

Full Length Research Paper

Gender differences in school children's self-efficacy beliefs: Students' and teachers' perspectives

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Received 9th October, 2013; Accepted 4th February, 2014; Published 10th February 2014

This small scale study examined gender differences in self-efficacy. 24 girls and 28 boys aged between 10 and 12 years completed self-efficacy questionnaires and attainment tests. The study was conducted in two primary school classrooms in England and the results indicated that gender differences in self-efficacy were significant with boys holding a lower sense of self-efficacy than girls coupled with lower performance. Boys' self-efficacy scores were significantly correlated with performance but this relationship was lower than that of the girls. Interviews with the two teachers involved in this study showed a lack of understanding and awareness of the self-efficacy beliefs of their students and the impact it potentially had on their students' performance. Implications for teachers are discussed.

Key words: Primary classroom, self-efficacy, gender, correlation, attainment.

INTRODUCTION

This study examines gender differences in self-efficacy beliefs of children aged 10 to 12 years in the classroom context. Given that less research has been conducted in the classroom context with school aged children, this research aimed to offer self-efficacy findings with this age range and, through an exploration of teachers' understandings of self-efficacy, examined some of the implications for educational practitioners.

Self-efficacy is defined as "beliefs in one's capabilities to organise and execute the courses of action required to produce given attainments"(Bandura, 1997, p.3). Self-efficacy beliefs are self-perceptions of capability that can influence how people feel, think and act. Two decades of research in self-efficacy have shown that people with a high sense of self-efficacy tend to perform better than those with a low sense of self-efficacy (Usher and Pajares, 2008). In education previous self-efficacy

research has demonstrated that self-efficacy beliefs are positively correlated with academic achievement (Jinks and Morgan, 1999; Pajares and Schunk, 2001; Usher, 2009) and linked to students' engagement (Schunk and Mullen, 2012).

Self-efficacy is part of Bandura's social cognitive theory which stresses the reciprocal interplay between personal factors, behavioural actions and environmental factors (Bandura, 2012a). In other words, a student's performance and motivation can be mediated by the interaction between self-efficacy beliefs, environmental factors such as classroom structures, and the influence of social interactions with peers. The development of self-efficacy beliefs therefore occurs through a process of selecting and interpreting thoughts, behaviours and environmental information (Bandura, 1997). Self-efficacy has unique features which distinguish it from other self-constructs.

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One main difference is that self-efficacy is a judgement of capability to perform a task not a judgment of personal qualities or self-worth and it is domain-specific which means people can exhibit a high sense of self-efficacy in one domain such as science but low in another such as maths. Self-efficacy is an expectancy belief in that it is measured *before* the task is performed and is not about how a person feels about a task after they have completed it. People with a strong sense of self-efficacy tend to be more motivated to achieve their goals, they put more effort into achieving goals and they persist even when faced with the issue that they may fail. This resilience and motivation provides them with a higher chance of success in tasks they perform. For example children with a high self-efficacy are more likely to choose to continue with a task than children with low self-efficacy (Bandura and Schunk, 1981), they persist longer and are more successful on difficult tasks than children with low self-efficacy (Schunk, 1981) and they rework more problems than children of the same ability with low self-efficacy (Collins 1982; in Bandura, 1997).

Self-efficacy beliefs have also been shown to influence self-regulation (Zimmerman, 1995). Self-regulation is concerned with regulating one's own learning process and includes processes such as goal setting, self-evaluation, strategy use and planning. Zimmerman (2002) claims self-regulation is important to be successful in learning. Knowing self-regulatory strategies is part of effective self-regulation but self-efficacy for self-regulated learning is also needed (Usher and Pajares, 2008b). Research in this field has shown that self-efficacy beliefs influence the deliberate observation of one's behaviour, the perception of that behaviour and the amount of attention given to aspects of that behaviour. Thus, there is an importance difference between having the necessary meta-cognitive skills and using them effectively (Bandura, 1997). Poor performance can arise, not because of a lack of knowledge but from disuse or deficit use of skills. Self-efficacy for self-regulated learning is therefore a key indicator and as such was used in the current study.

Although there is a strong relationship between self-efficacy and performance, it cannot be said that a person with low skills and high sense of self-efficacy can perform well. It takes more than a high sense of self-efficacy to produce high achievements. What self-efficacy does is influence a person to try harder and be motivated to gain the skills and then to make the best use of these skills in their performance. Self-efficacy can therefore be applied to classroom teaching; however, the majority of studies have been conducted in relation to adolescents and young adults, with few studies (other than those conducted in the USA) investigating the younger age range. Moreover, research conducted in USA has shown some evidence for gender differences in self-efficacy and a recent meta-analysis (Huang, 2013) found small but significant gender effects across 187 studies with a small difference favouring males. However, in some studies girls, have been shown to exhibit higher self-efficacy

beliefs. Britner and Pajares (2001) reported that girls had higher self-efficacy beliefs and attainment in science than boys and Pajares et al. (1999) investigated gender differences and self-efficacy for writing and reported that girls had a stronger self-efficacy for self-regulated learning together with higher attainment. This gain favouring females is not consistently reported; thus further research is needed to clarify the direction of any observed difference. This study aimed to examine gender differences with children in the classroom and given the application to teaching including an exploration of teacher's perceptions of their students' self-efficacy. This aspect of the research should provide new insights of teachers' understanding of the self-efficacy beliefs of their students. It is argued here that self-efficacy is under-explored outside of the USA and yet potentially is a useful construct in school learning. Alerting educators to the merits of enhancing self-efficacy and providing them with the tools, knowledge and strategies would be of significant value particularly given the strong correlation between attainment and self-efficacy. The following research questions were examined:

1. What are the self-efficacy levels of children aged 10 to 12 years in a classroom context?
2. What is the strength of the correlations between self-efficacy and performance of children aged 10 to 12?
3. Do the self-efficacy levels of children aged 10 to 12 years show a difference according to gender?
4. What are teachers' understanding and awareness of the self-efficacy beliefs of their students?

MATERIALS AND METHODS

Students completed two Likert scale self-efficacy questionnaires and a performance test. The two self-efficacy measures employed in the study were "self-efficacy for general academic achievement" and "self-efficacy for self-regulated learning". Self-efficacy for general academic achievement measures self-efficacy for achievement in three core subjects: English, Maths and Science. This scale was a shortened version of self-efficacy for academic achievement in Bandura's Children's Self-Efficacy Scales (2006). The scale needs to be modified for the present study in order to make it appropriate to the age and culture of the participants. Thus, the questions most relevant to English 10 and 12 year olds children such as "How well can you learn science?" were selected from the nine questions on the original scale. As a result questions such as "How well can you learn social studies?" and "How well can you learn algebra?" were discarded due to the fact that these topics were not taught in the year group being examined. Self-efficacy for self-regulated learning which measures self-efficacy beliefs for self-regulatory processes such as time planning and management was taken from Bandura's Children's Self-Efficacy Scales (Bandura, 2006). The performance test was a shortened version of Key Stage 2, levels 3 to 5, Science SATs A and B developed in England by the Department for Education and Employment (DfEE) and the Qualifications Curriculum Authority (QCA). All children in England take Standard Attainment Tests (SATs) at 10- 11 years. Using questions from these tests ensured that all items were appropriate and reliable. The test was shortened to allow administration. The newly created shortened version of the test comprised 8 questions

Table 1. Overall mean scores for self-efficacy scales (N=50)

Self-Efficacy Scale	No items	M (SD)	Item M	Median	Mode	Range	Skewness	Kurtosis
Academic Achievement	3	15.12 (2.87)	5.04	15	17	12	-.358	-.628
Self-Regulated Learning	11	51.12 (12.32)	4.65	51	49	50	-.167	-.702

from Scientific Enquiry (Sc1), 4 questions from Life Processes and living things (SC2), 4 questions from Physical Processes (Sc 3) and 4 questions from Material and their Properties (sc4). This split insured that similar questions were represented in the same ratio as the original test. Science was the domain chosen rather than maths or English because children of this age are not statutory required to complete the above tests in science and thus children would not have received intensive revision work in this subject as they would in the other subjects.

Teacher interviews were conducted and examined understanding of self-efficacy beliefs as well as providing predictions of their pupils' self-efficacy and performance scores.

The study complied with the British Educational Research Associations Ethical Guidelines. All ethical approvals were sought and informed consents from parents, students and teachers gathered. Participants were free to withdraw at any time and all information was confidential.

Participants

Fifty two students (24 girls, 28 boys) and 2 female teachers from one school located in the East of England participated in the study. Students were from two classes in the same school and ages of the students ranged from 10 years to 12 years. The researcher administered the self-efficacy and performance instruments for each of the two classes and then conducted individual interviews with each of the class teachers. It took approximately 45 min for the students to answer the self-efficacy measures and the performance test.

Procedure

In order to familiarise the children with the rating scale, practice items were presented on a white board and the rating scale explained to the whole class by the researcher. Pupils were then given the following guidelines regarding the completion of the questionnaires:

1. complete the questionnaire according to how you think, not your parents, your teacher or your friend
2. be as honest as you can, usually the first thing that pops into your head
3. this is not a test, there is no right or wrong answer
4. do not discuss your answers
5. give only one answer to each question
6. put up your hand if you are unclear of any items

Any child needing support to complete the questionnaires such as with writing of their answers or reading of the questions were helped promptly. On completion of the self-efficacy scales and attainment test for both classes the researcher left the school and returned three weeks later to conduct the teacher interviews, having analysed the data from the children.

The individual interviews with each of the class teachers were conducted in a private space and were audio taped. The interview

protocol for the teachers consisted of a semi-structured interview in which teachers were asked a series of questions about the self-beliefs and confidence levels of the children in their class. The conversations were free flowing and explored the responses of each of the teachers. Three main questions were the focus of the interviews which relate to the research questions outlined in the introduction:

1. What are your understanding of your student's academic self-beliefs and confidence levels?
2. Do you think these self-beliefs are related to attainment and if so how and why?
3. Do you think the self-beliefs and confidence levels of the students in your class are different for boys and girls?

On completion of the main interview teachers were given some feedback about the data collected from their students and asked to comment. Teachers were then given a debriefing about self-efficacy and asked to comment about its usefulness or relevance to their classroom practice. Each interview lasted approximately 50 min.

RESULTS

The data were analysed using standard descriptive statistics, Pearson correlations and t tests with the assistance of statistical software SPSS. The self-efficacy measures, which differed in length from 3 questions on the academic achievement scale to 11 questions on the self-regulated learning scale, were scored using a 7 point Likert scale ranging from 1= not very well to 7= very well. Cronbach's alpha was used to assess the internal consistency of the self-efficacy instruments. The academic achievement scale coefficient was 0.51 less and the self-regulated learning scale was 0.90.

The shapes of the distribution of the scores on the self-efficacy instruments were examined. Looking at the data presented in Table 1 one can see that distributions were negatively skewed, indicating that there exists low frequency, extremely low scores but not corresponding low frequency high scores. The skewness co-efficients reported here are between -1.0 and +1.0 and therefore not considered to be extreme. The kurtosis value also gives an indication of the shape in terms of the peak of the distribution. The kurtosis values are greater than -1.00 and therefore considered normal. Variability of the data was considered by examining the range and the standard deviation (SD) reported in Table 1. The range determines how far the lowest score is from the highest score. The self-efficacy for academic achievement has the lowest range of 12 (8-20); however, this measure involves only 3 items and therefore the maximum range

Table 2. Self-Efficacy Items

Self-efficacy for general academic achievement		M	SD
<i>How well can you:</i>			
1	learn general mathematics	4.80	1.18
2	learn science	5.42	1.44
3	learn reading, writing and literacy skills		
Self-efficacy for self-regulated learning			
<i>How well can you:</i>			
1	finish your homework assignments by deadlines	4.60	1.85
2	study when there are other interesting things to do	3.64	1.82
3	concentrate on school subjects	4.98	1.52
4	take class notes of class instruction	4.56	1.70
5	use the library to get information for class assignments	5.28	1.44
6	plan your school work	4.84	1.46
7	organise your school work	4.86	1.56
8	remember information presented in class and textbooks	4.32	1.61
9	arrange a place to study without distractions	4.26	1.43
10	motivate yourself to do school work	4.96	1.41
11	participate in class discussions	4.82	1.55

Table 3. Self-Efficacy scales: means for girls and boys

Self-Efficacy Scale	All Mean	Girls Mean (N =24)	Boys Mean (N=26)	T-test Sig.
Academic Achievement	15.12	16.54	13.81	P<0.001
Self-Regulated Learning	51.12	59.00	43.85	P<.001

is only 18 (3-21). Examination of the standard deviations of the self-efficacy measures indicates they contain a good amount of variability.

Means and standard deviations for each item across the self-efficacy measure are presented in Table 2. With regard self-efficacy for self-regulated learning, pupils rated their self-efficacy the lowest for being able to study when there are other interesting things to do ($M=3.64$) and highest for being able to use the library to get information for class assignments ($M=5.28$).

Analysis of the self-efficacy for academic achievement measure showed that pupils rated their self-efficacy highest for learning reading, writing and literacy skills ($M=5.42$) and lowest for learning science ($M= 4.80$). A paired samples t-test was used to establish statistical significance and self-efficacy for learning science was significantly different from learning English ($t=-3.394$, $df=49$, $p<.01$). Figure 1 shows the scores plotted as a maximum score and demonstrates the low sense of perceived capability to learn science.

Girls held a higher sense of self-efficacy than boys on both self-efficacy measures (Figure 2). The girls scored above the overall mean on the self-efficacy instruments whereas the boys' scores fell below the overall mean. An independent samples t-test was used to test the

significance of these differences and Table 3 shows that the girls scored significantly higher than the boys. The difference between the girls and boys occurred on every question of the self-efficacy measures with girls having a higher sense of self-efficacy than boys across the measures.

Girls' higher sense of self-efficacy was coupled with higher performance, with girls scoring a mean of 9.58 ($SD =3.51$) and boys scoring a mean of 7.00 ($SD = 3.48$). This difference was significant ($t =-2.612$, $df = 48$, $p = <0.05$). Analysis of the scores on the performance test produced a good internal consistency reliability coefficient of 0.74 and showed that the students mean score was 8.24 ($SD 3.69$). Table 4 shows the distribution of the science test and the skewness coefficient and kurtosis coefficient are considered slight and the data contain a good amount of variability ($SD =3.69$, range =15).

Not only do girls and boys differ in terms of their self-efficacy and science performance, but also in terms of the relationship that exists between self-efficacy and performance. The correlational analysis detailed in Table 4 shows that both boys' and girls' self-efficacy scores are highly related to their performance in science; however, there do exist some differences in the magnitude of this relationship. As can be seen in Table 5a and b, all the

Table 4. Self-Efficacy Item means for Girls and Boys

Self-efficacy for general academic achievement		Girls	Boys
<i>How well can you:</i>			
1	learn general mathematics	5.21	4.42
2	learn science	6.13	4.77
3	learn reading, writing and literacy skills		
Self-efficacy for self-regulated learning			
<i>How well can you:</i>			
1	finish your homework assignments by deadlines	5.63	3.65
2	study when there are other interesting things to do	4.33	3.00
3	concentrate on school subjects	5.75	4.27
4	take class notes of class instruction	5.38	3.81
5	use the library to get information for class assignments	5.62	4.96
6	plan your school work	5.67	4.08
7	organise your school work	5.50	4.27
8	remember information presented in class and textbooks	5.00	3.69
9	arrange a place to study without distractions	4.96	3.62
10	motivate yourself to do school work	5.54	4.42
11	participate in class discussions	5.62	4.08

Table 5a. Science Attainment Test

	M (SD)	Girls M (SD)	Boys M (SD)	Median	Mode	Range	Skewness	Kurtosis
Science Test	8.24 (3.69)	9.58 (3.51)	7.00 (3.48)	8	6	15	.317	-.737

Table 5b. Gender differences: Pearson's *r* correlation between self-efficacy and attainment in science

Self-Efficacy Scale	Boys <i>r</i>	Girls <i>r</i>
Academic Achievement	0.59**	0.58**
Self-Regulated Learning	0.49*	0.67**

*Significant to 0.05 level

** Significant to 0.01 level

correlations are significant at the 0.01 level, however, self-efficacy for self-regulated learning the girls self-efficacy/performance correlation is higher than the boys.

Teachers were asked to predict their students' scores on the performance test and self-efficacy measures. Correlations between actual and predicted scores showed that teachers were able to judge their students' academic performance better than the self-efficacy beliefs of their students, with Pearson correlations being $r = .75$ for performance and 0.45 for the self-efficacy for academic attainment measure and 0.39 for the self-efficacy for self-regulated learning scale. Teacher interview data regarding understandings of self-efficacy are

examined in the discussion section of this paper. Self-efficacy was explained to teachers in terms of levels of confidence because the term "confidence" is a familiar every day term and it was felt that teachers would engage more with a better understanding of the concept.

DISCUSSION

This study examined performance on a science attainment test together with self-reported self-efficacy beliefs of children between 10 and 12 years within a UK classroom. The focus of the study was to investigate potential

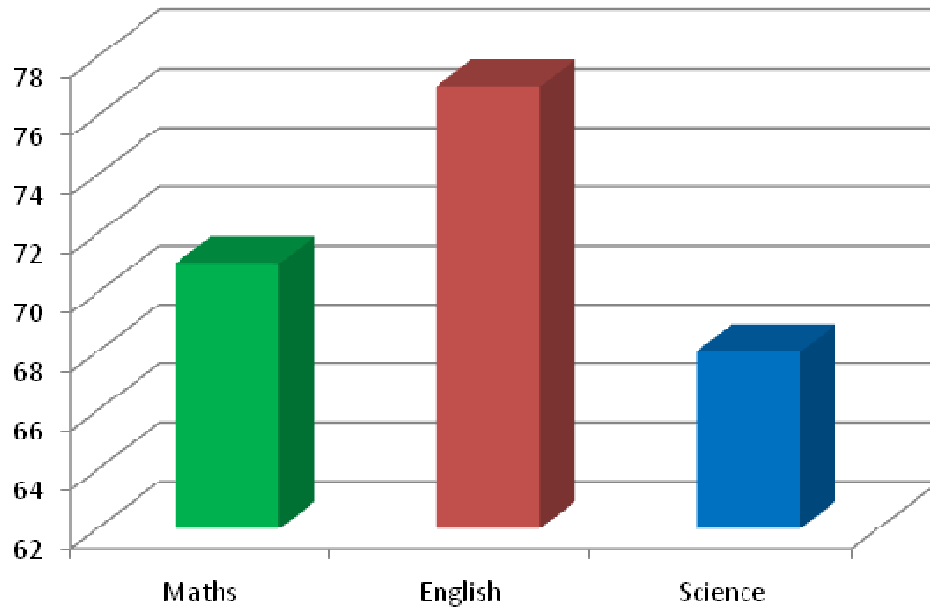


Figure 1. Self-efficacy for Academic Achievement (as a percentage of the maximum score)

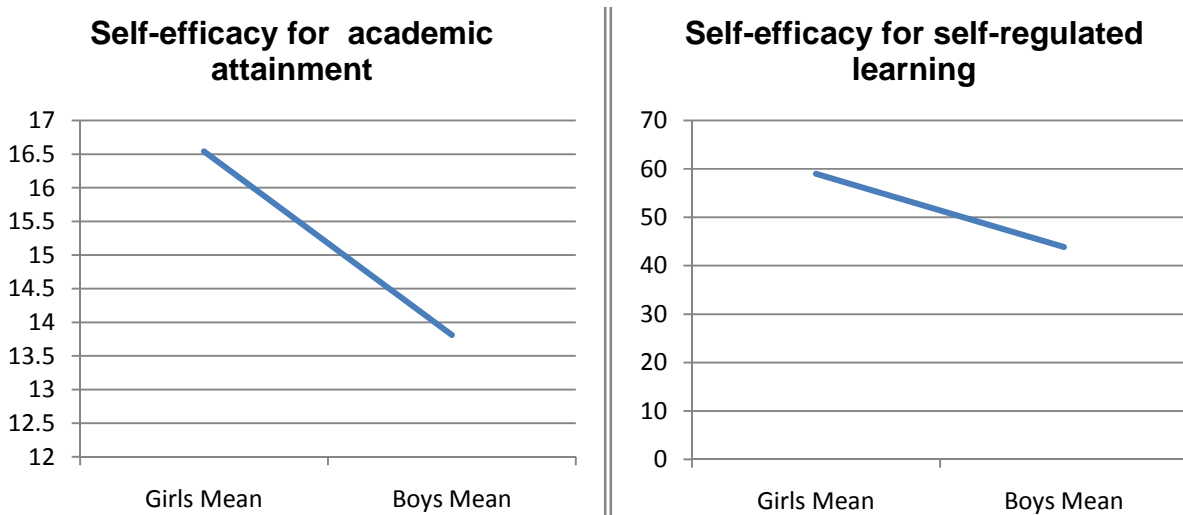


Figure 2. Self-efficacy beliefs: mean scores for girls and boys

gender differences that may exist in attainment and self-efficacy beliefs. The findings revealed gender differences, with boys scoring significantly lower than the girls on the attainment measure. This finding on its own is unsurprising given that gender gaps in academic performance have been reported internationally and much of the literature tends to focus on boys' underperformance compared with girls (Weiner 1995; Marks 2008). The more interesting finding with regard to attainment was the correlation between performance and self-efficacy beliefs. Previous research has tended to observe a strong positive

correlation between attainment and self-efficacy. This study provided evidence that boys held weaker correlations than girls. In addition boys scored significantly lower than girls on both measures of self-efficacy. Boys held a lower sense of self-efficacy across all items and large differences were observed. With regard to self-efficacy for self-regulated learning the largest gender differences occurred in the self-reporting of how well students could finish their homework assignments by deadlines, take class notes of class instruction and plan their school work (with boys scoring significantly lower

than the girls); furthermore, the pattern of the responses were different between boys and girls. The girls' highest self-efficacy was for concentrating on school subjects and planning their school work. In contrast the boys' strongest self-efficacy was for how well they thought they could motivate themselves to do school work and use the library to get information for class assignments.

Gender differences in self-efficacy have been reported in previous research but the direction of the results varies with some studies reporting gains for females and some reporting gains for males (Huang, 2013). It is therefore difficult to ascertain the direction of the gender disparity. This study provides support for gender differences within this field in reporting higher self-efficacy beliefs for females. In addition, the interesting aspect of the findings of this research lies in the magnitude of the gender differences reported here. The gender differences of the children aged between 10 and 12 years are of a greater magnitude than previous research. This finding could reflect a cultural difference due to the fact that much of the previous research has been conducted in the USA. Alternatively the large difference between boys and girls could reflect the age of the students since previous research tends to be conducted with older students. Another possibility is that the differences reflect classroom interaction and pedagogical approach used by the teachers involved in the study.

Teachers have great power and influence over the creation and development of their student's self-efficacy beliefs. Self-efficacy beliefs are developed through the four main sources of mastery experience, vicarious experience, verbal persuasion and physiological states (Bandura, 1997; Joet, Usher, and Bressoux, 2011). Thus most of what teachers do can influence a child's self-efficacy belief (LeFrancois, 2000). For example through classroom instruction, setting of tasks, how the children are responded to, how effort and achievement are rewarded, how feedback is given, how children are grouped are a few examples of how teachers can influence the development of a child's self-efficacy beliefs. It is possible that the school classrooms involved in this study have unknowingly impacted upon the children's self-beliefs such that polarisation according to gender occurs. Indeed, there is some evidence to support this hypothesis within this study.

The teachers interviewed in this study had limited understanding of self-efficacy beliefs and the influence of these self-perceptions on children's academic performance. This was evident in the correlations between teachers' predicted scores and the students' actual scores. The teachers were able to predict the attainment scores of the students in their class accurately with a high correlation of 0.75. In contrast the teachers were less able to accurately predict the self-efficacy beliefs of the children in their class with correlations of 0.49 and 0.39. This finding indicates that the teachers had less knowledge of their student's self-perceptions. This was also evident in the qualitative interview data which revealed

that teachers were unaware of the self-perceptions of their students:

Teacher A: Ah yes him ...not sure about him. He does well in maths and struggles a bit with his handwriting. His mum has come to see me a couple of times because she is concerned about his grades but overall he is sort of an average ability level for the class so really there is no problem.

This quote from Teacher A was in response to a question asking for the teacher to comment on a student's self-beliefs. The teacher responds in a way that reflects his understanding of the students' academic attainment but not self-beliefs.

Teacher B: Well I know that a couple of them, that is the boys, sort of think they can't do it and don't even bother looking at it, it makes me mad that they don't even have a go. I mean it is like crazy that they don't because they get a low mark anyway so they might as well have a go because they can't have done any worse on it. I don't get it really but it is only a couple the others are ok.

This quote shows the frustrations this teacher is having in engaging some of the boys in her class but also potentially indicates that the students with which she is referring have a low sense of self-efficacy and therefore are less motivated, less likely to sustain effort and more likely to expect failure of a task. Lack of teachers' understanding was further evident in discussions regarding gender where the teachers overestimate the confidence level of the boys in their class (confidence level was used to explain self-efficacy to the teachers):

Teacher B: well the boys I would say...yes the boys are more confident because well they sort of run it in the classroom, I mean they are loud and shout out the answers all the time which I don't like really but it is hard to stop them ..some say they can't do it but not many I mean they just sort of get on with it once they have stopped messing around ..yes the boys are really more confident the girls like to know they are getting it right so they ask lots of questions.

This quote provides an insight into how this teacher was judging the children's self-beliefs and it appears to be based on boys' more extrovert/difficult behaviour. Indeed the gender differences in self-efficacy beliefs revealed in this study came as a surprise to both teachers with both of them incorrectly suggesting that the boys held high stronger self-beliefs than the girls.

Many reasons have been suggested to explain gender differences such as bias in teacher classroom interaction, difference in learning styles, increase of 'laddish' behaviour' and that girls use a more social comparative method of evaluating their self-efficacy beliefs than boys (Pajares et al. 1999). Regardless of the reason behind

the gender differences the literature offers ways teachers can help to promote their students' self-efficacy which is especially important to examine given that the teachers in this study appeared to be largely unaware of the relationship between self-beliefs and performance.

It should be noted that the sample size of this study was small with only 52 students and 2 teachers involved in the study. Thus the findings of this research may not be generalisable to the wider population. That said, the findings of this study do have a significant practical importance in terms of classroom teaching practice. The teachers in the study were not aware of the self-efficacy beliefs of their students. The argument presented within this paper is that teachers need to have a better understanding of the pedagogical practices that can enhance student's self-efficacy beliefs. This would enable teachers to potentially increase a child's sense of self-efficacy and, given the strong correlation between self-efficacy and attainment, increasing self-efficacy would potentially increase any subsequent performance. Teacher based interventions are possible if teachers are given adequate training.

Self-efficacy research suggests that beliefs strengthen when teachers monitor the progress of their students on a daily basis rather than leaving a long gap between the task and the feedback, when goals are set by the students themselves and not imposed on them by others, when feedback is based on effort and shows that others can achieve the task (Schunk, 1981, 1983a). Moreover, peers are an influence on self-efficacy and teachers need to think about how they group children. Given the lower self-efficacy beliefs for self-regulated learning of the boys in this study, it implies that teachers should support boys to understand goal setting, strategy use, planning and time management, self-evaluation and self-monitoring. Indeed "The major goal of formal education should be to equip students with the intellectual tools, efficacy beliefs and intrinsic interests to educate themselves in a variety of pursuits throughout their lifetime." (Bandura, 1997 p. 214).

Conclusion

Self-efficacy has received much attention in the USA and two decades worth of research have shown that they influence persistence, effort, motivation and choice. Further international research is needed to validate this construct and provide strategies and practical activities that teachers can use in the classroom so that the impact of the research is fully realised. At present many schools in the UK know very little about self-efficacy and the lack of awareness of the teachers in this study indicates that teachers are failing to pay attention to the self-beliefs of their students. The gender differences observed within this study are a concern and indicate that boy's low perceptions of capability for school subjects and self-regulated learning skills contribute to low attainment.

Teachers are therefore missing the opportunity to harness the power of self-efficacy for achievement outcomes and emotional well-being of their students.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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