented in Table 7.4. As part of table, confidence intervals (CI) and t-value for online construct are also provided. Both measures indicated adequate fit of the items to the reading online in PISA 2009, 2018, and 2020 follow-up data.

Table 7.4

Estimates and Mean Square Fit of the items of Online reading for PISA 2009, 2018, and 2020 follow-up

Items	PISA2000						PISA 2009					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Reading emails							0.734	0.011	1.68	1.38	(0.97, 1.03)	19.0
Chat online							-0.147	0.012	0.92	0.94	(0.96, 1.04)	-3.3
Reading news							0.023	0.012	0.92	0.94	(0.96, 1.04)	-2.4
Using dictionary							-0.068	0.012	0.88	0.91	(0.96, 1.04)	-5.0
Particular topic							-0.081	0.012	0.92	0.95	(0.96, 1.04)	-2.7
Group discussion							-0.203	0.012	0.88	0.91	(0.96, 1.04)	-5.1
Practical inform.							-0.258	0.029	1.08	1.10	(0.96, 1.04)	4.9
Items	PISA 2018						2020 Data					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Reading emails	-0.999	0.007	1.27	1.26	(0.98, 1.02)	19.6	-0.946	0.036	1.26	1.28	(0.88, 1.12)	4.2
Chat on line	0.744	0.008	0.90	0.98	(0.96, 1.04)	-0.9	0.824	0.045	1.34	1.21	(0.73, 1.27)	1.4
Reading news	0.324	0.007	0.82	0.85	(0.97, 1.03)	-11.3	0.686	0.043	0.68	0.74	(0.82, 1.18)	-3.1
Using dictionary												
Particular topic	0.278	0.007	0.79	0.82	(0.97, 1.03)	-13.8	0.301	0.042	0.70	0.71	(0.84, 1.16)	-4.0
Group discussion	-0.452	0.007	1.16	1.15	(0.98, 1.03)	12.0	-0.883	0.036	1.16	1.14	(0.88, 1.12)	2.2
Practical inform.	0.105	0.016	0.91	0.93	(0.97, 1.03)	-5.6	0.018	0.091	0.87	0.88	(0.86, 1.14)	-1.7

7.3.5. READING STRATEGIES

As stated in the previous chapter that reading strategies construct were examined in PISA 2009, 2018, and 2020 follow-up data. The construct consisted of two sub-constructs: memorisation strategy with six items and summarising strategy with five items with the responses ranged from 1 to 6, with 'Not useful at all' being the lowest score and 'Very useful' being the highest.

Reading strategies (memorisation)

Reading strategies (memorisation) in this study used the rating scale modelling to conduct the item analysis for this construct. The overall information whether the data show acceptable fit to the model is recorded in Table 7.5.

The mean square fit statistics that were first examined shows that there were two items in PISA 2009 where the Infit values were higher than 1.0: 'Easy to understand' (1.20) and 'Read aloud' (1.19) which indicated that they were more varied than expected. Meanwhile, items with fit indices lower than 1.0 include: 'Read twice' (0.97), 'Discuss content' (0.98), 'Underline' (0.92), and 'Summarise' (0.92), indicated that the responses were less varied than expected. Additionally, the Outfit values ranged from 0.91 to 1.24 while the Infit values ranged from 0.92 to 1.20. In PISA 2018, there were also two items higher than 1.0: 'Easy to understand' (1.03) and 'Discuss content' (1.00). As compared to those with fit indices lower than 1.0 were 'Read twice' (0.99), 'Underline' (0.96), 'Summarise' (0.97) and 'Read aloud' (0.92). In addition, the Outfit values ranged from 0.89 to 1.01 while the Infit values ranged from 0.92 to 1.03. Meanwhile, in

2020 data, there were four items were higher than 1.0: ‘Easy to understand’ (1.18), ‘Read twice’ (1.02), ‘Discuss content’ (1.00), and ‘Underline’ (1.17). and “Newspaper’ (1.21), and two items with fit indices lower than 1.0 were ‘Summarise’ (0.97), and ‘Read aloud’ (0.92). Furthermore, the Outfit values ranged from 0.84 to 1.14 while the Infit values ranged from 0.92 to 1.18.

With a t-value below 5.0, indicating a good fit between items and indicative of the adequate fit of the items, PISA 2009 had two items with a t-value greater than 5.0: ‘Easy to understand’ (7.7) and ‘Read aloud’ (9.3). Nonetheless, all items in PISA 2018 and 2020 data had t-values below 5.0 and indicative was referred to as good fit items.

Table 7.5 also records the estimate’s statistics indicating the position of the items on the logit construct. Based on Table 7.5, item ‘Read twice’ ($\delta = 0.186$) appeared to be the most difficult statement to decide the usefulness of memorisation strategies in PISA 2009 while item ‘Easy to understand’ ($\delta = -0.446$) appeared to be the easiest item to decide. The standard errors were small and were indicative of precision in the measure. In PISA 2018, it appeared that item ‘Underline’ ($\delta = 0.295$) was the most difficult item to decide, while item ‘Read aloud’ ($\delta = -0.173$) was the easiest. Its standard errors were also small, indicating precision in the measure. Meanwhile in 2020 data, item ‘easy to understand’ ($\delta = 0.598$) was also the most difficult statement to decide the usefulness of memorisation strategies in 2020 data, while the easiest item was ‘Read aloud’ ($\delta = -0.973$). However, as compared with the other two PISA cycles, however, the standard errors were higher, indicative of less precision in the measure.

As shown in Table 7.5, all items in the three constructs were within acceptable ranges, indicating that the data fit Rasch model. Likewise, the table provides the confidence intervals

(CI) and t-value for reading strategies (memorisation). Both measures indicated adequate fit of the items to the reading strategies (memorisation) in PISA 2009, 2018, and 2020 follow-up data.

Table 7.5

Estimates and Mean Square Fit of the items of Reading strategies (memorisation) for PISA 2009, 2018, and 2020 follow-up

Items	PISA2000						PISA 2009					
	Estimate s	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Easy to understand							-0.446	0.017	1.24	1.20	(0.95, 1.05)	7.7
Read twice							0.186	0.016	0.95	0.97	(0.96, 1.04)	-1.5
Discuss content							-0.012	0.015	0.98	0.98	(0.96, 1.04)	-1.2
Underline							0.172	0.017	0.92	0.92	(0.96, 1.04)	-3.6
Summarise							0.177	0.017	0.91	0.92	(0.95, 1.05)	-3.7
Read aloud							-0.365	0.015	1.20	1.19	(0.96, 1.04)	9.3
Items	PISA 2018						2020 Data					
	Estimate s	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Easy to understand	0.081	0.013	1.02	1.03	(0.97, 1.03)	2.0	0.598	0.070	1.14	1.18	(0.75, 1.25)	1.4
Read twice	-0.032	0.012	0.99	0.99	(0.97, 1.03)	-0.4	0.303	0.067	0.84	1.02	(0.80, 1.20)	0.3
Discuss content	0.020	0.012	0.99	1.00	(0.97, 1.03)	-0.0	-0.294	0.061	1.04	1.00	(0.85, 1.15)	-0.0
Underline	0.295	0.013	0.94	0.96	(0.97, 1.04)	-2.1	0.254	0.067	1.07	1.17	(0.82, 1.18)	1.8
Summarise	0.125	0.013	0.95	0.97	(0.97, 1.03)	-2.1	0.152	0.065	1.02	0.97	(0.84, 1.16)	-0.3
Read aloud	-0.173	0.012	0.89	0.92	(0.97, 1.03)	-5.2	-0.973	0.058	0.94	0.92	(0.86, 1.14)	-1.1

Reading strategies (summarising)

Table 7.6 presents the overall information whether the data of reading strategies (summarising) show acceptable fit to the model. This study used the rating scale modelling to conduct the item analysis for this construct.

The mean square fit statistics were first examined. It shows that there were two items in PISA 2009 where the Infit values were higher than 1.0: 'Check paragraph' (1.06) and 'Write own word' (1.14) which indicated that they were more varied than expected. Meanwhile, items with fit indices lower than 1.0 include: 'Copy accurately' (0.97), 'Reading many times' (0.93), and 'Check facts' (0.92), indicated that the responses were less varied than expected. Additionally, the Outfit values ranged from 0.91 to 1.24 while the Infit values ranged from 0.92 to 1.20. In PISA 2018, there were also two items higher than 1.0: 'Check paragraph' (1.11) and 'Copy accurately' (1.09). As compared to those with fit indices lower than 1.0 were 'Reading many times' (0.94), 'Check facts' (0.92), and 'Write own words' (0.88). The Outfit values, in addition, ranged from 0.85 to 1.23 while the Infit values ranged from 0.88 to 1.22. Similarly, 2020 data had two items were higher than 1.0: 'Check paragraph' (1.16) and 'Copy accurately' (1.06) and three items with fit indices lower than 1.0 were 'Reading many times' (0.93), 'Check facts' (0.99), and 'Write own word' (0.90). Furthermore, the Outfit values ranged from 0.87 to 1.30 while the Infit values ranged from 0.90 to 1.16.

Based on the t-value, PISA 2009 and 2020 follow-up data had a t-value below 5.0 in all items, indicating a good fit between items and indicative of the adequate fit of the items. However, in PISA 2018, there were two items with t-values greater than 5.0: 'Check paragraph'

($t= 14.1$) and ‘Copy accurately’ ($t= 6.3$). These indicated that those items were not referred as good fit items. However, as the Infit indices were within the range, the items were retained.

Table 7.6 also demonstrates the estimate’s statistics indicating the position of the items on the logit construct. As seen in Table 7.6, item ‘Write own words’ ($\delta= 0.561$) appeared to be the most difficult statement to decide the usefulness of summarising strategies in PISA 2009 while item ‘Check paragraph’ ($\delta= -0.539$) appeared to be the easiest item to agree with. The standard errors were small and were indicative of precision in the measure except for ‘Write own words’ ($\delta= 0.051$). In PISA 2018, it appeared that item ‘Check facts’ ($\delta= 0.445$) was the most difficult item to decide, while item ‘Check paragraph’ ($\delta= -0.809$) was the easiest. Its standard errors were also small, indicating precision in the measure, except for ‘Write own words’ ($\delta= 0.039$). Meanwhile in 2020 data, item ‘Check paragraph’ ($\delta= 0.489$) was also the most difficult statement to decide, while the easiest item was ‘Write own words’ ($\delta= -0.650$). Nonetheless, as compared with the other two PISA cycles, the standard errors were higher, especially for item ‘Write own words’ (0.205) indicative of less precision in the measure.

Based on Table 7.6, all items in the construct of PISA 2009, 2018, and 2020 follow-up data were within acceptable ranges, indicating that the data fit Rasch model. The table also provides confidence intervals (CI) and t-value for reading strategies (summarising). Both measures indicated adequate fit of the items to the reading strategies (summarising) in PISA 2009, 2018, and 2020 follow-up data.

Table 7.6

Estimates and Mean Square Fit of the items of Reading strategies (summarising) for PISA 2000, 2009, 2018, and 2020 follow-up

Items	PISA2000						PISA 2009					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Check paragraph							-0.539	0.015	1.04	1.06	(0.96, 1.04)	3.0
Copy accurately							-0.009	0.016	0.97	0.97	(0.96, 1.04)	-1.4
Reading many times							-0.035	0.015	0.93	0.93	(0.96, 1.04)	-3.6
Check facts							0.310	0.017	0.90	0.92	(0.95, 1.05)	-3.7
Write own words							0.561	0.051	1.16	1.14	(0.95, 1.05)	5.7
Items	PISA 2018						2020 Data					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Check paragraph	-0.809	0.011	1.23	1.22	(0.97, 1.03)	14.1	0.489	0.068	1.30	1.16	(0.79, 1.21)	1.4
Copy accurately	-0.422	0.011	1.07	1.09	(0.97, 1.03)	6.3	0.386	0.065	1.01	1.06	(0.83, 1.17)	0.7
Reading many times	0.204	0.012	0.91	0.94	(0.97, 1.03)	-4.1	-0.292	0.062	0.91	0.93	(0.85, 1.15)	-0.9
Check facts	0.445	0.013	0.90	0.92	(0.97, 1.04)	-4.6	0.027	0.064	0.88	0.99	(0.85, 1.15)	-0.1
Write own words	0.267	0.039	0.85	0.88	(0.97, 1.04)	-6.8	-0.650	0.205	0.87	0.90	(0.86, 1.14)	-1.4

7.4 RASCH ANALYSIS FOR THE CONSTRUCTS FROM SCHOOL QUESTIONNAIRES

Several constructs from school questionnaires are included in the Rasch analysis, as well as the CFA analysis, including resources and technology, assessment, and school climate (student and teacher). In this analysis, the same data was used as in the CFA analysis, as well as the negatively worded items for which the codes were already reversed.

7.4.1 Resources and Technology

The resources and technology construct contains nine items for PISA 2000, eight items for PISA 2009, and three items in PISA 2018 and 2002 follow-up data. The study used the rating scale modelling to conduct the item analysis for this construct as the responses ranging from Not at all=1, Very little=2, To some extent=3, and A lot=4 regarding to the learning that hindered by some resources and technology. Table 7.7 records overall information whether the data show acceptable fit to the model.

As the mean square fit statistics were examined first, PISA 2000 had six items where the Infit values were higher than 1.0 such as ‘poor buildings’ (1.13), ‘poor lighting’ (1.00), ‘inadequate space’ (1.16), ‘lack materials’ (1.08), ‘lack computer’ (1.62), and ‘poor fine art’ (1.04) which indicated that they were more varied than expected. The fit indices that were lower than 1.0 were ‘poor library’ (0.86), ‘poor multimedia’ (0.89), and ‘poor laboratory’ (0.85) indicating that there was less variation in the responses than expected. The Outfit values ranged from 0.85 to 2.02 while the Infit values ranged from 0.85 to 1.62. In PISA 2009, there were five items higher than 1.0: ‘lack materials’ (1.19), ‘poor library’ (1.02), ‘poor laboratory’ (1.14), ‘poor assisting staff’ (1.06), and ‘poor internet’ (1.06). As compared to those with fit indices

lower than 1.0 were ‘lack computers’ (0.80), ‘poor multimedia’ (0.98), and ‘poor software’ (0.79). Moreover, the Outfit values ranged from 0.76 to 1.19 while the Infit values also ranged the same from 0.79 to 1.19. In PISA 2018, there was one item among three items that scored higher than 1.0, which was ‘poor assisting staff’ (1.13). As a result, those with fit indices lower than 1.0 were two items, namely ‘poor building’ (0.96) and ‘lack materials’ (0.93). The Outfit values ranged from 0.93 to 1.13 while the Infit values were also within the same range (0.93 to 1.13). Similarly in 2020 data, one item of ‘poor assisting staff’ (1.20) was higher than 1.0, while those with fit indices lower than 1.0 were ‘poor buildings’ (0.87) and ‘lack materials’ (0.95). Further, the Outfit values ranged from 0.84 to 1.23 while the Infit values ranged from 0.87 to 1.20.

Table 7.7 records that all items in four constructs of resources and technology were within acceptable range (0.6 – 1.4), indicating that the data adequately fit the standard Rasch Model. Also, the table provides the t-value statistics. According to the table, all items for all cycles were below 5.0 and indicative of the adequate fit of the items. Furthermore, the table displays the confidence interval (CI) and t-value of the item on resources and technology at school. These were also used to assess good fit and are complementary to Infit. As more emphasis is given to Infit values, both measures indicated adequate fit of the items to the resources and technology in PISA 2000, 2009, 2018, and 2020 follow-up data.

Table 7.7

Estimates and Mean Square Fit of the items of Resources and technology at school for PISA 2000, 2009, 2018, and 2020 follow-up

Items	Estimates	S.E.	PISA2000				Estimates	S.E.	PISA 2009			
			Mean Square Fit		C.I	t			Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Poor buildings	0.178	0.039	1.33	1.13	(0.66, 1.34)	0.8						
Poor lighting	0.337	0.040	0.98	1.00	(0.71, 1.29)	0.1						
Inadequate space	0.164	0.037	1.18	1.16	(0.67, 1.33)	1.0						
Lack materials	-0.080	0.039	1.17	1.08	(0.68, 1.32)	0.5	0.322	0.070	1.27	1.19	(0.81, 1.19)	1.9
Lack computers	-0.274	0.034	2.02	1.62	(0.75, 1.25)	4.1	-0.182	0.069	0.71	0.80	(0.80, 1.20)	-2.0
Poor library	-0.035	0.041	0.95	0.86	(0.68, 1.32)	-0.9	-0.322	0.072	1.01	1.02	(0.80, 1.20)	0.3
Poor multimedia	-0.061	0.041	0.91	0.89	(0.67, 1.33)	-0.6	-0.346	0.184	0.97	0.98	(0.80, 1.20)	-0.2
Poor laboratory	-0.158	0.040	0.85	0.85	(0.66, 1.34)	-0.8	-0.197	0.070	1.13	1.14	(0.80, 1.20)	1.4
Poor fine art	-0.070	0.110	1.10	1.04	(0.67, 1.33)	0.3						
Poor assisting staff							0.708	0.070	1.07	1.06	(0.81, 1.19)	0.6
Poor internet							0.118	0.066	0.07	1.12	(0.79, 1.21)	1.2
Poor software							-0.101	0.069	0.76	0.79	(0.79, 1.21)	-2.1
Items	Estimates	S.E.	PISA 2018				Estimates	S.E.	2020 Data			
			Mean Square Fit		C.I	t			Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Poor buildings	-0.234	0.073	0.95	0.96	(0.86, 1.14)	-0.6	0.299	0.384	0.84	0.87	(0.30, 1.70)	-0.3
Poor lighting												
Inadequate space												
Lack materials	-0.127	0.051	0.93	0.93	(0.86, 1.14)	-0.6	-0.571	0.263	1.04	0.95	(0.28, 1.72)	-0.0
Lack computers												
Poor library												
Poor multimedia												
Poor laboratory												
Poor fine art												
Poor assisting staff	0.361	0.052	1.13	1.13	(0.86, 1.14)	1.8	0.271	0.280	1.23	1.20	(0.34, 1.66)	0.7
Poor internet												
Poor software												

7.4.2 ASSESSMENT

The assessment construct consists of six items for PISA 2000 and eight items for PISA 2009, 2018, and 2020 follow-up data. A two-dimensional Rasch scale was employed to assess the item analysis for this construct as the responses were Yes=1 and No=2. Table 7.8 displays overall information whether the data show acceptable fit to the model.

According to table, the Infit values in PISA 2000 which higher than 1.0 was only in item 'Instructional group' (1.19) which indicated that it was more varied than expected, while the only item below 1.0 was only 'Teacher effectiveness' (0.84). Among six items of assessment in PISA 2000, four of which were misfitting. There were three items below the range and one item above the range. Thus, item 'Parent information' (0.47), 'Promotion' (0.34), 'National comparison' (1.78), and 'Progress monitoring' (0.29). Meanwhile, in PISA 2009 that consisted of eight items, there were two misfitting items, namely 'Parent information' (2.00) and 'Promotion' (2.00). As for the remaining six items, they were lower than 1.0 but still within the range (0.6 - 1.4). PISA 2018 also contained eight items of assessment, of which five were greater than 1.0 and three were less than 1.0. Compared to 2020 data, item 'National comparison' was misfitting (0.53), while the other seven items were within the range, with four items exceeding 1.0 and three items below 1.0. All the misfit values in PISA 2000, 2009, and 2020 data, however, were retained in regard to the importance to the entire constructs.

Inspecting the other indices (CI and t-value), all items in PISA 2000, 2009, and 2020 Data appeared to lie outside the recommended ranges. Only in PISA 2018 recorded the CI and t-value of the items were complimentary fit. However, more emphasis is given to Infit values.

Thus, the remaining items of assessment construct in PISA 2000, 2009, 2018, and 2020 data had indicated adequate fit of the items to assessment construct.

Table 7.8

Estimates and Mean Square Fit of the items of Assessment for PISA 2000, 2009, 2018, and 2020 follow-up

Items	PISA2000						PISA 2009					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Parents information	1.269	0.274	0.20	0.47	(0.15, 1.85)	-1.4	-0.505	0.109	0.84	2.00	(0.00, 3.39)	1.1
Promotion	1.531	0.284	0.75	0.34	(0.03, 1.97)	-1.7	-0.541	0.106	3.19	2.00	(0.00, 2.78)	1.2
Instructional group.	-1.988	0.152	1.62	1.19	(0.83, 1.17)	2.1	-0.196	0.108	1.06	0.92	(0.00, 2.04)	0.0
National comparison	-0.738	0.079	1.02	1.78	(0.47, 1.53)	2.5	-0.238	0.104	0.92	0.94	(0.22, 1.78)	-0.0
Progress monitoring	-0.331	0.103	0.55	0.29	(0.00, 2.89)	-0.7	1.867	0.143	0.93	0.87	(0.01, 1.99)	-0.1
Teachers' effective	0.256	0.442	0.55	0.84	(0.50, 1.50)	-0.6	-0.094	0.117	0.46	0.77	(0.00, 4.78)	0.5
Curriculum							-0.098	0.117	1.10	0.73	(0.00, 5.68)	0.7
Other schools							-0.194	0.305	0.94	0.91	(0.07, 1.93)	-0.0
Items	PISA 2018						2020 Data					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Parents information	-0.713	0.108	1.04	1.14	(0.83, 1.17)	1.6	0.208	0.532	0.97	0.87	(0.35, 1.65)	-0.3
Promotion	-1.112	0.100	0.94	1.12	(0.85, 1.15)	1.5	-0.792	0.505	1.03	1.06	(0.57, 1.43)	0.3
Instructional group.	-1.801	0.102	1.16	1.06	(0.86, 1.14)	1.2	-0.315	0.514	0.70	0.76	(0.49, 1.51)	-0.9
National comparison	1.494	0.129	0.41	0.89	(0.58, 1.42)	-0.5	0.212	0.532	0.44	0.53	(0.35, 1.65)	-1.6
Progress monitoring	0.342	0.118	0.79	0.88	(0.74, 1.26)	-0.9	0.213	0.532	1.21	1.12	(0.35, 1.65)	0.5
Teachers' effective	1.494	0.129	0.35	0.88	(0.58, 1.42)	-0.5	-0.313	0.514	1.04	1.02	(0.49, 1.51)	0.2
Curriculum	-1.690	0.313	1.13	1.01	(0.86, 1.14)	0.2	-0.314	0.514	1.24	1.14	(0.49, 1.51)	0.6
Other schools	0.313	0.107	2.41	1.05	(0.76, 1.24)	0.4	-0.793	0.505	0.76	0.80	(0.57, 1.43)	-0.9

7.4.3 SCHOOL CLIMATE

Two sub-constructs were included in the school climate construct, as discussed in the previous chapter. The subconstructs are school climate regarding student with six items and school climate regarding teacher with seven items in PISA 2000 and 2009 while five items in PISA 2018 and 2020 follow-up data ranged from Not at all=1, Very little=2, To some extent=3, and A lot=4 indicating the proportion of activities that occur in schools regarding teachers and students.

School climate (student)

School climate regarding student in this study used the rating scale modelling to conduct the item analysis for this construct. The overall information whether the data show acceptable fit to the model is recorded in Table 7.9.

The mean square fit statistics were first examined. The Infit values in PISA 2000 which higher than 1.0 was only in item ‘Absenteeism’ (1.21) which indicated that it was more varied than expected. The fit indices that were lower than 1.0 were ‘Disrupting of class’ (0.85), ‘Skipping classes’ (0.98), ‘Lack of respect’ (0.81), ‘Use of alcohol’ (0.91), and ‘Bullying’ (0.69) indicating that there was less variation in the responses than expected. The Outfit values ranged from 0.56 to 1.21 while the Infit values ranged from 0.69 to 1.21. In PISA 2009, two items higher than 1.0 were ‘Disrupting of class’ (1.04) dan ‘Use of alcohol’ (1.21). Comparatively, four items resulted in fit indices lower than 1.0 were ‘Absenteeism’ (0.99), ‘Skipping classes’ (0.91), ‘Lack of respect’ (0.83), and ‘Bullying’ (0.94). Moreover, the Outfit values ranged from

0.78 to 1.00 while the Infit values also ranged the same from 0.83 to 1.21. In PISA 2018, there were three items that scored higher than 1.0, which were 'Absenteeism' (1.03), 'Skipping classes' (1.05), and 'Bullying' (1.08). While those with fit indices lower than 1.0 were three items, namely 'Disrupting of class' (0.92), 'Lack of respect' (0.98), and 'Use of alcohol' (0.89). The Outfit values ranged from 0.90 to 1.07 while the Infit values ranged from 0.89 to 1.08. Meanwhile in 2020 data, two items of higher than 1.0 were 'Absenteeism' (1.23) and 'Skipping classes' (1.30), while those with fit indices lower than 1.0 were 'Disrupting of class' (0.72), 'Skipping classes' (0.98), 'Use of alcohol' (0.90), and 'Bullying' (0.99). Further, the Outfit values ranged from 0.83 to 1.97 while the Infit values ranged from 0.72 to 1.23.

As shown in the table 7.9, all items in all constructs were within acceptable ranges (0.6 – 1.4), indicating that the data fit Rasch model. Furthermore, the table displays the confidence interval (CI) and t-value of the item on school climate (student). As these statistics also used to assess good fit and are complementary to Infit, both measures indicated adequate fit of the items to the school climate regarding student in PISA 2000, 2009, 2018, and 2020 follow-up data.

Table 7.9

Estimates and Mean Square Fit of the items of School climate (student) for PISA 2000, 2009, 2018, and 2020 follow-up

Items	PISA2000						PISA 2009					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Absenteeism	0.788	0.060	1.21	1.21	(0.84, 1.16)	2.5	-1.295	0.081	0.97	0.99	(0.79, 1.21)	-0.1
Disrupting class	0.568	0.065	0.82	0.85	(0.84, 1.16)	-1.8	-0.229	0.082	1.00	1.04	(0.77, 1.23)	0.4
Skipping classes	-0.775	0.062	0.96	0.98	(0.83, 1.17)	-0.2	-0.176	0.082	0.90	0.91	(0.80, 1.20)	-0.9
Lack of respect	0.249	0.062	0.79	0.81	(0.84, 1.16)	-2.5	-0.171	0.079	0.78	0.83	(0.79, 1.21)	-1.6
Use of alcohol	0.320	0.061	0.56	0.91	(0.72, 1.28)	-0.6	0.849	0.091	0.99	1.21	(0.47, 1.53)	0.8
Bullying	0.439	0.063	0.67	0.69	(0.83, 1.17)	-4.1	0.690	0.084	0.84	0.94	(0.75, 1.25)	-0.5
Items	PISA 2018						2020 Data					
	Estimates	S.E.	Mean Square Fit		C.I	t	Estimates	S.E.	Mean Square Fit		C.I	t
			Outfit	Infit					Outfit	Infit		
Absenteeism	-0.859	0.068	0.99	1.03	(0.84, 1.16)	0.4	0.181	0.321	1.97	1.23	(0.42, 1.58)	0.8
Disrupting class	0.109	0.068	0.93	0.92	(0.84, 1.16)	-1.1	-0.748	0.395	0.70	0.72	(0.66, 1.34)	-1.7
Skipping classes	-0.207	0.067	1.07	1.05	(0.85, 1.15)	0.7	0.209	0.361	1.41	1.30	(0.27, 1.73)	0.9
Lack of respect	-0.156	0.068	0.97	0.98	(0.84, 1.16)	-0.2	0.043	0.373	0.98	0.98	(0.18, 1.82)	0.1
Use of alcohol	1.367	0.084	0.90	0.89	(0.58, 1.42)	-0.5	1.848	0.460	0.83	0.90	(0.00, 2.49)	0.1
Bullying	0.645	0.072	1.06	1.08	(0.83, 1.17)	0.9	-1.148	0.400	0.97	0.99	(0.50, 1.50)	-1.7

School climate (teacher)

The same as school climate regarding student, school climate regarding teacher in this study also used the rating scale modelling to conduct the item analysis for this construct. Table 7.10 records the overall information whether the data show acceptable fit to the model.

The mean square fit statistics were examined first, PISA 2000 had seven items where the Infit values higher than 1.0 were ‘Low expectation’ (1.44), ‘Ignoring students’ (1.14), and ‘Resisting change’ indicated that they were more varied than expected. The fit indices that were lower than 1.0 were ‘Student-teacher relations’ (0.79), ‘Teacher absenteeism’ (0.83), ‘Teacher’s strictness’ (0.64), and ‘Lack of change’ (0.93) indicating that there was less variation in the responses than expected, which may not provide meaningful information. The Outfit values ranged from 0.62 to 1.44 while the Infit values ranged from 0.64 to 1.44. PISA 2009 with the same number of items as PISA 2000, there were three items higher than 1.0 including ‘Low expectations’ (1.31), ‘Student-teacher relations’ (1.03), and ‘Lack of encourage’ (1.06). As compared to those with fit indices lower than 1.0 were ‘Ignoring students’ (0.86), ‘Teacher absenteeism’ (0.85), and ‘Teachers’ strictness’ (0.88). Moreover, the Outfit values ranged from 0.81 to 1.38 while the Infit values also ranged the same from 0.85 to 1.31. In PISA 2018, there were two items among five items that scored higher than 1.0, which were ‘Resisting change’ (1.34) and ‘Teachers’ strictness’ (1.12). As a result, those with fit indices lower than 1.0 were three items, namely ‘Ignoring students’ (0.91), ‘Teacher absenteeism’ (0.89), and ‘Lack of encourage’ (0.92). The Outfit values ranged from 0.83 to 1.32 while the Infit values ranged from 0.89 to 1.34. Meanwhile, in 2020 data, one item of ‘Teacher absenteeism’ (1.21) was higher than 1.0, while those with fit indices lower than 1.0 were ‘Ignoring students’ (0.84), ‘Resisting

change' (0.84), 'Teachers' strictness' (0.76), and 'Lack encourage' (0.84). Further, the Outfit values ranged from 0.83 to 1.23 while the Infit values ranged from 0.84 to 1.21.

Based on the Table 7.10, all items in all constructs were within acceptable ranges (0.6 – 1.4), indicating that the data fit Rasch model. Furthermore, the table displays the confidence interval (CI) and t-value of the item on school climate regarding teacher at school. As more emphasis is given to Infit values, both measures indicated adequate fit of the items to the school climate regarding teacher in PISA 2000, 2009, 2018, and 2020 follow-up data.

Table 7.10

Estimates and Mean Square Fit of the items of School climate (teacher) for PISA 2000, 2009, 2018, and 2020 follow-up

Items	PISA2000						PISA 2009					
	Estimates	S.E.	Mean Square Fit		CI	t	Estimates	S.E.	Mean Square Fit		CI	t
			Outfit	Infit					Outfit	Infit		
Low expectations	0.677	0.063	1.44	1.44	(0.82, 1.18)	4.2	0.032	0.079	1.36	1.31	(0.78, 1.22)	2.5
Stud-teach relations	0.504	0.062	0.73	0.79	(0.82, 1.18)	-2.5	0.774	0.085	0.86	1.03	(0.72, 1.28)	0.3
Ignoring students	-0.064	0.063	1.12	1.14	(0.84, 1.16)	1.6	0.236	0.081	0.86	0.86	(0.80, 1.20)	-1.4
Teacher absenteeism	-0.542	0.061	0.80	0.83	(0.83, 1.17)	-2.1	0.576	0.085	0.81	0.85	(0.78, 1.22)	-1.3
Resisting change	0.858	0.064	1.07	1.04	(0.83, 1.17)	0.5	0.523	0.081	1.38	1.20	(0.78, 1.22)	1.7
Teachers' strictness	0.247	0.062	0.62	0.64	(0.83, 1.17)	-4.8	-0.268	0.083	0.84	0.88	(0.80, 1.20)	-1.2
Lack of encourage	0.304	0.060	0.90	0.93	(0.83, 1.17)	-0.8	-1.542	0.287	1.07	1.06	(0.80, 1.20)	0.6

Items	PISA 2018						2020 Data					
	Estimates	S.E.	Mean Square Fit		CI	t	Estimates	S.E.	Mean Square Fit		CI	t
			Outfit	Infit					Outfit	Infit		
Low expectations												
Stud-teach relations												
Ignoring students	0.042	0.070	0.89	0.91	(0.83, 1.17)	-1.0	-0.360	0.395	0.83	0.84	(0.73, 1.27)	-1.2
Teacher absenteeism	0.925	0.075	0.83	0.89	(0.77, 1.23)	-0.9	-0.256	0.310	1.23	1.21	(0.48, 1.52)	0.8
Resisting change	-0.533	0.064	1.32	1.34	(0.85, 1.15)	4.0	-0.183	0.390	0.83	0.84	(0.02, 1.98)	-0.2
Teachers' strictness	-0.025	0.067	1.22	1.12	(0.83, 1.17)	1.4	0.208	0.361	0.78	0.76	(0.27, 1.73)	-0.6
Lack of encourage	-1.308	0.233	0.92	0.092	(0.85, 1.15)	-1.0	0.208	1.198	0.85	0.84	(0.27, 1.73)	-0.3

7.5 EQUATING

This study examined the factors impacted change over time from 2000 to 2020. A similar characteristic was assessed on each construct intended for each year of the cycle. The PISA data has some groups responding to instruments: student groups responding to student questionnaire and achievement tasks, the principal group responding to school questionnaire, parent group responding to parent questionnaire, and teacher group responding to teacher questionnaire. In this study, only student group and school group can be compared. Even though different constructs measure the same construct, not every cycle has the same characteristics of the questionnaire, particularly in terms of the number of items. It is, therefore, equating three instruments (PISA 2000, 2009, and 2018) is warranted.

Equating is statistical process used to adjust results on test forms in such a way that scores can be used interchangeably (Kolen & Brennan, 1995). In the PISA testing program, multiple forms of the same test are used, though not all of them. In this case, the test forms are as similar as possible in terms of their content and statistical specifications. An analysis of the PISA test can be undertaken for the purpose of longitudinal analysis, as it was in this study. By equating the scores of different tests measuring the same ability, the comparability of test scores is enhanced.

There are four constructs from the student questionnaire that need to be equated in this study: home educational resources, reading engagement, reading diversity, and online reading. Meanwhile, there are three constructs from the school questionnaire that require equating in this study: resources and technology, assessment, and student climate. Accordingly, since 2020

follow-up data were collected using the same questionnaire as PISA 2018, the number of items were automatically the same as in PISA 2018.

The numbers of items on some constructs varied between cycles. For example, in student questionnaire, home educational resources construct has seven items in PISA 2000 but six items in PISA 2009, 2018, and 2020 data. In addition, for reading engagement constructs, there are nine items in PISA 2000 and 2009 but five items in PISA 2018 and 2020 data. Moreover, for reading diversity, there are six items in PISA 2000 but five items in PISA 2009, 2018, and 2020 data. Furthermore, PISA 2009 and PISA 2018, and PISA 2020 data include seven items for the online reading construct that was not present in PISA 2000. Further, for online reading construct that was no present in PISA 2000, there are seven items in PISA 2009 and six items in PISA 2018 and 2020 data. Meanwhile, in school questionnaire, resources and technology construct has nine items in PISA 2000, eight items in PISA 2009, and three items in PISA 2018 and 2020 data. Moreover, for assessment construct, there are six items in PISA 2000, and eight items in PISA 2009, 2018, and 202 data. By using Rasch analysis, each set of constructs is considered to assess the same trait and scored in WLE. As shown in Table 7.11, the result is then assigned to one new equated construct. The new constructs are then used in subsequent chapters for further analysis (SEM and HLM).

Table 7.11

The constructs before and after equating in Rasch analysis

<i>Student Questionnaires</i>			<i>School Questionnaires</i>		
Constructs	Previous constructs	New constructs	Constructs	Previous constructs	New constructs
Home educational resources	hedres 2000 hedres 2009 hedres 2019 hedres 2020	hedres	Resources and technology	tech 2000 tech 2009 tech 2018 tech 2020	tech
Reading engagement	engread 2000 engread 2009 engread 2018 engread 2020	engread	Assessment	asment 2000 asment 2009 asment 2018 asment 2020	asment
Reading diversity	divread 2000 divread 2009 divread 2018 divread 2020	divread	School Climate	climatestud 2000 climatestud 2009 climatestud 2018 climatestud 2020 climateteach 2000 climateteach 2009 climateteach 2018 climateteach 2020	climstud climteach
Online reading	online 2009 online 2018 online 2020	online			
Reading strategies	stramemo 2009 stramemo 2018 stramemo 2020 strasum 2009 strasum 2018 strasum 2020	stramemo strasum			

7.6 SUMMARY

Following the confirmation of the structure of the construct at the macro level in the previous chapter, this chapter discusses the validation of the items at the micro level. Under

large-scale testing conditions, the study examines the accuracy of the mean square and standardised values of the item infit statistics in Rasch dichotomous and polytomous models.

The fit statistics focuses on the information-weighted fit statistic (INFIT indices) that expressed in mean square (MNSQ) values. When INFIT item fit statistic to investigate responses to items, MNSQ values take into consideration the sample size. These values illustrate good model-data fit for an item. Most items appear to fit well in a situation when the sample size is large enough. Some items yielded values of poor fit but were retained. More emphasis is given to INFIT values and on careful examination in terms of its importance to the entire construct.

Upon the determination of the item validity of each construct, the equating model is applied to similar constructs derived from separate tests administered in PISA 2000, 2009, and 2018. As a result of equation analysis, all items produced are on the same constructs. The new equated constructs are then assigned for the subsequent analyses (SEM and HLM) in the following sections.

Chapter 8

Student-level Factors on Reading Literacy: Structural Equation Model Analysis

8.1. INTRODUCTION

The objective of the present study is to examine the factors that may impact students' reading literacy. These factors include student-level and school-level (for all cycles) and an additional factor of teacher-level (for 2020 data only). As a result, different sets of data for different equation models are presented in this study for each level. It is important to note that the student-level model is presented first in this chapter, followed by that of the school-level and teacher-level in the following chapters.

The present chapter investigates the student factors that might have influenced Indonesian students' reading achievement based on PISA Data in four cycles: PISA 2000, 2009, 2018, and 2020 follow-up data. First, it examines the associations of the construct variables between the student-level model. As a result, there is student-level for four cycles. Secondly, since the study is aimed to investigate the factors impact change over time (from 2000 to 2020), the chapter examines the relationship of the construct variables between level models in all cycles.

To illustrate all causal relationships among the variables, the study employs Structural Equation Modelling (SEM). SEM analysis generates a series of structural equations, which are used to examine the plausibility of theoretical models that may explain the interrelationships between variables (Hu & Bentler, 1999). Likewise, SEM provides the hypothesised theoretical model that can be tested statistically through simultaneous analysis (Byrne, 2013). The data in

this study were in multiple scale items, thus it is best to examine them in a SEM model. SEM allows the combination of multiple imputations to construct variables and the modelling of causal relationships between these variables.

To perform the SEM analysis, the study applies Mplus 7 developed by Muthèn and Muthèn (1998 – 2021). Mplus handles the random missing data by implementing full information maximum likelihood estimation, using all available information to estimate each model parameter (Kelloway, 2015). Using a program from SPSS to Mplus requires special attention to the issue of missing values. Therefore, before carrying out the SEM analyses in Mplus, the missing values in SPSS have been recoded the way in which Mplus reads a data file. Mplus uses the maximum likelihood (ML) method to deal with missing data.

This chapter likewise seeks to answer the research questions presented in Chapter 1, referring to the student-level factors:

1. How do student and reading states (reading attitudes, reading strategies, and reading confidence) and their relationships impact student reading literacy in Indonesia considering paper-based (PISA 2000, PISA 2009, and follow up 2020) and computer-based reading performance (PISA 2018)?
 - a. Are there any effects of school factors on student factors, reading states, and reading literacy?
 - b. Are there any effects of student factors on reading states and reading literacy?
 - c. Are there any effects of reading states on reading literacy?

In the previous chapter, the items of the variables used in this study were subjected to validation using the Rasch Model in which the weighted likelihood estimates (WLE) were

obtained, including the equating analysis of scales. The analysis process has converted the raw score into Rasch scale scores, which are used in the subsequent analyses involving SEM.

PISA employs the imputation approach referred to as Plausible Values (PVs) that are used to scale and report the results of the achievement including reading literacy. In the so-called plausible values methodology, item response modelling techniques are combined with methods for handling missing response data through multiple imputations (Mislevy, 1991). The PVs are selected of likely proficiencies for students that attained each score (OECD, 2001). Likewise, PVs make it possible for secondary analysts to analyse data collected using complex matrix sampling designs using standard software and techniques (Adams et al., 2017). It is important to note that the 2020 follow-up data has the answer scores of each item of the reading literacy test, therefore, the PVs are required. Similar to PISA with five PVs (for PISA 2000 through 2012) and ten PVs (from PISA since 2015), this s, therefore requires a similar number of imputations for the cycles included in the 2020 follow-up data. Using Rasch analysis, it is capable of generating PVs for each of the items in 2020 data that fit producing WLE scores.

Five PVs per student were used for 2020 follow-up data. To align the WLE scores with the PISA data sets, converting them to W-scores is warranted. In simple terms, the W-Score is a special transformation of the ability scale and item scores that are derived from the Rasch model analysis (Benson et al., 2018; Chong & Siegel, 2008; Raudenbush et al., 2004). The W-score is derived by using the logarithm change-of-base formula by Benson et al. (2018). The equation can be written as:

$$W = 9.1024 (A) + C$$

Where A is either the person's ability C is set to 100, but a value of 500 is used in most current applications. The W-scores can be used for a variety of purposes: to measure student

growth in a change-sensitive metric, compare students who took different sets of items, or create criterion-reference measures. According to Benson et al. (2018), customarily, a value of 500 on the Woodcock-Johnson instruments (McGrew & Mather, 2004) is set to be the ability on the measured trait associated with a student beginning fifth grade or child of age 10 years, 0 months. Likewise, Chong & Siegel (2008) stated that the *W*-scale are centred on a mean of 500, which has been set to approximate the average performance of individuals.

SEM in Mplus produces two types of coefficients: standardised and unstandardised. In this study, the standardised is utilised. Likewise, there are two types of standardised coefficients: STD and STDYX. The STD columns contain coefficients standardised using the variance of continuous construct variables. While the STDYX column contains the coefficients standardised using the variance of continuous construct variables of the background and/or outcome variable, in addition to the continuous construct variables. An STD standardization is used when the variables are binary, whereas a STDYX standardization is used when the variables are continuous. Because the variables in this study are using the variance of continuous construct variables of reading literacy as the outcome variable, the STDYX standardization is applied.

To investigate the predictors of reading literacy, a series of SEM analyses were conducted. An overview of the hypothesised model is presented in this section. The causal relationships between the variables in the structural models are subsequently discussed using the direct effect result. More emphasis is given to the structural models as they present the causal relationships and direct effects on reading literacy. The analysis section is divided by student level beginning with cycle 2000, 2009, 2018, and 2020 follow-up data.

8.2 VARIABLE USED FOR STUDENT-LEVEL

This section presents the result of the structural equation modelling of the student-level factors using SEM using Mplus 7 software. Before SEM is performed, it is necessary to examine the necessary underlying conditions. Afterwards, the hypothesised models examined the predictors of student reading literacy for all cycles. According to each year's predictor, different hypotheses were generated for each cycle. The student-level model based on PISA 2000, 2009, 2018, and 2020 follow-up data are discussed correspondingly.

Several variables were assumed to have influenced students' achievement in reading literacy that is included in the student single-level model. Individual characteristic, home facilities, reading activities, and reading states are posited to have a relationship with their reading literacy achievement. Specific names for each of the variables included in the model are presented in Table 8.1.

Table 8.1

Variables used in the student-level analysis

Theoretical Dimensions	Construct variables	Description	Year of cycle
<i>Presage Student</i>			
Individual Characteristic	GENDER	Gender	2000, 2009, 2018, 2020
	MOMEDU	Mother education	2020
	FATHEDU	Father education	2020
	PINCOME	Parent income	2020
Home Facilities	BOOKS	Number of books at home	2000, 2009, 2018, 2020
	HEDRES	Home educational resources	2000, 2009, 2018, 2020
Reading Activities	ENGREAD	Reading engagement	2000, 2009, 2018, 2020
	DIVREAD	Reading diversity	2000, 2009, 2018, 2020
	ONLINE	Online reading	2009, 2018, 2020
<i>Process</i>			
Reading States	STRA	Reading strategies	2009, 2018, 2020
	CONFI	Reading confidence	2000, 2018, 2020
	RETIME	Reading time	2000, 2009, 2018, 2020
Parent Factors	PENGAGE	Parent reading involvement	2020
<i>Product</i>			

Reading literacy	READ (Achievement in Reading)	2000, 2009, 2018, 2020

As can be seen in Table 8.1, there are three different panels, presage, which refers to factors associated with students, process, which refers to reading states, and product, which refers to literacy as it pertains to reading. The construct variables in this study are individual characteristics (gender, mother education, father education, and parent income), home facilities (books and home educational resources), reading activities (reading engagement, reading diversity, and online reading), and reading states (reading strategies, reading confidence, and reading time). It is important to note that not all cycles possess the same set of questions. As some observed variables in each cycle had different responses, therefore, the equating in Rasch analysis was examined. Hence, all variables were in WLE.

The discussion begins with a hypothesis and is followed by a structural model that explains the relationship between the variables. The hypothesised model consists of rectangles representing observed variables and the lines connecting the variables illustrating the direct and/or indirect effects. The structural models demonstrate the hypothesised relationship between the latent and observed variables.

8.3 THE HYPOTHESED MODEL

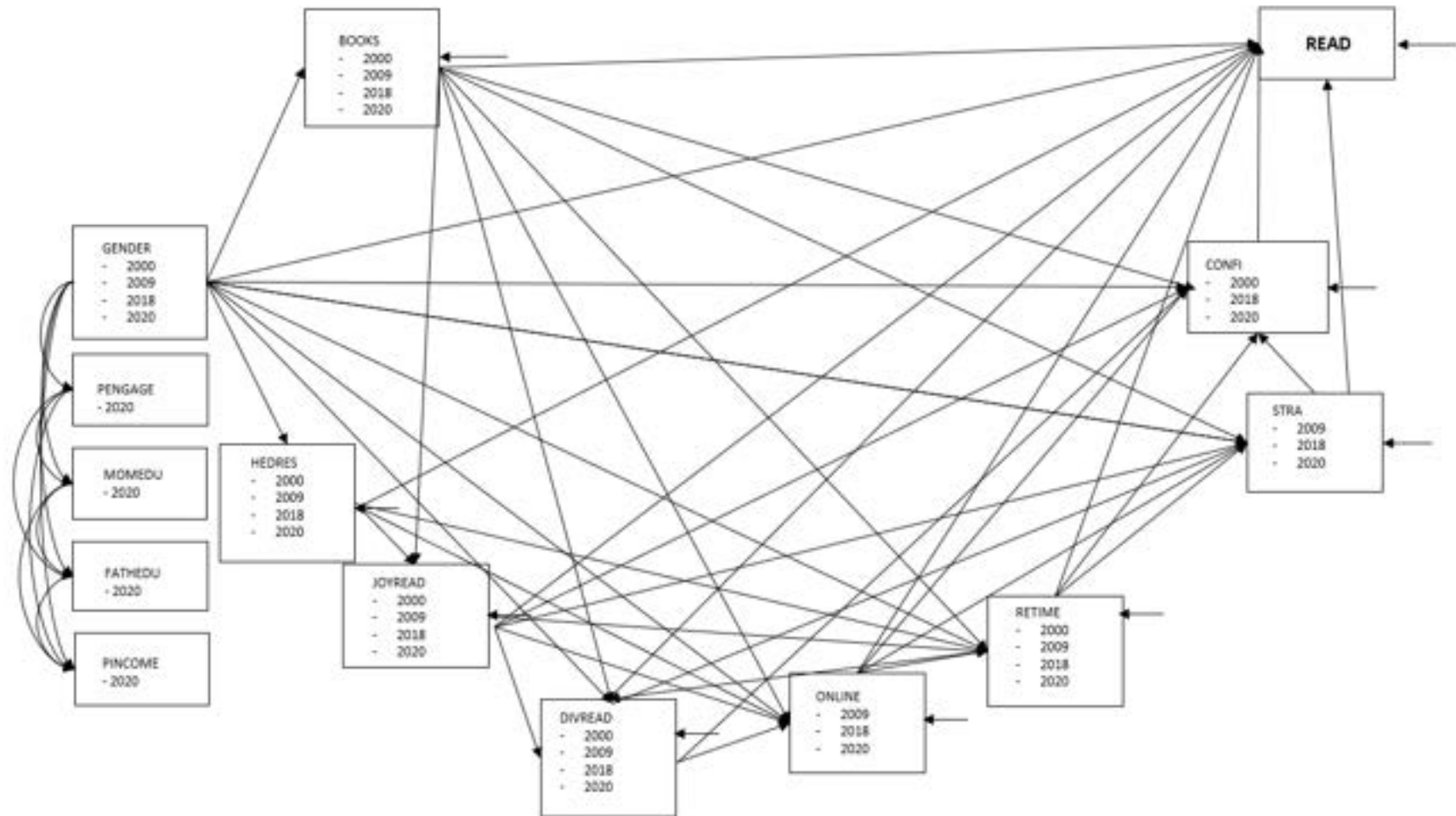
In this section, the hypothesised model of student-level in four cycles is examined. The hypothesised model shows the theoretical relationships between the construct variables. In this study, the hypothesised model examines the predictors of student' PISA achievement in reading. The hypothesised model also depicts the causal relationships between the student variables. It illustrates which variables are influencing one another.

The hypothesised model of student-level for all cycles is illustrated in Figure 8.1. It examines the predictors of students' reading literacy based on student-level predictors. Therefore, individual characteristics, home facilities, reading activities, and reading states are hypothesised to be affecting reading literacy (READ).

Predictors in each box are displayed according to which cycle they are in. Some predictors can be found across all cycles, while others are not. For PISA 2000, there are individual characteristic (GENDER), home facilities: number of books (BOOKS) and home education resources (HEDRES), reading activities: reading engagement (ENGREAD) and reading diversity (DIVREAD), and reading states: reading confidence (CONFI) and reading time (RETIME). As there is no reading confidence in PISA 2009, the predictors are individual characteristic (GENDER), home facilities: number of books (BOOKS) and home education resources (HEDRES), reading activities: reading engagement (ENGREAD), reading diversity (DIVREAD), and reading online (ONLINE), and reading states: reading strategies (STRA) and reading time (RETIME). PISA 2018 and 2020 follow-up data include all variables with individual characteristic (GENDER), home facilities: number of books (BOOKS) and home education resources (HEDRES), reading activities: reading engagement (ENGREAD), reading diversity (DIVREAD), and reading online (ONLINE), and reading states: reading strategies (STRA), reading confidence (CONFI), and reading time (RETIME).

Figure 8.1

Hypothesised student-level model for four cycles (2000, 2009, 2018, and 2020)



8.4 THE STRUCTURAL RESULTS

The students' reading literacy, which is the outcome measure of the student-level factors are obtained from students' reading achievement scores in PISA (2000, 2009, and 2018) and follow-up data (2020). The pattern of relationships between the student's individual characteristics (gender, mother education, father education, and parent income), home facilities (books and home education resources), reading activities (reading engagement, reading diversity, and reading online), reading states (reading strategies, reading confidence and reading time) and reading literacy are examined.

Using five goodness-of-fit statistics as used in CFA, the fit of the SEM models were assessed, including normed of relative chi-square (χ^2/df), Comparative Fit Index (CFI), Tucker Lewis Index (TLI), Root Means Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR). Table 8.2 summarises the results of the model fit. The fit model yielded the following fit indices in all cycles which indicate that the model fit the data relatively well. PISA 2000 with $\chi^2 = 2073.667$, $p < 0.05$, CFI = 0.858, TLI = 0.823, RMSEA = 0.041, SRMR = 0.035, PISA 2009 with $\chi^2 = 4325.692$, $p < 0.05$, CFI = 0.915, TLI = 0.925, RMSEA = 0.038, SRMR = 0.041, PISA 2018 with $\chi^2 = 100071.436$, $p < 0.05$, CFI = 0.899, TLI = 0.845, RMSEA = 0.044, SRMR = 0.039, and 2020 Data with $\chi^2 = 496.173$, $p < 0.05$, CFI = 0.883, TLI = 0.831, RMSEA = 0.053, SRMR = 0.048.

As a result of using Mplus, all estimates obtained are standardised coefficients that reflect the strength of the associations between the variables. It is the p -value that is used to indicate the significance of the effect of the predictors on the outcome variable at a level of 0.05.

Table 8.2

Summary table of model fit statistics for all cycles at student-level

Cycle	χ^2	df	p-value	CFI	TLI	RMSEA	SRMR
PISA 2000	2073.667	28	< 0.05	0.858	0.823	0.041	0.035
PISA 2009	4325.692	36	< 0.05	0.915	0.925	0.038	0.041
PISA 2018	100071.436	45	< 0.05	0.899	0.845	0.044	0.039
2020 Data	496.173	39	< 0.05	0.883	0.831	0.053	0.048

This discussion entails the interaction among student factors, followed by the interaction of student factors on reading states, and finally the interaction of student factors and reading states on reading literacy for four cycles. The causal relationships between the variables in the structural models are subsequently discussed using the direct, indirect, and total effects results. It is important to note that although some direct coefficients are relatively small, they appear to be significant because of the large sample size, especially in PISA data. The effects that are more than 0.05 are, however, not discussed as they no longer bear practical significance.

The model addressed the student-level measured by the predictor variables, the mediating variables, and the outcome variables. The predictor variables are individual characteristic (GENDER, PENGAGE, MOMEDU, FATHEDU, and PINCOME), home facilities: number of books (BOOKS) and home educational resources (HEDRES) and reading activities: reading engagement (ENGREAD), reading diversity (DIVREAD), and reading online (ONLINE). The mediating variables are reading states: reading strategies (STRA), reading confidence (CONFI) and reading time (RETIME). The outcome variable is reading literacy (READ). Earlier in this discussion, there are not the same variables in every cycle, especially in reading activities and reading states.

The results that appear along the lines, indicating direct effects are standardised significant coefficients (β). The indirect effects are a product of the path coefficients between the predictors and the mediating variables or variables that explain the process through which two variables are related, and the path coefficients between the mediating variables and the outcome variables. The results are presented based on the research questions outlined previously: Are there any effects among student-level factors (gender, books at home, home educational resources, reading engagement, reading diversity, and reading online)? The causal relationship between variables in the structural model for all cycles is presented along with the discussion. The estimation (β) in the table is assumed to be significant with a p -value of < 0.05 , or else it was considered NS, or not significant.

8.4.1 STUDENT FACTOR

This section examines the estimation of the interaction among the student factors that directly and/or indirectly impact each other. It also answers the first sub-question of the first research question in this study. The student variables are individual characteristic (GENDER, MOMEDU, FATHEDU, PENGAGE, and PINCOME), home facilities: number of books (BOOKS) and home educational resources (HEDRES), and reading activities: reading strategies (STRA), reading engagement (ENGREAD), and reading diversity (DIVREAD). Furthermore, it is important to note that only in 2020 data that parent factors were included, thus it is necessary to seek the relationship of parent engagement (PENGAGE), parent income (PINCOME), mother education (MOMEDU) and father education (FATHEDU).

After carrying out the analysis, the student variables in this analysis have not shown any indirect effects on other student variables, they were, however, greater than 0.05. As a

result, they are not discussed as they are of no practical significance. The summary of direct effect results is presented in Table 8.3.

Table 8.3

Summary of direct effects among student factors all cycles

Dependent variable	Independent variable	Direct standardised estimates							
		2000		2009		2018		2020	
		Est (β)	p-value	Est (β)	p-value	Est (β)	p-value	Est (β)	p-value
BOOKS	GENDER	0.002	0.000	-0.011	NS	-0.027	0.003	-0.001	NS
HEDRES	GENDER	0.022	0.061	-0.043	0.002	0.032	0.000	0.101	0.030
ENGREAD	GENDER	-0.089	0.000	-0.157	0.000	-0.102	0.000	0.001	NS
	BOOKS	0.095	0.000	0.060	0.000	0.051	0.000	0.227	0.000
	HEDRES	-0.056	0.000	-0.058	0.000	-0.043	0.000	-0.057	NS
DIVREAD	GENDER	-0.042	0.00	-0.066	0.000	-0.027	0.003	0.009	NS
	BOOKS	0.133	0.000	0.064	0.000	0.054	0.000	-0.008	NS
	HEDRES	-0.172	0.000	-0.198	0.000	-0.095	0.000	-0.149	0.003
	ENGREAD	0.147	0.000	0.191	0.000	0.198	0.000	0.063	NS
ONLINE	GENDER			0.014	NS	-0.014	NS	0.065	NS
	BOOKS			0.087	0.000	0.036	0.000	-0.062	NS
	HEDRES			-0.294	0.000	-0.223	0.000	0.057	NS
	ENGREAD			-0.028	0.040	0.033	0.000	0.119	NS
	DIVREAD			0.149	0.000	0.194	0.000	0.202	0.001
PINCOME	MOMEDU							0.183	0.003
	FATHEDU							0.256	0.000
PENGAGE	PINCOME							-0.002	NS
	MOMEDU							0.010	NS
	FATHEDU							0.018	NS

*NS = not significant

GENDER

Over a period of 20 years, not all student-level characteristics have recorded effects of GENDER on BOOKS, HEDRES, ENGREAD, DIVREAD, and ONLINE. The code used to refer to GENDER was 1 for females and 2 for males, thus, the negative effects indicated that females possessed more home facilities, whereas the positive effects indicated that males possessed more home facilities. A remarkable fact is that it was in 2000 and 2018 that GENDER appear to be related to BOOKS. It appears that the number of books possessed by females and males was fairly balanced, $\beta = 0.002$ in 2000 and $\beta = -0.027$ in 2018. In terms of

HEDRES, males were found to possess a greater number of home educational resources and the effects were getting stronger over the years ($\beta = 0.022$ in 2000; $\beta = 0.032$ in 2018; and $\beta = 0.101$ in 2020) while females in 2009 possessed the greater number ($\beta = -0.043$). Meanwhile, with regard to reading activities (ENGREAD, DIVREAD, and ONLINE), GENDER was insignificant on ONLINE across all cycles. ENGREAD and DIVREAD, on the other hand, were significant in all three cycles of PISA and females were more likely to engage in reading and to read a variety of materials ($\beta = -0.042$ and $\beta = -0.042$ in 2000; $\beta = -0.157$ and $\beta = -0.066$ in 2009; and $\beta = -0.102$ and $\beta = -0.027$ in 2018). From 2000 to 2009, the effects were stronger but were becoming weaker by 2018.

Home Facilities (BOOKS and HEDRES)

With regard to home facilities (BOOKS and HEDRES), there has been evidence that home facilities have direct impacts on reading activities (ENGREAD and DIVREAD) in three cycles of PISA but not in 2020 follow-up data. Likewise, another reading activity, ONLINE, which was not included in PISA 2000, was of significance in PISA 2009 and 2018, but not in PISA 2020.

Of the students' books at home, BOOKS had positive effects on ENGREAD over the PISA periods with decreasing path coefficients from $\beta = 0.095$ in 2000, $\beta = 0.060$ in 2009, $\beta = 0.051$ in 2018, and then increasing in 2020 with $\beta = 0.227$. The initial coding scheme was 1 for strongly disagree, 2 for disagree, 3 for agree, and 4 for strongly agree. The higher the value, the more students agree to engage in reading activities. Accordingly, these positive findings indicated that the greater the number of books students have at home, the more likely they are to participate in reading engagement activities. From 2000 until 2018, the effect of the number

of books on reading engagement was getting weaker. However, in 2020, the effect was stronger than it was in 2000.

There has also been a positive effect of BOOKS on DIVREAD but only in three PISA cycles, not in 2020 data. Using DIVREAD's initial coding scheme, 1 means never or hardly ever, 2 means a few times a year, 3 means about once a month, 4 means several times a month, and 5 means several times a week, demonstrating that the higher values show the more frequently the students read diverse materials such as magazines, comics, fictions, non-fictions, email and webs, and newspapers. As of 2000, 2009, and 2018, BOOKS on DIVREAD had positive effects respectively with $\beta = 0.133$, $\beta = 0.064$, and $\beta = 0.054$. Despite the findings showing declines in path coefficients over these periods, the positive effects indicated that students read diverse materials more often when they had access to more books at home.

As for ONLINE, there were decreasing positive effects of BOOKS on ONLINE between PISA 2009 and 2018 ($\beta = 0.087$ in 2009 and $\beta = 0.036$ in 2018). ONLINE has an initial code scheme consisting of 1 for 'I don't know what it is', 2 for 'never or almost never', 3 for 'several times a month', 4 for 'several times a week', and 5 for 'several times a day'. The more values illustrate the more frequent online reading activities regarding emails, chats, online news, online dictionary or encyclopedia, online information, online group discussion, and online practical information. Hence, it revealed that in 2009 and 2018, the greater number of books students have at home the more frequently students read in online activities.

Another home facility, HEDRES, showed significant effects on reading activities (ENGREAD, DIVREAD, and ONLINE) during the PISA cycles. In the 2020 follow-up data, only DIVREAD was found to be significant. Meanwhile, ONLINE variable is not available in PISA 2000. It can be reported that in PISA 2000, 2009, and 2018, HEDRES had negative

effects on ENGREAD ($\beta = -0.056$ in 2000, $\beta = -0.058$ in 2009, and $\beta = -0.043$ in 2018). Between 2000 and 2009, the effect was weaker and slightly stronger in 2018. In light of the initial coding scheme of 1 for Yes and 2 for No for HEDRES, the negative effect signifies Yes, and vice versa. Consequently, the results indicate that the possession of home educational resources such as a desk, study place, computer, textbook, software, and dictionary led to reading engagement activities.

Moreover, the effects of HEDRES on DIVREAD revealed negative effects for all cycles of PISA ($\beta = -0.172$ in 2000, $\beta = -0.198$ in 2009, $\beta = -0.095$ in 2018, and $\beta = -0.149$ in 2020). Thus, it was found that home educational resources led students to read diverse material more often over 20 years. Additionally, the effects of HEDRES on ONLINE in PISA 2009 and 2018 displayed negative effects and the effects became weaker over time ($\beta = -0.294$ in 2009 and $\beta = -0.223$ in 2018), suggesting that when students have educational resources at home, these enhance their online reading activities.

Reading Activities (ENGREAD, DIVREAD, and ONLINE)

ENGREAD on DIVREAD demonstrated significant results in three cycles of the PISA study, while ENGREAD on ONLINE demonstrated significant results in PISA 2009 and 2018 only. Positive effects resulted in the association of ENGREAD and DIVREAD between 2000 and 2018 ($\beta = 0.147$ in 2000, $\beta = 0.191$ in 2009, and $\beta = 0.198$ in 2018), indicating that the higher level of agreement in reading engagement the more frequent reading diverse materials. It was surprising to know that the effects of ENGREAD on ONLINE were contradictory between 2009 and 2018, with a negative effect in 2009 and a positive effect in 2018. As a result of this negative result, it appears that students who are more strongly opposed to reading engagement will be presented with more frequent reading online activities, as opposed to a

positive effect in 2018. Reading engagement and online reading might be strongly associated since those students who engage in reading activities most frequently do so online. Despite this, there have been instances in which students have been distracted by improper use of online reading, such as chatting too much rather than discussing materials, thus diverting their attention away from their reading activities.

Parent factors

All the items used to measure mother and father education were positively worded, with 1 for ISCED level 3, 2 for ISCED level 3B and C, 3 for ISCED level 2, 4 for ISCED level 1, and 5 for not completed ISCED level 1. To simplify interpretation, these responses have been reversibly ranked, which means that the higher the value, the higher the level of education the parent has. Meanwhile, the initial code scheme in parent engagement (PENGAGE) was 1 for never or hardly ever, 2 for once or twice a year, 3 for once or twice a month, 4 for once or twice a week, and 5 for every day or almost every day. This points out that the more values of PENGAGE the more frequently parent engage with their children reading activities. Further, the parent income (PINCOME) initial code was 1 for ‘less than Rp 500,000’, 2 for ‘Rp 500,000 – 1,000,000’, 3 for ‘1,000,000 – 2,500,000’, 4 for ‘2,500,000 – 5,000,000’, 5 for ‘5,000.000 – 10,000,000’, and 6 for ‘more than 10,000,000’. Hence, the more values of PINCOME the more annual household income in a family.

With regard to additional variables of the parents in 2020 data, a noteworthy result has been shown that MOMEDU and FATHEDU have positive effects on PINCOME. Accordingly, the higher the education of the mother and father, the greater the income of the family. On the

other hand, the results revealed that MOMEDU, FATHEDU, and PINCOME have no effect on parent engagement (PENGAGE) since none of the data was statistically significant.

8.4.2 STUDENT FACTOR ON READING STATES

This section examines the student factors that directly and/or indirectly impact the reading states. In this study, the reading states are measured by reading strategies (STRA), reading confidence (CONFI), and reading time (RETIME). As stated earlier that PISA 2000 does not include STRA while PISA 2009 does not include CONFI. Likewise, parent factors were included only in the 2020 data.

STRA's initial code scheme measured the level of use of reading strategies from 1 to 6, indicating that the higher the value, the more positive the perception of reading strategies. It is important to note, the initial code scheme on CONFI differed between PISA 2000 and 2018. In 2000, the code was 1 for never, 2 for sometimes, 3 for most of the time, and 4 for always, while in 2018, which is the same as in 2020, the code was 1 for strongly disagree, 2 for disagree, 3 for agree, and 4 for strongly agree. Hence, in 2000, the greater the values of reading confidence, the greater the students felt confident as they engage in reading activities. Meanwhile, in 2018 and 2020, the more reading confidence values referred to, the greater the agreement with the reading confidence values. The code for RETIME, in addition, was 1 for 'I do not read', 2 for '30 minutes', 3 for '30 to 60 minutes', 4 for '1 to 2 hours', and 5 for 'more than 2 hours a day'. This means that the more values, the more time is spent for reading.

The summary of causal relationships between student factors and reading states variables in the structural models are subsequently discussed using the direct, indirect, and total effects results, which are presented in Table 8.4. All the estimations provided in the table showed a practical significance of < 0.05 .

Table 8.4

Summary of direct and indirect effects between student factors and reading states

Dependent variable	Independent variable	Standardised estimates											
		Direct				Indirect				Total			
		2000	2009	2018	2020	2000	2009	2018	2020	2000	2009	2018	2020
STRA	GENDER		-0.047	-0.050	NS		0.029	-0.026	-		0.076	-0.076	-
	BOOKS		NS	0.024	NS		NS	0.019	-		NS	0.043	-
	HEDRES		NS	NS	NS		NS	NS	-		NS	NS	-
	ENGREAD		0.133	0.162	NS		0.014	0.033	-		0.147	0.195	-
	DIVREAD		0.074	0.166	NS		-0.010	0.000	-		0.064	0.166	-
	ONLINE		-0.066	0.094	NS		-	-	-		-	-	-
	PENGAGE				NS								
CONFI	GENDER	NS		-0.020	NS	NS		-0.035	-	NS		-0.055	-
	BOOKS	NS		0.045	0.115	NS		0.018	-	NS		0.063	-
	HEDRES	0.026		-0.060	NS	-0.001		-0.018	-	0.025		-0.078	-
	ENGREAD	NS		0.272	0.118	NS		0.012	0.002	NS		0.284	0.119
	DIVREAD	NS		0.062	NS	NS		0.000	-	NS		0.062	-
	ONLINE			0.075	NS			-	-			-	-
	PENGAGE				NS				-				-
RETIME	GENDER	-0.062	-0.154	-0.153	NS	-0.029	0.045	-0.032	-	-0.091	-0.199	-0.185	-
	BOOKS	0.117	0.099	0.092	NS	0.041	0.030	0.018	-	0.157	0.129	0.110	-
	HEDRES	NS	-0.112	-0.110	NS	NS	-0.059	-0.022	-	NS	-0.171	-0.132	-
	ENGREAD	0.232	0.254	0.178	NS	0.018	0.022	0.027	-	0.251	0.276	0.205	-
	DIVREAD	0.125	0.116	0.138	0.314	0.000	0.009	0.000	-0.035	0.125	0.125	0.138	0.280
	ONLINE		0.062	NS	NS		-	-	-		-	-	-
	PENGAGE				NS				-				-

Direct effect on reading states (STRA, CONFI, and RETIME)

GENDER on Reading states

The table indicates that STRA has been affected by GENDER in 2009 and 2018, BOOKS in 2018, ENGREAD, DIVREAD, and ONLINE in 2009 and 2018. Meanwhile, data from 2020 indicate that none of the variables had an effect on STRA. CONFI has been influenced by GENDER, DIVREAD, and ONLINE only in 2018, HEDRES in 2000 and 2018, and BOOKS and ENGREAD in 2018 and 2020. Furthermore, RETIME was found to be impacted on GENDER, BOOKS, and ENGREAD in three PISA studies, DIVREAD in all four cycles, HEDRES in 2009 and 2018, and ONLINE only in 2018. Nonetheless, based on the results in 2020 data, none of the parent variables (PENGAGE and PINCOME) was significantly correlated with any reading states.

Over the cycles concerning GENDER, a consistent negative trend can be seen in STRA ($\beta = -0.47$ in 2009 and $\beta = -0.059$ in 2018), CONFI ($\beta = -0.020$ in 2018), and RETIME ($\beta = -0.062$ in 2000, $\beta = -0.154$ in 2009, and $\beta = -0.153$ in 2018), in conjunction with the cycle that showed a significant impact. As a result of gender, there were all negative effects, as women outnumbered men in terms of better perception of reading strategies in 2009 and 2018, a greater level of reading confidence in 2018, and a greater amount of time spent reading in 2000, 2009, and 2018.

Home Facilities (BOOKS and HEDRES) on Reading States

Of the students' books at home, there were positive effects of BOOKS on STRA ($\beta = 0.024$ in 2018), CONFI ($\beta = 0.045$ in 2018 and $\beta = 0.115$ in 2020), and RETIME ($\beta = 0.117$ in 2000, $\beta = 0.099$ in 2009, and $\beta = 0.092$ in 2018) and the effect were getting stinger over the study periods. These results pointed out that the more books students have at home, the better

their perception of reading strategies in 2018, the greater their level of reading confidence in 2018 and 2020, and the more frequent reading time in 2000, 2009, and 2018.

It was remarkable that HEDRES did not affect STRA in all cycles with the effects getting weaker over time, but they did affect CONFI in 2000 ($\beta = 0.026$) and 2018 ($\beta = -0.060$) and RETIME in 2009 ($\beta = -0.112$) and 2018 ($\beta = -0.110$). Since the initial codes for CONFI were different between PISA 2000 and 2018, HEDRES effects on CONFI between 2000 and 2018 led to different interpretations.

There are, however, contradictory results of HEDRES on CONFI in 2000 and 2018. The results showed that HEDRES had a positive effect equal to 0.026 in 2000 and a negative effect of -0.060 in 2018. As HEDRES's initial coding indicates Yes and No, and negative effects correspond to Yes and vice versa, the positive effect in 2000 implied that when students dominantly disagreed with having educational resources at home, they felt more confident in reading. Reading confidence and home educational resources might be strongly correlated since students who have more facilities at home are most likely to be confident in the reading activity. Nevertheless, there have been cases where students have been distracted by improper use of home resources, such as computers, thus deviating from their reading confidence. Conversely, the negative of HEDRES on CONFI in 2018 suggests that students who agree dominantly to having educational resources at home will be more likely to agree with reading confidence values. Meanwhile, the HEDRES on RETIME between 2009 and 2018 decreased slightly, but the results suggest that the possession of educational resources corresponds to more time spent reading.

Reading activities (ENGREAD, DIVREAD, and ONLINE) on Reading states

A positive association was observed between ENGREAD and STRA. From 2000 until 2018, the effects were getting stronger but in 2020 it was weaker than it was in 2000 ($\beta = 0.133$ in 2009 and $\beta = 0.162$ in 2018), ENGREAD and CONFI ($\beta = 0.272$ in 2018 and $\beta = 0.118$ in 2020), and ENGREAD and RETIME ($\beta = 0.232$ in 2000, $\beta = 0.254$ in 2009, and $\beta = 0.178$ in 2018). On the other hand, there was no significant impact of ENGREAD on STRA in 2020, on CONFI in 2000 data, and on RETIME in 2020.

In terms of ENGREAD, the positive results on STRA in 2009 decreased in 2018. Additionally, the results pointed out that higher agreement with reading engagement was associated with a higher perception of reading strategies. A decrease in the effect of ENGREAD on CONFI has also been observed from 2018 to 2020. In spite of this, the results of the study indicated that students who reported higher levels of reading engagement felt more confident as they engaged in reading activities. A positive effect of ENGREAD on RETIME was demonstrated in three cycles of PISA studies. Students who are more willing to engage in reading activities spend more time reading.

The effects of DIVREAD on STRA were positive in 2009 ($\beta = 0.074$) and 2018 ($\beta = 0.166$), and non-significant in 2020. In this study, the more frequently students read diverse materials, the more positively they perceived reading strategies. There was a significant difference in CONFI in cycle 2018 only ($\beta = 0.062$), indicating that the more often students read diverse materials at that time, the greater their sense of confidence while engaging in reading activities. A remarkable to note that DIVREAD in all cycles had positive effects on RETIME with the largest estimation in 2020 ($\beta = 0.125$ in 2000, $\beta = 0.116$ in 2009, $\beta = 0.138$ in 2018, and $\beta = 0.314$ in 2020). These findings suggested that over the 20-year period, the

more frequently the students read diverse materials such as magazines, comics, fictions, non-fictions, email and webs, and newspapers, the more time they spend reading.

ONLINE on Reading states

Using the analysis results of ONLINE on reading states, there were effects on STRA in 2009 ($\beta = -0.066$) and 2018 ($\beta = 0.094$), on CONFI only in 2018 ($\beta = 0.075$) and RETIME only in 2009 ($\beta = 0.062$). Despite this, there was a contradictory result on STRA between 2009 and 2018, since there was a negative effect in 2009 and a positive effect in 2018. The more values in ONLINE indicate more frequent online reading, whereas the negative effect in 2009 implied that fewer frequent online reading precisely resulted in a more positive perception of reading strategies. A strong correlation may exist between reading online and reading strategies material, as higher levels of online activity would result in a better perception of reading strategies. There have however been instances where students have been distracted by improper use of online activities, such as playing games and thus diverted from their reading strategies perception. There was only one significant effect on CONFI in cycle 2018, with a positive effect suggesting that the greater the number of online reading activities, the greater the agreement with the reading confidence values. Also, only cycle 2009 showed a significant effect on RETIME, which suggested the more frequently one reads online, the more time one spends reading.

Parent factors on Reading states

Generally, the study examines how parent engagement (PENGAGE) may affect the reading states of students in 2020. However, after carrying out the analysis, the results showed that none of the reading states had been influenced by parent engagement as the effects were

greater than 0.05. Consequently, there is no point in discussing the matter since they no longer have any practical significance.

Indirect effect on reading states

Using the analysis result, some student factors in the cycles showed indirect effects on reading states (STRA, CONFI, and REIME). In this regard, it is pertinent to note that there is no indirect effect of student factors on STRA, all student factors in 2020 and STRA, or parent factors on STRA, CONFI, or RETIME.

According to the result, it can be seen that the indirect effects on STRA were only in PISA 2009 and 2018. Indirect effects of GENDER on STRA were found to be interesting in which through HEDRES, ENGREAD, DIVREAD, and ONLINE making its total effect different, a positive total effect in PISA 2009 ($\beta = 0.076$) and a negative effect in PISA 2018 ($\beta = -0.076$). According to these findings, males demonstrated better reading strategies in 2009, whereas females did so in 2018, through the possession of home educational resources, the agreement of reading engagement, and the use of online reading resources.

Among all student factors in this study, only HEDRES in 2000, all student factors in 2018, and ENGREAD in 2020 had indirect effects on CONFI. Through ENGREAD, DIVREAD, and RETIME, HEDRES had a negative indirect effect of ($\beta_1 = -0.001$), resulting in its positive total effect of 0.025. This implied that the possession of home educational resources led to the greater students feeling confident as they engage in reading activities, the frequency of reading diverse materials, and spent more time reading, thus resulting in higher reading literacy. According to the result of 2020 data that sought to examine student factors and CONFI, an indirect effect was only found on ENGREAD ($\beta_1 = 0.002$) through DIVREAD and ONLINE making its total effect equal to 0.119. It is evident that home educational resources

contributed to a higher level of reading online, resulting in a greater level of agreement with reading confidence values.

Upon examination of the indirect effects of student factors on RETIME, all student factors in PISA 2000, 2009, and 2018 have significant indirect effects, except for one factor of HEDRES in PISA 2000. The findings demonstrated that most of the student factors in those three PISA cycles (GENDER, BOOKS, HEDRES, ENGREAD, DIVREAD, and ONLINE) contribute to more time spent reading. Meanwhile, an examination of the indirect effect in 2020 data displayed that only DIVREAD had an indirect effect on RETIME with a negative coefficient of -0.035 through ONLINE making its total at 0.280. In this sense, this study indicated that the more frequently students read diverse materials, accompanied by more frequent online reading, the more time they spent reading.

8.4.3 EFFECTS OF STUDENT FACTORS AND READING STATES ON READING LITERACY

This section examines the student factors and reading states that directly and/or indirectly impact reading literacy (READ). All results over the past 20 years using four cycles of PISA 2000, 2009, 2018 and 2020 follow-up data are presented in Table 8.5. This analysis results also confirm the final SEM analysis in student-level in this study. In general, it has been reported that among student variables related to reading literacy, only reading confidence did not show significant results in PISA 2000, only the number of books did so in 2009, and none was reported in 2018. In contrast, in the 2020 data, there are only three predictors present at the student-level, which are the number of books, reading strategies, and reading confidence.

Table 8.5 presents a summary of causal relationships between student level and reading literacy as well as structural models using the direct, indirect, and total effects results. All estimations provided in the table had a statistical significance of 0.05. Meanwhile, the final

models which resulted after carrying out the significant coefficient of direct and indirect student-level analysis in all cycles presented respectively in Figure 8.2 for PISA 2000, Figure 8.3 for PISA 2009, Figure 8.4 for PISA 2018, and Figure 8.5 for 2020 follow-up data.

Table 8.5

Summary of direct and indirect effects between student factors and reading states

Dependent variable	Independent variable	Standardised estimates											
		Direct				Indirect				Total			
		2000	2009	2018	2020	2000	2009	2018	2020	2000	2009	2018	2020
READ	GENDER	-0.088	-0.279	-0.131	NS	-0.023	-0.011	-0.041	-	-0.111	-0.290	-0.172	-
	BOOKS	0.137	NS	0.054	0.118	0.038	NS	0.024	0.017	0.175	NS	0.078	0.135
	HEDRES	-0.073	-0.115	-0.255	NS	-0.024	-0.093	-0.054	-	-0.097	-0.208	-0.309	-
	ENGREAD	0.047	0.054	0.021	NS	0.047	0.011	0.052	-	0.094	0.065	0.073	-
	DIVREAD	0.077	0.046	-0.112	NS	0.018	0.029	0.010	-	0.095	0.075	-0.060	-
	ONLINE		0.185	0.149	NS		0.017	-	-		0.202	0.159	-
	STRA		-0.168	-0.023	-0.159		-	-	-		-0.168	-	-
	CONFI	NS		0.144	0.110	-		-	-			-	-
	RETIME	0.142	0.098	0.129	NS	-	-	-	-	-	-	-	-
	MOMEDU				NS				-				-
	FATHEDU				NS				-				-
	PENGAGE				NS				-				-
	PINCOME				NS				-				-

Figure 8.2

Final Structural equation Model: Student-level Model in PISA 2000

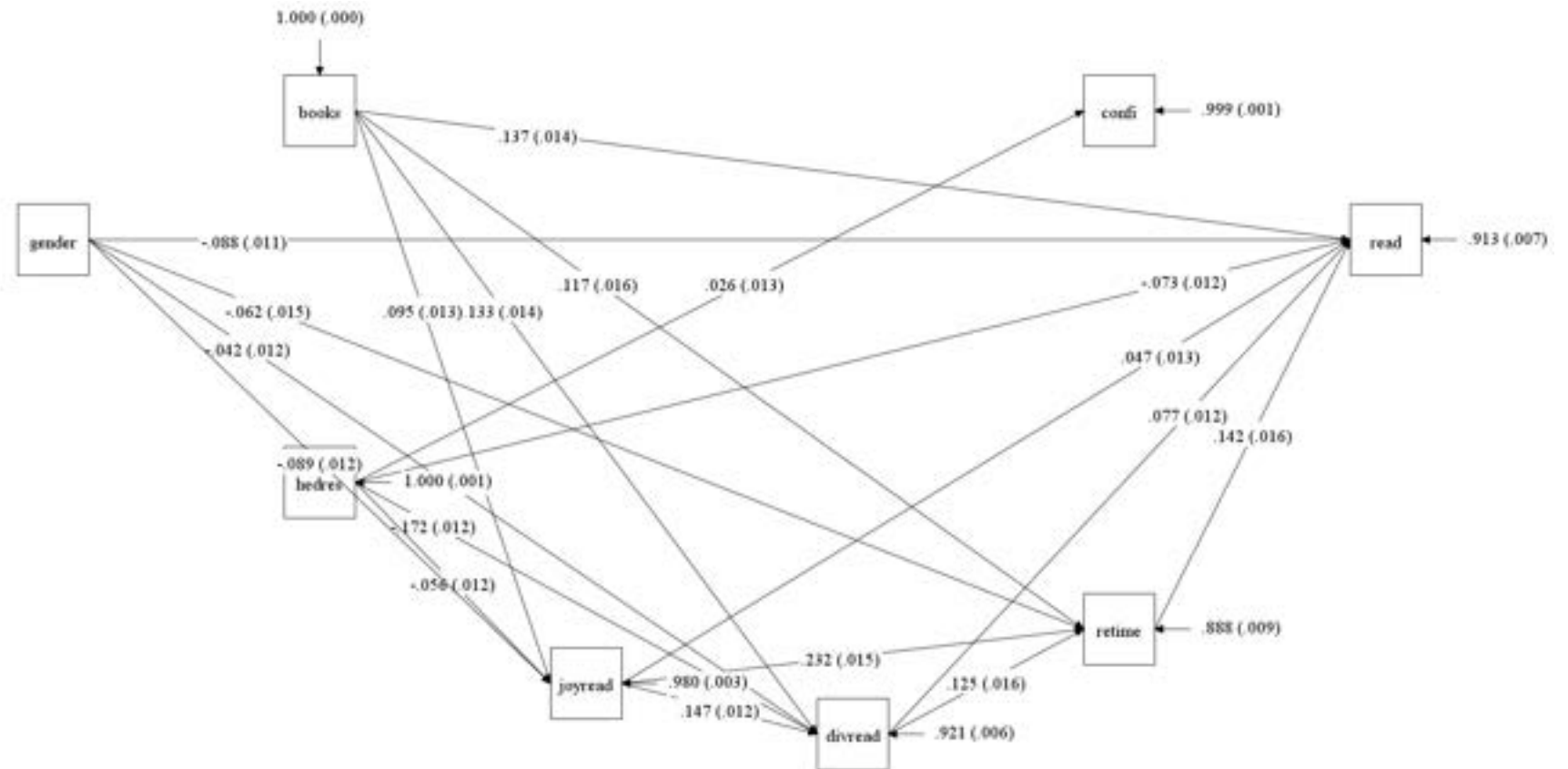


Figure 8.3

Final Structural equation Model: Student-level Model in PISA 2009

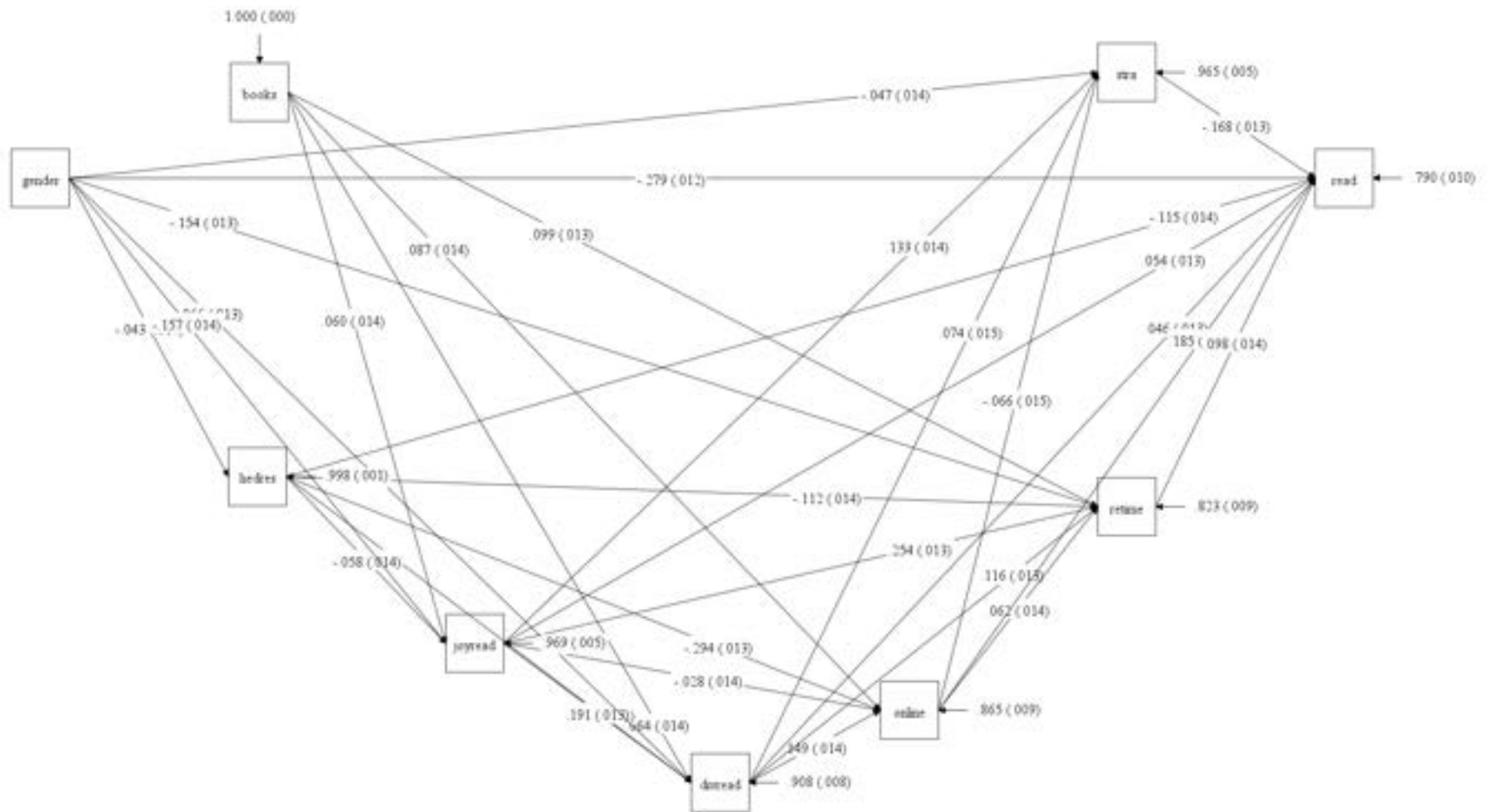
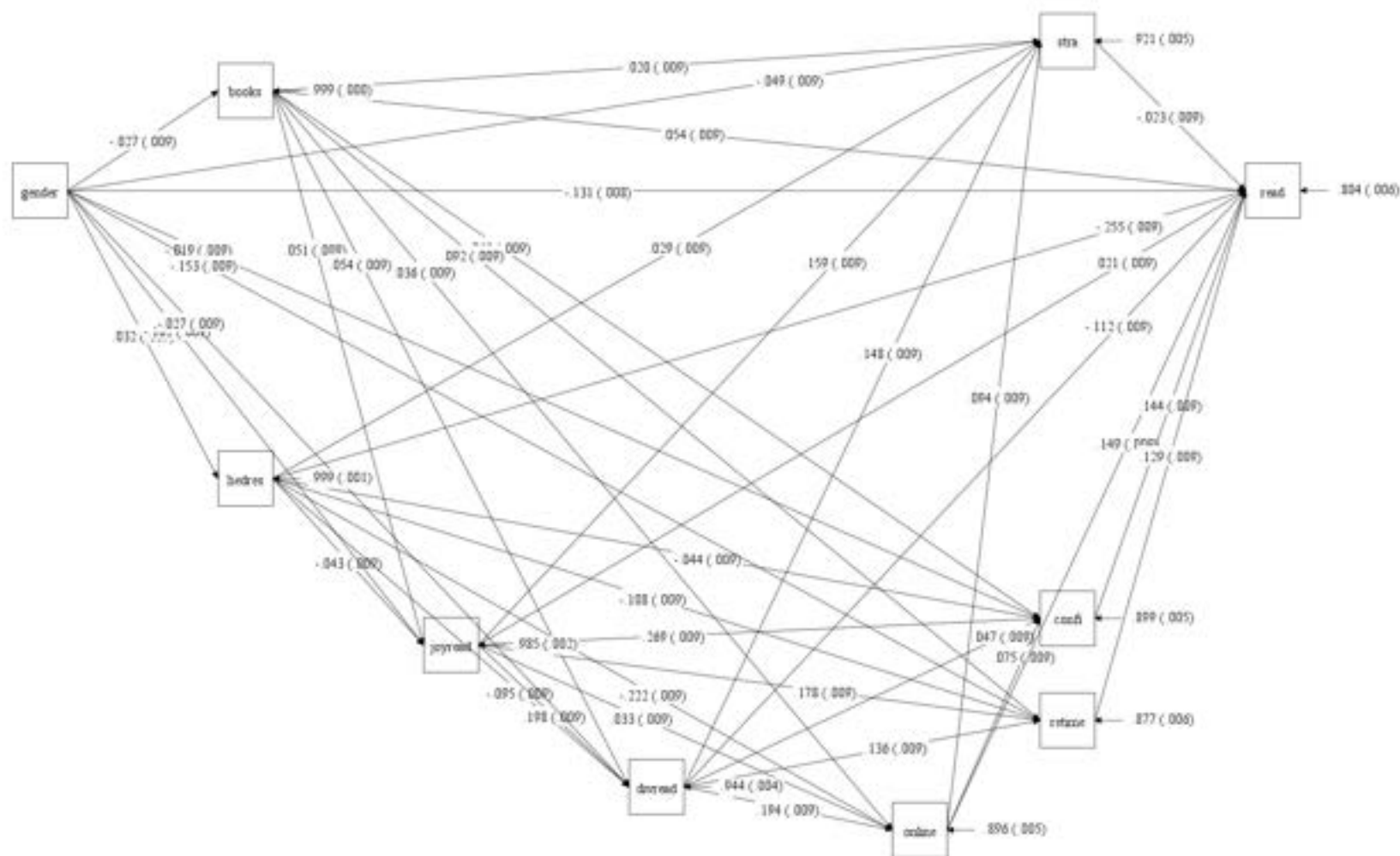


Figure 8.4

Final Structural equation Model: Student-level Model in PISA 2018



Final Structural equation Model: Student-level Model in 2020 follow-up data



Direct effect of student factors and reading states on reading literacy

Based on the structural equation modelling analysis carried out previously, this section discusses student-level trends towards reading literacy (READ). All results over the past 20 years using four cycles of PISA 2000, 2009, 2018 and 2020 follow-up data are presented in Table 8.4. It has been reported that, in general, only one variable (CONFI) was insignificant in PISA 2000. This was followed by one variable (BOOKS) in PISA 2009. In contrast, all variables were significant in PISA 2018 while only three variables were significant in 2020, and none of the parent factors was significant in determining reading literacy.

GENDER on READ

At the student-level, a significant effect of the GENDER was found for all PISA studies, but not for the 2020 follow-up data. The negative effect results of PISA 2000 ($\beta = -0.088$), 2009 ($\beta = -0.279$), and 2018 ($\beta = -0.131$) showed that females have outperformed males consistently in terms of reading literacy for 18 years with the highest coefficient was in PISA 2009.

Home facilities (BOOKS and HEDRES) on READ

With regard to home facilities, BOOKS, the effect was insignificant in PISA 2009. Based on the result, it has been demonstrated by the result of BOOKS in PISA 2000 ($\beta = 0.137$) which was the highest, 2018 ($\beta = 0.054$), and 2020 data ($\beta = 0.118$), that the more books students have at home, the higher their reading literacy will be until 2020. A consistent negative trend was observed in another home facility, HEDRES ($\beta = -0.073$ in 2000, $\beta = -0.115$, and $\beta = -0.255$ in 2018), which

indicated that the proportion of students agreeing to home education resources led to greater achievement of reading literacy, with the highest coefficient being observed in PISA 2018.

Reading activities (ENGREAD, DIVREAD, and ONLINE) on READ

As well as ENGREAD, DIVREAD, and ONLINE, other predictors at the student-level were significant in three cycles of PISA studies, but not in the 2020 data. ENGREAD showed positive effects with the highest coefficient in PISA 2009 ($\beta = 0.047$ in 2000, $\beta = 0.054$, and $\beta = 0.021$ in 2018). There was a meaningful connection between the students' agreement with reading literacy and the higher level of reading literacy.

Of reading diversity toward reading literacy, DIVREAD on READ, showed a positive effect on PISA 2000 ($\beta = 0.077$) and declined in PISA 2009 ($\beta = 0.046$). In contrast, however, the effect was negative, as in PISA 2018 ($\beta = -0.112$). It pointed out that in PISA 2000 and 2009, more frequently reading diverse material was associated with higher reading literacy. The PISA 2018 results, however, signified the more frequently students read diverse materials, the lower their achievement in reading. There may be a strong correlation between reading diversity and reading literacy, since the more diverse the material, the greater the knowledge or information students have. Students have, however, sometimes been distracted by a load of materials, resulting in deviations from the achievement score.

ONLINE on READ, in addition to the reading activities, had positive effects in PISA 2009 ($\beta = 0.185$) and 2018 ($\beta = 0.149$), as evidenced by the fact that the more frequently students engaged in online reading activities, the better their reading literacy was.

Reading states (STRA, CONFI, and RETIME) on READ

Interestingly, with regard to reading strategies toward reading literacy, it has been demonstrated that STRA had negative effects on READ in three PISA cycles with the effects getting stronger over time: PISA 2009 ($\beta = -0.168$), 2018 ($\beta = -0.023$), and 2020 ($\beta = 0.159$). Reading literacy performance was found to be better when the student perceived reading strategies as less useful. Reading strategies consisting of memorisation and summary skills might be strongly correlated with reading literacy performance since good strategies were the key to success in the achievement. The strategies have, however, not always proven useful to students in improving their literacy in reading, thus deviating their perception of reading strategies.

CONFI had a positive effect on PISA 2018 ($\beta = 0.144$) and 2020 data ($\beta = 0.110$). This suggested that the greater the agreement with the reading confidence values, the better the score on reading literacy.

The effect of RETIME on READ was positive in PISA 2000 ($\beta = 0.142$), 2009 ($\beta = 0.098$), and 2018 ($\beta = 0.129$). As a result of these findings, it was believed that the more time spent reading, the better the performance in reading literacy.

Indirect effect on reading literacy

Carrying out the analysis of student factors toward reading literacy (READ), there were indirect effects of GENDER (in 2000, 2009, and 2018), and BOOKS (in 2000, 2018, and 2020). Also, there was an indirect effect of HEDRES, ENGREAD, and DIVREAD in the three cycles of the PISA study. Further, only in 2009 did ONLINE have indirect effects.

GENDER on READ

The total indirect effect of GENDER on READ was in PISA 2000 ($\beta_1 = -0.023$), 2009 ($\beta_1 = -0.011$), and 2018 ($\beta_1 = -0.041$) through BOOKS, HEDRES, ENGREAD, DIVREAD, ONLINE, STRA, CONFI, and RETIME made its total effect equal to -0.111, -0.290, and -0.172 respectively. It indicated that over an 18-year period, female students outperformed males in reading literacy which was supported by the number of books, the agreement of home educational resources, the agreement of reading engagement, the diversity of reading materials, the frequent reading online, the level perception of reading strategies, and the greater of reading confidence, and the more time spent on reading.

BOOKS on READ

The examination of the indirect number of books, the result showed that ENGREAD, DIVREAD, ONLINE, STRA, CONFI, and RETIME mediated the effect of BOOKS on READ in PISA 2000 ($\beta_1 = 0.038$), 2018 ($\beta_1 = 0.024$), and 2020 data ($\beta_1 = 0.017$). The indirect regression coefficients were thus making each total effect equal to 0.175, 0.078, and 0.135 respectively. Accordingly, the greater the number of books, the agreement of reading engagement, the diversity of reading materials, the more frequent reading online, the level of perception of reading strategies, the greater of reading confidence, and the more time spent on reading.

HEDRES on READ

In addition to home facilities, the total indirect effect of HEDRES on READ was negative in three cycles of PISA: 2000 ($\beta_1 = -0.024$), 2009 ($\beta_1 = -0.093$), and ($\beta_1 = -0.054$), which, through ENGREAD, DIVREAD, ONLINE, STRA, CONFI, and RETIME, produced their total effect at -0.097, -0.208, and -0.309 correspondingly. Thus, the availability of educational resources contributed to a higher level of reading literacy as indicated by the agreement of reading engagement, the diversity of reading materials, the frequent reading online, the perception of reading strategies, the increased reading confidence, and the more time spent reading.

ENGREAD on READ

ENGREAD on READ, furthermore, had the total indirect effect were positive with a coefficient of $\beta_1 = 0.047$ for PISA 2000, $\beta_1 = 0.011$ for PISA 2009, and $\beta_1 = 0.052$ for PISA 2018. It was found that the variables of ENGREAD, DIVREAD, ONLINE, STRA, CONFI, and RETIME had a total effect equal to 0.094 (PISA 2000), 0.065 (PISA 2009), and 0.073 (PISA 2018), representing their total effect. As a result, the agreement of reading engagement contributes to the improvement of reading literacy in light of the diversity of reading materials, frequent reading online, the perception of reading strategies, the increased confidence in reading, and the longer time spent reading.

DIVREAD on READ

DIVREAD on READ, as well, had a total indirect effect in 2000 ($\beta_1 = 0.018$), 2009 ($\beta_1 = 0.029$), and 2018 ($\beta_1 = 0.010$). ONLINE, STRA, CONFI, and RETIME all mediated DIVREAD's

total effect on READ at 0.095 in 2000, 0.075 in 2009, and -0.060 in 2018. The findings in 2000 and 2009 pointed out that the agreement of reading diverse materials which led to reading literacy supported by frequent reading online, perceived reading strategies, greater confidence in reading, and longer time spent reading led to increased reading literacy. The negative total effect in 2018, which was discussed earlier in the section on direct effects, revealed that it was the disagreement with reading diverse materials that led to the increase in reading literacy in 2018 as reflected in frequent reading online, perceived reading strategies, greater confidence in reading, and longer time spent reading.

ONLINE on READ

ONLINE was the last that showed indirect effect on READ that was mediated by STRA, CONFI, and RETIME in PISA 2019 only with a coefficient of $\beta_1 = 0.017$ making its total equal to 0.202. It was concluded, therefore, that as more reading is done online, reading literacy increases as supported by the perception of reading strategies, reading confidence, and reading time.

8.5 SUMMARY

A single-level path analysis is conducted in order to examine the relationship between factors at the student level and to investigate further the factors that can be predictors of reading literacy.

It can be gleaned that at the student level, for PISA 2000, the predictors of reading literacy are individual characteristics (gender), home facilities (the number of books and home educational resources), reading activities (reading engagement and reading diversity), and reading states

(reading time). For PISA 2009, the predictors of reading literacy at the student-level are individual characteristics (gender), home facilities (home educational resources), reading activities (reading engagement, reading diversity, and reading online), and reading states (reading strategies and reading time). Furthermore, for PISA 2018, the predictors of reading literacy at student-level are individual characteristics (gender), home facilities (the number of books and home educational resources), reading activities (reading engagement, reading diversity, and reading online), and reading states (reading strategies, reading confidence, and reading time). Lastly, for 2020 follow-up data, the predictors of reading literacy at the student-level are home facilities (the number of books) and reading states (reading strategies and reading confidence). As pertains to parent variables, none of appears to be a factor that contributes to the students' reading literacy.

Chapter 9

School- and Teacher-level Factors on Reading Literacy: Structural Equation Model Analysis

9.1. INTRODUCTION

The chapter investigates the school factors that might have influenced Indonesian students' reading achievement based on PISA Data in four cycles: PISA 2000, 2009, 2018, and 2020 follow-up data using Structural Equation Modelling (SEM). In addition, the effects of teacher-level factors are also examined using the 2020 follow-up data. Using Mplus software, the same procedures and tests are conducted as for the student-level factors in the previous section. School-level SEM analysis is performed based on data from school principals in PISA 2000, 2009, 2018, and 2020 follow-up data. As for the teacher level SEM, it is only included in the 2020 data analysis. Hence, different hypotheses are generated based on the predictors for each year.

Likewise, this chapter seeks to answer the research questions presented in Chapter 1, referring to the school- and teacher-level factors:

1. How do school and reading states (school sector, school facilities, assessment, and school management) and their relationships impact student reading literacy in Indonesia considering paper-based (PISA 2000, PISA 2009, and follow up 2020) and computer-based reading performance (PISA 2018)?
 - a. Are there any effects of school factors on student factors, reading states, and reading literacy?
 - b. Are there any effects of student factors on reading states and reading literacy?
 - c. Are there any effects of reading states on reading literacy?

9.2 VARIABLES USED AT SCHOOL- AND TEACHER-LEVELS

The school-level model based on PISA 2000, 2009, 2018, and 2020 follow-up data are discussed correspondingly. Several variables are assumed to have influenced the school's achievement in reading literacy that is included in the student school-level model. School type, school facilities, assessment, school management, and reading states are posited to have a relationship with students' reading literacy achievement. Specific names for each of the variables included in the model are presented in Table 9.1. The following table shows three panels relating to presage, process, and product. Using the same pattern as student-level, the first column refers to school and teacher variables, the second refers to reading states, and the third refers to literacy as it pertains to reading.

Table 9.1

Variables used in the school- and teacher-level analysis

Theoretical Dimensions	Construct variables	Description	Year of cycle
<i>Presage School</i>			
School Type	SECTOR	School type	2000, 2009, 2018, 2020
	LOCATION	School location	2000, 2009, 2018, 2020
School Facilities	ICT	ICT tools at school	2000, 2009, 2018, 2020
	TECH	Resources and technology	2000, 2009, 2018, 2020
Assessment	ASMENT	Assessment at school	2000, 2009, 2018, 2020
School Management	LEAD	Leadership	2009, 2018, 2020
	CLIMATE	School Climate	2000, 2009, 2018, 2020
<i>Presage Teacher</i>			
	TLESSON	Teacher Lesson	2020
	TPROF	Professional Activities	2020
	TONLINE	Teacher online activities	2020
<i>Process</i>			
Reading States	STRA	Reading strategies	2009, 2018, 2020
	CONFI	Reading confidence	2000, 2018, 2020
	RETIME	Reading time	2000, 2009, 2018, 2020
<i>Product</i>			
Reading literacy	READ (Achievement in Reading)		2000, 2009, 2018, 2020

The latent variables in this study are school type (school sector and school location), school facilities (ICT and resources technology), assessment, school management (leadership and school climate) and reading states (reading strategies, reading confidence, and reading time). Similar to the student-level analysis, not all cycles have the same construct variables. As well, as some construct variables in each cycle responded differently, the equating in Rasch analysis was examined, thus, all variables were in WLE.

9.3 THE HYPOTHESED MODEL

In this section, the hypothesised models of school-level in all cycles (PISA 2000, 2009, 2018, and 2020 follow-up data) and teacher-level (in 2020 follow-up data) are presented in Figure 9.1. The model at the school-level depicts the causal relationships between school variables and illustrates which variables are influencing one another. Likewise, the teacher-level model illustrates the causal relationships between teacher variables as well as what variables influence which variables. In the figure, the ellipse represents a latent variable, the rectangular shape represents an observed variable, and the lines on each side indicate whether the variable has a direct or indirect effect on another variable.

School-level

The hypothesised model of school-level in this study is illustrated in Figure 9.1. The model examines the predictors of students' reading literacy based on school-level predictors. Therefore, school type, school facilities, assessment, school management, and reading states are hypothesised to be affecting students' reading literacy (READ).

All of the predictors in each box are displayed according to which cycle they belong to. Although some predictors are present in all cycles, others are not. The reading states that are included in the cycle are the same as those included in the cycle at the student level. As seen

in the figure, the predictors in PISA 2000 are school type: school sector (SECTOR) and school location (LOCATION), school facilities: ICT tools at schools (ICT) and resources and technology (TECH), assessment at school (ASMENT), school management: school climate (CLIMATE), and reading states: reading confidence (CONFI) and reading time (RETIME). In PISA 2009, there are school sector (SECTOR) and school location (LOCATION), school facilities: ICT tools at schools (ICT) and resources and technology (TECH), assessment at school (ASMENT), school management: school climate (CLIMATE), and reading states: reading strategies (STRA) and reading time (RETIME). The predictors in PISA 2018 are the same as in 2020 follow-up data with school sector (SECTOR) and school location (LOCATION), school facilities: ICT tools at schools (ICT) and resources and technology (TECH), assessment at school (ASMENT), school management: school climate (CLIMATE), and reading states: reading strategies (STRA), reading confidence (CONFI) and reading time (RETIME).

Teacher-level

The hypothesised model of teacher-level is presented in Figure 9.2. Using teacher-level predictors, the model examined the predictors of students' reading literacy. There are teaching lesson (TLESSON), teaching as professional (TPROF), and teacher online activities (TONLINE). The same reading states as in student- and school-level includes include reading strategies (STRA), reading confidence (CONFI) and reading time (RETIME). Teachers' lessons, professional interactions, online activities, and reading states were hypothesised to reading literacy (READ).

Figure 9.1

Hypothesised school-level model for four cycles (2000, 2009, 2018, and 2020)

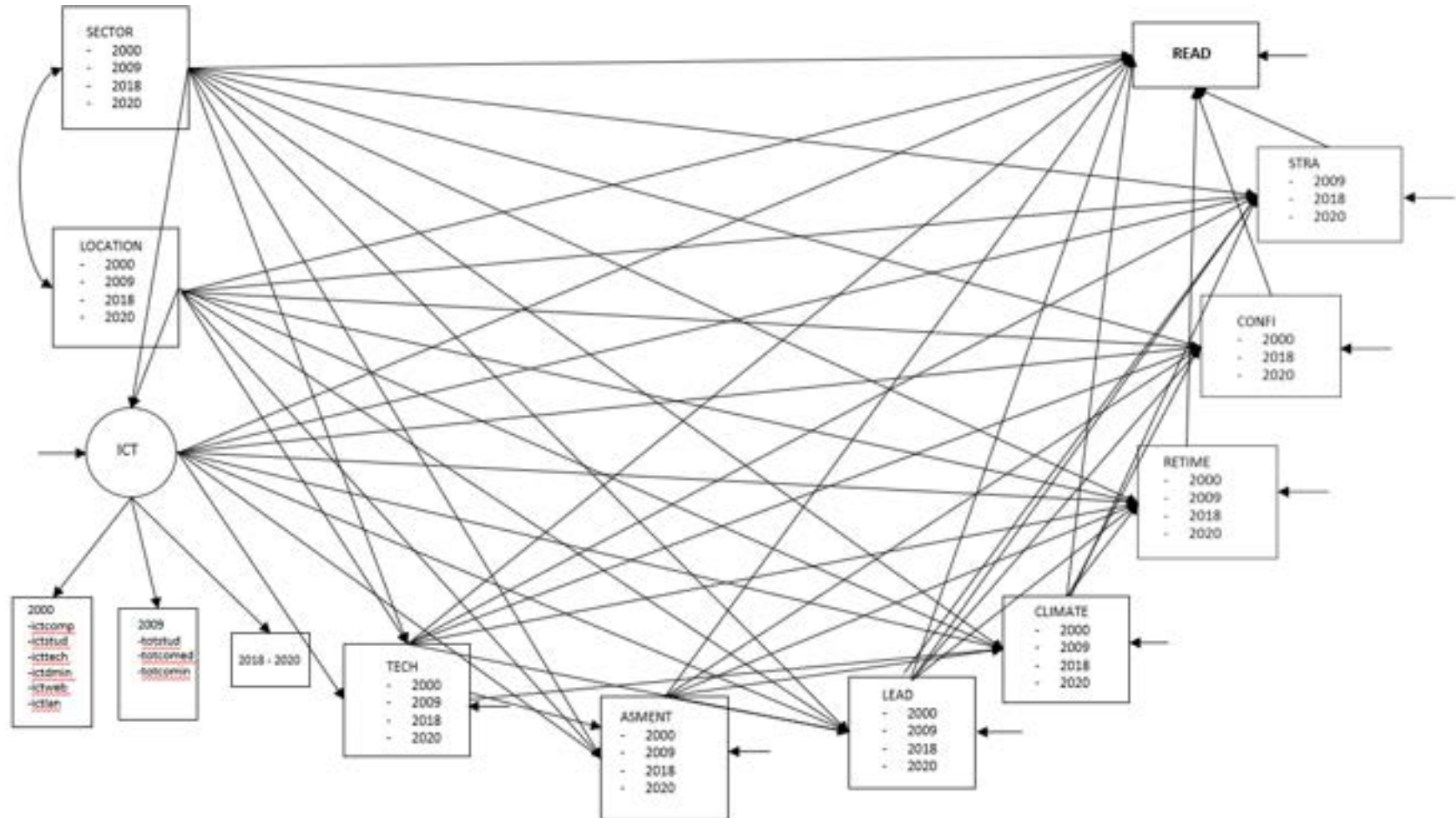
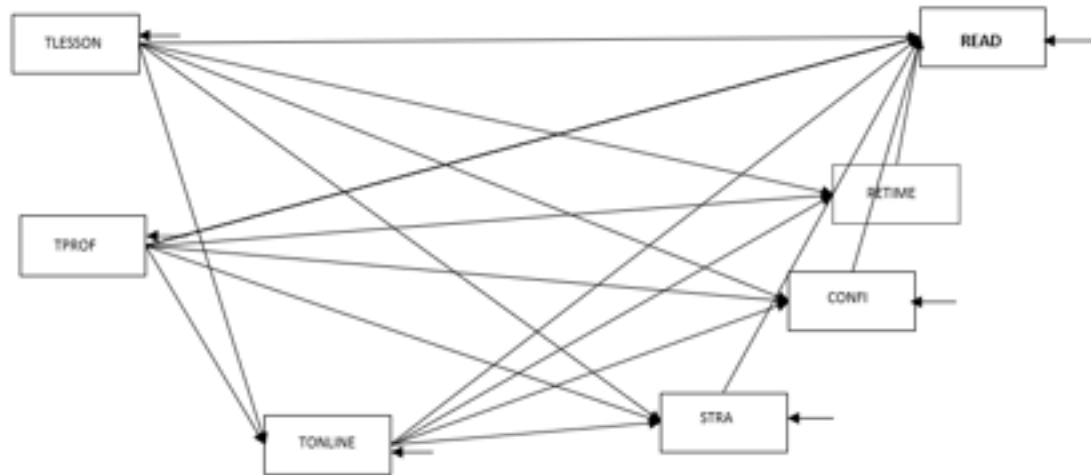


Figure 9.2

Hypothesised teacher-level model for 2020 data



9.4 RESULT FOR SCHOOL-LEVEL

The subsequent section discusses the measurement model and the structural model. The path analysis model with SEM methodology is applied for cycles of 2018 and 2020, as well as the teacher-level. A more detailed discussion of the structural model is therefore given.

9.4.1 THE MEASUREMENT RESULT FOR SCHOOL-LEVEL

The measurement model illustrates the relationship between the latent variables and their respective observed variables. Using the criteria of a factor loading 0.40 and above is considered acceptable.

It is important to note that the data for PISA 2018 and 2020 only contain one latent variable, whereas the data for PISA 2000 contains six observed variables and that for PISA 2009 contains three observed variables. The ICT in PISA 2000 involves ICT for schools

(ICTCOMP), for students (ICTSTUD), for teachers (ICTTEACH), for administrative staff (ICTADMIN), connected to the internet of the world wide web (ICTWEB), and connected to local area network (ICTLAN). Upon the analysis, the factor loadings of ICTCOMP, ICTSTUDY, ICTTECH, ICTDMIN, ICTWEB, and ICTLAN were 0.995, 0.928, 0.445, 0.463, 0.377, and 0.291 respectively. In light of the fact that the factor loading was below 0.40, the variables ICTWEB and ICTLAN were removed from the analysis. As a result of the removal of these variables, all the remaining variables exceeded the criteria for factor loading: ICTCOMP = 0.983, ICTSTUDY = 0.939, ICTTECH = 0.449, and ICTDMIN = 0.470. Meanwhile, in the 2009 cycle, the ICT variable consists of three observed variables consisting of ICT for students (TOTSTUD), for education (TOTCOMED), and administrative staff (TOTCOMIN). After carrying the out analysis, the factor loadings of TOTSTUD, TOTCOMED, and TOTCOMIN were 0.584, 0.970, and 0.884 respectively.

The observed variables are well above the acceptable range, indicating that they substantially reflect the construct. These show that the observed variables have adequately reflected their corresponding latent variable (ICT) in cycles 2000 and 2009. Since the coefficients for all the observed ICT variables in 2000 and 2009 were significant, these provide a basis for further discussion.

9.4.2 THE STRUCTURAL RESULT FOR SCHOOL-LEVEL

The students' reading literacy is the outcome measure of the school-level factors that were obtained from students' reading achievement scores in PISA (2000, 2009, and 2018) and follow-up data (2020). Having incorporated into the model the school sector, school type, school facilities, assessment, school management, reading states, and reading literacy, patterns of relationship among these variables were examined. In the same way that the student-level

values are reported, the resulting value is the standardised regression coefficient which indicates the strength of the relationship. As well, the relationships and regression coefficients shown in the figure are significant at the 0.05 level. As a result, the predictor contributes significantly to estimating the value of the outcome.

Upon completion of the analysis, the data were examined to ensure that the model fit the data relatively well. Below is a summary of the school- and teacher-level results of the model fit presented in Table 9.2.

Table 9.2

Summary table of model fit statistics for all cycles at school- and teacher-level

School-level	χ^2	df	p-value	CFI	TLI	RMSEA	SRMR
PISA 2000	1015.981	90	< 0.05	0.903	0.825	0.080	0.053
PISA 2009	694.018	65	< 0.05	0.897	0.849	0.036	0.050
PISA 2018	413.319	54	< 0.05	0.808	0.801	0.055	0.052
2020 Data	57.562	27	< 0.05	1.000	1.000	0.000	0.000
Teacher-level	χ^2	df	p-value	CFI	TLI	RMSEA	SRMR
2020 Data	12.944	6	< 0.05	1.000	1.000	0.000	0.000

In accordance with the fit indices in the table, all cycles at the school-level and the teacher-level produced a model that fitted the data well. For PISA 2000, the final structural model fit the data well with $\chi^2 = 1015.981$, $p < 0.05$, CFI = 0.903, TLI = 0.825, RMSEA = 0.080, and SRMR = 0.053. For PISA 2009, the final structural model fit the data well with $\chi^2 = 694.0018$, $p < 0.05$, CFI = 0.897, TLI = 0.849, RMSEA = 0.036, and SRMR = 0.053. For PISA 2018, the final structural model fit the data well with $\chi^2 = 413.319$, $p < 0.05$, CFI = 0.9808, TLI = 0.801, RMSEA = 0.055, and SRMR = 0.052.

Meanwhile, for 2020 follow-up data, the final structural model overfit the data with $\chi^2 = 57.562$, $p < 0.05$, CFI = 1.000, TLI = 1.000, RMSEA = 0.000, and SRMR = 0.000. As well for the same cycle at the teacher-level, the final structural model overfit the data with $\chi^2 = 12.944$, $p < 0.05$, CFI = 1.000, TLI = 1.000, RMSEA = 0.000, and SRMR = 0.000. Since the models have a degree of freedom at 27 at the school-level and 6 at the teacher-level, the model fit can be assessed in these cases. These situations of a very well-fitting model can occur when the sample size is low, there were 11 schools and 33 teachers in 2020 data, but they still appear to be significant nonetheless.

As a result of using Mplus, all estimates obtained are standardised coefficients that reflect the strength of the relationships between the variables. It is the p -value that is used to indicate the significance of the effect of the predictor variable on the outcome variable at a level of 0.05. The direct, indirect, and total effects, together with their associated p -values, are discussed in the following section. For a more concise presentation, the effects that are more than 0.05 were no longer discussed.

This discussion entails the interaction among school factors, followed by the interaction of school factors on reading states, and finally the interaction of school factors and reading states on reading literacy for four cycles. The causal relationships between the variables in the structural models are subsequently discussed using the direct, indirect, and total effects results.

The model was hypothesised to the school-level measured by the predictor variables, the mediating variables, and the outcome variables. The predictor variables are school sector (school type [SECTOR] and school location [LOCATION]), school facilities (ICT at school [ICT] and resources and technology [TECH]), assessment (ASMENT), and school management (leadership [LEAD] and school climate [CLIMATE]). The same mediating

variables as student-level are reading states: reading strategies (STRA), reading confidence (CONFI) and reading time (RETIME). Likewise, the outcome variable is reading literacy (READ).

A. SCHOOL FACTOR

A direct and/or indirect influence among school variables including school sector (SECTOR and LOCATION), school facilities (ICT and TECH), assessment (ASMENT), and school management (LEAD and CLIMATE) is presented in this following section.

The school variables, nonetheless, have not been observed to have any indirect effects on other school variables because they were greater than 0.05. Therefore, they are not discussed as they have no practical significance. A closer look at the coefficients and the summary of direct effect results are presented in Table 9.3.

SECTOR and LOCATION

In the analysis of the school sector, it was found that only PISA 2009 had an effect of SECTOR on ICT ($\beta = -0.172$) and only PISA 2000 had an effect of SECTOR on ASMENT ($\beta = 0.167$). The code used to refer to SECTOR is 1 for public schools and 2 for private schools. Accordingly, the negative effect result showed that in 2009, public schools had more ICT tools than private schools. In 2000, the positive associations between SECTOR and ASMENT demonstrated that private schools outperformed public schools in terms of assessment at schools. A closer look at assessment including informing parents about their child's progress, making decisions of promotion, grouping students for instructional, comparing to national performance, monitoring the school's progress annually, and making judgements about teachers' effectiveness are presented in this cycle.

Table 9.3

Summary of direct effects of school factors

Dependent variable	Independent variable	Direct standardised estimates							
		2000		2009		2018		2020	
		Est (β)	p-value	Est (β)	p-value	Est (β)	p-value	Est (β)	p-value
ICT	SECTOR	0.037	NS	-0.172	0.016	0.002	NS	-0.443	NS
	LOCATION	0.378	0.000	0.288	0.000	-0.126	0.016	0.065	NS
TECH	SECTOR	0.098	NS	0.012	NS	0.047	NS	0.255	NS
	LOCATION	0.021	NS	-0.218	0.002	0.037	NS	-0.259	NS
	ICT	0.010	NS	-0.297	0.000	-0.212	0.000	0.326	NS
ASMENT	SECTOR	0.167	0.004	-0.013	NS	0.010	NS	0.367	NS
	LOCATION	0.015	NS	-0.043	NS	-0.076	NS	-0.405	NS
	ICT	-0.122	NS	0.112	NS	-0.138	0.013	0.182	NS
	TECH	0.123	0.034	0.064	NS	0.003	NS	0.095	NS
LEAD	SECTOR			0.205	0.003	0.188	0.000	-0.242	NS
	LOCATION			0.018	NS	-0.021	NS	-0.520	NS
	ICT			-0.025	NS	-0.105	0.043	0.017	NS
	TECH			0.144	NS	0.074	NS	-0.213	NS
	ASMENT			0.216	0.002	0.298	0.000	0.081	NS
CLIMATE	SECTOR	-0.048	NS	0.013	NS	0.112	NS	0.325	NS
	LOCATION	-0.027	NS	0.011	NS	0.001	NS	-0.723	0.009
	ICT	-0.016	NS	-0.112	NS	-0.023	NS	0.272	NS
	TECH	-0.014	NS	0.216	0.002	0.076	NS	-0.047	NS
	ASMENT	0.061	NS	-0.045	NS	-0.022	NS	-0.419	NS
	LEAD			0.233	0.001	0.077	NS	-0.625	0.005

Further, the effect between SECTOR and LEAD presented a positive coefficient in 2009 ($\beta = 0.205$) and 2018 ($\beta = 0.188$). In 2009, the leadership construct measured the frequency of activities undertaken by the principals using an initial code scheme of 1 for never, 2 for seldom, 3 for quite often, and 4 for very often. The leadership construct in 2009 measures the frequency of activities by the principals that have an initial code scheme of 1 for never, 2 for seldom, 3 for quite often, and 4 for very often. Therefore, as indicated in the cycle 2009 result, private schools were more likely to provide activities for leadership development than public schools. Meanwhile, the leadership construct 2018 measures the improvement of leadership activities in the school whether based upon district-mandated requirements, school initiatives, or neither of these two factors. The construct has an initial code scheme of 1 for 'Yes, this is mandatory', 2 for 'Yes, based on school initiatives' and 3 for 'No'. Due to this, as indicated in cycle 2018 findings, the private schools have been able to be more flexible than the public schools in providing improvement activities or relying less on district or school initiatives.

LOCATION was found to have effects on ICT over three PISA cycles, with a positive effect in 2000 ($\beta = 0.378$), a decline in 2009 ($\beta = 0.288$), and a negative effect in 2018 ($\beta = -0.126$). For the initial code scheme for LOCATION, the more values are assigned, the larger the population and type of city in which the school is located. On the basis of the results, it appears that in cycles 2000 and 2009, the more schools located close to the city, the greater the use of ICT tools. On the other hand, in 2018, LOCATION has a negative association with ICT. The ICT construct in 2018 measures the school principals' agreement that several numbers of ICTs are adequate at the school such as internet, digital devices, computing facilities, and software. The initial codes are 1 for 'Strongly disagree', 2 for 'Disagree', 3 for 'Agree' and 4 for 'Strongly agree'. Accordingly, the finding indicated that the closer the school was to the

city, the less satisfied the school was with the ICT facilities at its school. The reason for this may be that schools in the city require more ICT tools due to a large number of students, and the ICT that is currently available in the schools is not sufficient.

Furthermore, the effects of LOCATION had a negative effect on TECH in 2009 ($\beta = -0.218$) and on CLIMATE in 2020 ($\beta = -0.723$). It was apparent from the initial code scheme in TECH that the more values the fewer resources and technology hindered school learning. Accordingly, in 2009, the more schools located to be situated in cities or urban areas, the less the school was hindered by resources and technology. In a similar manner, the original code scheme for school climate showed that the more values, the less likely the school were to be hindered by poor climate. In light of this, the study results in 2020 indicated that the more schools close to urban or city areas, the less likely to be affected by poor climate conditions.

ICT

Among the effects of ICT on TECH, there were significant path coefficients in 2009 ($\beta = -0.297$) and 2018 ($\beta = -0.212$). It means that schools were less hindered by resources and technology in 2009 and 2018 when there was more ICT in schools. As well in 2018, ICT had a negative effect on ASMENT ($\beta = -0.138$) and a positive effect on LEAD ($\beta = 0.298$). As the initial code scheme of ASMENT in 2018 is 1 for Yes and 2 for No, the results suggest that schools that possess more ICT tools, better school assessment. Meanwhile, the coding scheme in LEAD 2018 is 1 for ‘Yes, this is mandatory by district or ministry policies’, 2 for ‘Yes, based on school initiative, and 3 for No. It can therefore be suggested from the negative path coefficient that the number of ICTs in schools in 2018 was associated with either school-led initiatives or district-led mandatory initiatives in the improvement leadership activities.

TECH

A significant effect of TECH was reported on ASMENT in 2000 ($\beta = 0.123$), and on CLIMATE ($\beta = 0.216$) in 2009. It was demonstrated in 2000 that the more school learning was hindered by a lack of resources and technology, the worse the assessment of school performance was. In 2009, the initial code schemes of CLIMATE are 1 for not at all, 2 for very little, 3 for to some extent, and 4 for a lot. The positive coefficient, therefore, indicated that the more learning was hindered by technology and resources, the more the school climate hindered learning.

ASMENT

ASMENT on LEAD had significant effects in 2009 ($\beta = 0.216$) and 2018 ($\beta = 0.298$). Different code schemes between 2009 and 2008 resulted in different interpretations. In 2009, the result showed that the more leadership development, the fewer assessment used at schools.

In 2009, the result was that fewer assessments were used in the schools, resulting in principals providing more leadership development. Meanwhile, in 2018, the lack of assessment conducted in the school, the less the school relied on the effort of the district or school in regard to leadership development.

LEAD

About leadership, LEAD has a positive effect on CLIMATE in 2009 ($\beta = 0.233$) and a negative effect in 2020 ($\beta = -0.625$). The initial code between 2009 and 2020 also differed, resulting in different interpretations. Results of a 2009 study indicated the more often leadership was present, the fewer schools experience learning problems. Likewise, the result

in 2020 found that the less the school relied on the effort of the district or school in terms of leadership development, the less the school experience learning problems.

B. SCHOOL FACTOR ON READING STATES

In this section, the school factors which directly and/or indirectly impact reading states are examined. On the same basis as at the student level, the reading states are measured by the reading strategies (STRA), the reading confidence (CONFI), and the reading time (RETIME).

Following the summary of causal relationships between student factors and reading state variables in the structural models, Table 9.4 illustrates the direct, indirect, and total effects results of each factor, respectively. The practical significance of all the estimations provided in the table showed a practical significance of < 0.05 .

Direct effect on reading states (STRA, CONFI, and RETIME)

Generally, only PISA 2009 and 2018 had significant direct and indirect effects on reading states, while neither PISA 2000 nor 2020 follow-up study had significant effects. A significant direct effect of SECTOR was observed only in PISA 2018 for STRA ($\beta = -0.132$) and RETIME ($\beta = -0.130$). In public schools during 2018, reading strategies were more involved and more time was spent on reading than in private schools. Meanwhile, LOCATION only affected STRA in 2009 ($\beta = -0.216$). It was evident in 2000 that the more schools located in the city or urban areas the weaker the reading strategies. There might be a strong association between school location and reading strategies, since schools located in cities usually have good facilities that enable students to develop effective reading strategies. Nonetheless, there have been instances in which students have been distracted by improper use of facilities or by more activities outside of the school, which have diverted their reading strategies.

Table 9.4

Summary of direct and indirect effects between school factors and reading states

Dependent variable	Independent variable	Standardised estimates											
		Direct				Indirect				Total			
		2000	2009	2018	2020	2000	2009	2018	2020	2000	2009	2018	2020
STRA	SECTOR		NS	-0.132	NS		-	0.026	-		-	-0.106	-
	LOCATION		-0.216	NS	NS		-0.039	-	-		-0.256	-	-
	ICT		-0.316	NS	NS		0.067	-	-		-0.250	-	-
	TECH		NS	NS	NS		-	-	-		-	-	-
	ASMENT		NS	NS	NS		-	-	-		-	-	-
	LEAD		NS	0.170	NS		-	0.358	-		-	0.004	-
	CLIMATE		NS	NS	NS		-	-	-		-	-	-
CONFI	SECTOR	NS		NS	NS	-		-	-	-		-	-
	LOCATION	NS		NS	NS	-		-	-	-		-	-
	ICT	NS		0.145	NS	-		0.015	-	-		0.160	-
	TECH	NS		NS	NS	-		-	-	-		-	-
	ASMENT	NS		NS	NS	-		-	-	-		-	-
	LEAD			NS	NS			-	-			-	-
	CLIMATE			NS	NS	-		-	-	-		-	-
RETIME	SECTOR	NS	NS	-0.130	NS	-	-	-0.016	-	-	-	-0.146	-
	LOCATION	NS	NS	NS	NS	-	-	-	-	-	-	-	-
	ICT	NS	0.316	0.180	NS	-	0.046	0.026	-	-	0.362	0.206	-
	TECH	NS	NS	NS	NS	-	-	-	-	-	-	-	-
	ASMENT	NS	NS	NS	NS	-	-	-	-	-	-	-	-
	LEAD		NS	NS	NS		-	-	-		-	-	-
	CLIMATE	NS	NS	-0.107	NS	-	-	-	-	-	-	-	-

Of the ICT at schools, the significant direct effect of ICT was negative on STRA in 2009 ($\beta = -0.316$) and positive on RETIME in 2009 ($\beta = 0.316$) and 2018 ($\beta = 0.180$). It was interesting to know that in 2009, there were indications that the greater number of ICT at school led precisely to the low perception of reading strategies among students, yet to more frequent reading time at the same time. There might be a strong association between the use of ICT in schools and perceptions of reading strategies since the use of ICT accommodates a greater reading strategy activity. Nevertheless, there have been instances where students have misused ICT in school learning, thereby deviating from their perception of reading strategies in 2009. Meanwhile, in 2018, a positive path coefficient implied that the number of ICT at school contributed to a longer period spent reading.

A significant direct effect of LEAD on STRA was recorded in 2018 as a positive coefficient ($\beta = 0.170$). It appeared that either low leadership at school or school-led initiatives led to a better perception of student reading strategies.

The last significant direct effect at school-level was noted between CLIMATE and RETIME in 2018 ($\beta = -0.107$) which alluded that the fewer school climate-related problems, the greater the amount of reading time.

Indirect effect on reading states

Several variables that previously had a significant direct effect on reading states were identified by the indirect path coefficient following the analysis. A total of four variables indirectly influenced STRA, including one variable of SECTOR in 2018 and three variables of LOCATION, ICT, and LEAD in 2009. The indirect effect of SECTOR on STRA with a negative coefficient of $\beta_1 = 0.026$ made its total effect equal to -0.106 through ICT, TECH, ASMENT, LEAD, and CLIMATE. It was found that public schools outperformed on better

reading strategies perception due to the greater number of ICT in schools, the presence of leadership, and the less affecting effects of school climate. Likewise, an indirect effect of LOCATION on STRA on PISA 2009 with a coefficient of -0.039 and a total of -0.256 suggested that schools located in urban, or city areas performed better in reading strategies supported by the type of public school.

Concerning ICT, there is an indirect effect of ICT on CONFI in 2018 ($\beta_1 = 0.015$) and ICT on RETIME in 2009 ($\beta_1 = 0.046$ and 2018 ($\beta_1 = 0.026$). A total of 0.160 through TECH, ASMENT, LEAD, and CLIMATE, the relationship between ICT and CONFI in 2018 determined that the greater the availability of ICT in schools, the greater the level of reading confidence supported by the fact that fewer schools were hindered by the lack of adequate resources and technology, the presence of assessment, the leadership at the school, and the fact that fewer students were inhibited by issues related to school climate. Also, supported by the same indirect factors as in the relationship between ICT and CONFI, which amounted to 0.362 in 2009 and 0.206 in 2018, the relationship between ICT and RETIME determined that the greater the availability of ICT at school, the greater the amount of time students spend reading.

An indirect effect of LEAD on STRA was recorded in 2018 only with a positive effect ($\beta_1 = 0.170$) making its total positive effect ($\beta = 0.004$) through CLIMATE. The study found that either no leadership initiatives or school-led leadership initiatives had an impact on the perception of reading strategies as part of the greater school learning hindered by climate.

C. SCHOOL FACTORS AND READING STATES ON READING LITERACY

This section discusses school-level trends towards reading literacy (READ) based on the structural equation modelling analysis carried out previously. All results over the past 20 years using four cycles of PISA 2000, 2009, 2018 and 2020 follow-up data are presented in

Table 9.5. Generally, at school-level measurement, READ was not affected by any of the reading states (STRA, CONFI, and RETIME) in either of the cycles of 2000 and 2020. On the other hand, all reading states measured in PISA 2009 (STRA and RETIME) and PISA 2018 (STRA, CONFI, and RETIME) evidently influenced READ.

Direct effect of school factors and reading states on reading literacy

School sector (SECTOR and LOCATION) on READ

In all cycles, SECTOR was consistently associated with negative effects on READ. There was a consistent decline in the coefficient from 2000 to 2018, but an increase in 2020. ($\beta = -0.237$ in 2000, $\beta = -0.138$ in 2009, $\beta = -0.103$ in 2018, and $\beta = -0.576$ in 2020 data). Public schools appear to have consistently outperformed private schools regarding reading achievement over the past 20 years.

The final models which resulted after carrying out the significant coefficient of direct and indirect student-level analysis in all cycles are presented respectively in Figure 9.3 for PISA 2000, Figure 9.4 for PISA 2009, Figure 9.5 for PISA 2018, and Figure 9.6 for 2020 follow-up data.

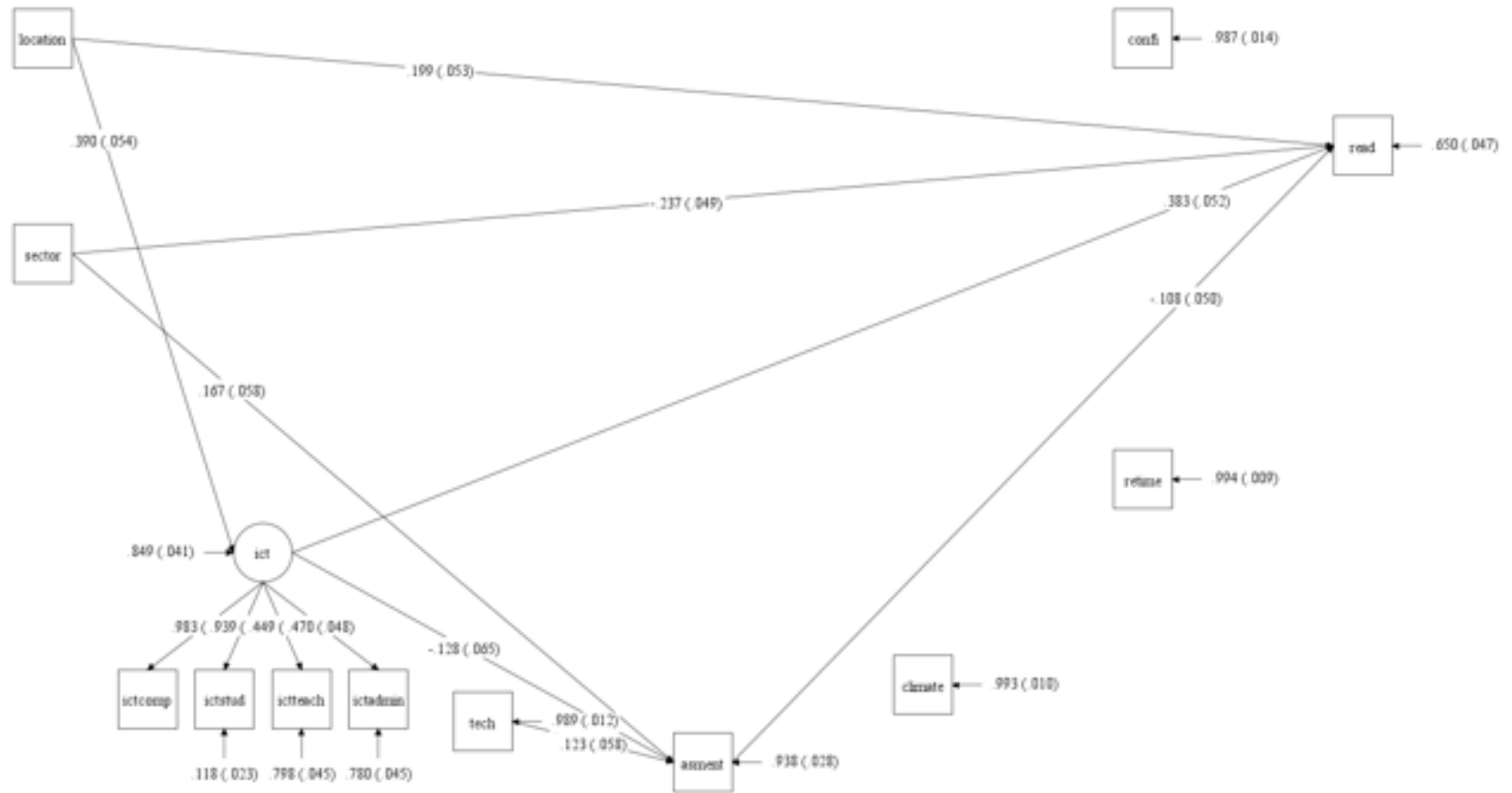
Table 9.5

Summary of direct and indirect effects between school factors and reading states

Dependent variable	Independent variable	Standardised estimates											
		Direct				Indirect				Total			
		2000	2009	2018	2020	2000	2009	2018	2020	2000	2009	2018	2020
READ	SECTOR	-0.237	-0.138	-0.103	-0.576	-0.044	-0.094	0.177	-0.034	-0.281	-0.232	-0.192	-0.609
	LOCATION	0.199	0.202	NS	0.523	0.157	0.154	-	-	0.356	0.356	-	0.416
	ICT	0.383	0.283	NS	0.234	0.018	0.172	-	0.099	0.401	0.455	-	0.333
	TECH	NS	NS	-0.302	NS	-	-	-0.043	-	-	-	-0.345	-
	ASMENT	-0.108	NS	NS	NS	-0.003	-	-	-	-0.111	-	-	-
	LEAD		0.107	NS	NS		-	-	-		-	-	-
	CLIMATE	NS	-0.115	-0.094	0.381	-	-	-0.048	-	-	-	-0.077	-
	STRA		-0.234	-0.094	-		-	-	-		-	-	-
	CONFI	NS		0.113	-	-		-	-	-		-	-
	RETIME	NS	0.290	0.424	-	-	-	-	-	-	-	-	-

Figure 9.3

Final Structural equation Model: School-level Model in PISA 2000



Final Structural equation Model: School-level Model in PISA 2009

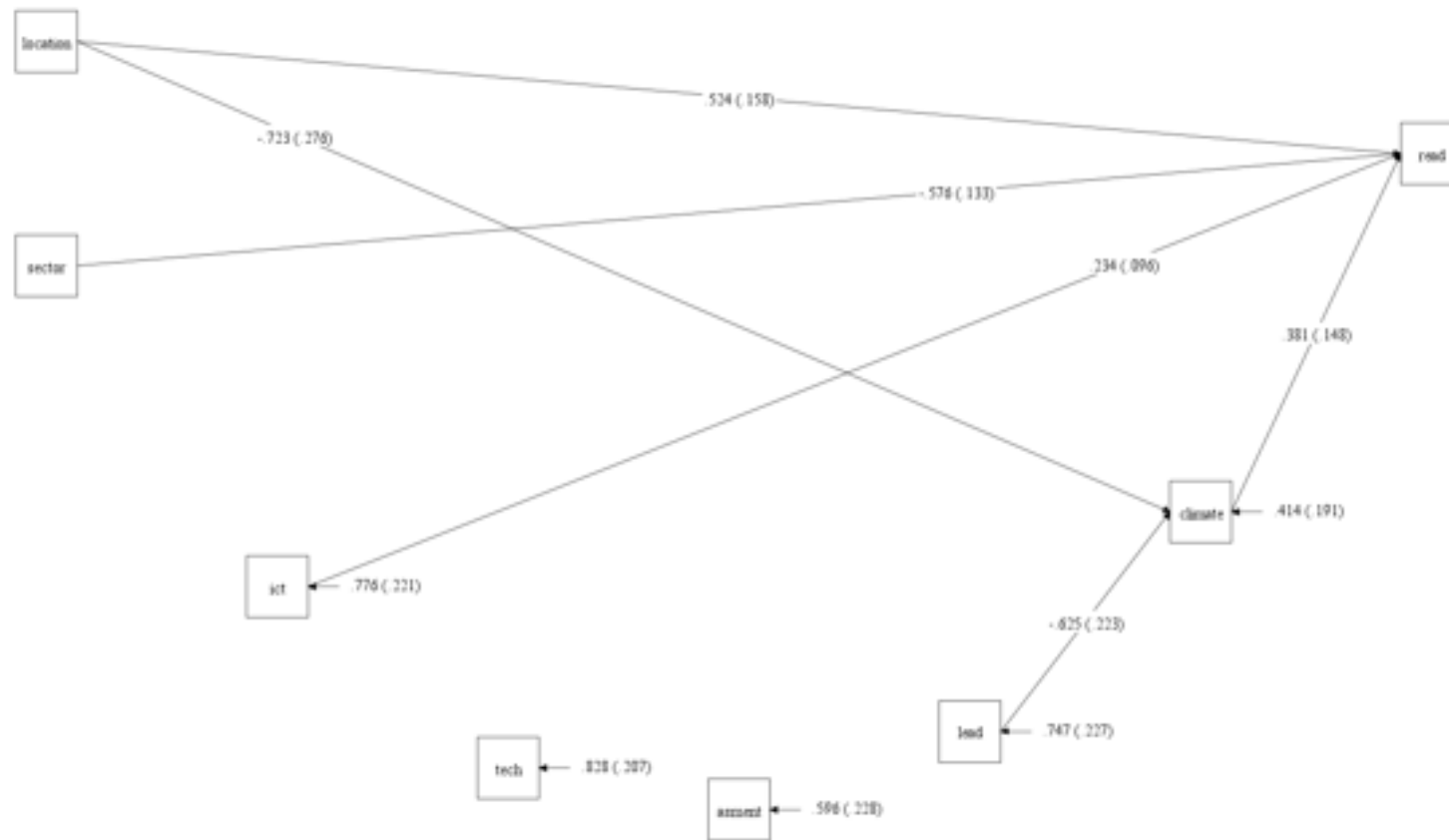


Final Structural equation Model: School-level Model in PISA 2018



Figure 9.6

Final Structural equation Model: School-level Model in 2020 follow-up data



Nonetheless, the LOCATION has been shown to have an impact on PISA 2000, 2009, and 2020 data, but not on PISA 2018. From 2000 to 2009, the coefficient did not vary significantly, but in 2020, it increased significantly ($\beta = 0.199$ in 2000, $\beta = 0.202$ in 2009, and $\beta = 0.523$ in 2020). A remarkable finding was that students attending schools in city or urban areas have the higher mean score of performance in reading.

School facilities (ICT and TECH) on READ

As part of school facilities, ICT and READ also showed positive significance in 2000, 2009, and 2020, but not in 2018. The coefficient declined over those three cycles, $\beta = 0.383$ in 2000, $\beta = 0.282$ in 2009, and $\beta = 0.234$ in 2020. It should be noted, nonetheless, that each cycle of the ICT initial code scheme differed, resulting in variations to the description. There was a positive effect of ICT in PISA 2000, where the more ICT in a school, the higher the average mark. As well, the positive effects of ICT in PISA 2009 indicated that the greater the number of ICTs in the school, the higher the average grade. Likewise, the positive effects of ICT in 2020 demonstrated that the more agree the school with ICT capacity at school, the higher the average reading performance.

There was, moreover, evidence of a negative effect of TECH that only appeared as a result of the PISA 2018 study ($\beta = -0.302$), which illustrated that the more schools that were hindered by technology, the lower the average reading literacy score.

ASMENT on READ

The school variable of ASMENT was only significant on reading literacy in PISA 2000 with a negative coefficient ($\beta = -0.108$). This indicated that the more assessments carried out in schools the higher the average score of students' reading performance.

School climate (LEAD and CLIMATE) on READ

In the school management consisting of LEAD and CLIMATE, it should be noted that LEAD only showed significance in cycle 2009 with a positive effect ($\beta = 0.107$) on reading literacy. The study demonstrated that the more often schools provided activities for leadership development, the higher the average reading ability.

Furthermore, CLIMATE had significant effects in PISA 2009, 2018, and 2020 data, although the effects were negative in PISA 2009 ($\beta = -0.115$) and 2018 ($\beta = -0.094$) and positive in 2020 ($\beta = 0.381$). Generally, it can be gleaned that in 2009 and 2018, the fewer schools hindered by school climate issues, the higher the average reading literacy score. However, this was in contrast to the results for 2020, which indicate that the more signs of a poor school climate, the higher the average grade.

Indirect effect on reading literacy

The indirect effects of each cycle were documented to differ based on the significant factor influencing reading literacy. Carrying out the analysis of student factors toward the average reading literacy (READ), there were indirect effects of SECTOR (in 2000, 2009, 2018, and 2020). Also, there was an indirect effect of LOCATION and ICT in 2000, 2009, and 2020. Meanwhile, an indirect effect of TECH and CLIMATE was recorded only in 2018, and ASMENT was in 2000 only.

SECTOR on READ

The total indirect effect of SECTOR on READ was in PISA 2000 ($\beta_1 = -0.044$), 2009 ($\beta_1 = -0.094$), 2018 ($\beta_1 = 0.177$) and 2020 ($\beta_1 = -0.034$) through ICT, TECH, ASMENT, LEAD, and CLIMATE made its total effect equal to -0.281, -0.231, -0.192, and -0.609 respectively. According to this report, the public school obtained a higher average score of reading literacy as a result of its greater use of ICT, its greater resources and technology, its presence of assessment, the frequency with which a principal leads activity for the development of the school, and the less learning hindered by school climate problems.

LOCATION on READ

In addition to school type, and school location, the total indirect effect of LOCATION on READ was recorded in 2000 ($\beta_1 = 0.157$) and 2009 ($\beta_1 = 0.154$), which also through ICT, TECH, ASMENT, LEAD, and CLIMATE, produced their total effect at 0.356, 0.356, and 0.416 correspondingly. During the period 2000 and 2009, the results showed that the more schools located in urban or city areas, the higher the average scores as a result of the greater use of information technology, greater resources and technology, the presence of assessments, the frequency with which a principal leads activity for the development of the school, and the fewer barriers that school climate problems pose to learning.

ICT on READ

As part of school facilities, the total indirect effect of ICT on READ was positive in 2000 ($\beta_1 = 0.018$), 2009 ($\beta_1 = 0.172$), and 2020 ($\beta_1 = 0.099$) through TECH, ASMENT, LEAD, and CLIMATE making their total effects equal to 0.401, 0.455, and 0.333 respectively. It can be concluded from this that the availability of ICT affects the average reading performance

when combined with greater resources and technology, assessment is present, principals lead school development activities frequently, and school climate problems pose fewer barriers to learning.

TECH on READ

The examination of the indirect of the resources and technology, as part of school facilities, the result showed that ASMENT, LEAD, and CLIMATE mediated the effect of TECH on READ in PISA 2018 only. The indirect regression coefficients were negative ($\beta_1 = -0.043$) making each total effect equal to -0.345. Therefore, the availability of resources and technology at schools affecting the higher average of reading literacy is supported by the fact that assessment is conducted, principals lead activities for the improvement of the school frequently, and there are fewer barriers to learning associated with school climate problems.

ASMENT on READ

ASMENT on READ, moreover, had a negative indirect effect in cycle 2000 only ($\beta_1 = -0.003$) with a total of -0.111 through LEAD and CLIMATE. Based on this research, assessment in schools was found to create a higher average of reading performance, accompanied by the frequency with which principals lead school development activities, and the fewer barriers to learning created by school climate issues.

CLIMATE on READ

As the last indirect effect recorded in school-level analysis, CLIMATE on READ had a negative coefficient in the 2018 cycle only ($\beta_1 = -0.048$) through STRA, making its total

effect -0.077. Hence, the fewer school climate problems that hinder school learning, the higher the average reading literacy was achieved by better reading strategies.

9.5 THE STRUCTURAL RESULT FOR TEACHER-LEVEL

At the teacher-level, in 2020 data, no variables had a significant effect on average student reading literacy. It is therefore not possible to discuss the teacher level influencing average students' reading literacy performance in further detail.

As shown in Table 9.6, however, there was a direct negative direct effect of TPROF on TLESSON ($\beta = -0.486$). As for TPROF and TLESSON, the initial code scheme is 1 for Yes and 2 for No. Accordingly, this result indicated that when teachers engage in professional activities, their lesson delivery improved.

Table 9.6

Summary of direct, indirect and total effects for a structural model of teacher-level 2020 data

Dependent variable	Independent variable	Standardised estimates	
		Direct	
		Est. (β)	p-value
TLESSON	TONLINE	-0.201	NS
	TPROF	-0.486	0.000
	READ	-0.066	NS
TONLINE	TPROF	0.132	NS
	READ	-0.050	NS
TPROF	READ	-0.158	NS
READ	TLESSON	-0.066	NS
	TONLINE	-0.050	NS
	TPROF	-0.158	NS

The final models which resulted after carrying out a significant coefficient of direct teacher-level analysis in the 2020 follow-up cycle are presented in Figure 9.7.

Figure 9.7

Final Structural equation model: teacher Single-level Model in 2020



9.6 SUMMARY

An SEM analysis in cycles 2000 and 2009 and a single-level path analysis in cycles 2019 and 2020 are conducted to examine the relationship between factors at the school- and teacher-level and to investigate further the factors that can be predictors of reading literacy. In general, all school variables influence reading literacy performance, but the significant factors vary among the four cycles of testing.

In PISA 2000, school type (school sector and school location), school facilities (ICT at school), and assessment are the predictors of reading literacy at the school level, whereas school management factors including leadership and school climate are not considered. Meanwhile, PISA 2009 finds that school-level predictors of reading literacy included school type (school sector and school location), school facilities (ICT at school) and school management (school climate). Continuing with the PISA 2018 results, school type (school sector), school facilities (resources and technology), and school management (school climate) are the predictors of reading literacy at the school level. Finally, for 2020 follow-up data, the predictor of reading literacy at the school-level is school type (school sector and school

location), school facilities (ICT at school), and school management (school climate). Along with the 2020 data, variables related to teachers are also provided. As pertains to teacher variables, however, there is no predictor at the teacher-level contributing to the student reading literacy.

On the whole, the results from the single-level structural equation model (student-level in the previous chapter and school-level in this chapter) are used to guide the multilevel analysis using hierarchical linear modelling (HLM) in conjunction with prior student-level analysis.

Chapter 10

Student-, Teacher- and School-level Factors on Reading Literacy: Hierarchical Linear Modelling

10.1 INTRODUCTION

The general objective of this study is to examine the factors that influence students' reading literacy. As in Chapters 8 and 9, the study sought to answer Question 1 (How do student and school factors and reading states and their relationships impact student reading literacy in Indonesia?). In the previous chapters (Chapter 8 and 9), individual models of student-, teacher-, and school-level were analysed using Mplus 7.0 by Muthén & Muthén (1998 - 2012). The Structural equation modelling (SEM) was employed to examine the individual level factors for students, teachers, and schools. There are, however, questions related to the relationship between variables at each level - student, teacher, and school - that need to be addressed in this chapter. In addition to the direct effects, HLM provides the estimate for the moderating effects of variables at each level. As well, the variables at different levels need to be analysed at the same time to investigate the factors that have influence on the outcome variables (students' reading literacy).

Accordingly, this section intends to investigate the interaction between reading literacy scores perceived by the factors. The factors perceived by student and school factors are based on PISA 2000, 2009, 2018, and 2020 follow-up study. The data relating to the level of student, teacher, and school require an investigation using a multilevel analysis procedure. To investigate

the data regarding the level of student, teacher, and school, a multilevel analysis procedure is necessary.

The hierarchy reflected in the multilevel data consist of groups at different levels in which each group is assumed to be a random sample from a population of individuals associated with those groups (Goldstein, 2004). It is considered that students are situated at the first level of hierarchy, nested within teachers who are located at the second level. Furthermore, school groups, within which students and teachers are also nested, are added as level-3 units, making this a three-level model. As mentioned in Chapter 5, to determine the interaction effect among the group of the factors and deal with nested data, Hierarchical Linear Modelling (HLM) is employed. HLM analysis is a statistical procedure that allows for an analysis to be conducted when variables operate at different levels (Raudenbush et al., 2004).

In this study, as no teacher data was collected with the PISA tests, factors are only based on two levels for PISA 2000, 2009, and 2018. Hence, the factors are multilevel or hierarchical in nature and where level-1 (student-level) is nested under level-2 (school-level). Meanwhile for 2020 follow-up data, the factors are from three levels, which are multilevel or hierarchical in nature and where level-1 (student-level) is nested under level-2 (teacher-level) and level-2 nested under level-3 (school-level). It is likely that when data is of a nested nature, there is a relationship between variables that does not just arise at one level but between and across the various hierarchical levels as well (Hofmann, 1997). For this study, the HLM analysis is carried out using the computer program HLM 8.1 developed by Raudenbush et al. (2004) in order to obtain a better understanding of the relationships within and between hierarchical levels.

Three two-level models (for PISA 2000, 2009, and 2018) and one three-level model (for 2020 follow-up data) of reading performance are examined in this chapter. In this study, HLM

models were fitted to measure the variation among students, teachers, and schools. The analysis is generally conducted in two stages: specifying the null model and evaluating the conditional model. The first model was an unconditional model (null model), with a mean of zero and a constant level variance (Bryk & Raundebush 1992, p.17). Following this, the results of both models will be presented and discussed. A summary of the findings is presented at the end of the chapter.

The data of this study as seen in Table 10.1 is comprised of 7368 students nested within 290 schools in PISA 2000, 5136 students nested within 183 schools in PISA 2009, 12098 students nested within 397 schools in PISA 2018, and 550 students nested within 33 teachers nested within 11 schools in 2020 follow-up data. The outcome of interest is plausible value in reading.

Table 10.1

Numbers of each level of HLM Analysis for all cycles

Year	Number of each level
PISA 2000	Students : 7368 Schools : 290
PISA 2009	Students : 5136 Schools : 183
PISA 2018	Students : 12098 Schools : 397
2020 Data	Students : 550 Teacher : 33 Schools : 11

10.2 THE VARIABLES USED AND THEIR LEVEL OF OPERATION

Two sets of variables at the student- and school-level are presented for PISA 2000, 2009, and 2018. Overall, in PISA 2000, there are 7 variables at student-level (level-1) and 6 variables at level-2. In addition to PISA 2009, there are 6 variables at level-1 and 9 variables at level-2. Further, in PISA 2018, there are 9 variables at level-1 and 6 variables at level-2. Meanwhile, there are three

sets of variables at student-, teacher-, and school-level for 2020 follow-up data with 13 variables at level-1, 5 variables at level-2, and 6 variables at level-3.

Described in this chapter are variables used in HLM analyses. Student-level or Level-1 and School-level or Level-2 (for PISA 2000, 2009, and 2018), and Student-level or Level-1, Teacher-level or Level-2, and School-level or Level-3 variables are listed in Table 11.2. The student-related variables are gender, the number of books, home educational resources, reading engagement, reading diversity, reading online, reading strategies, reading confidence, and reading time with additional parent-related variables for 2020 data such as parent engagement, mother education, father education, and parent income. The teacher-related variables (for 2020 data only) are teacher professional, teacher lesson, dan teacher online. The school-related variables are school sector, school location, ICT, resources and technology, assessment, leadership, and school climate.

The HLM software stores data in its own multivariate data matrix (MDM) format, which is generated from raw data or other packages, such as Rasch scores in this case. Presented in Table 10.2 are all the data that were used for the HLM analysis.

Table 10.2

Observed Variables in HLM Analyses for PISA 2000, 2009, 2018, and 2020 follow-up data

Variable PISA		Description	Coding			
			PISA 2000	PISA 2009	PISA 2018	Test 2020
Student level : Level-1						
Individual	GENDER	Gender of student	1 = Female	1 = Female	1 = Female	1 = Female
Characteristic			2 = Male	2 = Male	2 = Male	2 = Male
Home Facilities	BOOKS	Number of books	1 = None	1 = 0 – 10 books	1 = 0 – 10 books	1 = 0 – 10 books
			2 = 1 – 10 books	2 = 11 – 25 books	2 = 11 – 25 books	2 = 11 – 25 books
			3 = 11 – 50 books	3 = 26 – 100 books	3 = 26 – 100 books	3 = 26 – 100 books
			4 = 51 – 100 books	4 = 101 – 200 books	4 = 101 – 200 books	4 = 101 – 200 books
			5 = 102 – 250 books	5 = 201 – 500 books	5 = 201 – 500 books	5 = 201 – 500 books
			6 = 251 – 500 books	6 = more than 500 books	6 = more than 500 books	6 = more than 500 books
			7 = more than 500 books			
	HEDRES	Home educational resources	Rasch score	Rasch score	Rasch score	Rasch score
Reading Activities	ENGREAD	Reading engagement	Rasch score	Rasch score	Rasch score	Rasch score
	DIVREAD	Reading diversity	Rasch score	Rasch score	Rasch score	Rasch score
	ONLINE	Online reading	-	Rasch score	Rasch score	Rasch score
Reading States	STRA	Reading strategies	-	Rasch score	Rasch score	Rasch score
	CONFI	Reading confidence	Rasch score	-	Rasch score	Rasch score
	RETIME	Reading time	1 = I do not read for enjoyment	1 = I do not read for enjoyment	1 = I do not read for enjoyment	1 = I do not read for enjoyment
			2 = 30 minutes or less each day	2 = 30 minutes or less each day	2 = 30 minutes or less a day	2 = 30 minutes or less a day
			3 = More than 30 minutes to less than 60 minutes each day	3 = More than 30 minutes to less than 60 minutes each day	3 = More than 30 minutes to less than 60 minutes a day	3 = More than 30 minutes to less than 60 minutes a day
			4 = 1 to 2 hours each day	4 = 1 to 2 hours each day	4 = 1 to 2 hours a day	4 = 1 to 2 hours a day
			5 = More than 2 hours each day	5 = More than 2 hours each day	5 = More than 2 hours a day	5 = More than 2 hours a day
Teacher level : Level-2 (for 2020 data)						
Professional	TPROF	Professional Activities				1 = Yes
						2 = No

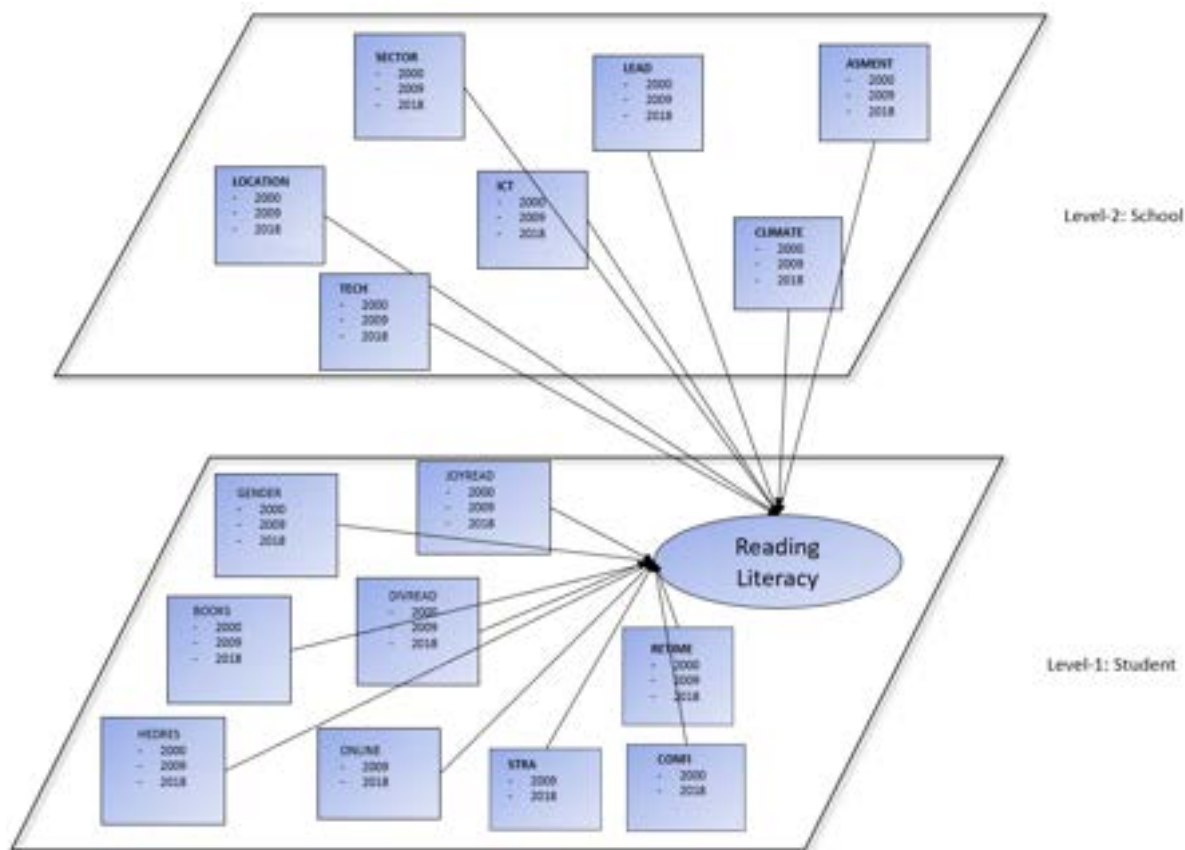
Lesson	TLESSON	Lesson Activities				1 = Yes 2 = No
Online	TONLINE	Online Activities				1 = I don't know what it is 2 = Never or almost never 3 = Several times a month 4 = Several times a week 5 = Several times a day
School level : Level-2 (for 2000, 2009, and 2018) and Level-3 (for 2020)						
chool Sector	LOCATION	The community in which your school is located	1 = A <village, hamlet or rural area> (fewer than 3 000 people 2 = A <small town> (3 000 to about 15 000 people 3 = A <town> (15 000 to about 100 000 people) 4 = A <city> (100 000 to about 1 000 000 people) 5 = Close to the centre of a <city> with over 1 000 000 people 6 = Elsewhere in a <city> with over 1 000 000 people	1 = A village, hamlet or rural area (fewer than 3 000 people) 2 = A small town (3 000 to about 15 000 people) 3 = A town (15 000 to about 100 000 people) 4 = A city (100 000 to about 1 000 000 people) 5 = A large city (with over 1 000 000 people)	1 = A village, hamlet or rural area (fewer than 3 000 people) 2 = A small town (3 000 to about 15 000 people) 3 = A town (15 000 to about 100 000 people) 4 = A city (100 000 to about 1 000 000 people) 5 = A large city (with over 1 000 000 people)	1 = A village, hamlet or rural area (fewer than 3 000 people) 2 = A small town (3 000 to about 15 000 people) 3 = A town (15 000 to about 100 000 people) 4 = A city (100 000 to about 1 000 000 people) 5 = A large city (with over 1 000 000 people)
	SECTOR	Type of school	1 = Public 2 = Private	1 = Public 2 = Private	1 = Public 2 = Private	1 = Public 2 = Private
School Facilities	ICT	ICT at school	Raw score	Raw score	Rasch score	Rasch score
	TECH	Resources and technology	Rasch score	Rasch score	Rasch score	Rasch score
	FUND	School Funding	Raw score	Raw score	Raw score	Raw score
Assessment	ASMENT	Assessment at school	Rasch score	Rasch score	Rasch score	Rasch score
School Management	LEAD	Leadership	-	Rasch score	Rasch score	Rasch score
	CLIMATE	School Climate	Rasch score	Rasch score	Rasch score	Rasch score
Outcome						
READ		The outcome of Model of reading literacy				

10.3 TWO-LEVEL MODEL OF READING LITERACY FOR STUDENTS

A HLM analysis was performed using the variables determined from the SEM analysis performed by MPlus in the previous chapter. Considering that other variables that are not significant in the single-level SEM model using Mplus may be significant in HLM analysis, those variables are examined as well. It is therefore necessary to conduct exploratory analyses in order to identify the variables that may be included in the model. The conceptual model for the two-level HLM analyses (for PISA 2000, 2009, and 2018) of reading literacy is illustrated in Figure 10.1.

Figure 10.1

Conceptual Two-level model of Reading Achievement on PISA 2000, 2009, and 2018



As shown in the model, the variation in the outcome variable is allocated across two different levels, namely the student level and the school level. In order to develop the two-level HLM model, a single cross-sectional data set is used with a two-level structure consisting of students (level-1) nested within schools (level-2). Thus, the fully unconditional model allows the variance of the outcome variable to be partitioned at two levels (Raudenbush et al., 2004).

10.3.1 NULL MODEL OF TWO-LEVEL HLM

After the data has been entered, the next step is to create the model. Typically, a two-level HLM model analysis is performed by first running the fully unconditional model (null model) to determine the amount of variance that could be explained by the model (Raudenbush & Bryk, 2002). The null model is also used as a baseline to calculate the intraclass correlation coefficient, a test used to determine whether multilevel modelling is necessary (Raudenbush & Bryk, 2002). Using a fully unconditional model, an estimate was obtained without entering for student and school level variables. As a result, there is no indication of predictors at any level for the outcome variables. In this section, these estimates do not involve any predictor at the student- and school-level. Yet, it produces a point estimate and confidence interval for the grand mean, β_{0j} .

The null model represents how much variation in an outcome variable is allocated across the two different levels, namely the student- and school-levels. Therefore, the null model is specified by the following equations.

Null Model

Level-1 model: the student level model

The outcome variable (reading literacy) is modelled as a function of school mean plus a random error:

$$READ_{ij} = \beta_{0j} + r_{ij}$$

Where

$READ_{ij}$ is the PISA reading literacy of student i in school j ;

β_{0j} is the grand mean of reading literacy in school j ; and

r_{ij} is a random student effect

Level-2 model: the school level model

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

Where

γ_{00} is the grand mean;

u_{0j} is a random school effect

The HLM results for the null models for all cycle 2000, 2009, and 2018 are presented in Table 10.3. The partition of variance into its two components is shown in the Table 10.4. Part of variability at each level can be explained or accounted for by measure variables at each level. Therefore, gender, the number of books, home educational resources, reading engagement, reading diversity, reading online, reading strategies, reading confidence, and reading time can be utilised as predictors. Furthermore, some of the relationship at the school levels may vary randomly among these units. Thus, the next step is to examine the conditional model and to build up the final model.

The results for the fully unconditional model of reading literacy are recorded in Table 10.4. The HLM two level model enables a baseline model from which subsequent models can be compared, and to capture the degree to which variance at level-1 depends upon group membership at level-2 (Raudenbush & Bryk, 2002). Accordingly, the results enable the estimation of the proportions of the variation that are within schools, among students within schools, and among schools. The parameter σ^2 represents the student level (level-1) variability, and τ_β captures the school level (level-2) variability (Raudenbush & Bryk, 2002), defined as intra-class correlation (ρ):

$\sigma^2 / (\sigma^2 + \tau_\beta)$ is the proportion of variance among students within schools;

and

$\tau_\beta / (\sigma^2 + \tau_\beta)$ is the proportion of variance among schools

In the case of reliability values below 0.05, it is assumed that no random effects are present.

Table 10.3

Fully Two-level Conditional Model of Reading Literacy for PISA 2000, 2009, and 2018

Cycle		Final estimation of fixed effects (with robust standard errors)					
	Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value	
PISA 2000	For INTRCPT1, θ_0						
	INTRCPT2, γ_{00}	365.328	2.901	125.934	260	<0.001	
PISA 2009	For INTRCPT1, θ_0						
	INTRCPT2, γ_{00}	401.078	3.373	118.897	180	<0.001	
PISA 2018	For INTRCPT1, θ_0						
	INTRCPT2, γ_{00}	382.639	3.090	123.806	376	<0.001	
Final estimation of level-1 and level-2 variance components							
	Random Effect	Reliability	Standard Deviation	Variance Component	d.f.	Chi-square χ^2	p-value
PISA 2000	INTRCPT1, u_0	0.866	43.686	1908.490	260	3321.530	<0.001
	level-1, r		50.627	2563.100			
PISA 2009	INTRCPT1, u_0	0.945	44.245	1957.601	180	4504.588	<0.001
	level-1, r		47.193	2227.148			
PISA 2018	INTRCPT1, u_0	0.956	58.744	3450.860	376	12621.874	<0.001

level-1, r	56.355	3175.840
Statistics for current covariance components model		
PISA 2000	Deviance	37690.585
	Number of estimated parameters	2
PISA 2009	Deviance	49707.177
	Number of estimated parameters	2
PISA 2018	Deviance	122802.677
	Number of estimated parameters	2

Based on the HLM analysis results of the fully unconditional model as shown in Table 10.3, the proportion of variance can be estimated for each of the two levels using the equations resulted as shown in following table.

Table 10.4

The proportion of variance for each of the two levels

Cycle	$\sigma^2 / (\sigma^2 + \tau_\theta)$	$\tau_\theta / (\sigma^2 + \tau_\theta)$	n
PISA 2000	2563.10 / (2563.10 + 1908.49) = 0.57	1908.49 / (2563.10 + 1908.49) = 0.43	n level-1 = 7368 n level-2 = 290
PISA 2009	2227.148 / (2227.148 + 1957.601) = 0.53	1957.601 / (2227.148 + 1957.601) = 0.47	n level-1 = 5136 n level-2 = 183
PISA 2018	3175.840 / (3175.840 + 3450.860) = 0.48	3450.860 / (3175.840 + 3450.860) = 0.52	n level-1 = 12098 n level-2 = 397

Based on Table 10.4, the result indicated that the student-level in PISA 2000 accounted for 57% of the variance and the school-level for 43% in the outcome measure of students' reading literacy. The student-level in PISA 2009 accounted for 53% of the variance and the school-level for 47 % in the outcome measure of students' reading literacy. The student-level in PISA 2018 accounted for 48% of the variance and the school-level for 52% in the outcome measure of students' reading literacy. This indicated that student-level was related to school-level, and school-level predicted students' reading literacy over the three PISA cycles.

In addition, as noted by Raudenbush and Bryk (1992), if the reliability value falls below 0.05, it is assumed that there is no random effect for that particular coefficient. As shown in Table 10.4, the reliability for level-2 in PISA 2000, 2009, and 2018 were more than 0.05, indicating that there was a random effect for students' reading literacy. As a result, further investigation is needed to determine what factors influence students' reading literacy. Accordingly, a subsequent analysis was undertaken to examine the conditional model and in order to construct the final model.

10.3.2 THE FINAL MODEL OF TWO-LEVEL HLM

The level-1 model was defined by entering into the equation variables that are found to be influential on students' reading literacy. The path coefficients were entered one by one in order of their magnitude and statistical significance, beginning with the strongest path and moving towards the weakest path. The level-2 predictors, however, were not included in this phase. The purpose of this step, as noted by Raudenbush (1994), is to determine how much variance can be explained by level-1 predictors. Following the examination of the results, the coefficients that were found not to be significant were removed from the model and the next possible variable was entered into the equation. The steps were repeated until a final model was obtained that contained only significant effects.

After the level-1 variables were finalised, school-level variables were entered into the equation. An analysis of explanatory variables was conducted to determine whether each level-2 variable could be included in the model. The school-level variables were entered one by one according to their t-values as shown in the exploratory analysis results. This procedure was repeated until a final level-2 model was obtained with only significant effects on both levels-1 and levels-2. Equations defining the final model are as follows:

Level-1 model

PISA 2000

$$READ_{ij} = \beta_{0j} + \beta_{1j}*(GENDER_{ij}) + \beta_{2j}*(RETIME_{ij}) + \beta_{3j}*(BOOKS_{ij}) + \beta_{4j}*(DIVREAD_{ij}) + \beta_{5j}*(ENGREAD_{ij}) + r_{ij}$$

PISA 2009

$$READ_{ij} = \beta_{0j} + \beta_{1j}*(GENDER_{ij}) + \beta_{2j}*(DIVREAD_{ij}) + \beta_{3j}*(ENGREAD_{ij}) + \beta_{4j}*(STRA_{ij}) + \beta_{5j}*(RETIME_{ij}) + r_{ij}$$

PISA 2018

$$READ_{ij} = \beta_{0j} + \beta_{1j}*(GENDER_{ij}) + \beta_{2j}*(CONFI_{ij}) + \beta_{3j}*(DIVREAD_{ij}) + \beta_{4j}*(HEDRES_{ij}) + \beta_{5j}*(ENGREAD_{ij}) + \beta_{6j}*(ONLINE_{ij}) + \beta_{7j}*(RETIME_{ij}) + r_{ij}$$

Level-2 model

PISA 2000

$$\begin{aligned}\beta_{0j} &= \gamma_{00} + \gamma_{01}*(SECTOR_j) + \gamma_{02}*(CLIMATE_j) + \gamma_{03}*(ASMENT_j) + u_{0j} \\ \beta_{1j} &= \gamma_{10} \\ \beta_{2j} &= \gamma_{20} \\ \beta_{3j} &= \gamma_{30} \\ \beta_{4j} &= \gamma_{40} \\ \beta_{5j} &= \gamma_{50}\end{aligned}$$

PISA 2009

$$\begin{aligned}\beta_{0j} &= \gamma_{00} + u_{0j} \\ \beta_{1j} &= \gamma_{10} \\ \beta_{2j} &= \gamma_{20} \\ \beta_{3j} &= \gamma_{30} \\ \beta_{4j} &= \gamma_{40} \\ \beta_{5j} &= \gamma_{50}\end{aligned}$$

PISA 2018

$$\begin{aligned}\beta_{0j} &= \gamma_{00} + \gamma_{01}*(LOCATION_j) + \gamma_{02}*(SECTOR_j) + \gamma_{03}*(LEAD_j) + \gamma_{04}*(TECH_j) \\ &+ \gamma_{05}*(ASMENT_j) + u_{0j} \\ \beta_{1j} &= \gamma_{10} \\ \beta_{2j} &= \gamma_{20} \\ \beta_{3j} &= \gamma_{30} \\ \beta_{4j} &= \gamma_{40} \\ \beta_{5j} &= \gamma_{50} \\ \beta_{6j} &= \gamma_{60} \\ \beta_{7j} &= \gamma_{70}\end{aligned}$$

Mixed model

PISA 2000

$$\begin{aligned}READ_{ij} &= \gamma_{00} + \gamma_{01}*SECTOR_j + \gamma_{02}*CLIMATE_j + \gamma_{03}*ASMENT_j + \gamma_{10}*GENDER_{ij} + \gamma_{20}*RETIME_{ij} + \\ &\gamma_{30}*BOOKS_{ij} + \gamma_{40}*DIVREAD_{ij} + \gamma_{50}*ENGREAD_{ij} + u_{0j} + r_{ij}\end{aligned}$$

PISA 2009

$$READ_{ij} = \gamma_{00} + \gamma_{10}*GENDER_{ij} + \gamma_{20}*DIVREAD_{ij} + \gamma_{30}*ENGREAD_{ij} + \gamma_{40}*STRA_{ij} + \gamma_{50}*RETIME_{ij} + u_{0j} + r_{ij}$$

PISA 2018

$$\begin{aligned}READ_{ij} &= \gamma_{00} + \gamma_{01}*LOCATION_j + \gamma_{02}*SECTOR_j + \gamma_{03}*LEAD_j + \gamma_{04}*TECH_j + \gamma_{05}*ASMENT_j + \\ &+ \gamma_{10}*GENDER_{ij} + \gamma_{20}*CONFI_{ij} + \gamma_{30}*DIVREAD_{ij} + \gamma_{40}*HEDRES_{ij} + \gamma_{50}*ENGREAD_{ij} + \gamma_{60}*ONLINE_{ij} \\ &+ \gamma_{70}*RETIME_{ij} + u_{0j} + r_{ij}\end{aligned}$$

The final model in PISA 2000 indicated that students' reading literacy was defined as a function with eight main effects and random errors. The five main effects at level-1 were: Individual characteristic (GENDER), the number of books (BOOKS), reading engagement (ENGREAD), reading diversity (DIVREAD), and reading time (RETIME). The three main effects at level-2 were: school sector (SECTOR), assessment (ASMENT), and school climate (CLIMATE).

Further, the model in PISA 2009 showed that students' reading literacy was defined as a function with five main effects and random errors. The five main effects at level-1 were: Individual characteristic (GENDER), reading engagement (ENGREAD), reading diversity (DIVREAD), reading strategies (STRA) and reading time (RETIME). However, unexpected results were observed in PISA 2009, where there was no significant variable at level 2.

To the model used in PISA 2018, students' reading literacy was defined as a function with twelve main effects and random errors. The seven main effects at level-1 were: Individual characteristic (GENDER), home educational resources (HEDRES), reading engagement (ENGREAD), reading diversity (DIVREAD), online reading (ONLINE), reading confidence (CONFI) and reading time (RETIME). The five main effects at level-2 were: school sector (SECTOR), school location (LOCATION), resources and technology (TECH), assessment (ASMENT), and leadership (LEAD).

The result of the final two-level model of students' reading literacy for PISA 2000, 2009, and 2018 is discussed in the following section.

10.3.3 THE EFFECT OF LEVEL-1 AND LEVEL-2 SIGNIFICANT VARIABLES ON READING LITERACY

Presented in this section are the results of two-level HLM analyses in PISA 2000, 2009, and 2018 respectively. The final relationships between significant variables and the outcome are displayed in Figure 10.2.

PISA 2000

The HLM analysis result of PISA 2000 is presented in Table 10.6. Five variables at level-1 had direct effects on the outcome, one with a negative relationship (GENDER) and four with positive relationships (BOOKS, ENGREAD, DIVREAD, and RETIME). GENDER had a negative

relationship to READ ($\gamma_{10} = -6.138$, $SE = 1.623$), from which it can be stated that female students outperformed males on reading literacy scores. BOOKS had positively influenced READ ($\gamma_{20} = 2.700$, $SE = 0.943$), revealing that the more books available at home, the higher their reading achievement. Also, ENGREAD had a positive relationship on READ ($\gamma_{30} = 4.622$, $SE = 1.179$), demonstrating that the more students agree to engage in reading activities, the higher the reading proficiency. Further, DIVREAD showed a positive relationship toward READ ($\gamma_{40} = 2.354$, $SE = 0.961$), implying that the more frequently the students read diverse materials, the higher the mark of reading literacy. Additionally, RETIME showed a positive relationship on READ ($\gamma_{50} = 5.118$, $SE = 0.874$), suggesting that the more time is spent for reading, the higher reading literacy grades.

Table 10.5

Final Model of Students' Reading Literacy in PISA 2000

Final estimation of fixed effects (with robust standard errors)						
Fixed Effect	Coefficient	Standard error	t-ratio	Approx. <i>d.f.</i>	<i>p</i> -value	
For INTRCPT1, θ_0						
INTRCPT2, γ_{00}	350.062	4.898	71.471	280	<0.001	
SECTOR, γ_{01}	-0.002	0.000	5.261	280	<0.001	
CLIMATE, γ_{02}	-0.006	0.000	-18.737	280	<0.001	
ASMENT, γ_{03}	-6.882	1.635	-4.208	280	<0.001	
For GENDER slope, θ_1						
INTRCPT2, γ_{10}	-6.138	1.623	-3.782	3482	<0.001	
For RETIME slope, θ_2						
INTRCPT2, γ_{20}	5.118	0.874	5.854	3482	<0.001	
For BOOKS slope, θ_3						
INTRCPT2, γ_{30}	2.700	0.943	2.863	3482	0.004	
For DIVREAD slope, θ_4						
INTRCPT2, γ_{40}	2.354	0.961	2.448	3482	0.014	
For ENGREAD slope, θ_5						
INTRCPT2, γ_{50}	4.622	1.179	3.921	3482	<0.001	
Final estimation of level-1 and level-2 variance components						
Random Effect	Reliability	Standard Deviation	Variance Component	<i>d.f.</i>	Chi- square χ^2	<i>p</i> -value

INTRCPT1, u_0	0.852	40.571	1646.050	280	3068.62 9	<0.001
level-1, r		49.760	2476.093			
Statistics for current covariance components model						
Deviance			40765.037			
Number of estimated parameters			2			

At level-2, there are three significant variables with negative relationships (SECTOR, ASMENT, and CLIMATE). The relationship between SECTOR and READ was negative ($\gamma_{01} = -0.002$, $SE = 1.623$), indicating that public schools performed better than private schools in reading literacy achievement. Likewise, ASMENT had a negative relationship negative with READ ($\gamma_{02} = -6.882$, $SE = 1.635$), demonstrating that the availability assessment in schools contributed to higher students' reading achievement. CLIMATE was also negatively associated with READ ($\gamma_{03} = -0.006$, $SE = 0.000$), implying that the less school was hindered by poor climate, the higher the reading literacy score.

PISA 2009

According to Table 10.6, as a result of the HLM analysis in PISA 2009, only significant variables were identified at the student level, not at the school level. There were five significant variables, one of which was associated with a negative relationship (GENDER), and four of which were associated with positive relationships (ENGREAD, DIVREAD, STRA and RETIME).

Table 10.6

Final Model of Students' Reading Literacy in PISA 2009

Final estimation of fixed effects (with robust standard errors)						
Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value	
For INTRCPT1, θ_0						
INTRCPT2, γ_{00}	429.999	4.477	96.054	180	<0.001	
For GENDER slope, θ_1						
INTRCPT2, γ_{10}	-26.461	1.564	-16.917	4475	<0.001	
For DIVREAD slope, θ_2						
INTRCPT2, γ_{20}	2.742	0.805	3.405	4475	<0.001	
For ENGREAD slope, θ_3						
INTRCPT2, γ_{30}	8.334	1.124	7.414	4475	<0.001	
For STRA slope, θ_4						
INTRCPT2, γ_{40}	4.825	0.822	-5.865	4475	<0.001	
For RETIME slope, θ_5						
INTRCPT2, γ_{50}	2.875	0.733	3.922	4475	<0.001	
Final estimation of level-1 and level-2 variance components						
Random Effect	Reliability	Standard Deviation	Variance Component	d.f.	Chi-square χ^2	p-value
INTRCPT1, u_0	0.950	41.930	1758.100	180	4496.101	<0.001
level-1, r		44.490	1979.360			
Statistics for current covariance components model						
Deviance			49144.340			
Number of estimated parameters			2			

GENDER showed a negative relationship on READ ($\gamma_{10} = -26.461$, $SE = 1.564$) indicating females students performed better in reading achievement than males. Meanwhile, ENGREAD had a positive relationship with READ ($\gamma_{30} = 8.334$, $SE = 1.124$) revealing that the more students agree to engage in reading activities, the higher the mark of reading literacy. The DIVREAD and READ data showed a positive relationship ($\gamma_{20} = 2.742$, $SE = 0.805$), which suggested that the greater the frequency of reading diverse materials, the greater the level of reading literacy. As well there was a positive relationship between STRA and READ ($\gamma_{40} = 4.825$, $SE = 0.822$), demonstrating that the more positive the perception of reading strategies, the higher the reading literacy score. The relationship between RETIME and READ was also positive ($\gamma_{50} = 2.875$, $SE =$

0.733), suggesting that the more time was spent for reading, the higher the reading achievement scores.

PISA 2018

In PISA 2018, Table 10.7 records there were seven variables at level-1, two of which had negative relationships (GENDER and HEDRES) and five of which had positive relationships (ENGREAD, DIVREAD, ONLINE, CONFI, and RETIME).

Table 10.7

Final Model of Students' Reading Literacy in PISA 2018

Final estimation of fixed effects (with robust standard errors)						
Fixed Effect	Coefficient	Standard error	t-ratio	Appro x. d.f.	p-value	
For INTRCPT1, θ_0						
INTRCPT2, γ_{00}	383.211	3.435	111.562	370	<0.001	
LOCATION, γ_{01}	20.598	2.154	9.562	370	<0.001	
SECTOR, γ_{02}	-0.015	0.003	-6.045	370	<0.001	
LEAD, γ_{03}	0.008	0.001	4.960	370	<0.001	
TECH, γ_{04}	-0.005	0.002	2.651	370	0.008	
ASMENT, γ_{05}	-0.004	0.002	2.265	370	0.024	
For GENDER slope, θ_1						
INTRCPT2, γ_{10}	-14.502	1.438	-10.087	10765	<0.001	
For CONFI slope, θ_2						
INTRCPT2, γ_{20}	10.908	0.663	16.455	10765	<0.001	
For DIVREAD slope, θ_3						
INTRCPT2, γ_{30}	-3.601	0.619	-5.812	10765	<0.001	
For HEDRES slope, θ_4						
INTRCPT2, γ_{40}	-1.855	0.459	-4.043	10765	<0.001	
For ENGREAD slope, θ_5						
INTRCPT2, γ_{50}	5.413	0.795	6.808	10765	<0.001	
For ONLINE slope, θ_6						
INTRCPT2, γ_{60}	2.072	0.449	4.614	10765	<0.001	
For RETIME slope, θ_7						
INTRCPT2, γ_{70}	4.491	0.535	8.393	10765	<0.001	
Final estimation of level-1 and level-2 variance components						
Random Effect	Reliability	Standard Deviation	Variance Component	d.f.	Chi-square χ^2	p-value
INTRCPT1, u_0	0.940	47.64363	2269.916	370	8818.835s	<0.001
level-1, r		54.11269	2928.183			
Statistics for current covariance components model						

Deviance	121806.596
Number of estimated parameters	2

As noted above, GENDER had a negative relationship with READ ($\gamma_{10} = -14.502$, $SE = 1.438$), indicating that in PISA 2018, female students performed better than male students in reading literacy. As well as a negative coefficient, HEDRES on READ ($\gamma_{40} = -1.855$, $SE = 0.459$), demonstrated that the more resources students had at home, the more proficient they were at reading.

ENGREAD on READ was positively influenced ($\gamma_{40} = 5.413$, $SE = 0.785$), suggesting that the higher the students agree to engage in reading activities, the higher the reading literacy mark. Also, DIVREAD on READ showed a positive relationship signifying that the more frequently the students read diverse materials the higher the reading achievement. A negative correlation was also found between DIVREAD and READ ($\gamma_{30} = -3.601$, $SE = 0.619$), which indicated that the more frequently students read diverse materials, the lower the reading achievement. Reading diversity and reading literacy may have a strong association. Even so, there have been instances in which students feel overwhelmed with the materials, especially when they are required to do more digital reading, which diverts their attention from reading. Further, ONLINE on READ ($\gamma_{60} = 2.702$, $SE = 0.449$), indicated that the more frequent online reading activities, the higher the score. CONFI on READ ($\gamma_{30} = 10.908$, $SE = 0.663$), and RETIME on READ ($\gamma_{70} = 4.491$, $SE = 0.535$), demonstrated that the greater students feel confident as they engage in reading activities, the more time was spent for reading, leading to higher reading achievement scores.

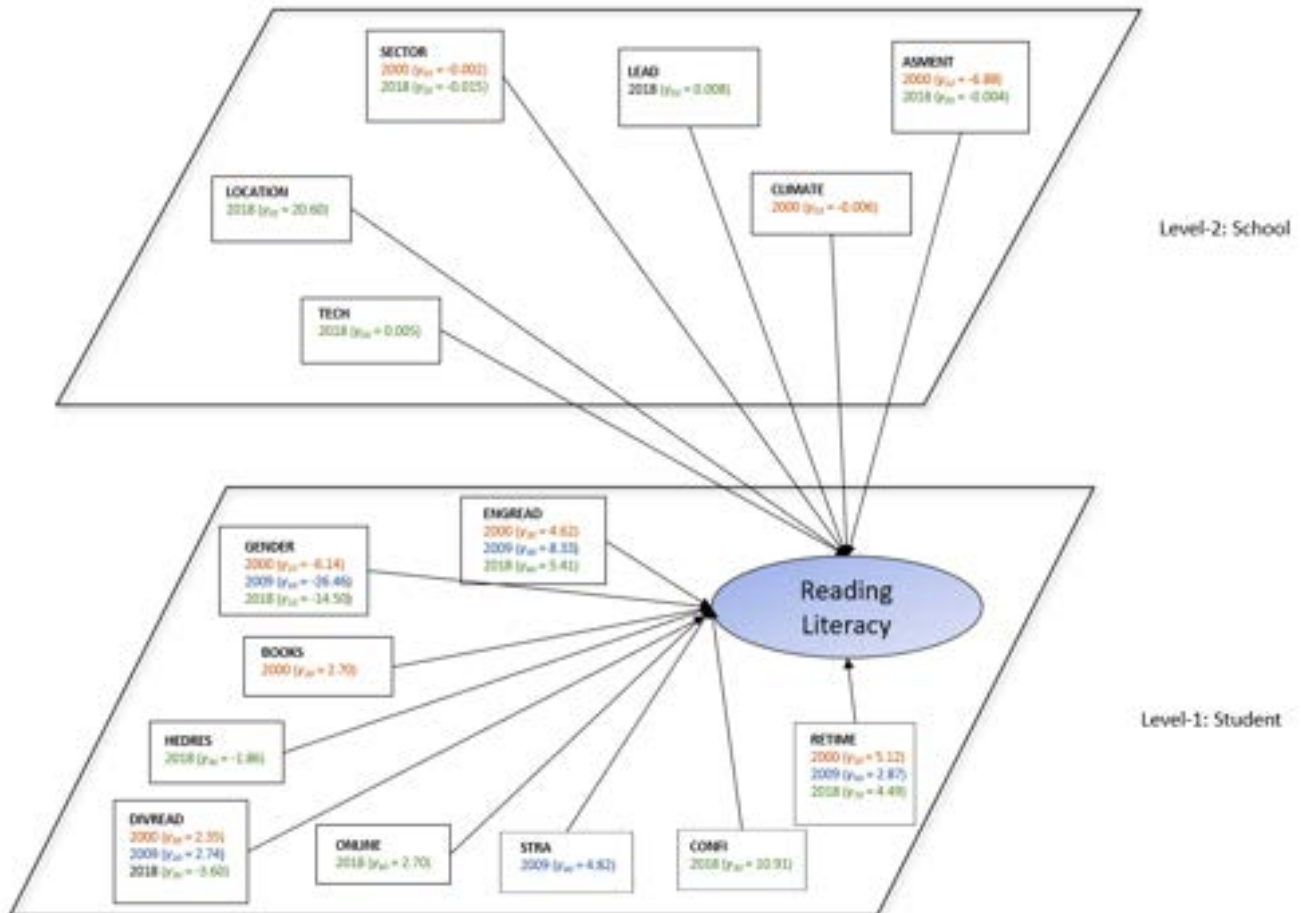
At level-2, there were five significant variables, three of which had a negative relationship (SECTOR, TECH, and ASMENT), and two of which had positive relationships (LOCATION, LEAD, TECH, and ASMENT). According to the negative relationship on SECTOR on READ (γ_{02}

= -0.015, $SE = 0.003$), public schools performed better in reading achievement scores in comparison to private schools. A negative coefficient was also found for TECH on READ coefficient ($\gamma_{04} = 0.005$, $SE = 0.002$), that is, the less learning was hindered by a lack of technology, the higher the mark of students' reading achievement. Likewise, ASMENT on READ ($\gamma_{05} = -0.004$, $SE = 0.002$), demonstrated that the more assessment used in schools, the higher the level of literacy in reading for students.

Meanwhile, according to LOCATION on READ relationship ($\gamma_{01} = 20.598$, $SE = 2.154$), a positive relationship implied that schools located in urban or city areas tend to perform better in reading than those located in villages or rural areas. Additionally, LEAD on READ ($\gamma_{03} = 0.008$, $SE = 0.001$) demonstrated that the greater the availability of a principal to provide activities for the development, the higher the mark.

Figure 10.2

Final Two-level model of Reading Achievement on PISA 2000, 2009, and 2018



As a result of the discussion above, it can be summarised the results of the fully two-level final model analysis for three cycles (PISA 2000, 2009, and 2018) in Table 10.8.

Table 10.8

Variance Components of Fully two-level Final Model of Reading Literacy for PISA 2000, 2009, and 2018

Two-level cycle	Final estimation of fixed effects (with robust standard errors)					
	Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value
PISA 2000	For INTRCPT1, θ_0					
	INTRCPT2, γ_{00}	350.062	4.898	71.471	280	<0.001
PISA 2009	For INTRCPT1, θ_0					
	INTRCPT2, γ_{00}	429.999	4.477	96.054	180	<0.001
PISA 2018	For INTRCPT1, θ_0					
	INTRCPT2, γ_{00}	383.211	3.435	111.562	370	<0.001
Final estimation of level-1 and level-2 variance components						
	Random Effect	Standard Deviation	Variance Component	d.f.	Chi-square χ^2	p-value
PISA 2000	INTRCPT1, u_0	40.571	1646.050	280	3068.629	<0.001
	level-1, r	49.760	2476.093			
PISA 2009	INTRCPT1, u_0	41.930	1758.100	180	4469.101	<0.001
	level-1, r	44.490	1979.360			
PISA 2018	INTRCPT1, u_0	47.644	2269.916	370	8808.835	<0.001
	level-1, r	54.113	2928.183			
Statistics for current covariance components model						
PISA 2000	Deviance			40765.037		
	Number of estimated parameters			2		
PISA 2009	Deviance			49144.340		
	Number of estimated parameters			2		
PISA 2018	Deviance			121806.596		
	Number of estimated parameters			2		

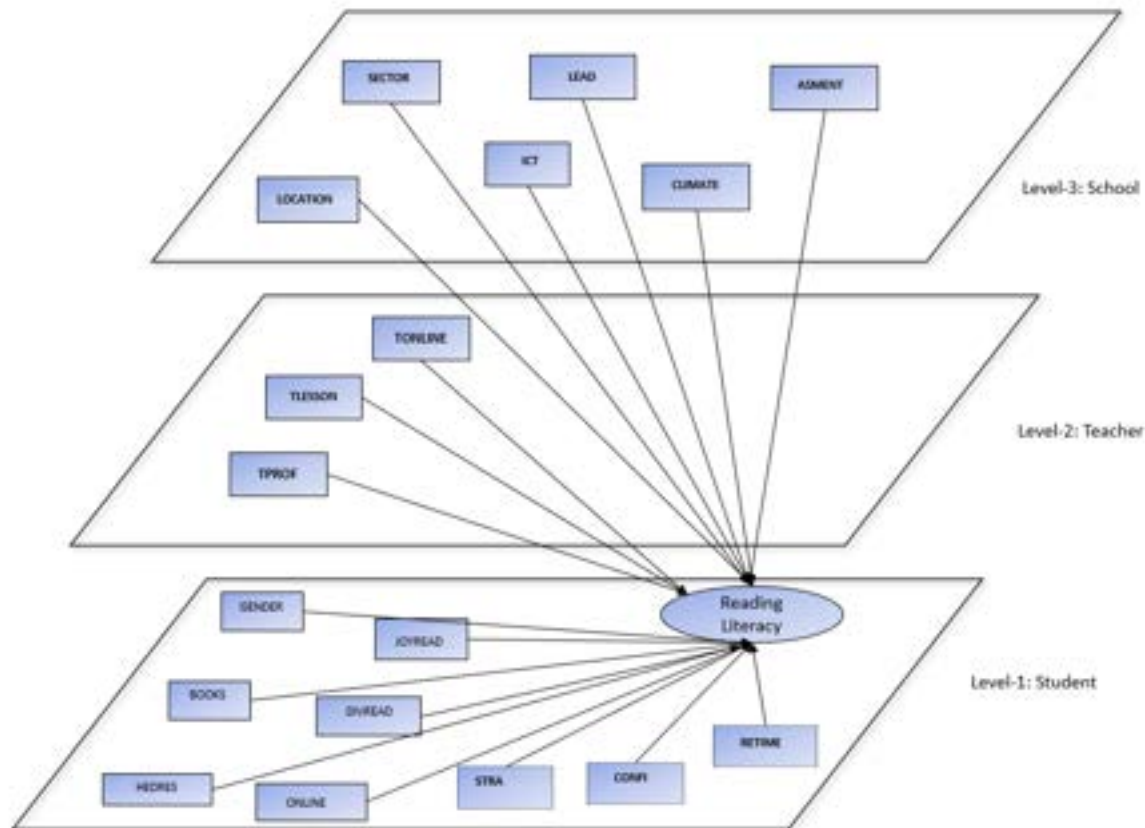
10.4 THREE-LEVEL MODEL OF READING LITERACY FOR STUDENTS

This section discusses the three-level HLM analysis for 2020 follow-up data only in which teacher-related variables are included. Following this discussion, a longitudinal study discussion will be presented covering all cycles.

Initially, the conceptual model for the three-level HLM analysis of reading literacy is illustrated in Figure 10.3.

Figure 10.3

Conceptual three-level model of Reading Achievement on 2020 follow-up data



Similar to the previous cycle analysis, the reading literacy was allocated according to level, but in this case three levels were identified, namely student, teacher, and school. A three-level HLM model is constructed based on a cross-sectional data set containing students (level-1), teachers nested within them (level-2), and teachers nested within schools (level-3). As the first stage, the first fully conditional model (null model) is operated to determine the amount of variance

that could be explained by the model. Thus, the estimates result does not involve any predictor at the student-, teacher-, and school-level. However, it produces estimate and confidence interval for the grand mean, γ_{000} . The second stage of the analysis involves the examination of which variables can explain the variability at each level of the model (Raudenbush & Bryk, 2002). Initially, significant variables at level-1 (student) related to the outcome variable are examined and estimated, followed by significant variables at level-2 (teacher) related to the outcome variables, along with estimates of the relationships between level-1 variables and outcome variables. The final steps examined and estimated whether the significant variables at level-3 (schools) are related to the outcome variables, as well as whether they are related to the significant variables at level-1 and level-2.

10.4.1 NULL MODEL OF THREE-LEVEL HLM

The null model represents how much variation in an outcome variable is allocated across the three different levels, namely the student-, teacher-, and school-levels. Therefore, the null model is specified by the following equations.

Null Model

Level-1 model: the student level model

$$READ_{ijk} = \pi_{0jk} + e_{ijk}$$

Where

$READ_{ijk}$ is the reading literacy on 2020 data of student i under teacher j in school k ;

π_{0jk} is the mean of reading literacy under teacher j ; and

e_{ijk} is a random teacher effect

Level-2 model: the teacher level model

$$\pi_{0jk} = \beta_{00k} + r_{0jk}$$

Where

β_{00k} is the mean of reading literacy in school k ;

r_{0jk} is a random teacher effect

Level-3 model: the school level model

$$\beta_{00k} = \gamma_{000} + u_{00k}$$

Where,

γ_{000} is the grand mean;

u_{00k} is a random school effect

The HLM result for the null model for 2020 follow-up data is presented in Table 10.9. Part of variability at each level can be explained or accounted for by measure variables at each level. Hence, there are gender, number of books, home educational resources, reading engagement, reading diversity, online reading, parent reading involvement, mother education, father education, parent income, reading strategies, reading confidence, and reading time can be utilised as predictors. In addition, some of the relationships at teacher level and school levels may vary randomly among these units. Therefore, the next step is to examine the conditional model and to build up the final model.

The HLM three-level model enables a baseline to provide information about the variability of the outcome variable at each level. Accordingly, the results enable the estimation of the proportions of the variations that are within schools, among teachers within schools, and among

schools. The parameter δ^2 represents the student level (level-1) variability, τ_π captures the teacher level (level-2) variability, and τ_β gives the school level (level-3) variability (Raudenbush & Bryk, 2002), that is:

$\delta^2 / (\delta^2 + \tau_\pi + \tau_\beta)$ is the proportion of variance within schools;

$\tau_\pi / (\delta^2 + \tau_\pi + \tau_\beta)$ is the proportion of variance among teachers within schools; and

$\tau_\beta / (\delta^2 + \tau_\pi + \tau_\beta)$ is the proportion of variance among schools

In the case of reliability values below 0.05, it is assumed that no random effects are present.

Table 10.9

Fully Three-level Conditional Model of Reading Literacy for 2020 follow-up data

Cycle	Final estimation of fixed effects (with robust standard errors)						
	Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value	
2020 Data	For INTRCPT1, π_0						
	For INTRCPT2, θ_{00}						
	INTRCPT3, γ_{000}	499.808	0.636	785.604	9	<0.001	
Final estimation of level-1 and level-2 variance components							
	Random Effect	Reliability	Standard Deviation	Variance Component	d.f.	Chi-square χ^2	p-value
	INTRCPT1, r_0	0.569	1.604	2.573	17	40.031	0.002
	level-1, e		5.708	32.583			
Final estimation of level-3 variance components							
	Random Effect	Reliability	Standard Deviation	Variance Component	d.f.	Chi-square χ^2	p-value
	INTRCPT1/INTRCPT2, u_{00}	0.570	1.519	2.308	9	23.840	0.005
Statistics for current covariance components model							
	Deviance			2926.735			
	Number of estimated parameters			4			

Based on the three level HLM results of the fully unconditional model as shown in Table 10.9, the proportion of variance can be estimated for each of the three levels using equations resulted as shown in following table.

Table 10.10

The proportion of variance for each of the three-levels

Cycle	$\delta^2 / (\delta^2 + \tau_\pi + \tau_\theta)$	$\tau_\pi / (\delta^2 + \tau_\pi + \tau_\theta)$	$\tau_\theta / (\delta^2 + \tau_\pi + \tau_\theta)$	n
2020 Data	$32.583 / (32.583 + 2.573 + 2.308) = 0.870$	$2.573 / (32.583 + 2.573 + 2.308) = 0.068$	$2.308 / (32.583 + 2.573 + 2.308) = 0.062$	n level-1 = 550 n level-2 = 33 n level-3 = 11

According to Table 10.10, the result indicated that the student-level in 2020 follow-up data accounted for 87% of the variance, the teacher-level for 6.8% and the school-level for 6.2% in the outcome measure of students' reading literacy. This indicated that student-level was related to teacher-level. Teacher-level only showed minor contributions to school-level and school-level predicted students' reading literacy in cycle 2020. It was stated that if the reliability value falls below 0.05, it is assumed that there is no random effect for that coefficient. The reliability for level-3 in 2020 follow-up data was greater than 0,05, indicating that the reading literacy of students was affected by a random effect. It was therefore necessary to conduct further investigation to identify the factors that affect students' reading literacy. The conditional model was subsequently examined, and a final model was constructed based on the results.

10.4.2 THE FINAL MODEL OF THREE-LEVEL HLM

A level-1 model was constructed by entering each variable one by one into the equation according to the magnitude and statistical significance of the path coefficient, starting with the strongest path to the weakest path, determined by the variables that were found to directly influence reading literacy at the student-level. The input was modified accordingly, and the data was reanalysed. In this way, the steps were repeated step by step until a final level-1 model with only significant effects was obtained. The next step was to enter variables related to the teachers into the equation one by one based on their t-values shown in exploratory analysis results. After repeating these steps several times, a final level-2 model was obtained with only significant effects at both levels. As well, the last step was to enter school-level variables into the equations one by one based on their t-values shown in exploratory analysis results. After repeating these steps, a final model was obtained that contained only significant effects at all three levels. The following equations define the final model after adding the significant level-2 and level-3 variables, resulting in the following equations for the final model.

Level-1 Model

$$READ_{ijk} = \pi_{0jk} + \pi_{1jk}*(HEDRES_{ijk}) + \pi_{2jk}*(ENGREAD_{ijk}) + \pi_{3jk}*(RETIME_{ijk}) + e_{ijk}$$

Level-2 Model

$$\pi_{0jk} = \beta_{00k} + r_{0jk}$$

$$\pi_{1jk} = \beta_{10k}$$

$$\pi_{2jk} = \beta_{20k}$$

$$\pi_{3jk} = \beta_{30k}$$

Level-3 Model

$$\begin{aligned}\beta_{00k} &= \gamma_{000} + \gamma_{001}(\text{LOCATION}_k) + \gamma_{002}(\text{SECTOR}_k) + \gamma_{003}(\text{ICT}_k) + u_{00k} \\ \beta_{10k} &= \gamma_{100} \\ \beta_{20k} &= \gamma_{200} \\ \beta_{30k} &= \gamma_{300}\end{aligned}$$

Mixed Model

$$\begin{aligned}\text{READ}_{ijk} &= \gamma_{000} + \gamma_{001}*\text{LOCATION}_k + \gamma_{002}*\text{SECTOR}_k + \gamma_{003}*\text{ICT}_k \\ &+ \gamma_{100}*\text{HEDRES}_{ijk} + \gamma_{200}*\text{ENGREAD}_{ijk} + \gamma_{300}*\text{RETIME}_{ijk} + r_{0jk} + u_{00k} + e_{ijk}\end{aligned}$$

The final model in 2020 follow-up data indicated that students' reading literacy was defined as a function with three main effects and random errors. The three main effects at level-1 (student) were: home educational resources (HEDRES), reading engagement (ENGREAD), and reading time (RETIME). In an unexpected development, there were no significant effects at level-2 (teacher) as all variables were not significant at that level. Meanwhile, there were three main effects at level-3 (school): school location (LOCATION), school sector (SECTOR), and ICT at school (ICT). The result of the final three-level model of students' reading literacy for 2020 follow-up data is presented in the following discussion.

10.4.3 THE EFFECT OF LEVEL-1, LEVEL-2, AND LEVEL-3

2020 Follow-up Data

The result analysis result is presented in Table 10.11. Three variables at level-1 had direct effects on the outcome, one with a negative relationship (HEDRES) and two with positive relationships (ENGREAD and RETIME). There was a negative relationship between HEDRES and READ ($\pi_{1jk} = -0.000$, $SE = 0.000$), which suggested that students who possess educational

resources at home have a higher level of reading literacy. ENGREAD had a positive influence on READ ($\pi_{2jk} = 0.001$, $SE = 0.000$), showing that the more students engage in reading activities, the higher their reading literacy scores were. As well, RETIME had a positive relationship on READ ($\pi_{3jk} = 0.001$, $SE = 0.000$) implying that the more time is spent for reading, the higher the reading achievement score.

Table 10.11

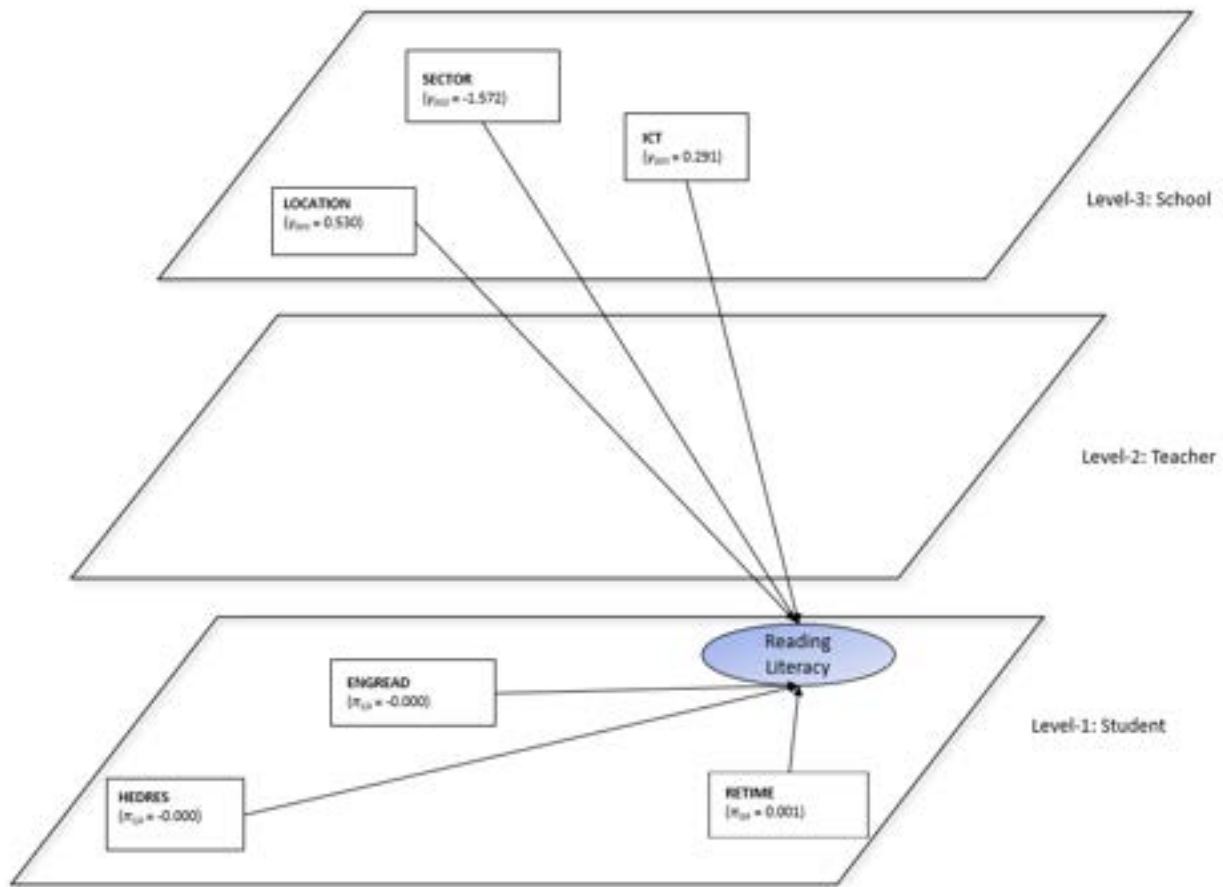
Final Model of Students' Reading Literacy in 2020 Data

Final estimation of fixed effects (with robust standard errors)						
Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value	
For INTRCPT1, π_0						
For INTRCPT2, θ_{00}						
INTRCPT3, γ_{000}	499.787	0.244	2045.829	6	<0.001	
LOCATION, γ_{001}	0.530	0.230	2.307	6	0.050	
SECTOR, γ_{002}	-1.572	0.443	-3.547	6	0.012	
ICT, γ_{003}	0.291	0.059	4.934	6	0.003	
For HEDRES slope, π_1						
For INTRCPT2, θ_{10}						
INTRCPT3, γ_{100}	-0.000	0.000	-5.725	418	<0.001	
For ENGREAD slope, π_2						
For INTRCPT2, θ_{20}						
INTRCPT3, γ_{200}	0.001	0.000	2.328	418	0.020	
For RETIME slope, π_3						
For INTRCPT2, θ_{30}						
INTRCPT3, γ_{300}	0.000	0.000	-1.989	418	0.047	
Final estimation of level-1 and level-2 variance components						
Random Effect	Reliability	Standard Deviation	Variance Component	d.f.	Chi- square χ^2	p-value
INTRCPT1, u_0		47.644	2269.916	370	8818.835	<0.001
level-1, r	0.361	54.113	2928.183			
Final estimation of level-3 variance components						
Random Effect	Reliability	Standard Deviation	Variance Component	d.f.	χ^2	p-value
	0.002	0.052	0.003	6	3.251	>.500
Statistics for current covariance components model						
Deviance			2898.092			
Number of estimated parameters			10			

As the level-2 (teacher) variable was not significant, thus no further discussion can be initiated. Meanwhile at level-3 (school) had effects on the outcome, one with a negative relationship (SECTOR) and two with positive relationships (LOCATION and ICT). SECTOR had a negative relationship to READ ($\gamma_{002} = -1.572$, SE = 0.443), indicated that public schools performed better than private schools in reading literacy achievement. As a result of LOCATION having a positive influence on READ ($\gamma_{001} = 0.530$, SE = 0.443), it was evident that schools located in urban areas tend to achieve higher reading literacy scores than those located in rural or village locations. Additionally, ICT was positively associated with READ ($\gamma_{003} = 0.291$, SE = 0.059), suggesting that the greater the agreement among schools to provide ICT, the greater the achievement of students in reading literacy. The final three-level model of reading literacy for 2020 data is presented in Figure 10.4.

Figure 10.4

Final Three-level model of Reading Literacy on 2020 Follow-up Data



10.5 THE TREND TOWARDS READING LITERACY

In this section, the analysis results for all cycles (PISA 2000, 2009, 2018, and 2020) are discussed the trend in relation to reading literacy in Indonesia over a period of time. Accordingly, there is a discussion of the factors in final model and the estimation of variance components.

The Factors in Final Model

As a result of the HLM analysis for the final model, the significant predictors of the student-, teacher-, and school-level were identified in each cycle differently over the 20-year period. Among the student-level in general, there is evidence that gender influenced in student performance on reading literacy in three study cycles: 2000, 2009, and 2018. A consistent trend with negative relationship showed that female students performed better on reading literacy than their male counterparts. As well, reading diversity is also a factor in these three cycles, with a positive correlation demonstrating that the more frequently students read diverse material, the higher their level of reading literacy.

It has been identified throughout all four cycles that reading engagement and reading time are factors affecting reading literacy, with a consistent positive relationship between these two variables and reading literacy achievement. It is evident from these results that over the 20-year period, the more students agree with reading engagement activities and the more time they spend reading, the higher the mark of reading literacy.

There were other student factors, such as the number of books, which only influenced reading literacy during cycle 2000. In the same way that reading strategies only impacted in cycle 2009, reading online and reading confidence only impacted in cycle 2018. Meanwhile, home educational resources influenced two cycles (2018 and 2020) of student outcomes.

It has been found that, on a teacher-level, there was no influence of teacher variables on reading literacy in cycle 2020. Likewise at school level, since there were no significant relationship variables in cycle 2009. Therefore, no further discussion is required regarding the teacher level in cycle 2020 and the school level in cycle 2009.

Other three cycles at school-level, 2009, 2008, and 2020, demonstrated a consistent trend of negative relationships between school sector and student reading literacy. The results showed that public schools outperformed private schools in regard to reading literacy. In addition, assessment influenced reading literacy in two cycles of 2000 and 2018 with a negative relationship indicating that the more assessment was used in schools, the higher the level of reading literacy. The school variable of school location influenced cycle 2018 and 2020 with a positive trend, indicating that schools located in urban or city areas tend to have more proficient reading literacy than those in rural or village areas. In addition, other school variables, such as the school climate, only influenced students' reading literacy score in cycle 2000, while the resources and technology at schools only influenced the score in cycle 2018, and ICT at schools only influenced students' reading literacy score in cycle 2020.

Estimation of Variance Components

Table estimation of variance components for all cycles (Two-level for PISA 2000, 2009, and 2018; and Three-level for 2020 follow-up data) is presented in Table 10.12. Estimates of the variance in reading literacy were obtained from both the fully unconditional model (no predictors specified at any level) and the final model (significant predictors at all levels). In PISA 2000, the greater proportion of the variance (57%) was found between students, while another 43 % of the variance was found between school principals. As well in PISA 2009, the greater proportion of variance was between students (53%), while another 47% of the variance was between school principals. Meanwhile, in PISA 2018, the greater proportion was between school principals (52 %) and another 48 % of the variance was between students. Furthermore, in 2020 follow-up data with three levels, indicated that majority of the variance (87 %) was found between students.

Approximately only 6.8 % of the variance was found between teachers and 6.2 % of the variance occurred between the school principals.

The variance explained at each level might decrease or increase as predictors were introduced into the model. The calculation for the variance that was explained at the final model are also presented in Table 10.12. For the final PISA 2000 model, 60% of the variance could be explained at level-1 (student-level). This represents a 3 % increase over the null model. On the other hand, there was a drop in the variance explained at the school-level from 43 % to 40 %. It was noteworthy that, when the variance explained at each level is related to the amount of variance available at each level, the total variance explained by the model was 58.2 %. In addition, the final PISA 2009 model explained 53% of the variance at level-1 (student level) and 47% at level-2 (school-level) indicating no change in the variance explained at the student and school levels compared to the null model. Nonetheless, when the variance explained at each level was related to the amount of variance available to be explained at that level, the total amount of variance explained by the model of PISA 2009 was 50.2 %. Further, for PISA 2018, most of the variance in the final model could be explained at level-1 (student-level) at 56 %, which increased by 8 % from the null model. In contrast, there was a decrease of the variance explained at the school-level (from 52 % to 44 %). Based on the amount of variance that can be explained at each level, the total amount of variance explained by the model was 49.8 %. Meanwhile for 2020 data with three levels, most of the variance in the final model could be explained at level-1 (student-level), which increased by 9.74 % from the null model. A significant drop of the variance explained at the teacher-level from 6.2 % to 3.25 % and at school-level from 6.8 % to 0.01 %. Based on the variance explained at each level in relation to the amount of variance available at that level, the total amount of variance explained by the model was 84.4 %.

Table 10.12

Estimation of Variance Components for all cycles (PISA 2000, 2009, 2018, and 2020 Data)

Model	Estimation of Variance components		
	between students	between teachers	between schools
	n 2000 = 7368		n 2000 = 290
	n 2009 = 5136		n 2009 = 183
	n 2018 = 12098		n 2018 = 397
	n 2020 = 550	n 2020 = 33	n 2020 = 11
Fully unconditional model	2000 = 2563.100 2009 = 2227.148 2018 = 3175.860 2020 = 32.583	2020 = 2.573	2000 = 1908.490 2009 = 1957.601 2018 = 3450.860 2020 = 2.308
Final model	2000 = 2476.093 2009 = 1979.360 2018 = 2928.183 2020 = 31.923	2020 = 1.072	2000 = 1646.050 2009 = 1758.100 2018 = 2269.916 2020 = 0.003
Variance at each level			
between students	2000 = 2563.100 / (2563.100 + 1908.490) = 57 % 2009 = 2227.148 / (2227.148 + 1957.601) = 53 % 2018 = 3175.860 / (3175.860 + 3450.860) = 48 % 2020 = 32.583 / (32.583 + 2.573 + 2.308) = 87 %		
between teachers	2020 = 2.573 / (32.583 + 2.573 + 2.308) = 6.8 %		
between schools	2000 = 1908.490 / (2563.100 + 1908.490) = 43 % 2009 = 1957.601 / (2227.148 + 1957.601) = 47 % 2018 = 3450.860 / (3175.860 + 3450.860) = 52 % 2020 = 2.308 / (32.583 + 2.573 + 2.308) = 6.2 %		
Proportion of variance explained by the final model			
between students	2000 = 2476.093 / (2476.093 + 1646.050) = 60 % 2009 = 1979.360 / (1979.360 + 1758.100) = 53 % 2018 = 2928.183 / (2928.183 + 2269.916) = 56 % 2020 = 31.923 / (31.923 + 1.072 + 0.003) = 96.74		
between teachers	2020 = 1.072 / (31.923 + 1.072 + 0.003) = 3.25 %		
between schools	2000 = 1646.050 / (2476.093 + 1646.050) = 40 % 2009 = 1758.100 / (1979.360 + 1758.100) = 47 % 2018 = 2269.916 / (2928.183 + 2269.916) = 44 % 2020 = 0.003 / (31.923 + 1.072 + 0.003) = 0.01 %		
Proportion of total available variance explained by the final model			
2000 = (0.60 x 0.57) + (0.40 x 0.60) = 58.2 %			
2009 = (0.53 x 0.53) + (0.47 x 0.47) = 50.2 %			
2018 = (0.48 x 0.56) + (0.52 x 0.44) = 49.8 %			
2020 = (0.87 x 0.9674) + (0.068 x 0.0325) + (0.062 x 0.0001) = 84.4 %			

10.6 SUMMARY

This chapter aims to answer research questions: *How do student and school factors and reading states and their relationships impact student reading literacy in Indonesia?* As a result of the study, three final two-level models are presented based on the PISA cycle of 2000, 2009, and 2018 data, and one final three-level model is presented based on the 2020 follow-up data.

Over 20-year period, a key point to note is that significant variables at the levels of students, teachers, and schools differed for each cycle. Among student-level factors, cycle 2000 identifies gender, the number of books, reading engagement, reading diversity, and reading time as directly influencing students' reading literacy. In cycle 2009, gender, reading engagement, reading diversity, reading strategies, and reading time are viewed as direct influences on students' reading literacy. According to the cycle 2018, there are more significant variables that influence reading literacy, including gender, home education resources, reading engagement, reading diversity, reading online, reading confidence, and reading time. In contrast, based on 2020 data, there are only three important variables influencing reading literacy: home educational resources, reading engagement, and reading time. Taking all factors into account, reading engagement and reading time have an influence on reading literacy across all cycles. These indicate that the more students engage with reading activities and the more reading time spent, the higher the score of reading literacy over the 20 years.

The teacher-level which only applied to cycle 2020, demonstrated that no single teacher variable had a significant impact on students' reading literacy. As for school-level factors, in cycle 2000, three major factors were associated with reading literacy: school sector, assessment, and school climate. In cycle 2009, there were no school-related factors identified. In cycle 2018, reading literacy was influenced by five school variables including school sector, school location,

resources and technology, assessment, and leadership. A study conducted in cycle 2020 found that three variables directly influence reading literacy at schools, including school sector, school location, and ICT at school.

In the next chapter, the discussion, conclusion, and implications of the study are presented. A discussion of future research recommendations is also included.

Chapter 11

Discussion and Conclusion

11.1 INTRODUCTION

In the context of measuring a country's socioeconomic development and well-being, significant attention has been paid to the importance of education, including reading literacy. Governments, non-government organisations and education systems have placed a great deal of emphasis on reading literacy worldwide, both in industrialised and developing countries. The Indonesian government and the Ministry of Education and Culture have emphasised the importance of reading literacy by including reading in the school curriculum and university courses. In this regard, reading literacy is of utmost importance. An international large-scale assessment, such as PISA (The Programme for International Student Assessment), is one way to determine the level of reading literacy in Indonesia. As part of the PISA program, not only are the educational processes measured but they are also evaluated and monitored. However, although reading levels have improved in Indonesia since it joined in 2000, the scores still fall below the international average.

Many studies have been conducted to examine the possible reasons for the poor level of reading literacy in Indonesia (Chintia et al., 2018; Nugrahanto & Zuchdi, 2019; Ratri, 2015). The trends have not been investigated in most existing studies concerned with individual cycles in reading literacy. Moreover, only a very few studies have attempted to examine teacher and parent factors, since Indonesia has not included teachers and parents in the PISA study, although other countries have done so. The predictors derived from teachers and parents in Indonesia remain

unexplored. In light of this, it was deemed necessary to gain some insight from teachers and parents toward students' reading literacy. Using the same instrument as that used in the PISA Test 2018, in the present study, an exploration of teacher and parent factors as additional predictors of poor reading literacy were conducted through a follow-up study in 2020. In addition to school and student factors being taken into account, the results of 2020 were compared with those drawn in 2000, 2009, and 2018. Thus, a longitudinal study of reading literacy based on PISA data was attempted.

The current quantitative study, which examined the impact of student reading literacy in Indonesia, investigated the predictors of reading literacy based on data from three cycles of PISA, in 2000, 2009, and 2018, and one follow-up study in 2020. Thus, it attempted to establish the influence of school and student variables from 2000 to 2018 and additional teacher and parent variables in 2020 on student reading achievement in the same cycle year. The objectives of the study were mentioned in Chapter 1 and addressed in Chapters 6 to 10. To answer the research questions, this study adopted a conceptual framework exploring the predictors of reading literacy in Indonesia (see Chapter 3) and incorporated the literature review (see Chapters 3 and 4). The study also employed methods in the analysis of the resulting data from responses of principal, teacher, student, and parent participants (see Chapter 4). The findings from the results of the data analyses (see Chapters 5 to 10) were summarised and discussed. Specifically, the implications of the study for theory, methodology, and policy (aligned with the curriculum applied during the cycle) were discussed, as well as for the practice of reading literacy. In the final chapter, the limitations of the study and some recommendations are presented.

11.2 THE DESIGN OF THE STUDY

A quantitative research design using questionnaires and a reading test was used to carry out the study. Several factors were examined for their influence on reading literacy. For measures of school-, student-, and teacher-level, some predictors of reading literacy were assessed through carefully selected and validated constructs and items. In addition, several demographic information items were used to the basis for subsequent analyses. At the school-level, there was school type (sector and location), school facilities (ICT at school and resources technology), assessment, and school management (leadership and school climate). At student-level variables consisted of individual characteristic (gender), home facilities (number of books and home educational resources), reading activities (reading engagement, reading diversity, and reading online), and reading states (reading strategies, reading confidence, and reading time). Additional to student-level in 2020 data, the parent variable included reading involvement, mother education, father education, and parent income. At the teacher-level variables consisted of professional, lesson activities, and online activities.

The PISA data was the secondary data (standardized scores) obtained from the PISA 2000, 2009, and 2018 from The Organisation for Economic Co-operation and Development (OECD). The 2020 follow-up data was the primary data obtained from data collection in 11 high schools, 33 teachers, 550 students, and 550 parents in Yogyakarta city, Indonesia. In the investigation process, descriptive and inferential statistical techniques and the corresponding specialised software were employed. Specifically, the frequency, mean, standard deviation, and percentage were used to describe the demographic of school, teacher, student, and parent. The analyses of descriptive statistics were carried out using SPSS 23.0. To validate the constructs' validity and consistency, the CFA and Rasch scaling were utilised. The software of MPlus 7.1 (Muthén &

Muthén, 1998-2017) was applied for the CFA and the software of Conquest 4.1 (Adams et al., 2007) was applied for Rasch scaling. A CFA was conducted to validate the constructs at the structure level, whereas a Rasch scaling was conducted to validate the constructs at the item level. Further, to examine the directional relations among the variables at each of the school, teacher, and student levels, structural equation modeling (SEM) was employed. The SEM was performed using Mplus 7.1 (Muthén & Muthén, 1998 - 2017). To further determine the directional influence of school, teacher, and student on reading literacy, hierarchical linear modeling (HLM) was employed. The HLM 8.2 (Raudenbush et al., 2011) was used in running the HLM analysis.

11.3 SUMMARY OF THE FINDINGS

This section presents the summary of the key findings that were drawn from the analysed data. The findings served to answer the research questions presented in Chapter 1 and as the contributions of this study to the Indonesian education system and broadly to the measurement literature. These findings are presented below according to the main and specific research questions.

The study was generally concerned with the factors and how they influence reading literacy achievement. To address this, several questions that involved variables or factors at school and student levels were posed in the PISA cycle (2000, 2009, and 2018). Meanwhile, the same questions from these three PISA cycles were also established in the 2020 follow-up study, with the variables or factors related to the school, teacher, and student (with parent participation).

The three main research questions were: (1) How do student and school factors and reading states (reading attitudes, reading strategies, and reading confidence) and their relationships impact student reading literacy in Indonesia considering paper-based (PISA 2000, PISA 2009, and 2020

follow-up data) and computer-based reading performance (PISA 2018)?; (2) How do the factors impact change over time from 2000 to 2020?; and (3) Are there any differences in the pattern of the relationships (over the multiple years) between paper-based and computer-based reading performance?

To examine the factors that significantly influence students' reading literacy in Indonesia over the four cycles, the structural equation model (with single and path analysis) and hierarchical linear model were applied. The study hypothesised that school-level factors affect the reading literacy of students. The structural equation model was used to impose a theoretical model on student variables and school variables measured by observed variables. With this model, the study explained the interrelationships between construct and observed variables. Meanwhile, the hierarchical linear model was used since the data had students who were nested in schools or students who were nested in classrooms, and classrooms were nested in schools. With this model, the study examined the effects of group variables (school- and teacher-level) and individual variables (student-level) and seek the interaction across levels.

11.3.1. THE EFFECT OF SCHOOL FACTORS ON STUDENT FACTORS, READING STATES, AND READING LITERACY OVER TIME

School factors on student factors

In the analyses of the hierarchical linear model, as student-level was nested with school-level, the interaction between school factors and student factors was evidenced only in cycles 2000 and 2018. The presence of assessment at school in 2000 was found to influence students' reading diversity, which resulted in students' reading literacy. According to this study, assessment practices by the school such as grouping students for instructional purposes in the year 2000 have had a significant influence on students' reading diverse material including magazines, comics, fictions,

non-fictions, websites, and newspapers. Researchers such as (Black et al., 2006) reported that an assessment at the school level can impact learning outcomes.

In cycle 2018, students' reading diversity also interacted with the school level, as interactions were occurring between school location and reading diversity as well as leadership and reading diversity. As a result of this finding, it implied that in the period 2018, schools located near urban or city areas affect the number of times a student reads diverse materials, which resulted in higher average scores on reading literacy. Additionally, the result of interaction between leadership and reading diversity revealed that the less of school relied on the district leadership the more frequently students read diverse materials which led to reading achievement scores. Some schools have mandatory leadership systems based on district or school initiatives, but others do not rely on either of these factors. As the Curriculum 2013 (K-13) was applied at that time, the attained curriculum emphasises the autonomy of schools and teachers. The K-13 has emphasised learner autonomy development (Agustina et al., 2022) and facilitated assessment to foster learning (Noor Chairani, 2015). Students' reading diversity was thus affected, which led to their success in reading performance.

In light of the fact that the interactions between school factors and student factors occur only in small factors and not in all cycles, it is not possible to discuss further the trends over the four cycles.

School factors on reading states

Under the hierarchical linear model results, school-level factors did not interact with reading states at the student-level over the four cycles. Nevertheless, under the structural equation model analysis of the interrelationship, the study noted significant effects between school-level

factors and reading states, including reading strategies, reading confidence, and reading time. Nevertheless, it was only in cycles 2009 and 2018 that school factors had significant effects on reading state, while neither cycle 2000 nor 2020 did.

The effects in cycle 2009 were school location on reading strategies, ICT at school on reading strategies and reading time. Meanwhile, the effects in cycle 2018 were the school sector on reading strategies and reading time, ICT at school on reading confidence and reading time, and school climate on reading time. As evidenced by the findings, the association between school factors and student reading states was, however, limited to a small number of cycles and not all. Thus, further discussion of the trends over the four cycles cannot be conducted.

School factors on reading literacy

School factors were reported to be a predictor of reading literacy over the cycle in the school-level model, despite the predictors being inconsistent over time. In the hierarchical linear model, cycle 2009 did not appear to have significant predictors of reading literacy. All four cycles were, however, indicated to have predictors under the structural equation model.

As part of school types, the school sector consisting of public and private schools showed that both results from the hierarchical linear model and school-level model revealed direct effects on reading literacy. In the hierarchical linear model, three cycles of 2000, 2018, and 2020 showed that public schools outperformed on average students' reading achievement compared to private schools. The coefficients were increased over the periods. A single and path school-level model over four cycles also exposed that public schools have performed better in the average students' reading achievement than private schools. During the three PISA cycles, estimates increased significantly, then dropped significantly in the cycle 2020. Indonesian public schools, particularly

high schools, that allow most students to enter because of their high academic achievement may be one of the reasons behind this. In contrast, private schools, which accept students with any level of achievement, remain at a lower level of achievement. There is no doubt that the academic background of 15-year-old students impacts their academic performance. These findings were in line with those reported by David & Beegle (2006), Stern & Smith (2016), and Kurniawati et al. (2018).

The school location, according to the results of the hierarchical linear model, was a predictor of reading literacy in cycles 2018 and 2020 only. Despite the large gap in estimates over those periods, positive estimates were still obtained. Meanwhile, according to the structural equation model, three cycles were found to be the most significant predictors of reading literacy: 2000, 2009, and 2020. There was a decrease in the coefficient trend during those periods. The findings of both models indicated that schools located near urban or city areas had higher average reading achievement than those located in rural or village areas. The findings of this study were consistent with those reported by Baier (2005) and (Safarah & Wibowo, 2018).

As part of school facilities, ICT at school was found to be the predictor of reading literacy in 2020 through hierarchical linear mode and structural equation model. It was demonstrated that the greater the agreement among schools to provide ICT, the greater the average reading achievement. In addition to the school-level model, ICT at school was also significant in cycles 2000 and 2009. ICT at school in cycles 2000 and 2009 had different initial codes, but the meaning of the finding was the same, the more ICT used at school, the higher the average reading achievement score. Over those three cycles, the coefficient decreased from cycle 2000 to 2020. ICT, such as the internet and local area network (LAN), had contributed to reading achievement in 2000, whereas computers and the internet contributed to reading achievement in 2009. Further,

it was found in 2020 that the more principals agreed that the ICT capacity was adequate, such as digital devices, internet bandwidth, instructional devices, computing capacity, and adequate software, the higher the average reading performance. The findings of both models in this study indicated consistent results with those reported by Pianfetti (2001), Tunjung (2009), Purnomo & Kusnandar (2019), and Toroujeni (2022).

The resources and technology were found to influence reading literacy only in cycle 2018 with the structural equation model. It was demonstrated that the less learning was hindered by a lack of technology such as textbooks, Information Technology (IT) equipment, library or laboratory materials, the higher the average student reading achievement. The result confirmed the finding reported by Darling-Hammond (2000). However, the fact that there was a limitation in the number of significant variables in each cycle in this variable, the trends of resources and technology over time in this study are therefore not able to be reported.

Assessment was found to predict reading literacy in cycles 2000 and 2020 as evidenced in the linear hierarchical model. Meanwhile, in path analysis, the assessment had a direct effect only in cycle 2000. The findings demonstrated the availability assessment in schools contributed to the higher average reading achievement. It further determined that during 2000, the assessment involve informing parents about the child's progress, making decisions about retention or promotion, making group students, comparing the school district's national performance, monitoring the school's progress from year to year and making judgements about teacher effectiveness had contributed to the student performance in reading. Meanwhile, in 2020, assessments remained the same as in 2000, but there were updates including guiding students' learning and identifying aspects of instruction of curriculum, adapting teachers to students' needs,

and awarding certificates to students. Although researchers such as Black et al. (2006) and Dubeck & Gove (2015) underlined that a poor assessment at schools resulting in poor achievement, in this study, assessment was carried out for all aspects such as students, teachers, and the principals. Researchers such as Mullis & Martin (2021) proved that a very planned and measured manner impacts the high achievement of students' academic results. There is a positive impact between assessment and achievement in the study, which is similar to the researcher's findings.

Leadership as part of school management was found to be a predictor of reading outcomes only in cycle 2009 under the school-level model analysis. The finding demonstrated that the more often schools provided activities for leadership development, the higher the average reading ability. It can be concluded that the principals were effective in leading the school in 2009, including ensuring the teachers work according to the school's education goals, observing instruction in classrooms, giving suggestions to teachers on how they can improve their teaching, monitoring students' work, taking initiatives to discuss matters, checking to see whether classroom activities are in keeping with educational goals, or ensuring responsibility for coordinating the curriculum, resulting in excellent reading results. Interestingly, this finding was consistent with studies by Carudin (2011) and Carudin & Agus (2022) which characterized the principal's role in Indonesia as one of guidance rather than a boss in providing correct strategies for teaching and learning which were reflected in excellent student achievement. The trends, however, cannot be presented as leadership was significant only in one cycle of study.

School climate, another part of school management, according to the hierarchical linear model analysis, only accounted for a significant impact on reading performance in cycle 2000. This result indicated that during 2000, the lesser school hindered by the poor atmosphere, the better

the average reading performance. In contrast, the school-level model demonstrated that cycles 2009, 2018, and 2020 were significantly associated with reading performance. There was an increased trend between the cycle of 2009 and 2018 but then decreased in the cycle of 2020. Cycles 2009 and 2018 had positive results, indicating a less problematic school atmosphere, better average reading results, but cycle 2020 had a contrast. The finding in 2020 demonstrated that the more signs of a poor school atmosphere, the higher the average grade. There may be a strong relationship between a better school climate and higher grades. However, there have been cases in which poor school climate did not distract students, such as when teachers did not meet the individual student's needs, they were able to make accommodations on their own and were not dependent on schools or teachers but parents. The results are consistent with those of a study by Alhosani & Singh (2017), which found that a mediated variable of parental involvement has an influence on a student's academic performance.

11.3.2. THE EFFECT OF TEACHER FACTORS ON STUDENT FACTORS, READING STATES, AND READING LITERACY OVER TIME

It is noteworthy that the results from the teacher-level model in cycle 2020 indicate that neither teacher professional, teacher lesson, nor teacher online activities have a significant effect or relationship on reading literacy, as indicated by the hierarchical linear model and single-level model. Thus, no further discussion can be presented.

However, in the single teacher-level model, there was a direct effect of teacher professional on teacher lessons in Indonesia. The findings indicated that when teachers engaged in professional activities such as joining courses or workshops, education conferences or seminars, conducting observation visits to other schools, observation visits to business premises, and joining in-service

training courses in business premises, their lesson delivery in classrooms improved. Researchers such as Didion et al. (2020) and (Carlisle et al., 2011) have highlighted the importance of teachers' professional development to the success of teaching and learning.

11.3.3. THE EFFECT OF STUDENT FACTORS ON READING LITERACY OVER TIME

As students were nested within schools, multilevel analysis was conducted to examine the effects of a higher-level unit namely school-level and on a lower-level unit namely student-level.

Gender was found to be influenced by reading literacy in three PISA cycles in 2000, 2009, and 2018. As evidenced by the hierarchical linear model, gender in those cycles had a negative effect on students' reading literacy, indicating that females outperformed males consistently in reading achievement. Between 2000 and 2009, the coefficient trend decreased and increased in 2018, but it was not as high as it had been in 2000. The direct relationship between gender and other students' factors, including reading activities (reading engagement, reading diversity, and reading online), and reading states (reading strategies, reading confidence, and reading time), was examined in structural equation modelling. It appears that females dominated and outperformed males especially in reading engagement, reading diversity, reading strategies, reading confidence and reading time, while males performed better in reading online. Researchers such as Brozo et al., (2014) and OECD (2010) revealed that concerning reading engagement, reading diversity, and reading time, females were notably higher level than boys and more aware of effective reading strategies. Likewise, a study by Solheim & Lundetræ (2018) believed that boys underachieve in reading, as confirmed by international reading surveys. There is still a lack of clarity regarding the main factors behind gender disparities. Thus, there is a need to conduct a test in the context of Indonesia.

The factor of books as one of home facilities component, was only significant in cycle 2000, with the more books students had at home the higher their reading achievement scores were. The finding of this study indicated consistent results with the reports by Jackson (2016) and Marie Johnson (2016). It is, however, not possible to present a trend since there was only one significant cycle.

Home educational resources, another aspect of home facilities, were significant during the cycle of 2018 and 2020. Even though cycle 2020 had a much higher coefficient than cycle 2018, both negative effects indicate that the availability of educational resources at home contribute to the higher reading performance. It was also suggested that, between 2018 and 2020, students with access to resources at home including dictionaries, study spaces, desks, textbooks, the internet, and software would be able to achieve better reading scores. This finding was in line with those reported by Espinosa et al. (2006), Hogan et al., (2018), Hollingworth et al. (2011), and Park, (2008).

As part of reading activities, reading engagement has been significant during three cycles (2000, 2009, and 2020). All effects were positive, showing that the more students agreed to engage in reading activities, the higher their performance in reading. The trend from 2000 increased in 2009, but then significantly decreased in cycle 2020. A similar finding was reported by Richardson & Morgan (2003).

In three PISA cycles, the second component of reading activities, reading diversity, had a significant impact, but its effects were different in each cycle. In cycles 2000 and 2009, there was a positive effect indicating the more frequently the students read diverse materials, the higher the reading achievement. As opposed to this, in cycle 2018 with negative effects, it was demonstrated

that the more students read diverse materials, the lower their reading scores will be. There was an increase in the trend between 2000 and 2009, but it changed to a negative trend by 2018. It is interesting to know that in 2018, students' reading scores declined as more diverse materials are read. There may be a strong association between reading diversity and reading performance (Brozo et al., 2014; Schoor, 2016). However, there have been instances in which students feel overwhelmed with the materials, especially when they are required to do more digital reading, especially in 2018 when the digital era is popular, thus diverting their attention from reading. Ho & Lau (2018) in their research argued that diversity of reading materials would increase students' satisfaction with reading tests whereas Hu & Yu (2021) observed an increase in PISA scores following the reading of ICT-based social media materials. Thus, the results from those researchers provided a basis for making sense of the findings in cycle 2018.

As another aspect of reading activities, reading online was significant in 2018 with a positive effect, indicating that the more students read online, the better their reading literacy score becomes. Another part of reading activities, reading online, was significant in 2018 with a positive effect indicating that the more students do reading online the higher the mark of reading literacy. There was a sense that students engaged in online activities during the PISA cycle 2018, which was the only one that used computer-based testing. According to Lee & Wu (2012) in their study, students have different ways to approach tests, with most students today learning and working online, and this has also impacted how students learn and take tests.

Among the reading states (reading strategies, reading confidence, and reading time) showed significant effects, though reading strategies only contributed significantly to reading literacy in 2009 and reading confidence in 2018, reading time contributed significantly to all cycles.

In 2009, it was suggested that the better perception of reading strategies, the higher the reading performance. Many studies have reported that reading strategies in Indonesia are challenged, including concentrating on specific parts of the text, summarising into own words, and understanding various texts when taking international tests such as PISA and reading olympics (Dardjito, 2019; Khosiyono et al., 2021; Sofo et al., 2012; Zuckerman et al., 2013). Still all, researchers such as Andrews (2021) and Debeer et al. (2014) believed that a variety of innovative strategies and methods would help improve the skills of Indonesian students at the international level.

According to the finding of reading confidence towards reading literacy in 2018, the higher the student's confidence, the better the performance in reading. During 2018, students were found to have self-confidence including good readers, being able to understand difficult texts, reading fluently, always having an easy reading, having to read texts several times before completely understanding them and finding it easy to answer questions about the text. This finding was supported by the statement of Geske et al. (2021) that self-confidence can overcome the risk of failure. High confidence to read was closely related to reading success Guthrie et al., 2007; Tannir, Abir; Al-Hroub, 2008).

Due to the limited significance factors, reading strategies and reading confidence cannot be presented in a trend, but reading time can be. As a result of all cycles showing positive effects, it implied that when students spent more time reading, they tend to achieve their reading literacy better. From 2000, the coefficient decreased in 2009 before rising in 2018, then declining again in 2020. Field study evidence has confirmed the findings that time spent reading would significantly affects students' reading success (Collins et al., 2014; Grabe et al., n.d.; Lockwood et al., 2010).

Parental effects that have only been observed in cycle 2020 did not demonstrate any significant effects on reading literacy. Despite this, it was found that both mother education and father education had positive effects on parent income based on the analysis carried out through path analysis. According to this finding, the higher the level of education of the mother and father, the greater the monthly income. This finding was consistent with the study by Akukwe & Schroeders (2016). Among the researchers, there was a strong correlation between the educational level of the parents and their occupation.

11.3.4. THE DEMOGRAPHICS OF STUDENT, SCHOOL, TEACHER, AND PARENT

This section provides a discussion of the demographic data supporting the findings of this study before conclusions are drawn from the findings. Student number of books, schools ICT at schools, school funding, teacher education, and parent education and income are discussed.

The majority of Indonesian students over the cycles had a percentage of books in the range of 11 to 100 books, about 40 to 65 per cent. Cycle 2000 had the lowest percentage (49.4%), while the other three cycles were balanced (2009 at 65.2%, 2018 at 65.2%, and 2020 at 62.5%). Several researchers have reported that there is a strong correlation between higher test scores and the number of books in the home (Evans et al., 2014). In addition, they reported that, out of 42 countries that participated in PISA 2012, the largest percentage of books was in the category of over 500 books. It can be concluded that the number of books Indonesians possess is still significantly lower than the average for most countries in the world.

The ICT at schools in high school in Indonesia showed that both public and private schools have a computer as the main ICT were less than 60 items. Even though more than half of the schools agree that ICT tools are sufficient, the average number of Indonesian students in a

classroom is thirty-two students, making it impossible for all students in a classroom to be accommodated at the same time. As a result of the massive flow of information in the digital age, the use of computers becomes increasingly rapid. It is also what is required by the recent PISA Test, that the students are able to access digital technology and be trained on how to use it. Therefore, there is an additional PISA measurement, namely computer literacy (PISA, 2021).

The school funding was provided by the government, student fees, donations, and others. Findings indicated that the funding from the government to public and private schools increased over the period. As public schools received a greater proportion of government funding, private schools received a greater proportion of student fees. However, researchers such as James et al. (1996) it was found that when funding is calculated per student, it remains low, and the facilities that students receive cannot increase the quality as measured by higher examination scores. Having found that private schools are more effective in budgeting and allocating school resources, it has been suggested that public schools be granted greater autonomy over spending funds raised locally. Further, urban schools are expected to increase their expenditures because urban areas place a high value on education.

Teacher demographics were collected only during cycle 2020 regarding teacher qualification and reading time. Thirty-three of the participants have completed a standard teacher training program obtained from an educational institution that is qualified to educate teachers. Based on the new Education Law enacted in 2003, teachers are required to hold a teacher's certificate and fulfil certain qualifications. It is expected that the implementation of teacher certification will ensure the adequate competencies and commitment of teachers to ensure high-quality learning takes place (Firman & Tola, 2008). Although the demographics show sufficient capacity for certified teachers, Kusumawardhani (2017) and Kusanagi (2022) argue that there is no strong

evidence that certified teachers have a positive impact on students' learning outcomes and teacher performance. In the teacher reading time survey, it was found that almost half of the teachers spend approximately six hours a week reading. Nevertheless, it was surprising to discover that there were still teachers who read very little less than one hour per week. The findings further confirmed that there is no single factor of teacher in this study that is significant concerning reading outcomes.

The demographics pertaining to parent (parent education and income) was also collected only in cycle 2020. Among the participants, the majority of parents had ISCED level 7 or similar qualifications and possessed a master's degree. Interestingly, it appears that parents in 2020 had a better education, and it appears that obtaining an education at the level of a master's degree rather than a bachelor's degree is becoming increasingly commonplace. As for parent income, most of the 534 parents who responded to the study reported that they earned more than 10,000,000 rupiahs (equivalent to \$10,000) per year, and more than half earned more than the minimum wage. The report indicated that more than half of the total number of students in 2020 live in families with an income sufficient to meet their basic needs. This study confirmed the previous discussion that parent education had a strong correlation with parental income, the higher the parent education, the higher the parent income.

11.3.5. THE DIFFERENCES IN THE PATTERN OF THE RELATIONSHIPS BETWEEN PAPER-BASED AND COMPUTER-BASED READING PERFORMANCE

This section attempts to address the question of whether there is a difference in the patterns associated with paper-based and computer-based reading performance. As discussed in Chapters 1 and 2, the paper-based reading tests refer to PISA 2000 and PISA 2009, in which participants performed the test manually on paper. Similarly, this method was used as follow-up data in the

cycle 2020. On the other hand, a computer-based test refers to the PISA 2018 test in which the test is administered through an online system. The PISA 2018 computer testing was the second experience for participants, having taken the PISA 2015 computer testing for science literacy. A comparison was made based on the factors toward reading literacy: reading engagement, reading online, reading time, and reading performance over the paper-based and computer-based cycles.

It was found that while reading engagement was significant in reading literacy in paper-based cycles, but it was not significant in the computer-based cycle. Meanwhile, for reading online, it was only the computer-based cycle that contributes to reading literacy. According to the findings, a comparison can be presented. There was in 2000, 2009, and 2020, engagement of students in reading if they have to, being a favourite hobby, discussing books, feeling happy if they receive books as presents, enjoying library visits, reading for information, and being able to read for more than a few minutes, contributed to reading performance. As in 2018, reading emails, chatting online using WhatsApp and Messenger, reading online news, searching online for information about particular topics, participating in online group discussions or forums, and searching the Internet for practical information contributed to the achievement of reading literacy were some of the activities that were performed.

Across all four cycles, both paper-based and computer-based, time spent reading contributed to reading literacy achievement. As discussed in Chapter 5, the majority of students on all cycles read every day for more than 30 minutes. As well, for the four data sets, a small percentage of the students read more than two hours a day. Therefore, the pattern of reading time did not differ between the method of taking a test paper and the method of using the computer.

Furthermore, the gap in reading performance occurred in the follow-up study as the score reached 500, while in the other three cycles it was under 500 (371 in 2000, 402 in 2009, and 371 in 2018). Since the 2020 cycle was a follow-up study conducted in a popular city with higher PISA 2018 reading scores than other cities, it made sense if the score was high. As there was no difference in scores between paper-based cycles and computer-based cycles in this study, a comparison of reading performance cannot be made between the two types of testing. Nonetheless, while it is not possible to make a clear comparison between paper and computer testing, it seems that students will be required to adapt computer-based testing in order to keep up with the digital age in the future and reduce paper consumption (Komatsu & Rappleye, 2017; Piaw Chua, 2012).

11.4 IMPLICATIONS OF THE STUDY

The implications of the findings for theory, methodology, theory, policy is discussed in this section. Also, a brief discussion of each implication is presented.

11.4.1 THEORETICAL IMPLICATION

The issue of Indonesian low level reading literacy had appeared in the literature sections (Anandari & Iswandari, 2019; Chintia et al., 2018; Nugrahanto & Zuchdi, 2019; Tobias et al., 2013). The literatures have indicated that reading literacy is one of the essential academic skills. This emphasis arises from the view that students who are reading literate will be successful in their future endeavours (Clark & Rumbold, 2006). Accordingly, an international assessment such as PISA has developed to ensure the needed competency in the domain of reading literacy. Besides, several studies have conducted on the factors of reading literacy using PISA study around the world. Several countries that wish to gauge their academic achievement at the national level and their level of competence on international platforms participate in some assessment processes and

accordingly review their systems. As such, Indonesia utilises the PISA assessment as a means of identifying relevant areas for future improvements, including reading literacy interventions. However, research studies on reading literacy are still insufficient (Fenanlampir et al., 2019). There have been several studies conducted on reading literacy in Indonesia (Chintia et al., 2018; Nugrahanto & Zuchdi, 2019; Ratri, 2015) but only few have focused on longitudinal study in multiple cycles.

This study also provides evidence of some continuing factors that lead to a better understanding of the factors contributing to the low-level reading achievement of Indonesian students. Likewise, those consistent factors can be used to predict reading literacy achievement, allowing future improvement initiatives to be focused on these factors. While there were only a limited number of significant effects from the parents and teachers, the study provides some insight for future studies, which will consider these two factors to understand their roles more fully in the achievement of students. Instead of blaming the student for poor reading performance and the principal for lack of leadership, this study suggests that factors from the student, parent, teacher, and school all play an equal role. Furthermore, the parent and teacher investigations in this study provide new essential information that complements the previous reading literacy study that did not include both factors, especially in Indonesia.

11.4.2 METHODOLOGICAL IMPLICATION

There were several research questions addressed in the study (Chapters 1, 8, 9, and 10) that sought to examine the factors (student, school, teacher, and parent) that influence reading literacy, including the relationships between them. Based on information in the literature, a theoretical framework (Chapters 2 and 3) has been developed to investigate these factors and their

relationships. A conceptual theoretical framework of the study exploring the predictors of reading literacy in Indonesia was used to guide the analysis of the tested factors and their relationships.

The instruments consisted of questionnaires and achievement tests that were employed in primary and secondary data collection. To ensure that the data obtained in this study are reliable and objective, rigorous validation procedures should be applied to the questionnaires or instruments. The questionnaires/constructs were validated to obtain reliable data for subsequent analysis through Confirmatory Factor Analysis (CFA) and the Rasch Model. While the CFA validated the constructs at the level of structure, the Rasch Model validated the constructs at the item level.

The use of Rasch models to transform the raw scores to the Weighted Likelihood Estimates (WLE) scores makes the interpretation more meaningful and valid as the WLE scores are interval scales of equal distance. Transformed scores using the WLE method in follow-up data were further converted to W scale scores to ensure that analyses were conducted with the same three cycles in 2000, 2009, and 2018. There is potential to use Rasch, particularly in Indonesia, where the Rasch model is not widely employed, especially in equating constructs. Some constructs such as home educational, reading engagement, reading diversity, online reading, and reading strategies, resources and technology, assessment, and school climate were not studied in the earlier study, and may have been least investigated in that study.

A structural equation modelling (SEM) analysis was conducted to examine the relationship between factors at a single-level analysis of the student-, school-, and teacher-level and to investigate further the factors that can be predictors of reading literacy. However, due to the hierarchical nature of the data collected, the SEM is not sufficient to explain significant variance

at other levels. Thus, a multilevel analysis technique was used with a model that went beyond the results of a single-level analysis. The analysis was performed using hierarchical linear modelling (HLM) which eliminates the limitations of SEM analysis and considers all variance at each level in addition to enabling interactions and cross-level effects.

11.4.2 POLICY AND PRACTICE IMPLICATION

The Ministry of Education and Culture (MoEC) and the Ministry of Religion (MoRA) could gain better understanding of what influences students reading literacy in PISA Test covered in the new curriculum. Some aspects of the implementation of K-13 have been improved from the results of cycles 2018 and 2020, in which literacy in reading and 21st century learning were strengthened. In these two cycles, literacy skill has improved with regard to student's reading engagement, while 21st century learning has improved with regard to ICT at schools and the availability of resources and technology. Accordingly, these aspects of the previous curriculum should be maintained in the new curriculum. As of February 2022, there is a new curriculum being evaluated by the previous curriculum (K-13) called the Independent Learning Curriculum (*Kurikulum Merdeka Belajar*). Even though the curriculum has again been revised, the requirement for students to read 15 minutes as part of program of National Literacy Movement (*Gerakan Literasi Nasional/ GLN*) before the beginning of class remains in place. An initiative has been made, but the academic result has not met expectations. It is therefore necessary for further research to be conducted to understand the different models of program approaches to supporting literacy development.

The government's initiative, to reintroduce ICT into the school curriculum, has yet to be effectively implemented and with a particular focus on improving digital literacy. Thus, the study may also provide insight to the curriculum developers should design curriculum that incorporates

digital literacy skills from the beginning of the level. There should be an emphasis on digital literacy skills, particularly in conjunction with critical thinking skills, not only in secondary schools, but also in primary schools. It becomes urgent to develop digital literacy at an early age in order for children, who will be future voters and consumers, to have the skills and understanding they will need for these roles as well as to maximize the use of the Internet to its full potential (Fairiza & Amanta, 2021). As well as this, the MoEC and MoRA should cooperate with the Ministry of Communication and Informatics to facilitate the expansion of technology and the availability of the Internet, particularly for schools located in villages and rural areas.

A further recommendation is made to the school to design a digital literacy improvement program in light of the curriculum's continued value of autonomy. Autonomy in national curriculum was therefore viewed as a dynamic process during the implementation of the leadership, in which the parties involved can adjust to the changing circumstances. In this regard, educational policies that have authority over schools such as Education, Youth, and Sport Office should provide professional development programs to increase the teaching ICT profession of new pedagogical strategies and instruction tools for teaching in accordance with newly enacted curriculum regulations. The teaching profession plays an important element of the overall strategy to enhance teaching quality and learning outcomes. The emphasis is on training and guidance for teachers on how to successfully implement a new approach of cultivating critical thinking skills in and improving teachers' capacities in ICT in their classrooms.

The progress in achieving greater quality of reading literacy has occurred in the context of relatively supportive leadership at schools. Maintaining a leadership role and being able to demonstrate the critical responsibilities that help teachers and students on their path to improvement are of utmost importance to the principal. Although principal leadership is important,

it is also important for parents to be involved in introducing literacy skills so that students are engaged in literacy not only at school but also at home.

11.5 LIMITATIONS OF THE STUDY AND RECOMMENDATIONS FOR FUTURE RESEARCH

Some significant findings regarding reading literacy have been drawn from the PISA data of Indonesian students, but some design flaws have also been identified. The present study is perhaps the first to investigate reading literacy in Indonesia using PISA data across multiple cycles, thereby making the conclusions regarding directional relationships far from conclusive. Specifically, as some proposed relationships and associations had not come out after conducting the analysis, thus diverting in predict the factors and discuss the trend. As such, the hypothesis needs further research to determine whether it is adequate. Moreover, the factors examined in this study are not meant to be the only factors influencing reading literacy. A future study using PISA data could examine other variables that may affect or be affected by reading literacy.

Although the study addressed some critical questions and provided some insightful recommendations for general educators, caution must be exercised when making generalisations. The follow-up study in 2020 employed purposive sampling in selecting school, teacher, student, and parent participants. The findings cannot be generalised to the whole population of schools, teachers, students and parents in Indonesia. Participants were selected based on school participation in the latest PISA and the city is well known for its educational reputation. Moreover, as the secondary data in this study adopted Indonesian data, it might not reflect students from different countries. In primary data collection, sample surveys are limited to a portion of the population. The data was collected from 11 secondary schools in Yogyakarta using non-probability sampling representing the Indonesian context.

PISA tests in Indonesia did not include teacher and parent surveys, therefore a longitudinal study to measure teacher and parent predictors of reading literacy cannot be conducted. Thus, it is strongly suggested to involve teacher and parent in the future PISA survey considering its advantages described briefly above and mentioned in the earlier chapters.

The declining score could be due to the shift from paper to computer-based testing. It was actually in PISA 2015 that computer-based testing was introduced with science as the main domain, and since then, reading scores have steadily declined. Several researchers have published their findings on the major reason for the decline in reading scores following the switch from paper to computer-based testing (Jerrim et al., 2017). In most of the findings, potential mechanisms were not considered, which remains a crucial area to investigate in the future.

The time factor was also a limitation as the data collected in 2020 collected in this study got impacted by the Covid-19 pandemic. The primary data was collected in January – February 2020. Unfortunately, some of the information obtained from the students was insufficient, which led to a further collection for additional information. Even though the study got approval from principals to provide the questionnaires online, due to the pandemic in Indonesia that started to happen in March 2020, the students needed to learn at home. Future studies should not be hindered by such constraints in order to collect primary data efficiently.

A study such as this might be one of the few investigations of reading literacy in Indonesia over a period of time. Furthermore, this is the first study to use secondary data in conjunction with primary data in a follow-up study conducted in Indonesia. The limitations of this study and the suggestions outlined above can be addressed to provide more meaningful results from future research in reading literacy based on the PISA data.

11.6 CONCLUDING REMARKS

The study determined that there were consistent and inconsistent factors affecting reading literacy throughout the four cycles. There was evidence of consistent predictors at the student level in the factors of gender, reading engagement, and time spent reading. At school-level, the predictors were school sector in the 2000, 2018 and 2020 cycles; school location in the 2018 and 2020 cycles; ICT in the 2020 cycle; resources and technology in the 2018 cycle; assessment in 2000 and 2018 cycles; leadership in the 2018 cycle; and school climate in the 2000 cycle. It was surprising to find that no factor was significant at the teacher-level in the 2020 cycle but a direct effect was found between teacher professional and teacher lesson activities. At student-level, the predictors were: gender in the 2000, 2009, and 2018 cycles; the number of books in the 2000 cycles; home and educational resources in the 2018 cycle; reading engagement in the 2000, 2009, and 2018 cycles; reading diversity in the 2000, 2009, and 2018 cycles; reading online in the 2018 cycle; reading strategies in the 2009 cycle, reading confidence in the 2018 cycle, and reading time in the 2000, 2009, and 2018 cycles. The predictors were consistently available in the factors of gender, reading engagement, and reading time. In addition, the results indicated that computer-based tests (2018 cycle) provided more predictors than text-based tests (2000, 2009, and 2020 cycles).

Indonesian students continue to struggle in the context of reading literacy, their struggles are far from over. As further evidence, the latest PISA 2021 report on the domain of mathematics, which was published at the end of the study, shows that Indonesia achieved the lowest level of reading literacy among the countries with a score of 358. The study suggests that, in general, private schools and schools located in rural or village areas require more attention regarding ICT, technology, assessment, leadership, and school climate. This likewise suggests that supplying every school with resources for reading online, such as computers and ICT aids, is important for

students in the digital era. In addition, males should receive greater attention to reading activities, such as reading engagement and reading diversity, as well as reading states, such as reading strategies, reading confidence, and reading time. Meanwhile, females should receive more attention in online reading.

Teacher professional activities plays an important role in supporting the delivery of better lessons in the classroom. In addition, it is important not to underestimate parental support in terms of the income and education of the parents. These findings also suggest that it would be beneficial for the Indonesian government in the future to maintain a curriculum based on autonomy in conjunction with digital literacy in the future to increase student reading achievement with computer-based testing. Furthermore, the government should include teacher and parent survey in future PISA Tests so that a longitudinal study could be conducted to capture better predictions of the variables and their relationships and to offer stronger findings. As well, a more comprehensive analysis of the factors influencing reading ability can be conducted.

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Appendix A Ethics Approval from The University of Adelaide



RESEARCH SERVICES
OFFICE OF RESEARCH ETHICS, COMPLIANCE
AND INTEGRITY
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CRCOS Provider Number 00123M

Our reference 34085

13 December 2019

Dr Igusti Darmawan
School of Education

Dear Dr Darmawan

ETHICS APPROVAL No: H-2019-249
PROJECT TITLE: Exploring the predictors of Indonesian reading literacy based on PISA data

The ethics application for the above project has been reviewed by the Low Risk Human Research Ethics Review Group (Faculty of Arts and Faculty of the Professions) and is deemed to meet the requirements of the *National Statement on Ethical Conduct in Human Research 2007 (Updated 2018)* involving no more than low risk for research participants.

You are authorised to commence your research on: 13/12/2019
The ethics expiry date for this project is: 31/12/2022

NAMED INVESTIGATORS:

Chief Investigator: Dr Igusti Darmawan
Student - Postgraduate Masters Ms Safitri Yosita Ratri
by Research:
Associate Investigator: Associate Professor Sivakumar Alagumalai

CONDITIONS OF APPROVAL: Thankyou for addressing the feedback. The revised ethics application provided on 12 December 2019 has been approved.

Ethics approval is granted for three years and is subject to satisfactory annual reporting. The form titled Annual Report on Project Status is to be used when reporting annual progress and project completion and can be downloaded at <http://www.adelaide.edu.au/research-services/oreci/human/reporting/>. Prior to expiry, ethics approval may be extended for a further period.

Participants in the study are to be given a copy of the information sheet and the signed consent form to retain. It is also a condition of approval that you immediately report anything which might warrant review of ethical approval including:

- serious or unexpected adverse effects on participants,
- previously unforeseen events which might affect continued ethical acceptability of the project,
- proposed changes to the protocol or project investigators; and
- the project is discontinued before the expected date of completion.

Yours sincerely,

Dr Anna Olijnyk
Convenor

Dr Douglas Bardsley
Convenor

The University of Adelaide

Appendix B Approval from Indonesia institution on behalf Ministry of Education and Culture



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS NEGERI YOGYAKARTA
FAKULTAS ILMU PENDIDIKAN

Alamat: Jalan Colombo Nomor 1 Yogyakarta 55281
Telepon (0274) 540611, Faksimile (0274) 540611
Laman: fip.uny.ac.id E-mail: humas_fip@uny.ac.id

Nomor : B/1723/UN34.11/PT.01.04/2019
Lamp. : Daftar Nama Sekolah dan Proposal Penelitian
Hal : *Permohonan Izin dan Data Penelitian*

23 Desember 2019

Yth. Bapak Kepala Dinas Pendidikan dan Olahraga DIY
Jl. Cendana No.9, Semaki, Umbulharjo, Kota Yogyakarta,
Daerah Istimewa Yogyakarta 55166

Dengan hormat,

Sehubungan dengan akan dilaksanakannya Penelitian Mandiri dengan judul *“Investigasi Prediktor Kemampuan Literasi Membaca Berdasarkan Data PISA di Indonesia”*, kami mohon Bapak Kepala Dikpora DIY berkenan memberikan izin dan data penelitian kepada Peneliti Fakultas Ilmu Pendidikan Universitas Negeri Yogyakarta sebagai berikut:

Nama : Safitri Yosita Ratri, M.Pd., M.Ed.
NIP : 198006292003122001
Pangkat/Gol : Penata Muda Tk.I/III/b
Jabatan : Lektor
Unit Kerja : Jurusan Pendidikan Sekolah Dasar Fakultas Ilmu Pendidikan UNY
Waktu Penelitian : Bulan Januari s.d. Bulan Februari 2020

Bersama ini kami lampirkan Daftar Sekolah untuk Penelitian dan Proposal Penelitian.

Demikian permohonan ini kami sampaikan, atas kerjasama dan terkabulkannya permohonan ini kami ucapkan terima kasih.

Dekan,



Tembusan :

1. Wakil Dekan Bidang Akademik dan Kerjasama
 2. Ketua Jurusan PSD
- FIP UNY

Dr. Suarwo, M.Pd.

NIP 196910302003121001

Lampiran Daftar Sekolah untuk Penelitian

No	Nama Sekolah	Alamat Sekolah
1.	SMP [REDACTED] Yogyakarta	[REDACTED]
2.	SMP [REDACTED] Yogyakarta	
3.	SMP [REDACTED] Yogyakarta	
4.	SMP [REDACTED] Yogyakarta	
5.	SMP [REDACTED] Yogyakarta	
6.	SMP [REDACTED] Yogyakarta	
7.	SMA [REDACTED] Yogyakarta	
8.	SMA [REDACTED] Yogyakarta	
9.	SMA [REDACTED] Yogyakarta	
10.	SMA [REDACTED] Yogyakarta	

11.	SMA [REDACTED] ogyakarta	[REDACTED]

Appendix C

School Questionnaire

Kepala Sekolah yang terhormat,

Terima kasih atas partisipasi Anda dalam studi ini. Kuesioner ini menanyakan informasi tentang:

- Latarbelakang keadaan sekolah
- Pengelolaan sekolah
- Data Guru
- Penilaian dan evaluasi
- Target Siswa
- Suasana sekolah

Informasi ini dapat menggambarkan persamaan dan perbedaan antarsekolah dalam rangka perbaikan hasil-hasil tes siswa. Misalnya, informasi yang diberikan akan bermanfaat untuk melihat dampak tersedianya sumber daya terhadap prestasi belajar siswa - baik di dalam suatu negara maupun antarnegara.

Kuesioner ini harus diisi oleh kepala sekolah atau orang yang ditugasi untuk itu. Pengisian kuesioner ini akan memerlukan waktu kurang lebih 60 menit.

Untuk beberapa pertanyaan diperlukan keahlian khusus. Anda perlu berkonsultasi dengan ahlinya untuk membantu Anda menjawab pertanyaan-pertanyaan tersebut.

Apabila Anda tidak mengetahui jawabannya secara pasti, perkiraan terbaik Anda cukup untuk tujuan studi ini.

Jawaban-jawaban Anda akan dirahasiakan. Jawaban-jawaban tersebut kemudian akan digabung dengan jawaban kepala sekolah dari sekolah lain untuk selanjutnya dihitung total dan rata-rata sehingga jawaban dari suatu sekolah tidak dapat diidentifikasi

Untuk menjawab pertanyaan-pertanyaan dalam kuesioner ini, mohon diperhatikan definisi-definisi berikut:

Pembelajaran Sains di sekolah meliputi semua mata pelajaran sains yang bersangkutan dengan bidang fisika, ilmu kimia, biologi, pengetahuan tentang Bumi atau geologi, pengetahuan angkasa luar atau astronomi, pengetahuan dan teknologi terapan yang dianjurkan dalam kurikulum Anda sebagai mata pelajaran sains yang terpisah atau diajarkan dalam satu mata pelajaran sains yang terintegrasi. TIDAK termasuk disini mata pelajaran terkait seperti matematika, psikologi, ekonomi, maupun masalah-masalah yang berhubungan dengan pengetahuan/sains tentang Bumi yang merupakan bagian dari mata pelajaran geologi.

LATAR BELAKANG KEADAAN SEKOLAH

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SC001

SC001Q01TA

Manakah definisi yang paling tepat untuk menggambarkan masyarakat tempat sekolah anda berada?

(Silahkan pilih satu jawaban.)

Daerah pedesaan (kurang dari 3.000 penduduk)	☐ ₁
Kota kecil/Kecamatan (3.000 sampai dengan 15.000 penduduk)	☐ ₂
Kota kabupaten (15.000 sampai dengan 100.000 penduduk)	☐ ₃
Ibu kota provinsi (100.000 sampai dengan 1.000.000 penduduk)	☐ ₄
Kota besar (lebih dari 1.000.000 penduduk)	☐ ₅

SC002 **Sampai pada tanggal 1 Februari 2015, berapa jumlah total siswa yang terdaftar di sekolah anda?**

(Tuliskan angka pada setiap baris. tulislah 0 (nol) jika tidak ada.)

SC002Q01TA Jumlah siswa laki-laki: _____

SC002Q02TA Jumlah siswa perempuan: _____

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SC003

SC003Q01TA

Berapa rata-rata jumlah siswa dalam satu rombel kelas 9 SMP/MTs atau kelas 10 SMA/MA/SMK yang berpengantar bahasa Indonesia di sekolah Anda?

(Silahkan pilih satu jawaban.)

15 siswa atau kurang	☐ ₁
16-20 siswa	☐ ₂
21-25 siswa	☐ ₃
26-30 siswa	☐ ₄
31-35 siswa	☐ ₅
36-40 siswa	☐ ₆
41-45 siswa	☐ ₇
46-50 siswa	☐ ₈
Lebih dari 50 siswa	☐ ₉

SC004 Tujuan dari sekumpulan pertanyaan berikut adalah untuk mendapatkan informasi mengenai perbandingan antara jumlah siswa dengan jumlah komputer untuk siswa kelas 9 SMP/MTs atau kelas 10 SMA/MA/SMK di sekolah Anda.

(Tuliskan angka pada setiap baris. Tuliskan 0 (nol) jika tidak ada.)

	Jumlah
SC004Q01TA Berapa jumlah keseluruhan siswa kelas 9 SMP/MTs atau kelas 10 SMA/MA/SMK di sekolah Anda?	_____
SC004Q02TA Kira-kira, berapa jumlah komputer yang tersedia bagi para siswa untuk proses pembelajaran?	_____
SC004Q03TA Kira-kira, berapa komputer tersebut yang dihubungkan dengan jaringan Internet?	_____
SC004Q04NA Kira-kira, berapa dari komputer-komputer tersebut berbentuk komputer jinjing (misalnya laptop, tablet)	_____
SC004Q05NA Kira-kira, berapa jumlah papan tulis interaktif secara keseluruhan yang tersedia di sekolah Anda	_____
SC004Q06NA Kira-kira, berapa jumlah projector data secara keseluruhan yang tersedia di sekolah Anda?	_____
SC004Q07NA Kira-kira, berapa jumlah komputer yang terhubung dengan internet yang disediakan untuk guru-guru di sekolah Anda?	_____

SC053 Pada tahun ajaran 2013/2014, kegiatan apa saja yang ditawarkan sekolah kepada siswa di kelas 9 SMP/MTs atau kelas 10 SMA/MA/SMK?

(Pilih satu jawaban untuk setiap pernyataan.)

		Ya	Tidak
SC053Q01TA	Band, group musik atau paduan suara	☐ ₁	☐ ₂
SC053Q02TA	Kelas drama atau kelas musik	☐ ₁	☐ ₂
SC053Q03TA	Buku tahunan sekolah, koran atau majalah	☐ ₁	☐ ₂
SC053Q04TA	Kegiatan sukarela atau layanan sukarela misalnya Palang Merah Remaja (PMR)	☐ ₁	☐ ₂
SC053Q05NA	Kelompok IPA	☐ ₁	☐ ₂
SC053Q06NA	Kompetisi-kompetisi IPA, misalnya Olimpiade Sains Nasional - OSN	☐ ₁	☐ ₂
SC053Q07TA	Kelompok catur	☐ ₁	☐ ₂
SC053Q08TA	Kelompok dengan focus komputer/ICT	☐ ₁	☐ ₂
SC053Q09TA	Kelompok seni atau aktivitas seni	☐ ₁	☐ ₂
SC053Q10TA	Tim olahraga atau aktivitas olah raga	☐ ₁	☐ ₂
SC053Q11TA	Lainnya (misal fotografi, kelompok baca Al Quran)	☐ ₁	☐ ₂

SC059 Manakah dari pernyataan berikut yang tepat tentang jurusan IPA di sekolah Anda?

(Pilih satu jawaban untuk setiap pernyataan.)

		Ya	Tidak
SC059Q01NA	Dibandingkan dengan jurusan-jurusan lainnya, jurusan IPA di sekolah kami mempunyai peralatan yang lengkap	☐ ₁	☐ ₂
SC059Q02NA	Apabila kami pernah mempunyai kelebihan finansial, sebagian besar anggaran dipergunakan untuk perbaikan pengajaran IPA.	☐ ₁	☐ ₂
SC059Q03NA	Guru-guru matapelajaran IPA di sekolah merupakan staf pengajar terbaik kami .	☐ ₁	☐ ₂
SC059Q04NA	Dibandingkan dengan sekolah yang lain, kita memiliki laboratorium yang lengkap	☐ ₁	☐ ₂
SC059Q05NA	Peralatan dan bahan yang digunakan untuk kegiatan praktek IPA berada dalam kondisi yang baik.	☐ ₁	☐ ₂
SC059Q06NA	Kami mempunyai keperluan-keperluan laboratorium yang memadai untuk digunakan secara teratur oleh semua program IPA.	☐ ₁	☐ ₂
SC059Q07NA	Kami mempunyai tambahan staf laboratorium yang dapat membantu pengajaran IPA.	☐ ₁	☐ ₂
SC059Q08NA	Sekolah kami membelanjakan kelebihan anggaran untuk membeli peralatan IPA yang terkini.	☐ ₁	☐ ₂

SC052 Untuk siswa usia 15 tahun, apakah sekolah memberikan bantuan pembelajaran dalam hal berikut?

(Pilih satu jawaban untuk setiap pernyataan.)

Ya

Tidak

SC052Q01NA	Ruangan-ruangan dimana siswa dapat mengerjakan tugas pekerjaan rumah mereka	☐ ₁	☐ ₂
SC052Q02NA	Guru yang membantu tugas pekerjaan rumah	☐ ₁	☐ ₂

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PENGELOLAAN SEKOLAH

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SC009 Berikut ini adalah pernyataan-pernyataan tentang manajemen Anda di sekolah. Pilihlah frekuensi aktivitas dan perilaku di sekolah Anda selama tahun ajaran terakhir.

(Pilih satu jawaban untuk setiap pernyataan.)

		Tidak pernah	1-2 kali dalam setahun	3-4 kali dalam setahun	Satu bulan sekali	Satu minggu sekali	Lebih dari sekali dalam satu minggu
SC009Q01TA	Saya memanfaatkan hasil prestasi siswa Untuk mengembangkan tujuan-tujuan pendidikan di sekolah.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q02TA	Saya memastikan bahwa aktivitas-aktivitas pengembangan profesi guru-guru sejalan dengan tujuan-tujuan di sekolah.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q03TA	Saya memastikan bahwa kerja guru-guru sesuai dengan tujuan-tujuan sekolah.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q04TA	Saya memperkenalkan praktek-praktek mengajar berdasarkan dari studi pendidikan yang terkini	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q05TA	Saya memuji guru-guru yang siswa-siswanya aktif berpartisipasi dalam belajar.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q06TA	Ketika guru memiliki masalah di kelasnya, saya mengambil inisiatif untuk	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆

membahas/mendiskusikan permasalahan tersebut.

SC009Q07TA	Saya mengajak guru untuk memperhatikan Pentingnya perkembangan kapasitas berpikir kritis dan sosial dari siswa.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q08TA	Saya memperhatikan tingkah laku yang mengganggu di dalam kelas.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q09TA	Saya memberi kesempatan staf untuk berpartisipasi dalam penentuan keputusan.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q10TA	Saya melibatkan guru-guru untuk membantu membangun budaya sekolah untuk perbaikan terus menerus	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q11TA	Saya mengajak guru-guru berpartisipasi dalam menelaah praktek-praktek manajemen.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q12TA	Ketika guru membawa masalah dari kelasnya, kami bersama-sama menyelesaikannya.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆
SC009Q13TA	Saya mendiskusikan tujuan-tujuan akademis sekolah dengan para guru di pertemuan guru.	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅	☐ ₆

SC010 Di sekolah Anda, siapa yang bertanggung jawab penuh untuk tugas-tugas berikut?

(Pilihan untuk setiap pernyataan bisa lebih dari satu.)

		Kepala sekolah	Guru	Yayasan atau Komite Sekolah	Dinas Pendidikan Kota/Kabupaten atau Provinsi	Kementerian Pendidikan dan Kebudayaan
SC010Q01T	Seleksi untuk pengangkatan guru	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q02T	Memberhentikan guru	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q03T	Penentuan gaji awal guru	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q04T	Penentuan kenaikan gaji guru.	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q05T	Penyusunan anggaran sekolah.	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q06T	Penentuan alokasi anggaran dalam sekolah.	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q07T	Penentuan kebijakan tentang kedisiplinan siswa.	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q08T	Penentuan kebijakan tentang asesmen siswa	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q09T	Penerimaan siswa baru	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q10T	Pemilihan buku teks yang digunakan.	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁

SC010Q11T	Menentukan isi atau materi pelajaran	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁
SC010Q12T	Penentuan mata pelajaran yang ditawarkan.	☐ ₁	☐ ₁	☐ ₁	☐ ₁	☐ ₁

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SC012 Seberapa sering faktor-faktor berikut dipertimbangkan pada saat penerimaan siswa baru di sekolah Anda?

Pilih satu jawaban untuk setiap pernyataan.)

		<i>Tidak</i>	<i>Kadang-kadang</i>	<i>Selalu</i>
SC012Q01TA	Rapor prestasi siswa (termasuk tes masuk)	☐ ₁	☐ ₂	☐ ₃
SC012Q02TA	Rekomendasi dari sekolah asal	☐ ₁	☐ ₂	☐ ₃
SC012Q03TA	Persetujuan orang tua siswa terhadap filosofi atau ciri keagamaan sekolah itu	☐ ₁	☐ ₂	☐ ₃
SC012Q04TA	Minat siswa pada program khusus yang ditawarkan sekolah	☐ ₁	☒ ₂	☐ ₃
SC012Q05TA	Ada tidaknya anggota keluarga yang sedang atau pernah sekolah di sekolah tersebut	☐ ₁	☐ ₂	☐ ₃
SC012Q06TA	Lokasi tempat tinggal	☐ ₁	☐ ₂	☐ ₃
SC012Q07TA	Faktor lain	☐ ₁	☐ ₂	☐ ₃

SC013 Sekolah Anda termasuk sekolah negeri atau swasta?

(Silahkan pilih satu jawaban.)

SC013Q01TA Sekolah Negeri

(Sekolah yang dikelola secara langsung atau tidak langsung oleh Dinas provinsi atau pemerintah.)

☐ ₁

Sekolah Swasta

(Sekolah yang dikelola secara langsung atau tidak langsung oleh organisasi non pemerintah, misal, gereja, bisnis, atau institusi pribadi lainnya.)

☐ ₂

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SC014 **Apa jenis organisasi yang menjalankan sekolah Anda?**

SC014Q01NA

(Silahkan pilih satu jawaban.)

Gereja atau organisasi keagamaan lainnya

☐ ₁

Organisasi nirlaba lainnya

☐ ₂

Sebuah organisasi yang mencari laba

☐ ₃

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SC016 Kira-kira berapa persen dana yang diterima sekolah Anda untuk satu tahun ajaran yang berasal dari sumber-sumber berikut?

(Tuliskan angkanya pada setiap baris. Tuliskan 0 (nol) jika tidak ada.)

		%
SC016Q01TA	Pemerintah (termasuk dana pusat atau daerah)	_____
SC016Q02TA	SPP (uang sekolah) yang dibayar orang tua	_____
SC016Q03TA	Para dermawan, donatur, hibah, sponsor, pencarian dana oleh orang tua murid	_____
SC016Q04TA	Sumber lainnya	_____
	<i>Total</i>	<i>100%</i>

SC017 Apakah kemampuan sekolah untuk melaksanakan proses pembelajaran terhalang oleh salah satu masalah berikut?

(Pilih satu jawaban untuk setiap pernyataan.)

		<i>Tidak sama sekali</i>	<i>Sangat sedikit</i>	<i>Untuk batas tertentu</i>	<i>Banyak</i>
SC017Q01NA	Kurangnya staf pengajar.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC017Q02NA	Staf pengajar yang tidak memadai atau kurang berkualitas	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC017Q03NA	Kekurangan tenaga yang membantu staf.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC017Q04NA	Staf yang membantu tidak memadai atau kurang berkualitas.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC017Q05NA	Kekurangan bahan dan alat untuk pembelajaran (misalnya buku teks, peralatan komputer, buku-buku perpustakaan atau bahan-bahan buat laboratorium).	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC017Q06NA	Bahan yang tidak memadai atau jeleknya alat-alat pendidikan yang berkualitas (misalnya buku teks, peralatan komputer, buku-buku perpustakaan atau bahan-bahan buat laboratorium)	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC017Q07NA	Kurangnya infrastruktur fisik (misalnya bangunan, lapangan, alat pendingin, pencahayaan dan sistem akustik).	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC017Q08NA	Kualitas infrastruktur fisik yang tidak memadai atau buruk (misalnya bangunan, lapangan, alat pendingin, pencahayaan dan sistem akustik).	☐ ₁	☐ ₂	☐ ₃	☐ ₄

DATA GURU

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SC018 Berapa jumlah guru di sekolah Anda?

Termasuk di dalamnya guru tetap dan guru honorer. Disebut guru tetap jika bertugas mengajar sebagai guru paling sedikit 90% dalam satu tahun ajaran. Jika tidak maka dikatakan sebagai guru honorer. Berkenaan dengan tingkat kemampuan/pendidikan, mohon hanya ditulis **tingkat kemampuan/pendidikan yang tertinggi**.

(Tuliskan angka pada setiap baris. Tuliskan 0 (nol) jika tidak ada.)

		Full-time	Part-time
SC018Q01TA	Jumlah SELURUH guru		
SC018Q02TA	Jumlah guru dengan sertifikat penuh dari LPTK/IKIP		
SC018Q05NA	Jumlah guru dengan kualifikasi S-1/ program sarjana.		
SC018Q06NA	Jumlah guru dengan kualifikasi S-2/ program master.		
SC018Q07NA	Jumlah guru dengan kualifikasi S-3/ program doktor.		

SC019 Berapa jumlah masing-masing guru IPA (Fisika, Biologi, Kimia) yang terdapat di sekolah anda?

Termasuk di dalamnya guru tetap dan guru honorer. Disebut guru tetap jika bertugas mengajar sebagai guru paling sedikit 90% dalam satu tahun ajaran. Jika tidak maka dikatakan sebagai guru honorer.

(Tuliskan angka pada setiap baris. Tuliskan 0 (nol) jika tidak ada.)

		Full-time	Part-time
SC019Q01NA	Jumlah total guru IPA (Fisika, Biologi, Kimia) yang terdapat di sekolah anda.		
SC019Q02NA	Jumlah guru IPA (Fisika, Biologi, Kimia) yang sudah sertifikasi.		
SC019Q03NA	Jumlah guru IPA (Fisika, Biologi, Kimia) yang berkualifikasi S-1 (Sarjana), S-2 (Master), atau S-3 (Doktor) yang mengajar IPA.		

SC025 Selama tiga bulan terakhir, berapa persen dari guru di sekolah Anda yang mengikuti program pengembangan profesi?

Program pengembangan profesi di sini adalah program formal yang dirancang untuk meningkatkan keterampilan mengajar atau praktik pedagogis. Ini mungkin atau mungkin tidak menuju pada kualifikasi yang diakui. Program ini harus dilaksanakan setidaknya satu hari dan memfokuskan diri pada pengajaran dan pendidikan.

(Tulis perkiraan persentase untuk setiap pernyataan. Apabila tidak ada satu orang gurupun yang berpartisipasi pada aktivitas pengembangan profesi tersebut, tulis "0" (nol)).

SC025Q01NA Seluruh guru di sekolah anda

SC025Q02NA Hanya guru IPA di sekolah anda

SC027 Manakah dari jenis pengembangan profesi berikut yang dilakukan di sekolah Anda?

(Pilih satu jawaban untuk setiap pernyataan.)

		Ya	Tidak
SC027Q01NA	Para guru di sekolah kami bekerja sama dengan saling bertukar pikiran atau materi ketika mengajar kompetensi-kompetensi tertentu atau serangkaian pembelajaran.	☐ ₁	☐ ₂
SC027Q02NA	Sekolah kami mengundang nara sumber untuk melakukan pelatihan in-service bagi para guru.	☐ ₁	☐ ₂
SC027Q03NA	Sekolah kami mengadakan lokakarya intern yang berhubungan dengan isu-isu spesifik yang dihadapi sekolah kami.	☐ ₁	☐ ₂
SC027Q04NA	Sekolah kami menyelenggarakan lokakarya intern untuk kelompok tertentu dari guru (misalnya guru yang baru diangkat).	☐ ₁	☐ ₂

PENILAIAN DAN EVALUASI

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SC032 Pada tahun ajaran 2013-2014, apakah salah satu dari metode-metode berikut ini sudah dipergunakan untuk memonitor guru dalam pembelajaran di sekolah Anda?

(Silahkan pilih satu jawaban.)

		Ya	Tidak
SC032Q01TA	Tes atau asesmen prestasi siswa	☐ ₁	☐ ₂
SC032Q02TA	Kegiatan telaah antar guru-guru bidang studi (tujuan pembelajaran, instrumen asesmen, dan pelajaran)	☐ ₁	☐ ₂
SC032Q03TA	Kepala sekolah atau staf senior melakukan observasi pembelajaran	☐ ₁	☐ ₂
SC032Q04TA	Observasi di kelas-kelas oleh pengawas atau lembaga lain di luar sekolah	☐ ₁	☐ ₂

SC034 Secara umum, di sekolah Anda, seberapa sering siswa kelas 9 SMP/MTs atau kelas 10 SMA/MA/SMK dinilai menggunakan metode berikut?

(Pilih satu jawaban untuk setiap pernyataan.)

		<i>Tidak Pernah</i>	<i>1-2 kali per tahun</i>	<i>3-5 kali per tahun</i>	<i>Setiap bulan</i>	<i>Lebih dari satu kali dalam satu bulan</i>
SC034Q01NA	Tes terstandarisasi wajib, contoh: ujian nasional	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅
SC034Q02NA	Tes terstandarisasi tidak wajib, contoh: Indonesian National Assessment Program (INAP)	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅
SC034Q03TA	Tes yang dibuat guru	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅
SC034Q04TA	Penggunaan rubrik penilaian oleh guru	☐ ₁	☐ ₂	☐ ₃	☐ ₄	☐ ₅

SC035

Di sekolah Anda, apakah tes-tes terstandarisasi dan/atau tes-tes yang dibuat oleh guru untuk siswa-siswa kelas 9 SMP/MTs atau 10 SMA/MA/SMK dipergunakan untuk tujuan berikut ini?

(Pilih “ya” atau “tidak” untuk menunjukkan penggunaan tes-tes terstandarisasi dan tes-tes yang dibuat oleh guru untuk masing-masing tujuan yang sudah ditentukan.)

		tes terstandarisasi		tes yang dibuat guru	
		Ya	Tidak	Ya	Tidak
SC035Q01N	Untuk membimbing belajar siswa	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q02T	Untuk memberitahu orang tua tentang kemajuan anak mereka	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q03T	Untuk membuat keputusan tentang retensi atau promosi siswa	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q04T	Untuk sekelompok siswa dalam mencapai tujuaninstruksional	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q05T	Untuk membandingkan sekolah per wilayah atau secara nasional	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q06T	Untuk memantau kemajuan sekolah dari tahun ke tahun	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q07T	Untuk membuat penilaian tentang efektivitas guru	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q08T	Untuk mengidentifikasi aspek pengajaran atau kurikulum yang dapat ditingkatkan	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q09N	Untuk menyesuaikan pengajaran dengan kebutuhan siswa	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q10T	Untuk membandingkan sekolah dengan sekolah lain	☐ ₁	☐ ₂	☐ ₁	☐ ₂
SC035Q11N	Untuk memberikan suratpenghargaan kepada para siswa	☐ ₁	☐ ₂	☐ ₁	☐ ₂

SC036 Di sekolah Anda, apakah data prestasi akademik digunakan dalam hal-hal berikut untuk memberikan proses pelaporan?

*Data prestasi akademik termasuk **kumpulan nilai** di sekolah, nilai tes di tingkat kelas atau tingkat kelulusan.*

(Pilih satu jawaban untuk setiap pernyataan.)

		Ya	Tidak
SC036Q01TA	Data Prestasi akademik diposting ke publik (misalnya di media)	☐ ₁	☐ ₂
SC036Q02TA	Data Prestasi akademik disimpan dari waktu ke waktu oleh otoritas administratif	☒ ₁	☐ ₂
SC036Q03NA	Data Prestasi akademik diberikan secara langsung kepada orang tua	☐ ₁	☐ ₂

SC037 Apakah di sekolah Anda terdapat tatanan berikut yang ditujukan untuk menjamin kualitas dan perbaikan-perbaikan dan dari mana mereka berasal?

(Pilih satu jawaban untuk setiap pernyataan.)

		Ya, wajib misalnya karena kebijakan dari wilayah atau kementerian	Ya, karena inisiatif sekolah	Tidak
SC037Q01TA	Evaluasi internal / Evaluasi Diri	☐ ₁	☐ ₂	☐ ₃
SC037Q02TA	Evaluasi eksternal	☐ ₁	☐ ₂	☐ ₃
SC037Q03TA	Pencantuman tertulis profil kurikuler sekolah dan tujuan-tujuan pendidikan	☐ ₁	☐ ₂	☐ ₃
SC037Q04TA	Pencantuman tertulis spesifikasi standar prestasi siswa	☐ ₁	☐ ₂	☐ ₃
SC037Q05NA	Pencatatan sistematis data seperti absensi guru atau siswa dan pengembangan profesional	☐ ₁	☐ ₂	☐ ₃
SC037Q06NA	Pencatatan yang sistematis dari hasil-hasil tes siswa dan tingkat-tingkat kelulusan	☐ ₁	☐ ₂	☐ ₃
SC037Q07TA	Mencari umpan balik tertulis dari para siswa (misalnya mengenai pelajaran, guru atau sarana prasarana)	☐ ₁	☐ ₂	☐ ₃
SC037Q08TA	Pembinaan guru	☐ ₁	☐ ₂	☐ ₃
SC037Q09TA	Konsultasi rutin yang bertujuan untuk perbaikan sekolah dengan satu atau lebih nara sumber setidaknya selama enam bulan	☐ ₁	☐ ₂	☐ ₃
SC037Q10NA	Pelaksanaan kebijakan standar untuk mata pelajaran sains (misalnya kurikulum sekolah dengan berbagi bahan-bahan ajar disertai dengan pengembangan staf dan pelatihan)	☐ ₁	☐ ₂	☐ ₃

SC040 Berdasarkan hasil evaluasi internal terakhir sekolah Anda, apakah sekolah Anda melakukan penilaian dalam hal-hal berikut?

(Pilih satu jawaban untuk setiap pernyataan.)

		Ya	Tidak, karena hasilnya memuaskan	Tidak, karena alasan lain
SC040Q02NA	Tenaga kependidikan (misalnya beban kerja, kebutuhan pribadi, kualifikasi)	☐ ₁	☐ ₂	☐ ₃
SC040Q03NA	Implementasi kurikulum	☐ ₁	☐ ₂	☐ ₃
SC040Q05NA	Kualitas pengajaran dan pembelajaran	☐ ₁	☐ ₂	☐ ₃
SC040Q11NA	Keterlibatan orang tua di sekolah	☐ ₁	☐ ₂	☐ ₃
SC040Q12NA	Pengembangan profesi guru	☐ ₁	☐ ₂	☐ ₃
SC040Q15NA	Prestasi siswa	☐ ₁	☐ ₂	☐ ₃
SC040Q16NA	Kompetensi lintas-kurikuler para siswa	☐ ₁	☐ ₂	☐ ₃
SC040Q17NA	Kesetaraan di sekolah	☐ ₁	☐ ₂	☐ ₃

SC041 Berkaitan dengan evaluasi eksternal terakhir di sekolah Anda. Apakah hal-hal pada pernyataan berikut berlaku?

(Pilih satu jawaban untuk setiap pernyataan.)

		Ya	Tidak
SC041Q01NA	Hasil evaluasi eksternal menyebabkan terjadinya perubahan-perubahan dalam kebijakan-kebijakan sekolah.	☐ ₁	☐ ₂
SC041Q03NA	Kami menggunakan data yang diperoleh untuk merencanakan kegiatan tertentu untuk pengembangan sekolah.	☐ ₁	☐ ₂
SC041Q04NA	Kami menggunakan data yang diperoleh untuk merencanakan kegiatan tertentu untuk peningkatan pengajaran.	☐ ₁	☐ ₂
SC041Q05NA	Kami segera mengambil kebijakan-kebijakan yang dijabarkan dari hasil- hasil evaluasi eksternal.	☐ ₁	☐ ₂
SC041Q06NA	Dorongan untuk melakukan tindak lanjut dari evaluasi eksternal "menghilang" sangat cepat di sekolah kami.	☐ ₁	☐ ₂

TARGET SISWA

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SC042 *Beberapa sekolah memberi perlakuan berbeda untuk siswa dengan kemampuan yang berbeda.*

Bagaimana kebijakan sekolah Anda tentang hal-hal di bawah ini untuk siswa kelas 9 SMP/MTs atau kelas 10 SMA/MA/SMK?

(Pilih satu jawaban untuk setiap pernyataan.)

		Untuk semua mata pelajaran	Hanya untuk beberapa mata pelajaran	Tidak untuk setiap mata pelajaran
SC042Q01TA	Siswa dikelompokkan ke dalam kelas yang berbeda berdasarkan kemampuan.	☐ ₁	☐ ₂	☐ ₃
SC042Q02TA	Siswa dikelompokkan berdasarkan kemampuan di dalam kelas mereka.	☐ ₁	☐ ₂	☐ ₃

SC048 **Perkirakanlah persentase siswa di kelas 9 SMP/MTs negeri maupun swasta atau di kelas 10 SMA/MA/SMK negeri maupun swasta di sekolah Anda yang mempunyai karakteristik di bawah ini.**

(Pertimbangkan adanya siswa yang memiliki lebih dari satu kategori.)

(Tuliskan angka persentase yang diperkirakan pada setiap baris.)

SC048Q01NA Siswa-siswa yang mempunyai bahasa warisan/bahasa ibu berbeda dengan bahasa Indonesia

SC048Q02NA Siswa berkebutuhan khusus

SC048Q03NA Siswa-siswa yang berasal dari keluarga-keluarga yang keadaan sosial ekonominya kurang/tidak mampu

SUASANA SEKOLAH

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SC061 Di sekolah Anda, sampai sejauh mana pembelajaran siswa terhalang oleh keadaan berikut ini?

(Pilih satu jawaban untuk setiap pernyataan.)

		<i>Tidak ada</i>	<i>Sedikit</i>	<i>Beberapa</i>	<i>banyak</i>
SC061Q01TA	Siswa membolos	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC061Q02TA	Siswa melewati kelas	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC061Q03TA	Siswa kurang menghormati guru	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC061Q04TA	Siswa menggunakan alkohol atau obat-obatan terlarang	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC061Q05TA	Siswa mengintimidasi atau intimidasi siswa lain	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC061Q06TA	Guru tidak memenuhi kebutuhan masing-masing siswa	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC061Q07TA	Ketidakhadiran guru	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC061Q08TA	Staf menolak perubahan	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC061Q09TA	Teachers being too strict with students	☐ ₁	☐ ₂	☐ ₃	☐ ₄
SC061Q10TA	Guru tidak memiliki persiapan yang baik di kelas	☐ ₁	☐ ₂	☐ ₃	☐ ₄

SC063 Apakah pernyataan-pernyataan berikut tentang keterlibatan orang tua berlaku untuk sekolah Anda?

(Pilih satu jawaban untuk setiap pernyataan.)

		Ya	Tidak
SC063Q02NA	Sekolah kami menyediakan suasana menyambut dan menerima dengan baik keterlibatan orang tua.	☐ ₁	☐ ₂
SC063Q03NA	Sekolah kami menciptakan komunikasi yang efektif antara sekolah - orang tua dan orang tua - sekolah tentang program sekolah dan kemajuan anak-anak.	☐ ₁	☐ ₂
SC063Q04NA	Sekolah kami melibatkan orang tua dalam keputusan sekolah.	☐ ₁	☐ ₂
SC063Q06NA	Sekolah kami menyediakan informasi dan ide-ide kepada keluarga tentang bagaimana membantu siswa di rumah dengan pekerjaan rumah dan kegiatan lain yang berkaitan dengan proses pembelajaran sesuai dengan yang diajarkan, keputusan-keputusan dan rencana-rencana.	☐ ₁	☐ ₂
SC063Q07NA	Sekolah kami mengidentifikasi dan mengintegrasikan sumber daya dari masyarakat untuk memperkuat program sekolah, kebiasaan-kebiasaan dalam keluarga, dan proses belajar siswa dan pengembangan pembelajaran.	☐ ₁	☐ ₂
SC063Q09NA	Terdapat peraturan nasional, peraturan pemerintah atau peraturan daerah mengenai keterlibatan orang tua pada kegiatan-kegiatan di sekolah.	☐ ₁	☐ ₂

SC064 Selama tahun ajaran 2012/2013, berapa proporsi orang tua siswa berpartisipasi dalam kegiatan sekolah berikut?

Tuliskan angkanya pada setiap pernyataan. Tulis 0 (nol) jika tidak ada orang tua yang berpartisipasi pada kegiatan tersebut. Tulis 100 jika seluruh orang tua berpartisipasi pada kegiatan tersebut.)

		%
SC064Q01TA	Pembahasan kemajuan anak mereka dengan guru atas inisiatif orang tua	_____
SC064Q02TA	Pembahasan kemajuan anak mereka atas prakarsa salah satu guru anak mereka	_____
SC064Q03TA	Berpartisipasi dalam organisasi sekolah, (misalnya wakil orang tua atau komite sekolah)	_____
SC064Q04NA	Menjadi relawan untuk aktivitas fisik atau ekstra kurikuler (misalnya pemeliharaan gedung, peralatan meja/kursi, pemeliharaan kebun, drama sekolah, olahraga, field trip)	_____

***Terima kasih banyak atas kerja sama Anda
dalam menyelesaikan kuesioner ini !***

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Appendix D

Student Questionnaire

Dalam kuesioner ini kamu akan menemukan pertanyaan-pertanyaan tentang:

- Dirimu, keluargamu, dan keadaan rumahmu
- Pendapatmu tentang kehidupanmu dan kesehatanmu
- Tentang pembelajaran IPA
- Pandanganmu mengenai IPA

Bacalah setiap pertanyaan dengan teliti dan jawablah setepat mungkin .

Dalam kuesioner ini tidak ada jawaban ‘benar’ atau ‘salah’. Jawabanmu merupakan jawaban yang benar bagimu.

Kamu boleh bertanya jika kamu tidak mengerti atau tidak yakin cara menjawabnya.

Beberapa pertanyaan yang berkaitan dengan mata pelajaran IPA. Mohon diingat semua mata pelajaran dan kursus-kursus lainnya yang mengajarkan materi yang berkaitan dengan IPA. Sekolah kamu mungkin mengajarkan IPA dalam subjek yang berbeda seperti fisika, kimia, biologi, bumi dan geologi, ruang angkasa dan astronomi, IPA dan teknologi terapan (misal. proses penjernihan air), atau sekolah kamu mengajarkan IPA umum yang digabung, atau IPA terpadu.

Jawabanmu akan digabung dengan jawaban dari siswa-siswa lainnya, kemudian dijumlahkan dan dibuat rata-rata, sehingga tidak diketahui jawaban perorangan. Semua jawabanmu akan dirahasiakan.

1. KAMU, KELUARGAMU, DAN RUMAHMU

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ST001 **Kelas berapa kamu sekarang?**

ST001Q01TA

Kelas

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ST002 **Manakah jenjang pendidikan berikut yang sedang kamu tempuh?**

ST002Q01TA *(Silahkan pilih satu jawaban.)*

SMP

☐ ₁

MTs

☐ ₂

SMA

☐ ₃

MA

☐ ₄

SMK

☐ ₅

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ST003 Tanggal berapa kamu lahir?

(silahkan tulis tanggal, bulan, dan tahun kelahiranmu.)

ST003Q01TA

Tanggal

ST003Q02TA

Bulan

ST003Q03TA

Tahun

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ST004 Apakah kamu perempuan atau laki-laki?

(Silahkan pilih satu jawaban.)

ST004Q01TA

Perempuan

Laki-laki

☐ ₁☐ ₂

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ST005 Apakah jenjang sekolah tertinggi yang diselesaikan ibumu?

ST005Q01TA

*Jika kamu tidak yakin cara menjawab pertanyaan ini, tanyakan pada pengawas untuk membantu.
(Silahkan pilih satu jawaban.)*

SMA/MA

☐ ₁

SMK, LPK (Kursus)

☐ ₂

SMP/MTs

☐ ₃

SD/MI

☐ ₄

Ibu tidak tamat SD/MI

☐ ₅

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ST006 Apa ibumu memiliki kualifikasi berikut?

Jika kamu tidak yakin kotak mana yang akan dipilih, mintalah bantuan Pengawas.

(Silahkan pilih satu jawaban untuk setiap baris.)

		Ya	Tidak
ST006Q01TA	Strata 3 (S3)	☐ ₁	☐ ₂
ST006Q02TA	Strata 1 (S1/Sarjana)	☐ ₁	☐ ₂
ST006Q03TA	Strata 2 (S2)	☐ ₁	☐ ₂
ST006Q04TA	Politeknik/Akademik/Diploma (D1, D2, D3, D4)	☐ ₁	☐ ₂

ST014 **Dua pertanyaan berikut berhubungan dengan pekerjaan ibumu:**

(Jika ibu sekarang tidak bekerja, tuliskan pekerjaan utamanya yang terakhir.)

ST014Q01TA Apakah pekerjaan utama ibumu?
(misal, guru sekolah, juru masak, manajer penjualan, dll)

*Tuliskan jenis pekerjaan tersebut.*_____

ST014Q02TA Apa tugas ibumu dalam menjalankan pekerjaan utamanya?
(misal, mengajar siswa SMA, membantu menyiapkan makanan di restoran, mengelola tim pemasaran, dll)

Uraikan tugas ibumu di tempat pekerjaan dalam satu kalimat.

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ST007

Apakah jenjang sekolah tertinggi yang diselesaikan ayahmu?

ST007Q01TA

Jika kamu merasa kurang yakin dalam menentukan kotak mana yang harus dipilih, silahkan menanyakannya pada administrator tes untuk mendapatkan bantuan.

(Silahkan pilih satu jawaban.)

SMA/MA

☐ 1

SMK, LPK (Kursus)

☐ 2

SMP/MTs

☐ 3

SD/MI

☐ 4

Ayah tidak tamat SD/MI

☐ 5

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ST008 Apa ayahmu memiliki kualifikasi berikut?

Jika kamu merasa kurang yakin bagaimana menjawab pertanyaan ini. Silahkan menanyakannya pada administrator tes untuk mendapatkan bantuan.

(Silahkan pilih satu jawaban untuk setiap baris.)

		Ya	Tidak
ST008Q01TA	Strata 3 (S3)	☐ ₁	☐ ₂
ST008Q02TA	Strata 1 (S1/Sarjana)	☐ ₁	☐ ₂
ST008Q03TA	Strata 2 (S2)	☐ ₁	☐ ₂
ST008Q04TA	Politeknik/Akademik/Diploma (D1, D2, D3, D4)	☐ ₁	☐ ₂

ST015 **Dua pertanyaan berikut berhubungan dengan pekerjaan ayahmu:**

(Jika ayah sekarang tidak bekerja, tuliskan pekerjaan utamanya yang terakhir.)

ST015Q01TA

Apakah pekerjaan utama ayahmu?
(misal, guru sekolah, juru masak, manajer penjualan, dll)

*Tuliskan jenis pekerjaan tersebut.*_____

ST015Q02TA

Apa tugas ayahmu dalam menjalankan pekerjaan utamanya?
(misal, mengajar siswa SMA, membantu menyiapkan makanan di restoran, mengelola tim pemasaran, dll)

Uraikan tugas ayahmu di tempat kerjanya dalam satu kalimat.

ST011 Adakah barang-barang berikut di rumahmu?*(Silahkan pilih satu jawaban untuk setiap baris.)*

		Ya	Tidak
ST011Q01TA	Meja belajar	☐ ₁	☐ ₂
ST011Q02TA	Kamar pribadi	☐ ₁	☐ ₂
ST011Q03TA	Tempat belajar yang tenang	☐ ₁	☐ ₂
ST011Q04TA	Komputer yang dapat kamu gunakan untuk mengerjakan tugas sekolah	☐ ₁	☐ ₂
ST011Q05TA	Perangkat lunak (software/program komputer) pendidikan	☒ ₁	☐ ₂
ST011Q06TA	Sambungan ke internet	☐ ₁	☐ ₂
ST011Q07TA	Buku sastra klasik (misal Siti Nurbaya, dll)	☐ ₁	☐ ₂
ST011Q08TA	Buku-buku kumpulan puisi	☐ ₁	☐ ₂
ST011Q09TA	Karya-karya seni (misal lukisan, dll)	☐ ₁	☐ ₂
ST011Q10TA	Buku-buku yang dapat membantu dalam mengerjakan tugas-tugas sekolahmu	☐ ₁	☐ ₂
ST011Q11TA	Buku rujukan teknis	☐ ₁	☐ ₂
ST011Q12TA	Kamus	☐ ₁	☐ ₂
ST011Q16NA	Buku-buku tentang seni, musik, atau desain	☐ ₁	☐ ₂
ST011Q17TA	Kamera digital	☐ ₁	☐ ₂
ST011Q18TA	Sepeda motor	☐ ₁	☐ ₂
ST011Q19TA	Mobil	☐ ₁	☐ ₂

ST012 Berapa jumlah benda-benda berikut yang ada di rumahmu?

(Silahkan pilih satu jawaban untuk setiap pertanyaan.)

		<i>Tidak ada</i>	<i>Satu</i>	<i>Dua</i>	<i>Tiga atau lebih</i>
ST012Q01TA	Televisi	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST012Q02TA	Mobil	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST012Q03TA	Kamar yang ada kamar mandi di dalamnya	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST012Q05NA	Telepon seluler(handphone) dengan akses internet (misal, smartphone)	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST012Q06NA	Komputer (komputer meja/desktop, laptop, atau notebook)	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST012Q07NA	Komputer tablet (misal, iPad®, BlackBerry® PlayBook™, Samsung® Galaxy Tab™)	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST012Q08NA	Perangkat membaca buku elektronik (misal, Kindle™, Kobo, Bookeen)	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST012Q09NA	Alat-alat musik (misal, gitar, piano)	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST012Q10NA	Telepon seluler (handphone) tanpa akses internet	☐ ₁	☐ ₂	☐ ₃	☐ ₄

ST013 Berapa jumlah buku-buku yang ada di rumahmu?

ST013Q01TA

*Biasanya ada 40 buku dalam setiap meter rak buku. Tidak termasuk majalah, koran atau buku pelajaran sekolahmu
(Silahkan pilih satu jawaban.)*

0-10 buku	☐ ₁
11-25 buku	☐ ₂
26-100 buku	☐ ₃
101-200 buku	☐ ₄
201-500 buku	☐ ₅
Lebih dari 500 buku	☐ ₆

ST019 Di negara manakah kamu dan orang tuamu dilahirkan?*(Silahkan pilih satu jawaban untuk setiap kolom.)*

	<i>Kamu</i> ST019Q01TA	<i>Ibu</i> ST019Q01TB	<i>Ayah</i> ST019Q01TC
Indonesia	☐ ₁	☐ ₁	☐ ₁
Singapura	☐ ₂	☐ ₂	☐ ₂
Malaysia	☐ ₃	☐ ₃	☐ ₃
Australia	☐ ₄	☐ ₄	☐ ₄
Belanda	☐ ₅	☐ ₅	☐ ₅
Negara lain	☐ ₆	☐ ₆	☐ ₆

ST022 Apakah bahasa yang sering kamu gunakan di rumah?

(Silahkan pilih satu jawaban.)

ST022Q01TA Bahasa Indonesia

☐ ₁

ST022Q02TA Bahasa Daerah

☐ ₂

ST022Q03TA Bahasa lainnya

☐ ₃

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ST124 Apakah kamu pernah belajar di Taman Kanak-kanak?

ST124Q01TA *(Silahkan pilih satu jawaban.)*

Tidak

☐₁

Ya, satu tahun atau kurang

☐₂

Ya, lebih dari satu tahun

☐₃

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ST126 Pada usian berapa kamu masuk kelas 1 SD/MI?

ST126Q01TA (Silahkan tulis angka yang sesuai.)

Usia:

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ST127 Apakah kamu pernah tinggal kelas?*(Silahkan pilih satu jawaban untuk setiap baris.)*

		<i>Tidak pernah</i>	<i>Ya, sekali</i>	<i>Ya, dua kali atau lebih</i>
ST127Q01TA	SD/MI	☐ ₁	☐ ₂	☐ ₃
ST127Q02TA	SMP/MTs	☐ ₁	☐ ₂	☐ ₃
ST127Q03TA	SMA/MA/SMK	☐ ₁	☐ ₂	☐ ₃

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2. PENDAPAT KAMU TENTANG KEHIDUPANMU

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ST114 **Apakah jenis pekerjaan yang kamu harapkan ketika kamu berusia 30 tahun?**

ST114Q01TA *(Tuliskan jenis pekerjaannya.)*_____

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ST034 Tentang sekolahmu: seberapa jauh kamu setuju dengan pernyataan-pernyataan berikut?

(Silahkan pilih satu jawaban untuk setiap pernyataan.)

		<i>Sangat tidak setuju</i>	<i>Tidak setuju</i>	<i>Setuju</i>	<i>Sangat setuju</i>
ST034Q01TA	Di sekolah saya merasa sebagai orang terasing (tersingkir).	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST034Q01TA	Di sekolah saya mudah mendapat teman.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST034Q03TA	Saya merasa menjadi bagian dari sekolah.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST034Q04TA	Saya merasa canggung di sekolah.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST034Q05TA	Siswa-siswa lain kelihatannya menyukai saya.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST034Q06TA	Di sekolah saya merasa kesepian.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

3. TENTANG PEMBELAJARAN IPA

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ST059 **Berapa jumlah jam pelajaran per minggu yang biasanya harus kamu ikuti untuk mengikuti mata pelajaran di bawah ini?**

(Silahkan tulis jumlah jam pelajaran per minggu untuk setiap mata pelajaran. Tulis “0” (nol) jika tidak ada.)

ST059Q01NA

Jumlah jam pelajaran per minggu dalam mata pelajaran Bahasa Indonesia

ST059Q02NA

Jumlah jam pelajaran per minggu dalam mata pelajaran Matematika

ST059Q03NA

Jumlah jam pelajaran per minggu dalam mata pelajaran IPA

ST063 Di antara mata pelajaran di bawah ini, mana yang kamu ikuti pada tahun ajaran ini atau tahun lalu?

(Silahkan isi yang sesuai untuk setiap baris.)

		Tahun ini	Tahun lalu
ST063Q01N	Fisika	☐ ₁	☐ ₂
ST063Q02N	Kimia	☐ ₁	☐ ₂
ST063Q03N	Biologi	☐ ₁	☐ ₂
ST063Q04N	Bumi dan ruang angkasa	☐ ₁	☐ ₂
ST063Q05N	IPA dan teknologi terapan (contoh: pembuatan biogas, dll)	☐ ₁	☐ ₂
ST063Q06N	Mata pelajaran IPA umum yang digabung atau IPA terpadu (contoh: penjernihan air minum, dll)	☐ ₁	☐ ₂

ST097 Seberapa seringkah hal-hal ini terjadi dalam kelas IPA?*(Silahkan pilih satu jawaban untuk setiap pernyataan.)*

		Setiap pertemuan	Hampir setiap pertemuan	Beberapa pertemuan	Hampir tidak pernah atau tidak pernah
ST097Q01TA	Siswa-siswa tidak mendengarkan yang diajarkan guru.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST097Q02TA	Berisik dan gaduh.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST097Q03TA	Guru harus menunggu lama agar siswa-siswanya tenang.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST097Q04TA	Siswa-siswa tidak dapat belajar dengan baik.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST097Q05TA	Saat pelajaran dimulai, para siswa menunggu lama untuk belajar.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

ST098 Pada waktu mempelajari topik-topik IPA di sekolah, seberapa seringkah kegiatan-kegiatan di bawah ini terjadi?

(Silahkan pilih satu jawaban untuk setiap pernyataan.)

		Setiap pertemuan	Hampir setiap pertemuan	Beberapa pertemuan	Hampir tidak pernah atau tidak pernah
ST098Q01TA	Siswa diberi kesempatan untuk menjelaskan pendapatnya	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST098Q02TA	Siswa melakukan praktek percobaan di laboratorium.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST098Q03NA	Siswa diharapkan untuk mengemukakan alasan mengenai pertanyaan IPA.	☐ ₁	☒ ₂	☐ ₃	☐ ₄
ST098Q05TA	Siswa diminta untuk membuat kesimpulan dari percobaan yang telah mereka lakukan.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST098Q06TA	Guru menjelaskan cara suatu ide dalam IPA dapat diterapkan pada sejumlah fenomena yang berbeda (misal, gerakan benda, bahan-bahan dengan sifat-sifat yang serupa).	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST098Q07TA	Siswa diperbolehkan merencanakan percobaannya sendiri.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST098Q08NA	Terdapat kelas debat mengenai investigasi.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST098Q09TA	Guru menjelaskan dengan baik hubungan antara konsep-konsep IPA dengan kehidupan kita.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST098Q10NA	Siswa diminta untuk melakukan investigasi untuk menguji idenya.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

ST065

ST065Q01NA

Pada waktu menjawab pertanyaan-pertanyaan di bawah ini, tolong selalu dibayangkan salah satu dari mata pelajaran IPA. Kamu bebas dalam memilih mata pelajaran tersebut

Apakah nama dari mata pelajaran IPA tersebut?

(Silahkan tulis nama mata pelajaran tersebut.)

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ST100 Seberapa seringkah hal-hal ini terjadi dalam kelas IPA?*(Silahkan pilih satu jawaban untuk setiap pernyataan.)*

		Setiap pertemuan	Hampir setiap pertemuan	Beberapa pertemuan	Tidak pernah atau hampir tidak pernah
ST100Q01TA	Guru tertarik pada kegiatan belajar setiap siswa.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST100Q02TA	Guru memberi bantuan tambahan bagi siswa yang membutuhkannya.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST100Q03TA	Guru membantu siswa dalam belajar.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST100Q04TA	Guru terus mengajar sampai siswa mengerti.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST100Q05TA	Guru memberi kesempatan kepada siswa untuk mengemukakan pendapatnya.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

ST103 Seberapa seringkah hal-hal ini terjadi dalam pelajaran Anda untuk mata pelajaran IPA?

(Perhatikan untuk menjawab pertanyaan berikut harus mengacu pada pembelajaran IPA yang sudah kamu terima.)

(Silahkan pilih satu jawaban untuk setiap pertanyaan.)

		Tidak pernah atau hampir tidak pernah	Beberapa pertemuan	Banyak pertemuan	Setiap pertemuan atau hampir setiap pertemuan
ST103Q01NA	Guru menjelaskan ide-ide ilmiah.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST103Q03NA	Terjadi diskusi seluruh siswa di kelas dengan guru.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST103Q08NA	Guru mendiskusikan pertanyaan-pertanyaan kami.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST103Q11NA	Guru mendemonstrasikan sebuah ide.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

ST104 Seberapa seringkah hal-hal ini terjadi dalam pembelajaran kamu untuk mata pelajaran IPA?

*(Jangan lupa untuk menjawab pertanyaan ini dengan merujuk pada mata pelajaran IPA yang sudah kamu pelajari sebelumnya.)
(Silahkan pilih satu jawaban untuk setiap pernyataan.)*

		Tidak pernah atau hampir tidak pernah	Beberapa pelajaran	Dalam banyak pelajaran	Setiap pelajaran atau hampir setiap pelajaran
ST104Q01NA	Guru memberi tahu saya mengenai prestasi saya di pelajaran IPA.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST104Q02NA	Guru saya memberi masukan mengenai kelebihan saya dalam mata pelajaran IPA.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST104Q03NA	Guru memneri tahu saya materi apa saja yang masih bisa saya tingkatkan.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST104Q04NA	Guru memberitahu saya bagaimana cara meningkatkan prestasi saya.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST104Q05NA	Guru memberi saran kepada saya bagaimana cara meraih tujuan pembelajaran saya.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

4. PANDANGANMU TENTANG IPA

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ST092 Seberapa banyak informasi yang kamu miliki tentang hal-hal berikut mengenai lingkungan?

(Silahkan pilih satu jawaban untuk setiap pernyataan.)

	Saya belum pernah mendengar ini	Saya pernah mendengar ini, tetapi saya tidak dapat menjelaskannya	Saya tahu sesuatu tentang ini dan dapat menjelaskannya secara umum	Saya tahu betul tentang ini dan dapat menjelaskannya dengan baik
ST092Q01TA Peningkatan gas-gas rumah kaca di dalam atmosfer	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST092Q02TA Penggunaan organisme-organisme hasil rekayasa genetika	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST092Q04TA Sampah nuklir	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST092Q05TA Akibat penggundulan hutan untuk kegunaan lain tanah	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST092Q06NA Polusi udara	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST092Q08NA Kepunahan tanaman dan hewan	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST092Q09NA Kekurangan air	☐ ₁	☐ ₂	☐ ₃	☐ ₄

ST094 Seberapa jauh kamu tidak setuju atau setuju dengan pernyataan-pernyataan tentang dirimu berikut ini?

(silahkan pilih satu jawaban untuk setiap pernyataan.)

		<i>Sangat tidak setuju</i>	<i>Tidak setuju</i>	<i>Setuju</i>	<i>Sangat Setuju</i>
ST094Q01NA	Pada umumnya saya merasa senang pada waktu mempelajari topik-topik IPA.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST094Q02NA	Saya suka membaca hal-hal mengenai IPA	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST094Q03NA	Saya merasa senang bekerja dengan topik-topik IPA.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST094Q04NA	Saya senang mendapatkan pengetahuan baru tentang IPA.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST094Q05NA	Saya tertarik mempelajari IPA.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

ST113 Seberapa setujukah kamu dengan pernyataan-pernyataan di bawah ini?

(silahkan pilih satu jawaban untuk setiap pernyataan.)

		<i>Sangat setuju</i>	<i>Setuju</i>	<i>Tidak setuju</i>	<i>Sangat tidak setuju</i>
ST113Q01TA	Belajar IPA dengan sungguh-sungguh sangat bermanfaat karena dapat membantu saya saat bekerja di kemudian hari.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST113Q02TA	Apa yang saya pelajari dalam mata pelajaran IPA adalah penting bagi saya karena saya memerlukannya untuk sesuatu hal yang saya ingin lakukan di kemudian hari.	☐ ₁	☐ ₂	☒ ₃	☐ ₄
ST113Q03TA	Belajar IPA berguna untuk saya karena yang saya pelajari akan meningkatkan masa depan saya.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST113Q04TA	Banyak hal yang saya pelajari pada mata pelajaran IPA akan membantu saya dalam mendapatkan pekerjaan.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

ST129 Menurutmu, seberapa mudah bagimu untuk melakukan sendiri tugas-tugas berikut?

(Silahkan pilih satu jawaban untuk setiap pernyataan.)

	Saya dapat melakukan nya dengan mudah	Saya dapat melakukan nya dengan sedikit usaha	Saya akan berusaha keras untuk dapat melakukan nya sendiri	Saya tidak dapat melakukan nya
ST129Q01TA Mengenali pertanyaan IPA yang berkaitan dengan topik kesehatan yang terdapat dalam tulisan surat kabar.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST129Q02TA Menjelaskan alasan gempa bumi lebih banyak terjadi di suatu area daripada di area lain.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST129Q03TA Menjelaskan peranan antibiotik dalam pengobatan penyakit.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST129Q04TA Mengidentifikasi pertanyaan-pertanyaan IPA yang berkaitan dengan pembuangan sampah.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST129Q05TA Meramalkan cara perubahan lingkungan akan mempengaruhi kelangsungan hidup spesies tertentu.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST129Q06TA Menginterpretasikan informasi ilmiah yang tertera pada label makanan.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST129Q07TA Mendiskusikan cara pembuktian baru dapat mengubah pemahaman tentang kemungkinan hidup di planet Mars.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST129Q08TA Mengidentifikasi mana yang lebih baik dari dua penjelasan tentang pembentukan hujan asam.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

ST131 **Sejauh mana kamu setuju dengan pernyataan-pernyataan berikut?**

(Silahkan pilih satu jawaban untuk setiap pernyataan.)

		Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju
ST131Q01NA	Cara paling baik untuk mengetahui apakah sesuatu itu benar adalah dengan melakukan percobaan.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST131Q03NA	Gagasan-gagasan yang terdapat dalam mata pelajaran IPA kadang-kadang berubah.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST131Q04NA	Jawaban yang baik didasarkan pada bukti dari beberapa percobaan yang berbeda.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST131Q06NA	Sangat baik untuk mencoba eksperimen lebih dari sekali untuk memastikan hasil temuanmu.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST131Q08NA	Kadang-kadang ilmuwan IPA mengubah pendapatnya mengenai apa yang benar dalam mata pelajaran IPA.	☐ ₁	☐ ₂	☐ ₃	☐ ₄
ST131Q11NA	Gagasan-gagasan yang terdapat dalam buku-buku IPA kadang-kadang berubah.	☐ ₁	☐ ₂	☐ ₃	☐ ₄

***Terima kasih banyak atas kerjasama-mu
menyelesaikan pengisian angket ini!***

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Appendix E

Teacher Questionnaire

KUISIONER GURU UNTUK PISA 2018

GURU UMUM

(PILIHAN INTERNASIONAL)

EDISI SURVEI UTAMA

CY7_201710_QST_MS_TCQ-G_NoNotes

Oktober 2017

PERTANYAAN UNTUK GURU UMUM

Guru yang terhormat

Terimakasih atas partisipasi Anda dalam studi ini.

Kuisisioner ini menanyakan informasi tentang:

- Latar belakang Anda
- Pendidikan dan pengembangan profesional Anda
- Kerjasama dengan sesama guru dan wali murid
- Persepsi dan etika guru
- Praktik pengajaran
- Sekolah tempat mengajar

Informasi ini dapat menggambarkan persamaan dan perbedaan antarguru dalam rangka perbaikan hasil-hasil tes siswa. Misalnya, informasi yang diberikan akan bermanfaat untuk melihat dampak tersedianya sumber daya terhadap prestasi belajar siswa - baik di dalam suatu negara maupun antarnegara.

Kuesioer ini harus diisi oleh guru. Pengisian kuesioner ini akan memerlukan waktu kurang lebih 60 menit.

Apabila Anda tidak mengetahui jawabannya secara pasti, perkiraan terbaik Anda cukup untuk tujuan studi ini.

Jawaban-jawaban Anda akan dirahasiakan. Jawaban-jawaban tersebut kemudian akan digabung dengan jawaban guru lain untuk selanjutnya dihitung total dan rata-rata sehingga jawaban dari satu guru tidak dapat teridentifikasi

TC001

Apakah Anda wanita atau pria?

(Silahkan pilih satu jawaban.)

TC001Q01NA

Wanita

☐ 01

TC001Q01NA

Pria

☐ 02

TC002

Berapa usia Anda?

..... tahun

TC005

Apakah status pekerjaan Anda sebagai guru sekarang?

	<i>Full-time (mengajar 90% dari jam kerja)</i>	<i>Part-time (me- ngajar 71-90% dari jam kerja)</i>	<i>Part-time (me- ngajar 50-70% dari jam kerja)</i>	<i>Part-time (mengajar kurang dari 50% dari jam kerja)</i>
TC005Q01NA Status pekerjaan saya di sekolah ini	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄

TC007

Sudah berapa tahu pengalaman mengajar Anda?

..... tahun

TC188

Apakah Anda pernah studi di negara lain selain Indonesia?

(Silahkan pilih salah satu jawaban.)

TC188Q01HA

Tidak

☐₀₁

TC188Q01HA

Ya, kurang dari tiga bulan

☐₀₂

TC188Q01HA

Ya, antara tiga hingga duabelas bulan

☐₀₃

TC188Q01HA

Ya, lebih dari satu tahun

☐₀₄

TC014

Apakah Anda menyelesaikan pembekalan guru atau program pelatihan guru?

(Silahkan pilih salah satu jawaban.)

TC014Q01HA Ya, program selama kurang dari satu tahun

☐_01

TC014Q01HA Ya, program lebih dari satu tahun

☐_02

TC014Q01HA Tidak

☐_03

TC015

Bagaimana Anda mendapatkan kualifikasi mengajar?

(Silahkan pilih salah satu jawaban.)

- TC015Q01NA Saya mengikuti pendidikan guru resmi atau program pelatihan di sebuah <lembaga pendidikan yang memenuhi persyaratan menyelenggarakan program pendidikan guru>. ☐₀₁
- TC015Q01NA Saya mengikuti program magang guru atau pelatihan guru. ☐₀₂
- TC015Q01NA Saya mengikuti program pendidikan guru berbasis kerja atau pelatihan guru. ☐₀₃
- TC015Q01NA Saya mengikuti pelatihan kependidikan dan profesional yang lain. ☐₀₄
- TC015Q01NA Lain-lain ☐₀₅

TC018

Dibawah ini, manakah yang termasuk dalam program pelatihan atau pendidikan atau kualifikasi profesional lain, dan apakah Anda mengajar program tersebut di <kelas dimana siswa umur 15 tahun belajar> pada tahun ajaran ini?

(Dikarenakan studi ini adalah survei internasional, kami mengelompokkan beberapa subyek aktual yang diajarkan di kelas secara umum. Apabila terdapat subyek tidak ada dalam daftar ini, silahkan pilih kelompok yang Anda anggap sesuai dengan subyek tersebut.)

		Termasuk dalam program pelatihan atau pendidikan atau kualifikasi profesional lain	Saya mengajar di <kelas dimana siswa umur 15 tahun> pada tahun ajaran ini
		A	B
TC018Q01N	Membaca, menulis, dan kajian pustaka	☐ ₀₁	☐ ₀₁
TC018Q02N	Matematika	☐ ₀₁	☐ ₀₁
TC018Q03N	Pengetahuan Alam	☐ ₀₁	☐ ₀₁
TC018Q04N	Teknologi	☐ ₀₁	☐ ₀₁
TC018Q05N	Pengetahuan Sosial	☐ ₀₁	☐ ₀₁
TC018Q06N	Bahasa Asing Masa Kini	☐ ₀₁	☐ ₀₁
TC018Q07N	Bahasa Kuno (misalnya: Bahasa Latin)	☐ ₀₁	☐ ₀₁
TC018Q08N	Seni	☐ ₀₁	☐ ₀₁
TC018Q09N	Pendidikan Keolahragaan	☐ ₀₁	☐ ₀₁
TC018Q10N	Agama dan Moral	☐ ₀₁	☐ ₀₁
TC018Q11N	Ketrampilan praktek dan vokasi	☐ ₀₁	☐ ₀₁

TC021

Apakah Anda diharuskan mengambil kegiatan pengembangan profesional?

(Silahkan pilih salah satu jawaban.)

TC021Q01NA

Ya

☐₀₁

TC021Q01NA

Tidak

☐₀₂

TC193

Selama 12 bulan, apakah Anda berpartisipasi pada kegiatan pengembangan profesional seperti di bawah ini?

(Silahkan pilih salah satu jawaban pada tiap baris).

		Ya	Tidak
TC193Q01HA	Kursus/workshop (misal: tentang mata pelajaran atau metode dan/atau topik terkait pembelajaran lain)	☐ ₀₁	☐ ₀₂
TC193Q02HA	Seminar atau konferensi pendidikan (dimana para guru dan/atau peneliti menyajikan hasil penelitian dan berdiskusi tentang permasalahan pendidikan)	☐ ₀₁	☐ ₀₂
TC193Q03HA	Kunjungan untuk pengamatan di sebuah sekolah	☐ ₀₁	☐ ₀₂
TC193Q04HA	Kunjungan untuk pengamatan pada tempat usaha, organisasi pemerintah, organisasi bukan pemerintah	☐ ₀₁	☐ ₀₂
TC193Q05HA	Pelatihan (In-service training) pada tempat usaha, organisasi pemerintah, organisasi bukan pemerintah	☐ ₀₁	☐ ₀₂

TC020

Selama 12 bulan terakhir, apakah Anda mengikuti beberapa kegiatan dibawah ini?

(Silahkan pilih satu jawaban dalam setiap kolom.)

		Ya	Tidak
TC020Q01NA	Program kualifikasi (misalnya <program strata>)	☐ ₀₁	☐ ₀₂
TC020Q02NA	Berpartisipasi dalam jaringan komunitas guru yang terbentuk khusus untuk pengembangan profesional guru	☐ ₀₁	☐ ₀₂
TC020Q03NA	Penelitian individu atau kolaboratif dengan topik yang sesuai bidang keprofesionalan Anda	☐ ₀₁	☐ ₀₂
TC020Q04NA	Menjadi mentor dan/atau pembimbing observasi sesama guru, sebagai bagian peraturan sekolah	☐ ₀₁	☐ ₀₂
TC020Q05NA	Membaca literature ilmiah (misalnya: jurnal, artikel ilmiah, tesis)	☐ ₀₁	☐ ₀₂
TC020Q06NA	Terlibat dalam dialog informal dengan sesama kolega untuk meningkatkan kualitas pembelajaran	☐ ₀₁	☐ ₀₂

TC175 **Seberapa sering Anda membaca guna mendukung kegiatan mengajar (misalnya artikel, majalah, buku, modul dan situs web) diluar jam mengajar?**

(Silahkan pilih salah satu jawaban.)

TC175Q01HA Kurang dari 1 jam per minggu ☐₀₁

TC175Q01HA 1-3 jam per minggu ☐₀₂

TC175Q01HA 4-6 jam per minggu ☐₀₃

TC175Q01HA Lebih dari 6 jam per minggu ☐₀₄

TC046

Kira-kira, seberapa sering Anda mengikuti kegiatan berikut ini di sekolah?

(Silahkan pilih satu jawaban pada setiap kolom.)

		<i>Tidak pernah</i>	<i>1 kali setahun atau kurang</i>	<i>2-4 kali setahun</i>	<i>5-10 kali setahun</i>	<i>1-3 kali sebulan</i>	<i>1 atau lebih seminggu</i>
TC046Q04NA	Bertukar materi pembelajaran dengan guru lain	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅	☐ ₀₆
TC046Q05NA	Terlibat diskusi mengenai pengembangan pembelajaran untuk kasus khusus siswa	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅	☐ ₀₆
TC046Q06NA	Bekerjasama dengan guru lain dalam satu sekolah guna memastikan kesamaan standar evaluasi untuk menilai kemajuan siswa	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅	☐ ₀₆
TC046Q07NA	Menghadiri kelompok seminar	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅	☐ ₀₆

TC166

Saat mengajar, apakah Anda pernah memberikan materi seperti dibawah ini?

(Silahkan pilih satu jawaban pada setiap kolom.)

		Ya	Tidak
TC166Q01HA	Bagaimana menggunakan kata kunci pada mesin pencari seperti <Google©>, <Yahoo©>, dll.	☐ ₀₁	☐ ₀₂
TC166Q02HA	Bagaimana mengetahui informasi terpercaya dari Internet	☐ ₀₁	☐ ₀₂
TC166Q03HA	Bagaimana membandingkan laman web yang berbeda lalu menyeleksi informasi yang sesuai untuk tugas siswa di sekolah	☐ ₀₁	☐ ₀₂
TC166Q04HA	Memahami akibat saat membuat informasi secara online misalnya di <Facebook©>, <Instagram©>, dsb.	☐ ₀₁	☐ ₀₂
TC166Q05HA	Bagaimana menggunakan informasi singkat dibawah tautan pada daftar hasil pencarian	☐ ₀₁	☐ ₀₂
TC166Q06HA	Bagaimana mendeteksi apakah informasi yang diperoleh akurat atau tidak	☐ ₀₁	☐ ₀₂
TC166Q07HA	Bagaimana mendeteksi informasi palsu atau spam di email	☐ ₀₁	☐ ₀₂

TC207

Saat mengajar, Apakah Anda memberi kesempatan siswa untuk mengembangkan kemampuan seperti dibawah ini?

(Silahkan pilih satu jawaban pada setiap kolom .)

		Ya	Tidak
TC207Q01HA	Communicating with people from different cultures or countries	☐ ₀₁	☐ ₀₂
TC207Q02HA	Knowledge of different cultures	☐ ₀₁	☐ ₀₂
TC207Q03HA	Openness to people from other cultural backgrounds	☐ ₀₁	☐ ₀₂
TC207Q04HA	Respect for cultural diversity	☐ ₀₁	☐ ₀₂
TC207Q05HA	Foreign languages	☐ ₀₁	☐ ₀₂
TC207Q06HA	Critical thinking skills	☐ ₀₁	☐ ₀₂

TC169

Seberapa sering Anda menggunakan alat pembelajaran seperti dibawah ini pada tahun ajaran ini?

(Silahkan pilih satu jawaban pada setiap kolom.)

		<i>Tidak pernah</i>	<i>Dalam beberapa pembelajaran</i>	<i>Pada setiap pembelajaran</i>	<i>Di sepanjang pembelajaran</i>
TC169Q01HA	Perangkat lunak tentang tutorial atau program praktek	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q02HA	Permainan pembelajaran digital	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q03HA	Software untuk Word atau presentasi (misal <Microsoft Word ®>, <Microsoft PowerPoint ®>)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q04HA	Lembar kolom (misalnya <Microsoft Excel®>)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q05HA	Alat produksi multimedia (misal: media capture dan editing, web production)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q06HA	Software peta konsep (misal: <Inspiration ®>, <Webspiration ®>)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q07HA	Data logging dan alat monitoring	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q08HA	Software simulasi and modelling	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q09HA	Sosial media (misal <Facebook>, <Twitter>)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q10HA	Software komunikasi (misal: email, blogs)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q11HA	Perangkat komputer berbasis informasi (misal: website, wiki, ensiklopedia)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q12HA	Suberdaya pembelajaran digital interaktif (e.g. learning objects)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q13HA	Software menggambar dan menggaris	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
TC169Q14HA	E-portfolio	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄

TC176

Seberapa sering Anda terlibat pada kegiatan membaca seperti dibawah ini?

(Silahkan pilih satu jawaban pada setiap kolom. Apabila Anda tidak paham apa kegiatan itu, pilih "Saya tidak paham.")

		Saya tidak paham	Tidak pernah atau hampir tidak pernah	Beberapa kali dalam sebulan	Beberapa kali dalam seminggu	Beberapa kali dalam sehari
TC176Q01HA	Membaca email	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
TC176Q02HA	<Mengobrol online> (misal: <Whatsapp®> , <Messenger®>)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
TC176Q03HA	Membaca berita online	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
TC176Q05HA	Mencari informasi online guna belajar topik tertentu	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
TC176Q06HA	Bergabung dengan grup atau forum diskusi online	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
TC176Q07HA	Mencari informasi praktis secara online (misal: jadwal, kegiatan, tips, resep)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅

TC172

Manakah pernyataan dibawah ini yang paling menggambarkan bagaimana membaca buku (berbagai topik)?

(Silahkan pilih salah satu jawaban.)

TC172Q01HA	Saya jarang atau tidak pernah membaca buku.	☐ ₀₁
TC172Q01HA	Saya lebih sering membaca buku dalam format cetakan.	☐ ₀₂
TC172Q01HA	Saya membaca buku lebih sering pada perangkat digital (misalnya: e-reader, tab, handphone, komputer).	☐ ₀₃
TC172Q01HA	Saya membaca buku baik pada format cetakan maupun perangkat digital.	☐ ₀₄

TC173

Manakah pernyataan dibawah ini yang paling menggambarkan bagaimana membaca berita (misalnya: politik, budaya, olah raga, berita lokal)?

(Silahkan pilih salah satu jawaban.)

TC173Q01HA	Saya tidak mengikuti berita sama sekali.	☐ ₀₁
TC173Q01HA	Saya hanya menonton dan mendengarkan berita (misal: radio, TV, podcast).	☐ ₀₂
TC173Q01HA	Saya lebih sering membaca berita pada perangkat digital (misal: tablet, handphone, komputer).	☐ ₀₃
TC173Q01HA	Saya lebih sering membaca berita cetakan (misal: koran, majalah).	☐ ₀₄
TC173Q01HA	Saya membaca berita baik pada format cetakan maupun perangkat digital.	☐ ₀₅

Appendix F

Parent Questionnaire

Tentang Kuisisioner ini.

<Putra/i Bapak/Ibu yang membawa kuisisioner ini ke rumah> dipilih sebagai partisipan studi tentang Literasi Membaca yang berfokus pada kemampuan membaca siswa usia 15 tahun.

Dalam studi ini, siswa diminta menjawab pertanyaan mengenai literasi membaca, sebagai salah satu kompetensi global, dengan memberikan informasi tentang latar belakang, persepsi, dan pendapat yang berhubungan dengan pembelajaran di sekolah. Sebagai bagian dari studi, maka kami membutuhkan informasi dari orang tua mengenai hal-hal berikut:

- Informasi tentang siswa dan keluarga
- Bagaimana siswa sekolah
- Jalur pendidikan putra/i

Informasi dari Bapak/Ibu akan sangat berharga guna memberikan informasi bagaimana tingkat literasi membaca siswa dapat berkembang dan faktor yang mempengaruhi.

Kami berharap Bapak/Ibu dapat mengisi kuisisioner ini sebagai orang tua siswa berusia 15 tahun. Dalam kuisisioner ini tidak ada jawaban benar atau salah. Semua informasi yang diberikan akan dijamin kerahasiaannya. Atas ketersediaan Bapak/Ibu dalam mengisi kuisisioner ini, diucapkan terima kasih.

Q01 **Siapa yang melengkapi kuisioner ini?**

PA001 (Silahkan pilih jawaban yang sesuai.)

PA001Q01TA Ibu atau wali murid perempuan ☐ 01

PA001Q02TA Ayah atau wali murid laki-laki ☐ 01

PA001Q03TA Lainnya ☐ 01

Q02**Seberapa sering Anda atau orang lain dirumah mendampingi putra/i dalam kegiatan berikut ini?**

PA003

(Silahkan pilih salah satu jawaban pada setiap kolom.)

		<i>Tidak pernah atau hampir tidak pernah</i>	<i>Satu atau dua kali dalam setahun</i>	<i>Satu atau dua kali dalam sebulan</i>	<i>Satu atau dua kali dalam seminggu</i>	<i>Setiap hari atau hampir setiap hari</i>
PA003Q01TA	Diskusi seberapa baik putra/i mengerjakan di sekolah	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA003Q02TA	Makan <makanan utama> dengan putra/i di meja makan	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA003Q03TA	Menghabiskan waktu berbicara dengan putra/i	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA003Q04HA	Mendampingi putra/i dengan membaca dan menulis Pekerjaan Rumah	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA003Q05IA	Berdiskusi isu politik dan sosial	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA003Q06IA	Pergi ke toko buku atau perpustakaan dengan putra/i	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA003Q07IA	Berbicara dengan putra/i tentang apa yang sedang mereka baca	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅

Q03

Ketika putra/i Anda masuk pertama kali sekolah <SD>, seberapa sering Anda atau orang lain di rumah yang mendampingi dengan aktivitas seperti dibawah ini?

PA154

(Silahkan pilih satu jawaban pada setiap kolom.)

		Tidak pernah atau hampir tidak pernah	Satu atau dua kali dalam sebulan	Satu atau dua kali dalam seminggu	Setiap hari atau hampir setiap hari
PA154Q01A	Membaca buku	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA154Q02A	Bercerita atau mendongeng	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA154Q03A	Menyanyikan lagu	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA154Q04A	Bermain dengan mainan huruf (misal: papan dengan huruf alfabet)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA154Q05A	Bercerita tentang hal yang pernah dilakukan	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA154Q06A	Bercerita hal yang pernah dibaca	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA154Q07A	Bermain permainan huruf	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA154Q08A	Menulis huruf atau kata	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA154Q09A	Membaca nyaring tanda dan bunyi huruf	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA154Q10HA	Menghitung irama atau bernyanyi menghitung angka	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄

Q05

Saat putra/i Bapak/Ibu berumur 10 tahun, seberapa sering mereka membaca bacaan seperti dibawah ini?

m

PA156

(Silahkan pilih salah satu jawaban pada setiap kolom.)

		<i>Tidak pernah atau hampir tidak pernah</i>	<i>Satu atau dua kali sebulan</i>	<i>Satu atau dua kali seminggu</i>	<i>Setiap hari atau hampir setiap hari</i>
PA156Q01HA	Komik	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA156Q02HA	Majalah	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA156Q03HA	Buku	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA156Q04HA	Koran	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄

Q12**Sebarapa setuju atau tidak setuju Anda dengan pernyataan mengenai membaca berikut ini?**

PA158

(Pilihan dibawah ini untuk beberapa variasi bacaan seperti buku, majalah, koran, website, blog, email)

(Silahkan pilih salah satu jawaban di setiap kolom.)

		<i>Sangat tidak setuju</i>	<i>Tidak setuju</i>	<i>Setuju</i>	<i>Sangat setuju</i>
PA158Q01HA	Membaca karena keharusan.	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA158Q02IA	Membaca karena sebuah hobi	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA158Q03HA	Senang bercerita tentang sebuah buku pada orang lain.	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA158Q04IA	Membaca hanya membuang waktu.	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄
PA158Q05HA	Membaca untuk mendapatkan informasi yang dibutuhkan	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄

Q13

Kira-kira berapa lama Anda biasanya membaca buku untuk hiburan?

(Pilihan dibawah ini untuk beberapa variasi bacaan seperti buku, majalah, koran, website, blog, email)

PA159

(Silahkan pilih satu jawaban.)

PA159Q01HA

Saya tidak membaca untuk hiburan

☐ ₀₁

PA159Q01HA

30 menit atau kurang sehari

☐ ₀₂

PA159Q01HA

Lebih dari 30 menit sampau kurang dari 60 menit sehari

☐ ₀₃

PA159Q01HA

1 sampai 2 jan sehari

☐ ₀₄

PA159Q01HA

Lebih dari 2 jam sehari

☐ ₀₅

Q14 **Seberapa sering Anda membaca tipe bacaan karena memang Anda butuh?**

PA160

(Pilihan berdasarkan membaca baik dalam format cetakan ataupun dalam bentuk digital.)

(Silahkan pilih salah satu jawaban pada setiap kolom.)

		Tidak pernah atau hampir tidak pernah	Sesekali waktu dalam setahun	Sekitar satu kali sebulan	Beberapa kali dalam sebulan	Beberapa kali dalam sebulan
PA160Q01HA	Majalah	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA160Q02HA	Komik	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA160Q03HA	Buku fiksi (novel, cerita narasi)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA160Q04HA	Buku non-fiksi (pengetahuan, dokumenter)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA160Q05HA	Koran	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅

Q15 Seberapa sering Anda terlibat pada kegiatan membaca seperti dibawah ini?

PA161

(Silahkan pilih salah satu jawaban pada setiap kolom. Bila Anda tidak paham tentang kegiatan tersebut, pilih "Tidak paham")

	Tidak paham	Tidak pernah atau hampir tidak pernah	Beberapa kali dalam sebulan	Beberapa kali dalam seminggu	Beberapa kali dalam sehari
PA161Q01HA Membaca email	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA161Q02HA <Percakapan online> (misal. <Whatsapp®> , <Messenger®>)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA161Q03HA Membaca berita online	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA161Q05HA Mencari informasi online guna belajar tentang topik tertentu	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA161Q06HA Terlibat dalam komunitas atau forum diskusi online	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅
PA161Q07HA Mencari informasi kegiatan secara online (misal: acara, tips, atau resep tertentu)	☐ ₀₁	☐ ₀₂	☐ ₀₃	☐ ₀₄	☐ ₀₅

Q16 **Manakah pernyataan dibawah ini yang sesuai menggambarkan bagaimana Anda membaca buku (semua jenis topik)?**

PA162 (Silahkan pilih satu jawaban.)

PA162Q01HA Saya jarang atau tidak pernah membaca buku. ☐ ₀₁

PA162Q01HA Saya lebih sering membawa buku pada format cetakan. ☐ ₀₂

PA162Q01HA Saya lebih sering membaca buku pada perangkat digital (misal: e-reader, tablet, HP, komputer). ☐ ₀₃

PA162Q01HA Saya membaca buku secara seimbang pada format cetakan dan perangkat digital. ☐ ₀₄

Q17

Manakah pernyataan dibawah ini yang sesuai untuk menggambarkan bagaimana Anda membeaca berita (misal: politik, budaya, olah raga, berita lokal)?

PA163

(Silahkan pilih satu jawaban.)

PA163Q01HA

Saya tidak mengikuti berita sama sekali.

☐ ₀₁

PA163Q01HA

Saya hanya menonton atau mendengarkan berita (misal: radio, TV, HP).

☐ ₀₂

PA163Q01HA

Saya lebih sering membawa berita secara online pada perangkat digital (misal: HP, tab, komputer).

☐ ₀₃

PA163Q01HA

Saya lebih sering membaca berita format cetakan (misal: koran, majalah).

☐ ₀₄

PA163Q01HA

Saya membaca dengan seimbang pada format cetakan dan perangkat digital.

☐ ₀₅

Q18 **Berapa bahasa yang digunakan untuk komunikasi di rumah, apakah Anda berbicara cukup baik untuk berkomunikasi dengan orang lain?**

PA166 (Silahkan pilih satu jawaban.)

PA166Q01HA

Satu

☐ ₀₁

PA166Q01HA

Dua

☐ ₀₂

PA166Q01HA

Tiga

☐ ₀₃

PA166Q01HA

Empat atau lebih

☐ ₀₄

Q31 Berapa rata-rata pendapatan setahun?

PA042

Silahkan isi berdasarkan pendapatan total, sebelum pajak, dari semua pemasukan rumah tangga.

Pertanyaan ini hanyalah pilihan, jika Anda merasa nyaman menjawab, jawaban Anda akan kami jamin kerahasiaanya.

(Silahkan pilih salah satu jawaban.)

PA042Q01TA

Kurang dari <Rp. 500.000>

☐ ₀₁

PA042Q01TA

<Rp. 500.000> atau lebih, namun kurang dari <Rp.1.000.000>

☐ ₀₂

PA042Q01TA

<Rp. 1.000.000> atau lebih, namun kurang dari <Rp. 2.500.000>

☐ ₀₃

PA042Q01TA

<Rp. 2.500.000> atau lebih, namun kurang dari <Rp.5.000.000>

☐ ₀₄

PA042Q01TA

<Rp. 5.000.000> atau lebih, namun kurang dari <Rp. 10.000.000>

☐ ₀₅

PA042Q01TA

<Rp. 10.000.000> atau lebih

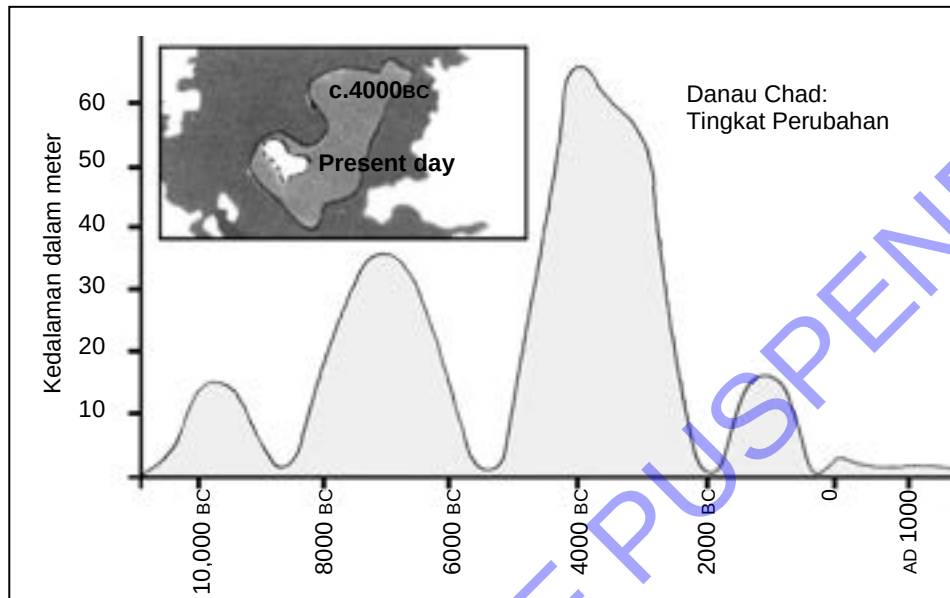
☐ ₀₆

Appendix G

Student Reading Test

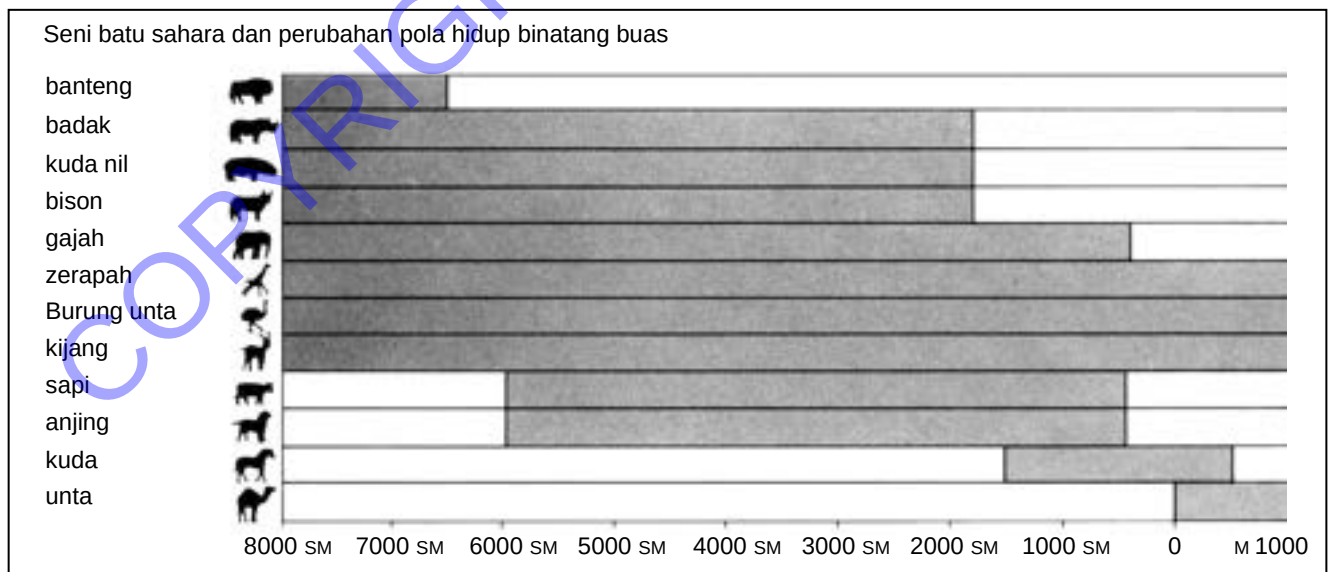
DANAU CHAD

Gambar 1 menunjukkan kedalaman yang berubah-ubah dari Danau Chad di Gurun Sahara, Afrika Utara. Danau Chad menghilang sama sekali pada kira-kira 20.000 sebelum Masehi, selama zaman Es. Pada kira-kira 11.000 SM danau itu kembali muncul. Sekarang kedalamannya kira-kira sama dengan kedalaman pada tahun 1000 M.



Gambar 1

Gambar 2 menunjukkan seni batu Sahara (gambaran atau kuno yang ditemukan pada dinding-dinding gua) dan perubahan pola hidup binatang buas.



Gambar 2

Gunakan informasi tentang Danau Chad pada halaman sebelumnya untuk menjawab pertanyaan-pertanyaan berikut.

Pertanyaan 1 DANAU CHAD

R040Q02

Berapakah kedalaman Danau Chad sekarang?

- A Sekitar dua meter.
- B Sekitar lima belas meter
- C Sekitar lima puluh meter
- D Danau itu telah hilang sama sekali.
- E Tak ada informasi tentang itu.

Pertanyaan 2 DANAU CHAD

R040Q03B- 0 1 9

Mengapa penulis memulai grafiknya pada titik tersebut?

.....
.....

Pertanyaan 3 DANAU CHAD

R040Q04

Gambar 2 didasarkan pada pandangan bahwa:

- A binatang-binatang pada seni batu terdapat pada daerah tersebut pada saat digambar.
- B para seniman yang menggambar binatang-binatang itu sangat terampil.
- C para seniman yang menggambar binatang-binatang itu dapat ber pergian jauh.
- D tidak ada usaha menjinakkan binatang-binatang yang digambarkan pada seni batu tersebut.

Pertanyaan 4 DANAU CHAD

R040Q06

Untuk pertanyaan ini, kamu harus dapat menggabungkan informasi dari gambar 1 dan gambar 2.

Menghilangnya badak, kuda nil, dan bison dari seni batu Sahara terjadi

- A pada awal Zaman Es yang terbaru.
- B pada pertengahan periode saat Danau Chad berada pada tingkat kedalaman tertinggi.
- C setelah dasar Danau Chad menurun selama lebih dari seribu tahun.
- D pada permulaan periode kering yang terus menerus.

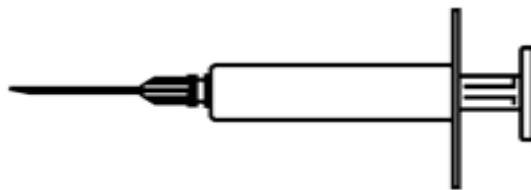
COPYRIGHT OF PUSPENDIK

ACOL VOLUNTARY FLU IMMUNISATION PROGRAM

PROGRAM IMUNISASI FLU SUKARELA ACOL

Seperti yang pasti Anda ketahui, flu dapat menyerang secara cepat dan ganas pada musim dingin. Ia dapat membuat penderitanya sakit selama berminggu-minggu.

Cara terbaik untuk melawan virus ini adalah dengan memiliki tubuh yang sehat dan bugar. Olahraga setiap hari dan makan banyak buah-buahan dan sayuran sangat dianjurkan untuk membantu sistem kekebalan tubuh melawan virus yang menyerang ini.



ACOL telah memutuskan untuk memberikan kesempatan pada staf untuk diimunisasi anti-flu sebagai cara tambahan untuk mencegah virus yang mematikan ini agar tidak menyebar di antara kita. ACOL telah mengatur agar ada seorang perawat untuk memberikan imunisasi di ACOL, dalam suatu sesi setengah hari pada jam-jam kerja pada minggu antara tanggal 17-21 Mei. Program ini gratis dan tersedia bagi seluruh anggota staf.

Keikutsertaan dalam program ini bersifat sukarela. Anggota staf yang memilih untuk ikut serta akan diminta untuk menandatangani suatu formulir persetujuan yang menyatakan bahwa mereka tidak mengidap alergi apa pun, dan mereka mengerti bahwa mereka mungkin mengalami dampak sampingan yang ringan.

Informasi medis menyatakan bahwa imunisasi tidak akan mengakibatkan influenza. Bagaimanapun juga, imunisasi ini mungkin akan menimbulkan dampak sampingan ringan seperti kelelahan, demam ringan, dan sedikit rasa sakit pada lengan.



SIAPA YANG HARUS DIIMUNISASI?

Siapa pun yang ingin terhindar dari virus ini.

Imunisasi ini terutama dianjurkan bagi orang-orang yang berusia di atas 65 tahun. Tetapi tanpa memandang usia, SIAPA PUN yang menderita penyakit kronis yang menjadikan “badan lesu”, terutama penyakit jantung, paru-paru, tenggorokan, atau kencing manis sebaiknya diimunisasi.

Dalam lingkungan kantor, SEMUA staf berisiko terjangkit flu.

SIAPA YANG SEBAIKNYA TIDAK DIIMUNISASI?

Orang-orang yang sangat peka terhadap telur, orang-orang yang menderita penyakit demam yang akut, dan wanita hamil.

Periksalah ke dokter Anda apabila Anda menjalani pengobatan atau pernah mengalami reaksi terhadap suntikan flu.



Jika Anda ingin diimunisasi pada minggu antara tanggal 17 – 21 Mei, harap Anda memberi tahu karyawan personalia, Fiona McSweeney, sebelum hari Jum'at tanggal 7 Mei. Tanggal dan waktunya akan diatur, tergantung pada adanya perawat, jumlah peserta, dan waktu yang sesuai bagi sebagian besar staf. Jika Anda ingin diimunisasi pada musim dingin ini, tetapi tidak dapat hadir pada waktu yang telah ditentukan, harap beri tahu Fiona. Akan dicarikan waktu lain jika ada cukup peserta.

Untuk informasi lebih lanjut, hubungi Fiona di saluran 5577.

Nikmati

KESEHATAN PRIMA

Fiona McSweeney, petugas personalia pada suatu perusahaan yang bernama ACOL, menulis lembar informasi pada halaman 31 dan 32 bagi para staf ACOL. Rujuklah lembar informasi tersebut untuk menjawab pertanyaan-pertanyaan berikut.

Pertanyaan 5 FLU

R077Q02

Mana dari pernyataan-pernyataan berikut yang menggambarkan suatu ciri program imunisasi flu ACOL?

- A Kelas-kelas olahraga akan diadakan setiap hari selama musim dingin.
- B Imunisasi akan diberikan pada jam-jam kerja.
- C Suatu bonus kecil akan diberikan pada peserta.
- D Seorang dokter akan memberikan suntikan.

Pertanyaan 6 FLU

R077Q04

Lembar informasi ini menyatakan bahwa jika Anda ingin melindungi diri dari virus flu, maka suntikan imunisasi flu

- A lebih efektif daripada latihan olahraga dan makan yang sehat, tetapi lebih berisiko.
- B adalah gagasan yang bagus, tetapi bukan merupakan pengganti olahraga dan makan yang sehat.
- C sama efektifnya dengan olahraga dan makan yang sehat, dan tidak merepotkan.
- D tidak perlu dipertimbangkan jika Anda sudah cukup berolahraga dan makan yang sehat.

Pertanyaan 7 FLU**R077Q05- 0 1 2 9**

Sebagian lembar informasi ini menyatakan:

SIAPA YANG SEHARUSNYA DIIMUNISASI?

Siapa pun yang tertarik untuk terhindar dari virus ini.

Setelah Fiona mengedarkan lembar informasi, seorang rekannya berkata bahwa sebaiknya ia menghilangkan kalimat “Siapa pun yang tertarik untuk terhindar dari virus ini” karena kalimat itu menyesatkan.

Setujukah kamu bahwa kata-kata tersebut menyesatkan dan seharusnya tidak dicantumkan?

Jelaskan jawabanmu

.....

.....

.....

.....

Pertanyaan 8 FLU**R077Q06**

Menurut lembar informasi, anggota staf mana di bawah ini yang harus menghubungi Fiona?

- A Steve dari toko tidak mau diimunisasi karena ia lebih percaya pada kekebalan alamiahnya.
- B Julie dari bagian penjualan ingin mengetahui apakah program imunisasi ini bersifat wajib.
- C Alice dari bagian surat-menyurat ingin diimunisasi pada musim dingin ini, tetapi ia akan melahirkan dua bulan lagi.
- D Michael dari bagian akuntansi ingin diimunisasi tetapi dia akan cuti sejak tanggal 17 Mei.

GRAFITI

Amarahku membara tatkala dinding sekolah dibersihkan dan dicat kembali untuk keempat kalinya agar grafiti itu hilang. Kreativitas memang mengagumkan tetapi orang seharusnya menemukan cara untuk mengungkapkan dirinya yang tidak membebani masyarakat.

Mengapa kamu merusak reputasi anak-anak muda dengan melukis grafiti di tempat yang terlarang? Pelukis profesional pun tidak menggantung lukisannya di jalanan, bukan? Tapi mereka mencari uang dan memperoleh ketenaran lewat pameran yang diakui.

Menurut pendapatku, bangunan, pagar dan bangku-bangku di taman merupakan karya seni tersendiri. Sangatlah menyedihkan merusak arsitektur dengan grafiti, apa lagi, cara merusak lapisan ozon. Sungguh, aku tidak mengerti mengapa pelukis-pelukis jahat itu menyusahkan ketika "karya-karya artistik" mereka dibersihkan dari kampungku.

Helga

Tidak ada ukuran untuk selera. Masyarakat penuh dengan komunikasi dan periklanan. Logo perusahaan, nama toko. Poster mencolok terpampang besar di jalanan. Apakah itu semua bisa diterima? Ya, sebagian besar. Apakah grafiti itu diterima? Beberapa menjawab ya, dan beberapa tidak.

Siapa yang membayar grafiti itu? Siapa yang membayar iklan-iklan itu pada akhirnya? Betul, konsumen.

Sudahkah orang-orang yang memasang papan iklan minta ijin? Tidak. Apakah pelukis grafiti harus minta ijin? Bukankah itu pertanyaan komunikasi – Nama kamu sendiri, nama geng dan karya yang besar di jalanan?

Pikirkanlah baju garis-garis dan kotak-kotak yang muncul di toko-toko beberapa tahun yang lalu. Dan pakaian ski. Corak dan warna yang langsung diambil dari dinding beton yang bergambar bunga. Menarik sekali corak dan warna tersebut diterima dan digemari tapi grafiti dengan cara yang sama itu dianggap mengerikan.

Zaman sangatlah sulit untuk berseni.

Sophia

Kedua surat tersebut diambil dari internet tentang grafiti.

Grafiti merupakan tulisan atau lukisan yang dilarang pada tembok atau di mana pun. Surat tersebut merupakan rujukan untuk menjawab pertanyaan di bawah ini:

Pertanyaan 9 GRAFITI

R081Q01

Tujuan setiap surat tersebut adalah untuk

- A menjelaskan apa grafiti itu.
- B menyampaikan pendapat tentang grafiti
- C menunjukkan popularitas grafiti
- D memberi tahu masyarakat berapa biaya-biaya yang dihabiskan untuk menghapus grafiti itu.

Pertanyaan 10 GRAFITI

R081Q02- 0 1 9

Helga menunjuk pada biaya yang membebani pada masyarakat. Salah satunya adalah biaya membersihkan grafiti dari tempat umum.

Sebutkan satu biaya lain yang dimaksudkan oleh Helga?

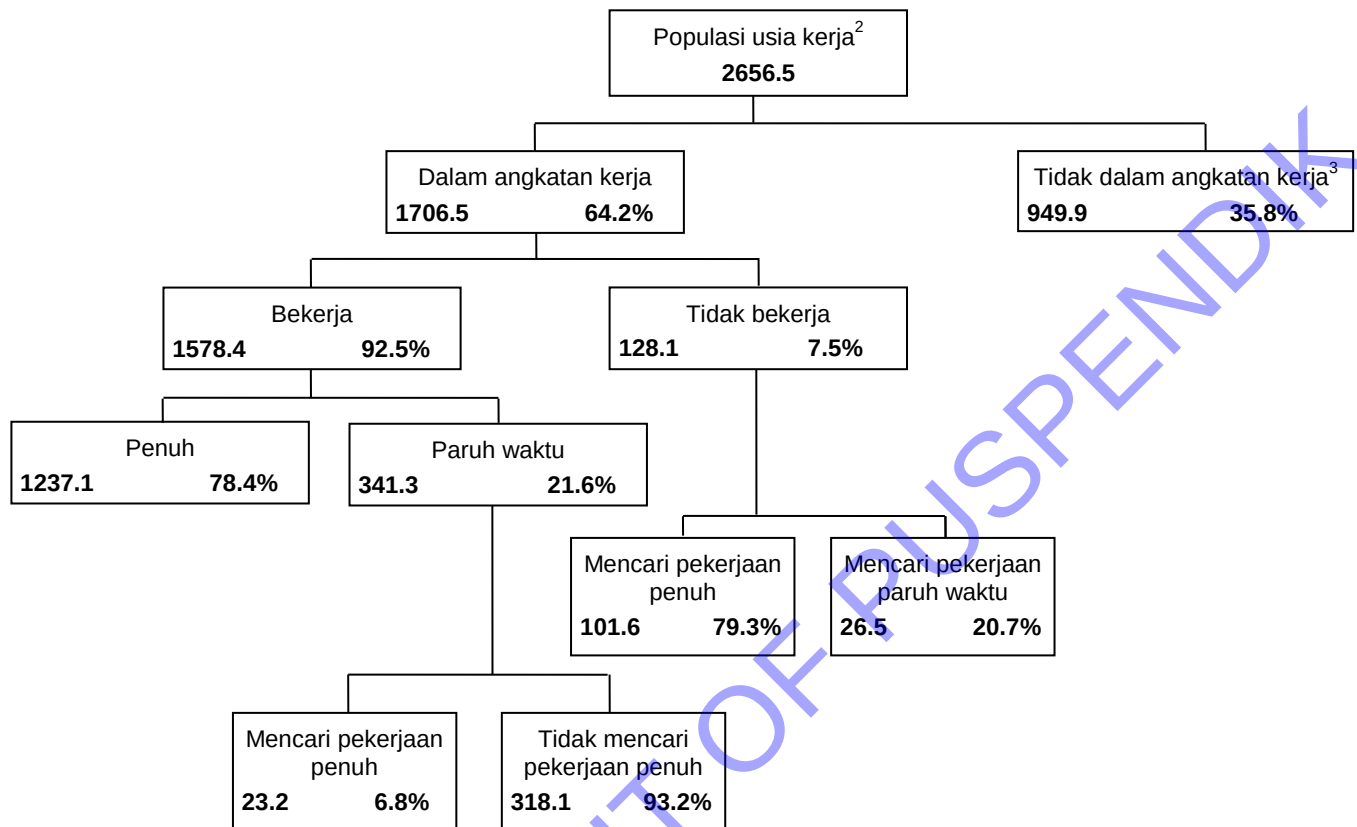
.....

.....

.....

Diagram pohon di bawah ini menunjukkan struktur angkatan kerja atau “populasi usia kerja” suatu negara. Jumlah penduduk total negara itu pada tahun 1995 adalah $\pm$ 3,4 juta jiwa.

Tahun Struktur Angkatan Kerja berakhir pada 31 Maret 1995 (000)¹



Catatan :

1. Jumlah orang dinyatakan dalam ribuan (000s).
2. Populasi usia kerja didefinisikan sebagai orang-orang yang berusia antara 15 sampai dengan 65 tahun.
3. Orang-orang yang “Tidak dalam angkatan kerja” adalah mereka yang tidak secara aktif mencari kerja dan/atau tidak dapat bekerja

Gunakan informasi tentang tenaga kerja suatu negara di halaman sebelumnya untuk menjawab pertanyaan-pertanyaan di bawah ini.

Pertanyaan 11 TENAGA KERJA

R088Q01

Populasi usia-kerja dikelompokkan ke dalam dua grup utama yang mana?

- A Bekerja dan tidak bekerja.
- B Usia kerja dan bukan usia kerja.
- C Pekerja penuh-waktu dan pekerja paruh-waktu.
- D Di dalam angkatan kerja dan tidak dalam angkatan kerja.

Pertanyaan 12 TENAGA KERJA

R088Q03- 0 1 2 9

Berapa orang yang tergolong usia kerja yang tidak berada di dalam angkatan kerja? (Tuliskan **jumlah** orangnya, bukan persentasenya).

.....

Pertanyaan 13 TENAGA KERJA

R088Q05

Umpamakan informasi tentang angkatan kerja disajikan dalam diagram pohon seperti ini setiap tahun.

Di bawah ini adalah daftar empat ciri dari diagram pohon. Nyatakan apakah Anda merasa ciri-ciri itu akan berubah dari tahun ke tahun dengan melingkari kata “Berubah” atau “Tidak berubah”. Yang pertama telah dikerjakan sebagai contoh:

Ciri-ciri Diagram Pohon	Jawaban
Label dalam tiap kotak (mis.: “Dalam angkatan kerja”)	Berubah / Tidak berubah
Persentase (mis. “64,2%”)	Berubah / Tidak berubah
Jumlah (mis. “2656,5”)	Berubah / Tidak berubah
Catatan kaki di bawah diagram pohon	Berubah / Tidak berubah

Pertanyaan 14 TENAGA KERJA

R088Q07

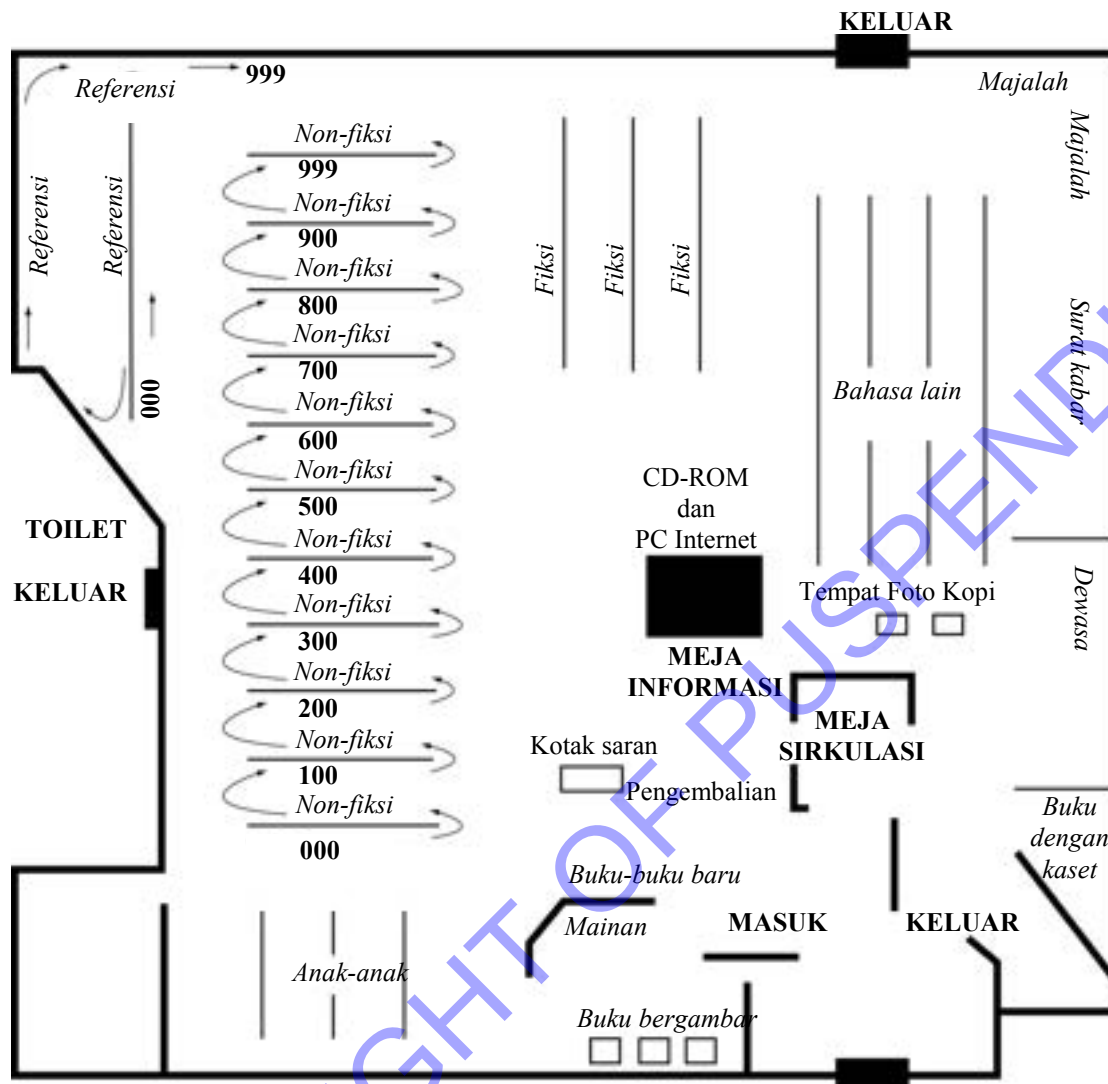
Informasi mengenai struktur angkatan kerja telah disajikan dalam bentuk diagram pohon, tetapi dapat juga disajikan dengan cara lain, seperti deskripsi tertulis, diagram lingkaran, grafik, atau tabel.

Diagram pohon mungkin telah dipilih karena sangat berguna untuk menunjukkan

- A perubahan dari waktu ke waktu.
- B jumlah populasi total suatu negara.
- C kategori dalam setiap kelompok.
- D ukuran tiap kelompok.

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PETA PERPUSTAKAAN



Pada halaman sebelumnya terdapat peta perpustakaan. Gunakan peta tersebut untuk menjawab pertanyaan di bawah ini.

Pertanyaan 15 PERPUSTAKAAN

R091Q06

Jalan terpendek dari pintu masuk perpustakaan ke bagian surat kabar melewati:

- A bagian majalah.
- B meja sirkulasi.
- C bagian referensi.
- D bagian anak-anak.

Pertanyaan 16 PERPUSTAKAAN

R091Q07A

Di mana *buku-buku baru* ditempatkan?

- A Di bagian fiksi.
- B Di bagian non - fiksi.
- C Dekat pintu masuk.
- D Dekat meja informasi.

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Hasil-hasil Program PLAN Internasional Tahun Anggaran 1996

DAERAH AFRIKA TIMUR DAN SELATAN

RESA



Hidup Sehat

	MESIR	ETHIOPIA	KENYA	MALAWI	SUDAN	TANZANIA	UGANDA	ZAMBIA	ZIMBABWE	TOTALS
Membangun pos-pos kesehatan dengan 4 ruang atau kurang	1	0	6	0	7	1	2	0	9	26
Melatih pekerja kesehatan selama satu hari	1 053	0	719	0	425	1 003	20	80	1 085	4 385
Memberi nutrisi tambahan >satu minggu pada anak-anak	10 195	0	2 240	2 400	0	0	0	0	251 402	266 237
Memberi bantuan finansial untuk kesehatan/ perawatan gigi anak-anak	984	0	396	0	305	0	581	0	17	2 283



Belajar

	MESIR	ETHIOPIA	KENYA	MALAWI	SUDAN	TANZANIA	UGANDA	ZAMBIA	ZIMBABWE	TOTALS
Melatih guru-guru selama 1 minggu	0	0	367	0	970	115	565	0	303	2 320
Membeli/menyumbang buku-buku latihan sekolah	667	0	0	41 200	0	69 106	0	150	0	111 123
Membeli/menyumbang buku teks sekolah	0	0	45 650	9 600	1 182	8 769	7 285	150	58 387	131 023
Membeli/membuat/menyumbang pakaian seragam	8 897	0	5 761	0	2 000	6 040	0	0	434	23 132
Memberi biaya/beasiswa anak-anak	12 321	0	1 598	0	154	0	0	0	2 014	16 087
Membuat/membeli/menyumbang bangku sekolah	3 200	0	3 689	250	1 564	1 725	1 794	0	4 109	16 331
Membangun kelas-kelas permanen	44	0	50	8	93	31	45	0	82	353
Memperbaiki ruang kelas	0	0	34	0	0	14	0	0	33	81
Latihan membaca orang dewasa dalam tahun anggaran ini	1 160	0	3 000	568	3 617	0	0	0	350	8 695



Habitat

	MESIR	ETHIOPIA	KENYA	MALAWI	SUDAN	TANZANIA	UGANDA	ZAMBIA	ZIMBABWE	TOTALS
Menggali/membangun WC atau toilet	50	0	2 403	0	57	162	23	96	4 311	7 102
Menghubungkan rumah-rumah dengan sistem sanitasi baru	143	0	0	0	0	0	0	0	0	143
Menggali/memperbarui sumur (melindungi sumber air)	0	0	15	0	7	13	0	0	159	194
Mengebor sumber air baru	0	0	8	93	14	0	27	0	220	362
Membangun sistem saluran air minum tenaga gravitasi	0	0	28	0	1	0	0	0	0	29
Memperbaiki/memperbarui sistem air minum	0	0	392	0	2	0	0	0	31	425
Memperbarui rumah-rumah dengan proyek PLAN	265	0	520	0	0	0	1	0	2	788
Membangun rumah-rumah baru untuk ahli waris	225	0	596	0	0	2	6	0	313	1 142
Membangun atau memperbarui gedung pertemuan	2	0	2	0	3	0	3	0	2	12
Melatih pemimpin masyarakat selama satu tahun atau lebih	2 214	95	3 522	232	200	3 575	814	20	2 693	13 365
Memperbarui tanda kilometer jalan	1.2	0	26	0	0	0	0	0	53.4	80.6
Membangun jembatan	0	0	4	2	11	0	0	0	1	18
Memberi imbalan kepada keluarga dari pengendalian erosi	0	0	1 092	0	1 500	0	0	0	18 405	20 997
Memberi pelayanan penerangan listrik pada rumah-rumah	448	0	2	0	0	0	0	0	44	494

Tabel pada halaman sebelumnya merupakan bagian dari laporan yang diterbitkan oleh PLAN Internasional, suatu organisasi bantuan internasional. Organisasi ini memberikan informasi tentang kerja PLAN dalam salah satu wilayah kerjanya (Afrika Timur dan Selatan). Dengan mengacu pada tabel tersebut, jawablah pertanyaan-pertanyaan berikut.

Pertanyaan 17 PLAN INTERNASIONAL

R099Q02

Menurut tabel, di negara manakah PLAN Internasional terlibat dalam skala kegiatan terbesar?

- A Zambia
- B Malawi
- C Kenya
- D Tanzania

Pertanyaan 18 PLAN INTERNASIONAL

R099Q04A

Apa yang ditunjukkan oleh tabel tersebut tentang tingkat kerja PLAN Internasional di Ethiopia pada tahun 1996 bila dibandingkan dengan di negara-negara lain dalam wilayah itu?

- A Tingkat kerja di Ethiopia termasuk tinggi.
- B Tingkat kerja di Ethiopia termasuk rendah.
- C Tingkatannya hampir sama seperti di negara-negara lain dalam wilayah itu.
- D Dalam kategori Habitat termasuk tinggi, dan termasuk rendah dalam kategori lain.

Pertanyaan 19 PLAN INTERNASIONAL

R099Q04B- 0 1 2 3 9

Pada tahun 1996 Ethiopia merupakan salah satu negara termiskin di dunia.

Dengan mempertimbangkan fakta itu dan informasi dalam tabel, menurut kamu apa yang bisa menjelaskan tingkat kerja PLAN Internasional di Ethiopia, dibandingkan dengan kegiatan-kegiatannya di negara lain?

.....

.....

.....

Senjata Ilmiah Anggota Polisi

Terjadi pembunuhan tapi tersangka menyangkal. Ia mengatakan bahwa ia tidak mengenal korban. Katanya ia tidak pernah kenal, tidak pernah dekat-dekat, tidak pernah menyentuhnya Polisi dan jaksa yakin bahwa ia berbohong. Tapi bagaimana membuktikannya?

Pada tempat kejadian perkara, para penyidik telah mengumpulkan semua yang mungkin dapat dijadikan barang bukti seperti serpihan kain, rambut, sidik jari, puntung rokok.... Beberapa helai rambut yang ditemukan di jaket korban berwarna merah. Rambut itu tampaknya mirip dengan rambut tersangka. Kalau saja dapat dibuktikan bahwa rambut itu memang berasal dari kepalanya, ini dapat dijadikan bukti bahwa ia memang pernah berjumpa dengan korban.

Setiap Manusia Unik

Para ahli mulai bekerja. Mereka memeriksa beberapa sel yang diambil dari akar rambut dan beberapa yang diambil dari darah tersangka. Dalam inti setiap sel dalam tubuh kita terdapat *DNA*. Apakah itu? *DNA* itu dapat diibaratkan sebagai kalung yang terdiri dari dua untai mutiara yang dijalin.

Bayangkan kalau mutiara ini terdiri dari empat macam warna dan bahwa ribuan yang mutiara berwarna ini (yang membentuk *gene*) terjalin dengan urutan yang khusus. Dalam tubuh setiap orang urutan ini persis sama di semua sel, misalnya yang ada di akar rambut sama seperti yang ada di ibu jari kaki dan yang ada di hati sama seperti yang terdapat di lambung atau darah. Tapi urutan ini berbeda pada setiap orang. Adanya jumlah jalinan mutiara yang demikian banyaknya, hanya sedikit sekali kemungkinan dua orang mempunyai *DNA* yang sama kecuali mereka yang kembar identik. Jadi *DNA* merupakan sejenis kartu pengenalan genetika.

Oleh karenanya para ahli genetika dapat membandingkan kartu pengenalan genetika tersangka (yang ditentukan dari darahnya) dengan milik orang yang berambut merah. Kalau

kartu pengenalan genetiknya sama, maka dapat disimpulkan bahwa tersangka memang berada dekat korban yang katanya tidak pernah dijumpainya.

Hanya sebuah bukti

Semakin sering dalam kasus pelanggaran susila, pembunuhan, pencurian atau kejahatan lainnya, polisi selalu meminta dibuatkan analisis genetika. Mengapa? Untuk mencoba mencari bukti kontak antara dua orang, dua buah benda atau seorang dengan sebuah benda. Membuktikan adanya kontak demikian seringkali sangat berguna bagi penyidikan, tapi tidaklah mesti menjadikannya sebagai bukti kejahatan. Itu hanyalah sebuah bukti di antara sejumlah bukti lainnya.

Anne Versailles

Kita terdiri dari bermilyar sel

Setiap makhluk hidup terdiri sel yang jumlahnya sangat besar. Sel itu kecil sekali. Dapat juga dikatakan sel itu mikroskopik karena hanya dapat dilihat lewat mikroskop yang sudah melipat gandakan ukurannya. Setiap sel mempunyai jaringan lapisan luar dan sebuah inti yang di dalamnya terdapat *DNA*.

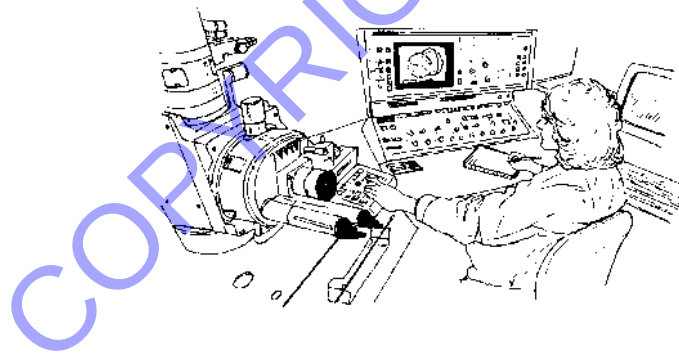
Apa genetika itu?

DNA terdiri dari sejumlah *gen* yang masing-masing terdiri dari ribuan “mutiara”. Gabungan *gen* ini membentuk kartu pengenalan genetika setiap orang.

Bagaimana kartu pengenalan genetika terungkap?

Para pakar genetika mengambil beberapa sel dari akar rambut yang ditemukan pada korban atau dari air liur yang tertinggal pada puntung rokok. Sel itu diletakkan dalam suatu zat yang menghancurkan segala sesuatu di sekitar *DNA* sel itu. Ia kemudian berbuat yang sama terhadap sel dari darah tersangka. *DNA* sekarang sudah siap secara khusus untuk dianalisis. Setelah itu, ditempatkan dalam sebuah *jeli* khusus yang dialiri dengan arus listrik. Setelah beberapa jam, akan dihasilkan garis-garis lurus (seperti tertera pada label harga barang yang kita beli) yang akan nampak di bawah sinar lampu khusus. Lalu *garis-garis* dari *DNA* tersangka dibandingkan dengan *garis-garis DNA* dari rambut korban.

Mikroskop
Di Laboratorium
Kepolisian



Jawablah pertanyaan di bawah ini dengan merujuk pada artikel di halaman sebelumnya

Pertanyaan 20 POLISI

R100Q04

Untuk menjelaskan struktur *DNA*, pengarang berbicara tentang kalung mutiara. Apa perbedaan kalung-kalung mutiara ini pada setiap orang?

- A Ukuran panjangnya.
- B Urutan mutiaranya berbeda.
- C Jumlah kalungnya berbeda.
- D Warna mutiaranya berbeda.

Pertanyaan 21 POLISI

R100Q05

Apa tujuan bagian yang berkotak dengan judul “Bagaimana kartu pengenal genetika terungkap?”

Untuk menjelaskan

- A apa *DNA* itu.
- B apa garis-garis lurus itu.
- C bagaimana cara menganalisis sel untuk mencari pola *DNA*.
- D bagaimana membuktikan terjadinya kejahatan.

Pertanyaan 22 POLISI

R100Q06

Apa tujuan utama sang pengarang? Untuk:

- A memberikan peringatan.
- B membuat senang.
- C memberi keterangan.
- D meyakinkan.

Pertanyaan 23 POLISI

R100Q07

Pada bagian terakhir pengantar (kotak sebelah kiri) terdapat pertanyaan “Tapi bagaimana membuktikannya?”

Menurut bacaan, para penyidik mencoba mencari jawaban pertanyaan ini dengan

- A menanyai para saksi.
- B melakukan analisis genetika.
- C menanyai tersangka dengan cermat.
- D melihat kembali seluruh hasil penyidikan.

NIKMATILAH SEPATU LARI ANDA



Selama 14 tahun Pusat Kesehatan Olahraga di Lyon (Perancis) telah mempelajari cedera yang dialami olahragawan muda dan olahragawan profesional. Penelitian menunjukkan bahwa yang terbaik adalah pencegahan ... dan sepatu yang baik.

Pukul, jatuh, pakai dan sobek...

Delapan belas persen atlet berusia antara 8 sampai 12 tahun mengalami cedera tumit. Tulang rawan pergelangan kaki pemain sepak bola tidak dapat menahan tekanan sehingga 25% atlet profesional mengakui bahwa ini merupakan titik lemah mereka. Tulang rawan persendian lutut halus dapat mengalami cedera parah jika tidak dirawat dengan baik sejak dini (usia 10-12 tahun). Jika dibiarkan dapat mengakibatkan radang tulang sendi. Pinggang para atlet pun tidak luput dari cedera, khususnya ketika mereka kelelahan. Tulang pinggang dapat retak jika mereka jatuh atau tabrakan.

Menurut penelitian, para pemain sepak bola yang telah bermain lebih dari sepuluh tahun sering mengalami kelainan pertumbuhan tulang, terutama tulang kering atau tumit. Hal ini dikenal dengan istilah "kaki pemain bola", yaitu kelainan bentuk yang disebabkan oleh bagian telapak dan

pergelangan kaki sepatu yang terlalu lentur.

Lindungi, dukung, seimbangkan, scrap

Sepatu yang terlalu sempit akan menyulitkan gerakan. Tetapi jika terlalu lentur, hal ini akan menambah risiko cedera dan keseleo. Sepatu olah raga yang baik harus memenuhi empat kriteria berikut: Pertama, sepatu harus memberikan perlindungan bagian luar, dapat menahan benturan bola atau pemain lain, mampu menahan benturan permukaan tanah yang tidak rata, dan menjaga kaki agar tetap kering ketika hujan atau cuaca dingin.

Sepatu yang baik juga harus menopang telapak kaki, terutama pergelangan kaki sehingga dapat terhindar dari keseleo, pembengkakan, dan masalah lain yang akhirnya dapat mengganggu lutut. Sepatu juga harus memberikan keseimbangan yang baik bagi para pemain sehingga mereka tidak tergelincir di tanah licin atau yang terlalu kering. Yang terakhir, sepatu yang baik harus dapat menahan

tekanan, terutama bagi para pemain bola voli dan basket yang sering melompat.

Kaki kering

Untuk menghindari masalah kecil tetapi sangat mengganggu seperti kulit lecet atau pecah-pecah (karena infeksi jamur), sepatu juga harus dapat menguapkan keringat dan menahan kelembaban dari luar sehingga tidak masuk ke sepatu.

Bahan sepatu yang baik adalah kulit, karena sifatnya yang tahan air sehingga air tidak mudah masuk ke dalam sepatu ketika hujan.

Gunakan artikel pada halaman sebelumnya untuk menjawab pertanyaan berikut ini

Pertanyaan 24 PELARI

R110Q01

Apa yang ingin dikemukakan penulis dalam teks ini? Bahwa:

- A Kualitas sepatu olah raga tertentu telah meningkat.
- B Sebaiknya kamu tidak bermain bola jika kamu berumur di bawah 12 tahun.
- C Kebanyakan cedera yang dialami oleh anak muda disebabkan kondisi fisiknya jelek.
- D Atlet muda sebaiknya mengenakan sepatu olah raga yang baik.

Pertanyaan 25 PELARI

R110Q04- 0 1 9

Menurut artikel tersebut, mengapa sepatu olah raga sebaiknya tidak kaku?

.....

Pertanyaan 26 PELARI

R110Q06

Perhatikan kalimat pertama bagian akhir teks yang dijelaskan dalam dua bagian:

“Untuk menghindari masalah kecil tapi sangat mengganggu seperti lecet atau pecah-pecah (karena infeksi jamur),...” (bagian pertama)

“....sepatu harus menguapkan keringat dan menahan kelembaban dari luar sehingga tidak masuk ke sepatu.” (bagian kedua)

Apa hubungan antara bagian pertama dan kedua dari kalimat tersebut?

Bagian kedua pada kalimat tersebut

- A berlawanan dengan bagian pertama.
- B mengulang bagian pertama.
- C menjelaskan masalah yang digambarkan pada bagian pertama.
- D memberikan pemecahan terhadap masalah yang dijelaskan pada bagian pertama.

HADIAH

Dia bertanya-tanya sudah berapa hari dirinya duduk seperti ini, memandangi air keruh dan dingin merayap menutupi tebing tanggul. Yang samar-samar diingatnya hanya mulainya hujan, mengalir melintasi rawa dari arah selatan dan menghantam benteng rumahnya. Lalu air sungai mulai naik, turun lagi secara perlahan dan akhirnya

5 berhenti sebentar untuk kemudian kembali seperti semula. Selama berjam-jam, air membanjiri sungai-sungai kecil dan parit-parit dan menggenangi tempat rendah. Di malam hari, ketika dia tidur, banjir telah menggenangi jalan dan mengurungnya sehingga dia duduk sendirian, perahunya hanyut, rumahnya seperti barang hanyut bertengger di tebing sungai. Bahkan sekarang air telah mencapai papan penyangga
10 rumah yang berlapis aspal. Dan air terus naik.

Sejauh yang dapat dia amati, ke pucuk pepohonan di tempat yang sekarang sungai, rawa itu seperti laut yang sepi, terbasuh siraman hujan, sungai lenyap ditelan air banjir. Rumahnya yang beralaskan perahu dibuat agar dapat dilayarkan tatkala banjir datang seperti ini, tetapi sekarang rumahnya sudah lapuk. Mungkin papan-papan
15 di bagian bawah telah lapuk dan hanyut terbawa air. Mungkin juga tali penambat rumah ke pohon oak akan putus dan membuatnya hanyut ke hilir, bersama perahunya

Tak seorang pun yang dapat menghampirinya. Dia dapat saja berteriak, tetapi tak akan ada artinya, tidak akan ada yang mendengar. Di rawa, yang lain tengah berjuang untuk menyelamatkan apa yang dapat diselamatkan, bahkan hidup mereka. Dia
20 melihat sebuah rumah yang hanyut, dia termenung mengingat pekuburan. Tatkala melihatnya dia merasa bahwa dia tahu rumah siapa itu. Melihatnya hanyut merupakan pemandangan yang mengerikan, tetapi pemilik rumah itu pasti telah menyelamatkan diri ke dataran yang lebih tinggi. Lalu, ketika hujan semakin lebat dan hari semakin gelap, dia mendengar suara harimau kumbang dari hulu sungai.

25 Kini rumahnya seakan-akan berguncang seperti sesuatu yang hidup. Dia kemudian mengulurkan tangannya untuk menangkap lampu yang miring di meja tidurnya dan menjepitnya di antara kakinya agar stabil. Dengan suara yang berderak-derak, rumah itu berusaha untuk keluar dari lumpur, terapung bebas, terombang-ambing seperti gabus dan bergerak perlahan-lahan terbawa arus sungai. Dia lalu
30 mencengkram ujung tempat tidurnya. Rumah itu bergerak-gerak sepanjang tali tambatan. Terjadi sentakan dan keluhan kayu tua dan lalu berhenti sesaat. Secara perlahan arus menghanyutkannya dan membiarkan terombang-ambing lagi, menuju tempat yang lain. Dia menarik napas dan duduk untuk beberapa lama merasakan ayunan yang bergerak perlahan. Gelap merayapi hujan yang belum reda, dan,
35 dengan kepala di atas tangan, dia tertidur bersandar pada tempat tidur.

Malam harinya, suara jeritan membangunkannya, suara itu begitu memilukan. Dia sudah berdiri sebelum benar-benar terjaga. Dalam kegelapan kakinya tersandung tempat tidurnya sendiri. Suara itu berasal dari luar, dari sungai. Dia dapat mendengar sesuatu bergerak dan sesuatu yang besar mengeluarkan suara keras yang
40 mengerikan. Bisa jadi rumah lain. Lalu menabrak, dan bukan tabrakan dari depan tetapi dalam sekejap meluncur ke rumahnya. Ternyata hanya sebatang pohon. Dia mendengar dahan dan daun yang hanyut ke hilir, meninggalkan hujan dan daerah banjir, sementara suara tersebut tetap terdengar sehingga tampaknya seperti bagian dari keheningan. Sambil meringkuk di atas tempat tidur, dia hampir tertidur lagi sampai
45 terdengar lagi suara jeritan yang kali ini begitu dekat seperti di dalam kamarnya. Dengan membelalakkan mata dalam kegelapan, dia meraba-raba tempat tidurnya sampai tangannya memegang laras senapan yang dingin. Kemudian dengan membungkukkan badannya di atas bantal, dia memangku senapan di lututnya. "Siapa di sana?" tanyanya.

Jawabannya hanyalah suara jeritan yang berulang tetapi agak pelan, suara yang letih, dan diakhiri dengan keheningan. Dia kembali ke tempat tidurnya. Apa pun yang ada di luar itu, dia dapat mendengarnya bergerak di sekitar serambi. Papan berderak dan dia dapat mengenali suara benda jatuh. Terdengar suara cakaran pada dinding
55 seolah-olah akan membuat jalan masuk. Sekarang dia tahu bendanya, yaitu seekor harimau, yang ditinggalkan oleh pohon yang tumbang dan hanyut melewatinya. Harimau itu datang bersama banjir, sebuah hadiah.

Tanpa disadari dia menekankan tangannya ke wajah dan lehernya sendiri yang tegang. Senapannya bergetar di atas lutut. Selama hidup dia belum pernah melihat
60 harimau kumbang seperti ini. Dia pernah mendengar cerita tentang harimau itu dari orang lain dan pernah mendengar aumannya, seperti menderita dari kejauhan. Harimau tersebut kembali mencakari dinding, dan menderakkan jendela dekat pintu. Sepanjang dia dapat mempertahankan jendela dan membiarkan harimau itu terkurung di luar antara dinding dan di air, dia akan baik-baik saja. Di luar, binatang itu berhenti
65 menggaruk-garukkan cakarnya pada dinding lapuk. Sesekali, binatang itu hanya mengeram dan merintih.

Tatkala akhirnya cahaya menembus hujan, muncul seperti kegelapan lain, dia masih duduk di atas tempat tidurnya, dingin dan kaku. Tangannya, yang biasa digunakan untuk mendayung, terasa sakit karena terus memegang senapan. Dia
70 hampir tidak berkeinginan untuk bergerak karena takut suaranya akan membuat harimau itu kuat. Terlihat kaku, dia menggoyangkan badan seiring dengan gerakan rumah. Hujan belum reda juga seolah-olah tidak akan berhenti. Akhirnya, dengan cahaya remang-remang, dia dapat melihat banjir yang masih disirami hujan dan di kejauhan tampak ujung pohon yang tenggelam. Kucing itu tidak lagi bergerak-gerak
75 sekarang. Mungkin sudah pergi. Dengan meletakkan senapan di sampingnya, dia turun dari tempat tidur dan bergerak ke arah jendela tanpa membuat suara. Ternyata ia masih ada di sana, meringkuk di ujung serambi, memandangi pohon oak yang masih hidup, penambat rumah, seolah-olah menghitung peluangnya untuk melompat ke sebuah dahan. Karena dia sekarang dapat melihatnya, harimau itu tidak tampak
80 menakutkan lagi, bulu kasarnya berlekatan seperti ranting-ranting, perutnya kempis dan iganya menonjol. Mudah untuk menembaknya di tempat ia duduk, ekor panjangnya bergerak-gerak. Dia bergerak mengambil senapan saat harimau itu berbalik. Tanpa peringatan, tanpa peregang otot, harimau itu melompati jendela, memecahkan kacanya. Dia terhempas, menahan jeritan, lalu mengambil senapan, dan
85 menembakkannya ke jendela. Dia tidak dapat melihatnya lagi, tetapi dia meleset. Binatang itu bergerak lagi. Dia dapat melihat kepala dan punggungnya saat melewati jendela.

Menggigil, dia kembali ke tempat tidurnya dan berbaring diri. Suara hujan dan sungai yang membuai, serta udara dingin yang menusuk, membatalkan niatnya. Dia
90 hanya mengawasi jendela sambil tetap memegang senapan. Setelah menunggu beberapa saat, dia lalu bangkit untuk melihat. Harimau itu ternyata tertidur, dengan kepalanya berada di atas kakinya, mirip seperti kucing rumah. Untuk pertama kalinya sejak hujan turun, dia ingin menangis, menangisi dirinya, semua orang, dan semua yang terkena banjir. Ketika dia berbaring kembali di tempat tidur, dia menarik
95 selimutnya ke atas pundaknya. Seharusnya dia ke luar saat jalan masih terbuka atau saat perahunya belum hanyut. Saat dia bergerak mengikuti gerakan rumahnya yang bergoyang, rasa sakit di perutnya mengingatkannya bahwa dia belum makan. Dia tidak ingat sudah berapa lama dia tak makan. Seperti harimau itu, dia juga merasa lapar. Lalu dia menyelinap ke dapur, dan membuat perapian dengan beberapa batang
100 kayu yang tersisa. Apabila banjir surut, dia akan membakar kursi, atau bahkan membakar meja sekalipun. Setelah mengambil sisa daging asap yang telah direbus dari langit-langit, dia memotong beberapa potong daging itu tebal-tebal dan menaruhnya di penggorengan. Bau daging goreng itu membuatnya pusing. Ada biskuit basi sisa yang dia masak dulu dan dapat dimakan sambil minum kopi. Air pun

105 berlimpah saat itu.

Ketika dia sedang memasak, dia hampir melupakan harimau itu sampai terdengar lagi geramannya. Harimau itu lapar juga. "biarkan saya makan" dia berkata," lalu aku akan mengurusmu." Dia tertawa mencibir. Ketika dia menggantungkan sisa daging itu, harimau tersebut menggeram sehingga tangannya bergetar.

- 110 Setelah dia selesai makan, dia kembali ke tempat tidurnya lagi dan mengambil senapan. Rumahnya sudah terangkat begitu tinggi sehingga tidak lagi menggesek dasar tanggul ketika terayun kembali dari sungai. Makanan telah membuatnya hangat. Dia sebenarnya dapat mengusir kucing itu saat masih ada cahaya menembus hujan. Dia kemudian menyelip ke jendela. Harimau itu ternyata masih di sana,
- 115 menggeram dan mulai berjalan di serambi. Dia mengamati harimau itu untuk beberapa saat tanpa perasaan takut. Kemudian, tanpa memperdulikan apa yang sedang dia lakukan, dia meletakkan senapan di sampingnya dan kemudian berjalan dari ujung tempat tidur menuju dapur. Ternyata di belakangnya harimau itu bergerak dengan marah. Di dapur dia mengambil daging sisa dan berjalan lagi melalui lantai
- 120 yang bergoyang menuju jendela melemparkannya melalui kaca jendela yang pecah. Di sisi lain terdengar suara geram karena lapar dan sesuatu yang mengejutkan terjadi, yaitu ada yang berpindah dari binatang itu kepadanya. Kelelahan dengan apa yang telah dilakukannya, dia kembali ke tempat tidur. Dia masih dapat mendengar suara harimau yang mencabik-cabik daging. Rumahnya kembali berguncang-guncang.
- 125 Saat bangun, dia langsung menyadari bahwa segalanya telah berubah. Hujan telah reda. Dia merasakan gerakan rumahnya, tetapi banjir tidak lagi menggoyangkannya. Dengan membuka pintunya, dia melihat melalui kaca yang pecah dunia yang berbeda. Rumahnya berada di tepi tebing sungai, di tempat yang biasanya. Beberapa meter di bawahnya, air sungai masih mengalir dengan deras, tetapi tidak
- 130 lagi menggenangi daerah antara rumahnya dengan pohon oak. Dan harimau tersebut telah pergi. Jalan yang ada dari serambi ke pohon oak dan tentu menuju rawa kini tidak ada lagi dan sudah lenyap tertutup lumpur tipis. Dan di serambi teronggok tulang-tulang putih yang merupakan sisa daging itu.

Pertanyaan 27 HADIAH**R119Q01**

Bagaimanakah situasi wanita tersebut pada awal cerita?

- A Dia terlalu lemah untuk keluar rumah karena sehari-hari tidak makan.
- B Dia mempertahankan diri dari binatang liar.
- C Rumahnya sudah digenangi air bah.
- D Sungai yang banjir telah menghanyutkan rumahnya.

Pertanyaan 28 HADIAH**R119Q06**

"Dengan suara yang berderak-derak, rumah itu berusaha untuk keluar ..."
(baris 28)

Apa yang terjadi dengan rumah pada bagian cerita ini?

- A Ambruk sebagian.
- B Mulai mengapung.
- C Menabrak pohon oak.
- D Tenggelam ke dasar sungai.

Pertanyaan 29 HADIAH**R119Q08- 0 1 2 9**

Menurut cerita itu, apa alasan si wanita memberi makan harimau kumbang tersebut?

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Pertanyaan 30 HADIAH**R119Q04**

Tatkala si wanita berkata, "lalu aku akan mengurusmu" (baris 107 - 108) dia ingin mengatakan bahwa dia

- A yakin kalau harimau kumbang tersebut tidak akan menyakitinya.
- B mencoba menakut-nakuti harimau kumbang.
- C akan menembak harimau kumbang tersebut.
- D akan memberi makanan kepada harimau kumbang.

TEKS 1

AMANDA DAN SANG RATU

Ringkasan: Sejak kematian Léocadia, Sang Pangeran, yang mencintainya, sangat merana. Di sebuah toko yang bernama Résédà Socurs, Sang Ratu, yaitu bibi Sang Pangeran, bertemu dengan seorang muda pramuniaga muda, Amanda, yang sangat mirip dengan Léocadia. Sang Ratu ingin agar Amanda membantunya membebaskan Sang Pangeran dari kenangan yang selalu menghantuinya.

Suatu persimpangan jalan di halaman istana, bangku bundar di sekitar tugu kecil senja mulai turun

AMANDA

Saya masih tetap tak mengerti. Apa yang dapat saya lakukan untuknya, paduka? Saya tak percaya, Paduka telah berpikir Dan kenapa saya? Saya cantik juga tidak. Dan bahkan kalau pun sangat cantik - siapa yang dapat dengan tiba-tiba menghilangkan kenangannya seperti itu?

SANG RATU

Tak seorang pun kecuali engkau.

AMANDA *betul-betul terkejut*

Saya?

SANG RATU

Dunia ini begitu bodoh, Anakku. Ia hanya melihat parade, tingkah laku, dan pangkat atau jabatan mungkin karena itulah engkau tidak pernah diberitahu. Tapi hatiku tidak pernah berbohong - Aku hampir berteriak saat kulihat engkau di Résédà Soeurs untuk pertama kalinya. Untuk seseorang yang mengenal dia lebih dari sekadar citra publiknya, kau adalah seseorang, yang teramat mirip dengan Léocadia.

Sunyi. Burung-burung malam kini telah mengambil alih nyayian burung-burung senja. Alam dipenuhi bayangan dan ceririt burung.

AMANDA, *dengan sangat lembut*

Saya benar-benar merasa tak dapat, Paduka. Saya tak memiliki apa-apa, saya bukan siapa-siapa, dan pecinta-pecinta itu khayalan saya bukan seperti itu, tidakkah Paduka mengerti?

Ia telah berdiri. Seolah hendak pergi, ia mengambil tas kecilnya

SANG RATU, *juga dengan lembut dan kelelahan. Tentu saja, Anakku. aku minta maaf.*

Ia juga berdiri, dengan sulit layaknya seorang wanita tua. Bel sepeda terdengar di kesunyian malam itu, ia terhenyak.

Dengar..... itu dia! Coba perhatikanlah dirimu padanya, bersandarlah di tugu kecil ini, di mana ia dulu pertama kali bertemu Léocadia. Biarkan dia melihat mu, walaupun untuk sekali ini saja, biarkan ia berteriak, tertarik oleh kemiripan ini, pada rencana yang akan kuakui padanya besok, yang pasti akan membuatnya membenciku - pada apa pun selain kekasihnya yang telah tiada, yang akan merenggutnya dariku suatu saat nanti, aku yakin (Sang Ratu mencengkeram lengan Amanda) Engkau mau melakukannya, bukan? Aku memohon padamu dengan sangat, Nona. (Ia memandang Amanda dengan memohon dan menambahkan) Dan dengan begitu kau akan melihatnya juga. Dan aku merasa tersipu-sipu mengatakannya lagi padamu - hidup terlalu gila ! Ini adalah kali ketiga aku tersipu-sipu dalam 60 tahun, dan kedua kalinya dalam 10 menit - kau akan melihatnya, dan seandainya dia bisa (mengapa tidak dia, dia kan tampan dan menarik dan bukan yang pertama) seandainya dia beruntung untuknya sendiri dan untukku, menarik minatmu untuk sekejap saja... Suara bel lagi dalam bayangan, tetapi kali ini sangat dekat.

AMANDA, *berbisik*

Apa yang harus saya katakan padanya?

SANG RATU, *mencengkeram lengan Amanda*

Katakan saja: "Maaf, Paduka, dapatkah Paduka menunjukkan jalan ke laut ?

Amanda bergegas ke dalam bayangan pohon. Tepat pada waktunya. Ada kilasan pucat, yaitu Sang Pangeran dengan sepedanya. Ia lewat sangat dekat dengan

Amanda di dekat tugu Amanda menggumam.

AMANDA

Maaf, Paduka

Ia berhenti, turun dari sepedanya, melepas topinya dan memandang Amanda

PANGERAN

Ya?

AMANDA

Dapatkan Paduka menunjukkan jalan ke laut?

PANGERAN

Berbeloklah di tikungan kedua ke kiri

Ia membungkuk, dengan sedih dan sopan, kembali menaiki sepedanya dan berlalu. Bel terdengar lagi di kejauhan. Sang Ratu keluar dari bayangan pohon, nampak sangat tua.

AMANDA, dengan lembut setelah beberapa saat

Ia tak mengenali

SANG RATU

Memang gelap.... Dan lagi, siapa yang tahu wajah yang bagaimana yang disimpannya sekarang dalam mimpinya? *(Ia bertanya pelan)* Kereta api terakhir telah lewat, Nona. Maukah kau menginap di istana malam ini?

AMANDA, dengan suara aneh

Ya, Paduka

Hari benar-benar telah menjadi gelap. Keduanya tak lagi nampak dalam bayangan, dan hanya suara angin yang dapat terdengar di antara pohon-pohon besar di situ.

LAYAR TERTUTUP

TEKS 2

DEFINISI BEBERAPA PEKERJAAN TEATER

Aktor : memerankan peran di panggung

Sutradara : mengendalikan dan memantau semua aspek sandiwara. Dia tidak saja menempatkan para pemain, mengatur keluar dan masuk mereka dan menyutradarai permainan (akting) mereka, tetapi juga menyarankan bagaimana naskah harus diinterpretasi.

Staf Busana : memproduksi kostum untuk pemain.

Perancang Set : merancang model-model dan kostum. Model-model tersebut kemudian diubah ke dalam ukuran sebenarnya dalam workshop.

Manajer Props : bertanggung jawab untuk mencari properti/peralatan yang dibutuhkan. Kata “props” diartikan sebagai segala sesuatu yang dapat dipindah-pindahkan: kursi, surat, lampu, bunga-bunga, dan lain-lain. Set dan kostum tidak digolongkan ke dalam props.

Teknisi Suara : bertanggung jawab atas semua efek suara yang dibutuhkan dalam produksi. Ia bertugas mengendalikan kontrol suara saat pertunjukan.

Pembantu/Asisten Lampu atau Teknisi Lampu : bertanggung jawab atas pencahayaan. Ia juga bertugas mengatur cahaya saat pertunjukan. Pencahayaan begitu canggih sehingga suatu teater yang lengkap dapat mempekerjakan sampai sepuluh teknisi.

Pertanyaan 31 AMANDA DAN SANG RATU

R216Q01

Tentang apakah cuplikan sandiwara itu ?

Sang Ratu memikirkan sebuah tipuan agar

- A Pangeran lebih sering datang mengunjunginya.
- B Pangeran akhirnya memutuskan untuk menikah.
- C Amanda membuat Pangeran melupakan kesedihannya.
- D Amanda datang ke istana dan tinggal bersamanya

Pertanyaan 32 AMANDA DAN SANG RATU

R216Q03B- 0 1 9

Tabel di bawah ini memuat para teknisi teater yang terlibat dalam pertunjukan cuplikan dari *Léocadia* ini. Lengkapilah tabel ini dengan menyebutkan satu perintah panggung dari TEKS 1 yang membutuhkan keterlibatan setiap teknisi.

Yang pertama telah dikerjakan untuk Anda

Teknisi Teater	Perintah Panggung
Perancang set	Bangku bundar di sekitar tugu kecil
Manajer Props	
Teknisi Suara	
Teknisi Cahaya	

Pertanyaan 33 AMANDA DAN SANG RATU

R216Q06

Mendekati akhir cuplikan sandiwara itu, Amanda berkata, “Ia tidak mengenali saya”

Apa yang dia maksudkan? Bahwa Sang Pangeran tidak :

- A memandang pada Amanda.
- B menyadari bahwa Amanda seorang pramuniaga.
- C menyadari bahwa ia pernah bertemu dengan Amanda.
- D menganggap bahwa Amanda mirip dengan *Léocadia*.

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PUSAT MOBILITAS INTERNAL AND EXTERNAL

Apa PMIE itu?

PMIE adalah singkatan dari Pusat Mobilitas Internal dan Eksternal, diprakarsa oleh Bagian Personalia. Sejumlah karyawan dari bagian ini bekerja di PMIE, bersama-sama dengan karyawan dari bagian lain dan konsultan karier dari luar.

PMIE siap membantu para karyawan dalam mencari pekerjaan lain di dalam maupun di luar Perusahaan Industri *Canco*.

Apa kegiatan PMIE?

PMIE mendukung para karyawan yang benar-benar ingin mencari pekerjaan lain melalui kegiatan berikut:

- **Bank Data**

Setelah wawancara dengan karyawan, informasinya dimasukkan ke dalam bank data yang menelusuri pencari kerja dan lowongan kerja di *Canco* dan di perusahaan-perusahaan lainnya.

- **Bimbingan**

Potensi para karyawan digali melalui diskusi bimbingan karier.

- **Kursus**

Beberapa kursus sedang ditata (bekerjasama dengan bagian informasi dan pelatihan) yang akan menggarap masalah pencarian kerja dan perencanaan karier.

- **Proyek Alih Karier**

PMIE mendukung dan mengkoordinasikan beberapa proyek untuk membantu para karyawan mempersiapkan diri dalam karier dan perspektif baru.

- **Mediasi**

PMIE dapat bertindak sebagai penengah bagi karyawan yang diancam putus hubungan kerja (PHK) karena adanya reorganisasi, dan membantu mendapatkan jabatan baru jika perlu.

Berapa biaya PMIE?

Biaya ditentukan melalui konsultasi dengan bagian tempat kamu bekerja. Beberapa layanan PMIE gratis. Kamu bisa juga diminta untuk membayar dalam bentuk uang atau waktu.

Bagaimana cara kerja PMIE?

PMIE membantu para karyawan yang memang ingin mencari pekerjaan lain di dalam atau di luar perusahaan ini.

Prosesnya dimulai dengan penyerahan lamaran. Diskusi dengan pembimbing bidang personalia juga akan bermanfaat. Sudah barang tentu kamu harus membicarakan terlebih dahulu dengan pembimbing tentang keinginan kamu dan kemungkinan pekerjaan lain sehubungan dengan kariermu. Pembimbing paham akan kemampuan dan perkembangan di dalam unit kerjamu.

Berhubungan dengan PMIE dalam urusan apa saja dilakukan melalui pembimbing bidang personalia. Dia akan menangani lamaranmu, setelah itu kamu diundang untuk berdiskusi dengan wakil PMIE.

Untuk keterangan lebih lanjut

Bagian Personalia dapat memberikan informasi lebih lanjut.

Jawab pertanyaan-pertanyaan berikut berdasarkan pengumuman dari bagian personalia pada halaman 40.

Pertanyaan 34 PERSONALIA

R234Q01- 0 1 9

Menurut pengumuman tersebut, di mana Kamu dapat memperoleh informasi lebih lanjut tentang PMIE?

.....

Pertanyaan 35 PERSONALIA

R234Q02- 0 1 9

Sebutkan dua cara PMIE membantu orang yang akan kehilangan pekerjaannya karena adanya reorganisasi di suatu bagian.

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Appendix H: Answer Key for 2020 Follow-up Data

Bacaan	Nomer	Jawaban
Danau Chad	1	2 meter
	2	11,000 BC
	3	Mengacu pada kemunculan kembali danau
	4	A
	5	C
Flu	1	B
	2	Salah satu jawaban ini: 1. tata letak, gaya penulisan, gambar atau grafik lainnya; atau detail serupa lainnya) – yaitu, ke bagian atau kualitas fitur tertentu atau 2. menggunakan istilah evaluatif selain "ramah" dan "mendorong."
	3	B
	4	1. Jawaban yang mengevaluasi bagian teks dalam kaitannya dengan istilah "menyesatkan" dengan menunjukkan bahwa ada potensi kontradiksi. Mungkin atau mungkin tidak menjelaskan apa kontradiksi itu. Persetujuan atau ketidaksetujuan dapat dinyatakan atau tersirat, atau 2. Jawaban yang mengevaluasi bagian teks dalam kaitannya dengan istilah "menyesatkan" dengan menunjukkan bahwa pernyataan tersebut mungkin berlebihan. (yaitu Tidak semua orang membutuhkan imunisasi, atau imunisasi tidak memberikan perlindungan yang lengkap). Mungkin atau mungkin tidak menjelaskan apa yang dilebih-lebihkan itu. Persetujuan atau ketidaksetujuan dapat dinyatakan atau tersirat.
	5	D
PLAN Internasional	1	B
	2	1. Rendahnya aktivitas PLAN di Etiopia (informasi tersedia dalam tabel); DAN 2. Kemiskinan Ethiopia (informasi diberikan di batang).
POLISI	1	B
	2	C
	3	C
	4	B
HADIAH	1	Pembicara 1: Jawaban yang memberikan bukti dari cerita untuk mendukung gagasan bahwa wanita itu tidak berperasaan dan kejam. Mungkin merujuk pada niatnya untuk menembak macan kumbang, atau fakta bahwa dia benar-benar menembak macan kumbang. Dapat menggunakan kutipan atau parafrase dekat dari cerita; Pembicara 2: Jawaban yang memberikan bukti dari cerita untuk mendukung gagasan bahwa wanita itu penyayang. Dapat merujuk pada tindakannya dalam memberi makan macan kumbang, atau saran tentang kapasitasnya untuk berbelas kasih terhadap macan kumbang atau lebih umum. Dapat menggunakan kutipan atau parafrase dekat dari cerita.

	2	C
	3	1. deskripsi yang dikutip menghubungkan macan kumbang dengan wanita (atau manusia pada umumnya) dalam penderitaan; ATAU 2. deskripsi yang dikutip mempersiapkan perilaku welas asih wanita itu di kemudian hari terhadap macan kumbang; ATAU macan kumbang disajikan sebagai objek belas kasih.
	4	B
	5	Mengakui implikasi bahwa wanita dimotivasi oleh rasa kasihan atau empati terhadap macan kumbang. Mungkin juga menyebutkan bahwa wanita itu tidak secara sadar memahami motivasinya sendiri. ATAU Mengakui bahwa cerita tersebut tidak secara eksplisit menjelaskan motivasi wanita tersebut dan/atau bahwa dia tidak secara sadar memahaminya. ATAU Mengenali kebutuhan fisik macan kumbang akan makanan atau bantuan, tanpa mengacu pada motivasi wanita tersebut.
	6	C
	7	Jawaban yang melampaui interpretasi literal dari cerita sambil menafsirkannya dengan cara yang konsisten dengan pemahaman literal yang akurat. Mengevaluasi akhir dalam hal kelengkapan tematik, dengan menghubungkan kalimat terakhir dengan hubungan sentral, isu atau metafora dalam cerita. Jawaban dapat merujuk, misalnya, pada hubungan antara macan kumbang dan wanita; untuk bertahan hidup; atau untuk hadiah atau terima kasih. Pendapat tentang kesesuaian dapat dinyatakan atau tersirat. Jawaban yang melampaui interpretasi literal dari cerita sambil menafsirkannya dengan cara yang konsisten dengan pemahaman literal yang akurat. Mengevaluasi akhir dari segi gaya atau suasana hati, dengan menghubungkan kalimat terakhir dengan gaya umum atau suasana keseluruhan cerita. Pendapat tentang kesesuaian dapat dinyatakan atau tersirat.
GRAFITI	1	B
	2	Jawaban yang mengakui bahwa ada perbandingan antara grafiti dan iklan, dan konsisten dengan gagasan bahwa iklan adalah bentuk legal dari grafiti. ATAU Jawaban yang mengakui bahwa mengacu pada iklan adalah strategi untuk mempertahankan grafiti.
	3	Jawaban yang menjelaskan sudut pandang siswa dengan mengacu pada isi salah satu atau kedua huruf. Dapat merujuk pada posisi umum penulis (yaitu mendukung atau menentang) atau detail argumennya. Interpretasi argumen penulis harus masuk akal. Penjelasan dapat berbentuk parafrase dari sebagian teks, tetapi tidak boleh disalin seluruhnya atau sebagian besar tanpa perubahan atau penambahan.
	4	Jawaban yang menjelaskan pendapat dengan mengacu pada gaya atau bentuk salah satu atau kedua huruf. Mereka harus mengacu pada kriteria seperti gaya penulisan, struktur argumen, kekuatan argumen, nada, register yang digunakan, strategi untuk membujuk pembaca. Istilah seperti "argumen yang lebih baik" harus dibuktikan.
BURUH	1	D
	2	Jawaban yang menunjukkan bahwa angka pada diagram pohon DAN "000s" pada judul/catatan kaki telah digabungkan: 949.900. Izinkan perkiraan 949.000 dan 950.000 dalam angka atau kata. Juga menerima 900.000 atau satu juta (dalam kata-kata atau angka) dengan kualifikasi.

	3	5 benar	SCORING: <table><tr><td></td><td>"In labor force- employed"</td><td>"In labor force- unem- ployed"</td><td>"Not in labor force"</td><td>Not included in any category</td></tr><tr><td>A part-time waiter, aged 35</td><td>☒</td><td>☐</td><td>☐</td><td>☐</td></tr><tr><td>A business woman, aged 43, who works a sixty-hour week</td><td>☒</td><td>☐</td><td>☐</td><td>☐</td></tr><tr><td>A full-time student, aged 21</td><td>☐</td><td>☐</td><td>☒</td><td>☐</td></tr><tr><td>A man, aged 28, who recently sold his shop and is looking for work</td><td>☐</td><td>☒</td><td>☐</td><td>☐</td></tr><tr><td>A woman, aged 55, who has never worked or wanted to work outside the home</td><td>☐</td><td>☐</td><td>☒</td><td>☐</td></tr><tr><td>A grandmother, aged 80, who still works a few hours a day at the family's market stall</td><td>☐</td><td>☐</td><td>☐</td><td>☒</td></tr></table>		"In labor force- employed"	"In labor force- unem- ployed"	"Not in labor force"	Not included in any category	A part-time waiter, aged 35	☒	☐	☐	☐	A business woman, aged 43, who works a sixty-hour week	☒	☐	☐	☐	A full-time student, aged 21	☐	☐	☒	☐	A man, aged 28, who recently sold his shop and is looking for work	☐	☒	☐	☐	A woman, aged 55, who has never worked or wanted to work outside the home	☐	☐	☒	☐	A grandmother, aged 80, who still works a few hours a day at the family's market stall	☐	☐	☐	☒
	"In labor force- employed"	"In labor force- unem- ployed"	"Not in labor force"	Not included in any category																																		
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	4	3 benar	SCORING: <table><tr><th>Features of Tree Diagram</th><th>Answer</th></tr><tr><td>The labels in each box (e.g. "In labor force")</td><td>Change ☒ No change</td></tr><tr><td>The percentages (e.g. "64.2%")</td><td>☒ Change ☐ No change</td></tr><tr><td>The numbers (e.g. "2656.5")</td><td>☒ Change ☐ No change</td></tr><tr><td>The footnotes under the tree diagram</td><td>Change ☒ No change</td></tr></table>	Features of Tree Diagram	Answer	The labels in each box (e.g. "In labor force")	Change ☒ No change	The percentages (e.g. "64.2%")	☒ Change ☐ No change	The numbers (e.g. "2656.5")	☒ Change ☐ No change	The footnotes under the tree diagram	Change ☒ No change																									
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AMANDA DAN PUTRI	1	C																																				
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	3	Manajer: koper atau sepeda Teknisi suara: suara burung atau cuitan atau bel sepeda atau angin atau kesunyian Pengatur lampu: bayangan atau cahaya gelap/sore																																				
	4	Tanda A pada obelisk dan D di belakang atau di dekat pepohonan																																				
	5	D																																				
Pelari	1	D																																				
	2	Jawaban yang mengacu pada pembatasan gerakan																																				
	3	1.Untuk memberikan perlindungan eksterior 2.Untuk menopang kaki 3.Untuk memberikan stabilitas yang baik 4.Untuk menyerap guncangan																																				
	4	D																																				
Aturan baru	1	1."buat komisi" atau 2."tiga bulan diizinkan untuk opini publik untuk menanggapi rekomendasi komisi"																																				

	2	1. Ketika Rioses meninggal, ada kontroversi tentang apa yang harus dilakukan dengan embrio. [Jangan terima kontroversi di paragraf 4 (misalnya, "Apa hubungan rumah sakit dengan embrio beku?" "Apakah embrio berhak atas warisan?") kecuali jika responden secara eksplisit mengaitkan kontroversi ini dengan kematian donor embrio (Kebangkitan).]2.Seorang wanita di Prancis harus pergi ke pengadilan untuk diizinkan menggunakan sperma almarhum suaminya.3.Bagaimana seharusnya aturan bagi ibu pengganti yang menolak menyerahkan bayi yang dikandungnya?
Personil	1	Dari departemen personalia atau Dari konselor personalia
	2	1. Mereka bertindak sebagai mediator bagi karyawan ATAU mediasi 2.Mereka membantu menemukan posisi baru. [Tidak menerima: "Bank Data Pekerjaan", "Bimbingan", "Kursus", atau "Proyek Perubahan Karir".]
Keamanan HP	1	B
	2	C
	3	Jawaban yang mengidentifikasi faktor gaya hidup modern yang dapat dikaitkan dengan kelelahan, sakit kepala, atau kehilangan konsentrasi. Penjelasanannya mungkin terbukti dengan sendirinya, atau dinyatakan secara eksplisit.
	4	C
The Play's the thing	1	makan malam atau minum sampanye
	2	B
	3	Menunjukkan kontras antara Adam dan dua karakter lainnya dengan mengacu pada satu atau lebih dari berikut ini: status dām sebagai yang termiskin atau termuda dari tiga karakter; pengalamannya (sebagai selebriti).
	4	D
Komunikasi	1	D
	2	Jawaban yang mengidentifikasi jenis pekerjaan dan memberikan penjelasan yang masuk akal mengapa seseorang yang melakukan pekerjaan semacam itu tidak dapat melakukan telecommuting. Tanggapan HARUS menunjukkan (secara eksplisit atau implisit) bahwa perlu untuk hadir secara fisik untuk pekerjaan tertentu. Bangunan. Sulit untuk bekerja dengan kayu dan batu bata dari mana saja. Olahragawan. Anda harus benar-benar berada di sana untuk bermain olahraga. Tukang ledeng. Anda tidak dapat memperbaiki wastafel orang lain dari rumah Anda! Menggali parit karena Anda harus berada di sana. Perawatan – sulit untuk memeriksa apakah pasien baik-baik saja melalui Internet.
	3	B

Appendix I: Table Variables Questionnaire

STUDENT

Year PISA	Variables	Initial Code	Item questions
2000	Gender (GENDER)	1 = Female 2 = Male	Q3 (ST03Q01) Are you <female> or <male>?
	Home Facilities		
	- Number of books (BOOKS)	1 = None 2 = 1 – 10 books 3 = 11 – 50 books 4 = 51 – 100 books 5 = 102 – 250 books 6 = 251 – 500 books 7 = more than 500 books	Q37 (ST37Q01) How many books are there in your home?
	- Home educational resources (HEDRES)	1 = Yes 2 = No	Q21 In your home, do you have: (Please <tick> only one box on each row.) ST21Q05 = Dictionary ST21Q06 = Study place ST21Q07 = Desk ST21Q08 = Textbook ST21Q03 = Software
	Reading Activities		
	- Reading Engagement (ENGREAD)	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree	Q35 How much do you disagree or agree with these statements about reading? (Please <tick> only one box on each row.) ST35Q01 = I read only if I have to ST35Q02 = Reading is one of my favourite hobbies ST35Q03 = I like talking about books with other people ST35Q04 = I find it hard to finish books ST35Q05 = I feel happy if I receive a book as a present ST35Q06 = For me, reading is a waste of time ST35Q07 = I enjoy going to a bookstore or a library ST35Q08 = I read only to get information that I need ST35Q09 = I cannot still and read for more than a few minutes
	- Reading Diversity (DIVREAD)	1 = Never or hardly ever 2 = A few times a year 3 = About once a month 4 = Several times a month	Q36 How often do you read these materials because you want to? (Please <tick> only one box on each row.) ST36Q01 = Magazines ST36Q02 = Comic books ST36Q03 = Fictions (novels, narratives, stories) ST36Q04 = Non-fiction books

		5 = Several times a week	ST36Q05 = Emails and Web pages ST36Q06 = Newspapers
	- Online reading (ONLINE)		-
	Reading States		
	- Reading strategies (STRA)		-
	- Reading confidence (CONFI)	1 = Never 2 = Sometimes 3 = Most of the time 4 = Always	Q32 Please indicate how often each of these applies to you. (Please <tick> only one box on each row.) ST32Q01 = I complete my homework on time ST32Q02 = I do my homework while watching television ST32Q03 = My teachers grade my homework ST32Q04 = I finish my homework during the school day ST32Q05 = My teachers make useful comments on my homework ST32Q06 = I am given interesting homework ST32Q07 = My homework is counted as part of my marks
	- Reading time (RETIME)	1 = I do not read for enjoyment 2 = 30 minutes or less each day 3 = More than 30 minutes to less than 60 minutes each day 4 = 1 to 2 hours each day 5 = More than 2 hours each day	Q24 Each day, about how much time do you usually spend reading for enjoyment? (Please <tick> only one box.)

Year PISA	Variables	Initial Code	Item questions
2009	Gender	1 = Female 2 = Male	Q4 – ST04Q01 Are you female or male?
	Home Facilities		
	- Number of books	1 = 0 – 10 books 2 = 11 – 25 books 3 = 26 – 100 books 4 = 101 – 200 books 5 = 201 – 500 books 6 = more than 500 books	Q22 – ST22Q01 How many books are there in your home? There are usually about 40 books per metre of shelving. Do not include magazines, newspapers, or your schoolbooks. (Please tick only one box.)
	- Home educational	1 = Yes 2 = No	Q20 Which of the following are in your home? (Please tick one box in each row)

	resources (hedres)		ST20Q12 = Dictionary ST20Q03 = Study place ST20Q01 = Desk ST20Q10 = Textbook ST20Q11= Technical reference books ST20Q04 = Computer ST20Q05 = Software
	Reading Activities		
	- Reading Engagement (engread)	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly Agree	Q24 How much do you agree or disagree with these statements about reading? (Please tick only one box in each row) ST24Q01 = I read only if I have to ST24Q02 = Reading is one of my favourite hobbies ST24Q03 = I like talking about books with other people ST24Q04 = I find it hard to finish books ST24Q05 = I feel happy if I receive a book as a present ST24Q06 = For me, reading is a waste of time ST24Q07 = I enjoy going to a bookstore or a library ST24Q08 = I read only to get information that I need ST24Q09 = I cannot still and read for more than a few minutes
	- Reading Diversity (divread)	1 = Never or almost never 2 = A few times a year 3 = About once a month 4 = Several times a month 5 = Several times a week	Q25 How often do you read these materials because you want to? (Please tick only one box in each row) ST25Q01 = Magazines ST25Q02 = Comic books ST25Q03 = Fictions (novels, narratives, stories) ST25Q04 = Non-fiction books ST25Q05 = Newspapers
	- Online reading (online)	1 = I don't know what it is 2 = Never or almost never 3 = Several times a month 4 = Several times a week 5 = Several times a day	Q26 How often are you involved in the following reading activities? (Please tick only one box in each row. If you don't know what the activity is tick "I don't know what it is.") ST26Q01 = Reading emails ST26Q02 = Chant on line ST26Q03 = Reading online news ST26Q04 = Using an online dictionary or encyclopaedia ST26Q05 = Searching online information to learn about a particular topic ST26Q06 = Taking part in online group discussions or forums

			ST26Q07 = Searching for practical information online
	Reading States		
	- Reading strategies (stra)	Score 1 = Not useful at all 2 = 3 = 4 = 5 = 6 = Very useful	Q41 – Memorisation Reading task: You have to understand and remember the information in a text. How do you rate the usefulness of the following strategies for understanding and memorising the text? ST41Q01 = I concentrate on the parts of the text that are easy to understand ST41Q02 = I quickly read through the text twice ST41Q03 = After reading the text, I discuss its content with other people ST41Q04 = I underline important parts of the text ST41Q05 = I summarise the text in my own words ST41Q06 = I read the text aloud to another person Q42 - Summarise ST42Q01 = I write a summary. Then I check that each paragraph is covered in the summary, because the content of each paragraph should be included ST42Q02 = I try to copy out accurately as many sentences as possible ST42Q03 = Before writing the summary, I read the texts as many times as possible ST42Q04 = I carefully check whether the most important facts in the text are represented in the summary ST42Q05 = I read through the text, underlining the most important sentences. Then I write them in my own words as a summary
	- Reading confidence (confi)		-
	- Reading time (retime)	1 = I do not read for enjoyment 2 = 30 minutes or less each day 3 = More than 30 minutes to less than 60 minutes each day 4 = 1 to 2 hours each day 5 = More than 2 hours each day	Q23 – ST23Q01 About how much time do you usually spend reading for enjoyment? (Please tick only one box)

Year PISA and Test	Variables	Initial Code	Item questions
2018 and 2020	Gender	1 = Female 2 = Male	ST004Q01 Are you female or male? (Please select one response.)
	Home Facilities		
	- Number of books	1 = 0 – 10 books 2 = 11 – 25 books 3 = 26 – 100 books 4 = 101 – 200 books 5 = 201 – 500 books 6 = more than 500 books	ST013Q01 How many books are there in your home? There are usually about 40 books per metre of shelving. Do not include magazines, newspapers, or your schoolbooks. (Please select one response.)
	- Home educational resources (hedres)	1 = Yes 2 = No	ST011Q01 Which of the following are in your home? (Please tick one box in each row) ST11Q12TA = Dictionary ST11Q03TA = Study place ST11Q001TA = Desk ST11Q010TA = Textbook ST11Q011TA = Technical reference books ST11Q004TA = Computer ST11Q05TA = Software
	Reading Activities		
	- Reading Engagement (engread)	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly Agree	ST160 How much do you agree or disagree with these statements about reading? (Please take into account diverse kinds of reading material, such as books, magazines, newspapers, websites, blogs, emails...) (Please select one response in each row.) ST160Q01IA I read only if I have to. ST160Q02IA Reading is one of my favourite hobbies. ST160Q03IA I like talking about books with other people. ST160Q04IA For me, reading is a waste of time. ST160Q05IA I read only to get information that I need.
	- Reading Diversity (divread)	1 = Never or almost never 2 = A few times a year 3 = About once a month 4 = Several times a month 5 = Several times a week	ST167 How often do you read these materials because you want to? (Please take into account reading on paper and on digital devices.) (Please select one response in each row.) ST167Q01IA Magazines ST167Q02IA Comic books ST167Q03IA Fiction (novels, narratives, stories) ST167Q04IA Non-fiction books (informational, documentary)

			ST167Q05IA Newspapers
	- Online reading (online)	1 = I don't know what it is 2 = Never or almost never 3 = Several times a month 4 = Several times a week 5 = Several times a day	ST176 How often are you involved in the following reading activities? (Please select one response in each row. If you don't know what the activity is, please select "I don't know what it is.") ST176Q01IA Reading emails ST176Q02IA <Chat on line> (e.g. <Whatsapp®>, <Messenger®>) ST176Q03IA Reading online news ST176Q05IA Searching information online to learn about a particular topic ST176Q06IA Taking part in online group discussions or forums ST176Q07IA Searching for practical information online (e.g. schedules, events, tips, recipes)
	Reading States		
	- Reading strategies (stra)	Score 1 = Not useful at all 2 = 3 = 4 = 5 = 6 = Very useful	ST164 – Memorisation How do you rate the usefulness of the following strategies for understanding and memorising the text? (Please select one response in each row.) ST164Q01IA = I concentrate on the parts of the text that are easy to understand. ST164Q02IA = I quickly read through the text twice. ST164Q03IA = After reading the text, I discuss its content with other people. ST164Q04IA = I underline important parts of the text. ST164Q05IA = I summarise the text in my own words. ST164Q06IA = I read the text aloud to another person. ST 165 – Summarise How do you rate the usefulness of the following strategies for writing a summary of this two-page text? (Please select one response in each row.) ST165Q01IA = I write a summary. Then I check that each paragraph is covered in the summary, because the content of each paragraph should be included. ST165Q02IA = I try to copy out accurately as many sentences as possible. ST165Q03IA = Before writing the summary, I read the text as many times as possible.

			ST165Q04IA = I carefully check whether the most important facts in the text are represented in the summary. ST165Q05IA = I read through the text, underlining the most important sentences. Then I write them in my own words as a summary.
	- Reading confidence (confi)	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly Agree	ST161 How much do you agree with the following statements? (Please select one response in each row.) ST161Q01HA I am a good reader. ST161Q02HA I am able to understand difficult texts. ST161Q03HA I read fluently. ST161Q06HA I have always had difficulty with reading. ST161Q07HA I have to read a text several times before completely understanding it. ST161Q08HA I find it difficult to answer questions about a text.
	- Reading time (retime)	1= I do not read for enjoyment 2 = 30 minutes or less a day 3 = More than 30 minutes to less than 60 minutes a day 4 = 1 to 2 hours a day 5 = More than 2 hours a day	ST 175 About how much time do you usually spend reading for enjoyment? (Please take into account diverse kinds of reading, such as books, magazines, newspapers, websites, blogs, emails...) (Please select one response.)

SCHOOL Questionnaires

Year PISA	Variables	Initial Code	Item questions
2000	School Sector	1 = Public 2 = Private 1 = A <village, hamlet or rural area> (fewer than 3 000 people) 2 = A <small town> (3 000 to about 15 000 people) 3 = A <town> (15 000 to about 100 000 people) 4 = A <city> (100 000 to about 1 000 000 people) 5 = Close to the centre of a <city> with over 1 000 000 people 6 = Elsewhere in a <city> with over 1 000 000 people	SC03Q01 Is your school a <public> or a <private> school? SC01Q01 Which of the following best describes the community in which your school is located? (Please <tick> only one box.)
	School Facilities		
	- ICT at School	Total number	In your school, about how many computers are: <Reminder note> (Please write in a number on each row. Write 0 (zero) if there is none SC13Q01 : a) in the school altogether? SC13Q02 : b) available to 15-year-old students? SC13Q03 : c) available only to teachers? SC13Q04 : d) available only to administrative staff? SC13Q05 : e) connected to the Internet/World Wide Web? SC13Q06 : f) connected to a local area network (LAN, Intranet)?
	- Resources and Technology	1 = Not at all 2 = Very little 3 = To some extent 4 = A lot	In your school, how much is the learning of <15-year-old students> hindered by: (Please <tick> one box on each row.) SC11Q01 : a) poor condition of buildings? SC11Q03 : c) lack of instructional space (e.g., classrooms)? SC11Q04 : d) lack of instructional material (e.g., textbooks)? SC11Q05 : e) not enough computers for instruction? SC11Q06 : f) lack of instructional materials in the library? SC11Q07 : g) lack of multi-media resources for instruction?

	Assessment	1 = Yes 2 = No	In your school, are assessments of <15-year-old students> used to: (Please <tick> one box on each row.) SC18Q01 = a) inform parents about their child's progress? SC18Q02 = b) make decisions about retention or promotion? SC18Q03 = c) group students for instructional purposes? SC18Q04 = d) compare the school to <district or national> performance? SC18Q05 = e) monitor the school's progress from year to year? SC18Q06 = f) make judgments about teachers' effectiveness?
	School Management		
	- Leadership	-	-
	- School Climate	1 = Not at all 2 = Very little 3 = To some extent 4 = A lot	In your school, is the learning of <15-year-old students> hindered by: (Please <tick> one box on each row.) TEACHBEHA SC19Q01 : a) low expectations of teachers? SC19Q03 : c) poor student-teacher relations? SC19Q07 : g) teachers not meeting individual students' needs? SC19Q08 : h) teacher absenteeism? SC19Q11 : k) staff resisting change? SC19Q14 : n) teachers being too strict with students? SC19Q16 : p) students not being encouraged to achieve their full potential? STUDBEHA SC19Q02 : b) student absenteeism? SC19Q06 : f) disruption of classes by students? SC19Q09 : i) students skipping classes? SC19Q10 : j) students lacking respect for teachers?

			SC19Q13 : m) the use of alcohol or illegal drugs? SC19Q15 : o) students intimidating or bullying other students?

Year PISA	Variables	Initial Code	Item questions
2009	School Sector	1 = Public 2 = Private 1 = A village, hamlet or rural area (fewer than 3 000 people) 2 = A small town (3 000 to about 15 000 people) 3 = A town (15 000 to about 100 000 people) 4 = A city (100 000 to about 1 000 000 people) 5 = A large city (with over 1 000 000 people)	Q2 Is your school a <public> or a <private> school? Q4 Which of the following definitions best describes the community in which your school is located? (Please tick only one box)
	School Facilities		
	- ICT at School	Total number	The goal of the following set of three questions is to gather information about the student-computer ratio for students in the <national modal grade for 15-year-olds> at your school. Q10a : At your school, what is the total number of students in the <national modal grade for 15-year-olds>? Q10b : Approximately, how many computers are available for these students for educational purposes? Q10c : Approximately, how many of these computers are connected to the Internet/World Wide Web?
	- Resources and Technology	1 = Not at all 2 = Very little 3 = To some extent 4 = A lot	Q11 Is your school's capacity to provide instruction hindered by any of the following issues? (Please tick one box in each row) g) Shortage or inadequacy of science laboratory equipment h) Shortage or inadequacy of instructional materials (e.g. textbooks)

			i) Shortage or inadequacy of computers for instruction j) Lack or inadequacy of Internet connectivity k) Shortage or inadequacy of computer software for instruction l) Shortage or inadequacy of library materials m) Shortage or inadequacy of audio-visual resources
	Assessment	1 = Yes 2 = No	Q16 In your school, are assessments of students in <national modal grade for 15-year-olds> used for any of the following purposes? (Please tick only one box in each row) a) To inform parents about their child's progress b) To make decisions about students' retention or promotion c) To group students for instructional purposes d) To compare the school to <district or national> performance e) To monitor the school's progress from year to year f) To make judgements about teachers' effectiveness g) To identify aspects of instruction or the curriculum that could be improved h) To compare the school with other schools
	School Management		
	- Leadership	1 = Never 2 = Seldom 3 = Quite often 4 = Very often	Q26 Below you can find statements about your management of this school. Please indicate the frequency of the following activities and behaviours in your school during the last school year. (Please tick only one box in each row) a) I make sure that the professional development activities of teachers are in accordance with the teaching goals of the school b) I ensure that teachers work according to the school's educational goals c) I observe instruction in classrooms d) I use student performance results to develop the school's educational goals

			e) I give teachers suggestions as to how they can improve their teaching f) I monitor students' work g) When a teacher has problems in his/her classroom, I take the initiative to discuss matters h) I inform teachers about possibilities for updating their knowledge and skills i) I check to see whether classroom activities are in keeping with our educational goals j) I take exam results into account in decisions regarding curriculum development k) I ensure that there is clarity concerning the responsibility for coordinating the curriculum l) When a teacher brings up a classroom problem, we solve the problem together m) I pay attention to disruptive behaviour in classrooms n) I take over lessons from teachers who are unexpectedly absent
	- School Climate	1 = Not at all 2 = Very little 3 = To some extent 4 = A lot	Q17 In your school, to what extent is the learning of students hindered by the following phenomenon? (Please tick one box in each row) TEACHBEHA SC17Q01 : a) Teachers' low expectations of students SC17Q03 : c) Poor student-teacher relations SC17Q05 : e) Teachers not meeting individual students' needs SC17Q06 : f) Teacher absenteeism SC17Q09 : i) Staff resisting change SC17Q11 : k) Teachers being too strict with students SC17Q13 : m) Students not being encouraged to achieve their full Potential STUDBEHA: SC17Q02 : b) Student absenteeism SC17Q04 : d) Disruption of classes by students SC17Q07 : g) Students skipping classes SC17Q08 : h) Students lacking respect for teachers SC17Q10 : j) Student use of alcohol or illegal drugs SC17Q12 : l) Students intimidating or bullying other students

Year PISA	Variables	Initial Code	Item questions
2018/2020	School Sector	1 = Public 2 = Private 1 = A village, hamlet or rural area (fewer than 3 000 people) 2 = A small town (3 000 to about 15 000 people) 3 = A town (15 000 to about 100 000 people) 4 = A city (100 000 to about 1 000 000 people) 5 = A large city (with over 1 000 000 people)	SC013 Is your school a public or a private school? (Please select one response.) Which of the following definitions best describes the community in which your school is located? (Please select one response.)
	School Facilities		
	- ICT at School	1 = Strongly Disagree 2 = Disagree 3 = Agree 4 = Strongly Agree	To what extent do you agree with the following statements about your school's capacity to enhance learning and teaching using digital devices? (Please select one response in each row.) (Please think of different kinds of digital devices such as for example desktop computers, portable laptops, tablet computers or interactive whiteboards) SC155Q01HA : The number of digital devices connected to the Internet is sufficient SC155Q02HA : The school's Internet bandwidth or speed is sufficient SC155Q03HA : The number of digital devices for instruction is sufficient SC155Q04HA : Digital devices at the school are sufficiently powerful in terms of computing capacity SC155Q05HA : The availability of adequate software is sufficient
	- Resources and Technology	1 = Not at all 2 = Very little 3 = To some extent 4 = A lot	Is your school's capacity to provide instruction hindered by any of the following issues? (Please select one response in each row.) SC017Q05NA : A lack of educational material (e.g. textbooks, IT equipment, library or laboratory material).
	Assessment	1 = Yes	SC154

		2 = No	In your school, are assessments of students in <national modal grade for 15-year-olds> used for any of the following purposes? (Please select one response in each row.) SC154Q01HA : To guide students' learning SC154Q02WA : To inform parents about their child's progress SC154Q03WA : To make decisions about students' retention or promotion SC154Q04WA : To group students for instructional purposes SC154Q05WA : To compare the school to <district or national> performance SC154Q06WA : To monitor the school's progress from year to year SC154Q07WA : To make judgements about teachers' effectiveness SC154Q08WA : To identify aspects of instruction or the curriculum that could be improved SC154Q09HA : To adapt teaching to the students' needs SC154Q10WA : To compare the school with other schools SC154Q11HA : To award certificates to students
	School Management		
	- Leadership	1 = Yes, this is mandatory, e.g. based on district or ministry policies 2 = Yes, based on school initiative 3 = No	SC037 Do the following arrangements aimed at quality assurance and improvements exist in your school and where do they come from? (If you need further explanation of the term "internal school evaluation" or "external school evaluation", please use the help button.) (Please select one response in each row.) SC037Q01TA : Internal evaluation/Self-evaluation SC037Q02TA : External evaluation SC037Q03TA : Written specification of the school's curricular profile and educational goals SC037Q04TA : Written specification of student performance standards SC037Q05NA : Systematic recording of data such as teacher or student attendance and professional development

			SC037Q06NA : Systematic recording of student test results and graduation rates SC037Q07TA : Seeking written feedback from students (e.g. regarding lessons, teachers or resources) SC037Q08TA : Teacher mentoring SC037Q09TA : Regular consultation aimed at school improvement with one or more experts over a period of at least six months SC037Q10NA : Implementation of a standardised policy for reading subjects (i.e. school curriculum with shared instructional materials accompanied by staff development and training)
	- School Climate	1 = Not at all 2 = Very little 3 = To some extent 4 = A lot	SC061 In your school, to what extent is the learning of students hindered by the following phenomena? (Please select one response in each row.) TEACHBEHA

PARENT Questionnaires

Year Test	Variables	Initial Code	Item questions
2020	Reading Involvement	1 = Never or hardly ever 2 = Once or twice a year 3 = Once or twice a month 4 = Once or twice a week 5 = Every day or almost every day	PA003 How often do you or someone else in your home do the following things with your child? PA003 (Please select one response in each row.) PA003Q02TA : Discuss how well my child is doing at school PA003Q02TA : Eat <the main meal> with my child around a table PA003Q03TA : Spend time just talking to my child PA003Q04HA : Help my child with his/her reading and writing homework PA003Q05IA : Discuss political or social issues PA003Q06IA : Go to a bookstore or library with my child PA003Q07IA : Talk with my child about what he/she is reading on his/her own
	Mother Education	1 = <ISCED level 3A> 2 = <ISCED level 3B, 3C> 3 = <ISCED level 2> 4 = <ISCED level 1>	ST005 What is the <highest level of schooling> completed by your mother?

		5 = She did not complete <ISCED level 1>	If you are not sure which response to choose, please ask the <test administrator> for help. (Please select one response.)
	Father Education	1 = <ISCED level 3A> 2 = <ISCED level 3B, 3C> 3 = <ISCED level 2> 4 = <ISCED level 1> 5 = She did not complete <ISCED level 1>	ST007 What is the <highest level of schooling> completed by your father? If you are not sure which response to choose, please ask the <test administrator> for help. (Please select one response.)
	Parent Income	1 = less than Rp 500,000 2 = Rp 500,000 and less than Rp 1,000,000 3 = Rp 1,000,000 and less than Rp 2,500,000 4 = Rp 2,500,000 and less than 5,000,000 5 = Rp 5,000,000 and less than Rp 10,000,000 6 = more than Rp 10,000,000	PA042 What is your annual household income? Please add together the total income, before tax, from all members of your household. Please remember we ask you to answer questions only if you feel comfortable doing so, and that all responses are kept strictly confidential. (Please select one response.)
	Parent Job		ST014 The following two questions concern your mother's job: (If she is not working now, please tell us her last main job.) ST014Q01TA What is your mother's main job? (e.g. school teacher, kitchen-hand, sales manager) Please type in the job title. ST014Q02TA What does your mother do in her main job? (e.g. teaches high school students, helps the cook prepare meals in a restaurant, manages a sales team) Please use a sentence to describe the kind of work she does or did in that job. ST015 ST015 The following two questions concern your father's job: (If he is not working now, please tell us his last main job.) ST015Q01TA What is your father's main job? (e.g. school teacher, kitchen-hand, sales manager) Please type in the job title ST015Q02TA

			What does your father do in his main job? (e.g. teaches high school students, helps the cook prepare meals in a restaurant, manages a sales team) Please use a sentence to describe the kind of work he does or did in that job.

TEACHER Questionnaires

Year Test	Variables	Initial Code	Item questions
2020		1 = Yes, a programme of 1 year or less 2 = Yes, a programme longer than 1 year 3 = No	TC014 Did you complete a teacher education or training programme? (Please select one response.)
		1 = Yes 2 = No	TC193 During the last 12 months, did you participate in any of the following professional development activities? TC193Q01HA : Courses/workshops (e.g. on subject matter or methods and/or other education-related topics) TC193Q02HA : Education conferences or seminars (where teachers and/or researchers present their research results and discuss educational issues) TC193Q03HA : Observation visits to other schools TC193Q04HA : Observation visits to business premises, public organisations, non-governmental organisations TC193Q05HA : In-service training courses in business premises, public organisations, non-governmental organisations
		1 = Less than 1 hour a week 2 = 1-3 hours a week 3 = 4-6 hours a week 4 = More than 6 hours a week	TC175 About how much time per week do you spend reading for your work (e.g. articles, magazines, books, manuals and websites) out of your classes? (Please select one response.)
		1 = Yes 2 = No	TC166 In your lessons, have you ever taught any of the following things? (Please select one response in each row.) TC166Q01HA : How to use keywords when using a search engine such as <Google©>, <Yahoo©>, etc. TC166Q02HA : How to decide whether to trust information from the Internet TC166Q03HA : How to compare different web pages and decide what information is more relevant for the students' school work

			TC166Q04HA : To understand the consequences of making information publicly available online on <Facebook@>, <Instagram@>, etc. TC166Q05HA : How to use the short description below the links in the list of results of a search TC166Q06HA : How to detect whether the information is subjective or biased TC166Q07HA : How to detect phishing or spam emails
		1 = I don't know what it is 2 = Never or almost never 3 = Several times a month 4 = Several times a week 5 = Several times a day	TC176 How often are you involved in the following reading activities? (Please select one response in each row. If you don't know what the activity is, select "I don't know what it is.") TC176Q01HA Reading emails TC176Q02HA <Chat on line> (e.g. <Whatsapp®> , <Messenger®>) TC176Q03HA Reading online news TC176Q05HA Searching information online to learn about a particular topic TC176Q06HA Taking part in online group discussions or forums TC176Q07HA Searching for practical information online (e.g. schedules, events, tips, recipes)