Virtual Classroom Simulation:
Design and Trial in a Preservice Teacher Education Program

A thesis submitted by
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for the degree of Doctor of Philosophy

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June 2010

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____________________, 24 August 2010
Simon Skrødal

This document was typeset with the MiKTeX distribution of LaTeX using the LyX document processor.
Til min kjære kone Rikki som alltid er der for meg,
vår sønn Haakon og en liten guttunge som snart kommer til verden...

I love you.
Contents

1. Introduction ........................................ 1
   1.1. Background ..................................... 2
       1.1.1. Commencement of the PhD Candidature .......... 3
   1.2. Description of the Virtual Classroom Simulation .. 5
       1.2.1. How it Works ................................ 5
   1.3. Statement of Research Problems .................. 7
       1.3.1. Research Problem 1 ........................ 8
       1.3.2. Research Problem 2 ........................ 9
       1.3.3. Research Problem 3 ........................ 11
   1.4. Participants (Population) ........................ 12
   1.5. Theoretical Framework .......................... 13
   1.6. Timeline for Research Study ..................... 13
   1.7. Research Budget ................................ 15
   1.8. Intellectual Property ........................... 15
   1.9. Summary ........................................ 15

2. Background ........................................ 17
   2.1. Challenges in Education .......................... 18
       2.1.1. Mental Models, Preconceptions & Schema .......... 18
       2.1.2. Practice Teaching ................................ 20
       2.1.3. Reflective Practice ............................ 23
       2.1.4. Praxis ........................................ 24
       2.1.5. Student-Teacher Interaction in the Classroom (STIC) ........................ 24
   2.2. Alternative Solution: Simulation .................. 25
       2.2.1. Existing Simulations .......................... 27
2.2.2. Emerging Support for Simulations in Teacher Education ... 29
2.3. Summary ........................................... 30

3. Conceptual and Simulation Modelling ........................................... 33
   3.1. Terminology ...................................... 34
   3.2. Social Simulation .................................. 37
       3.2.1. Agent Based Social Simulation ............... 38
   3.3. What is Modelling? .................................. 38
   3.4. VCS Conceptual Model (VCS Entities) ................. 42
       3.4.1. Class ......................................... 43
       3.4.2. Student Entity ............................... 44
           3.4.2.1. Earlier Work ............................. 45
           3.4.2.2. Current Development ..................... 45
       3.4.3. Task Entity .................................... 53
           3.4.3.1. Earlier Work ............................. 54
           3.4.3.2. Current Development ..................... 55
       3.4.4. Teacher Entity .................................. 59
   3.4.5. States of Interaction ............................. 61
       3.4.5.1. Simulation 'Sweeps' ......................... 63
   3.5. Model Verification and Validation ............................. 63
   3.6. Summary ........................................... 65

4. Simulation Framework .................................................. 67
   4.1. Earlier Work ........................................ 69
       4.1.1. Honours Work .................................. 69
           4.1.1.1. Simulation Framework ...................... 70
           4.1.1.2. Data Input/Output (Data Management) .... 71
       4.2. Current Development ................................ 76
           4.2.1. Simulation Framework ......................... 76
               4.2.1.1. Search for an existing implementation .... 76
               4.2.1.2. Development of a new simulation framework ... 78
           4.2.2. Data Input/Output and Data Management ........ 79
           4.2.3. Framework Components ......................... 82
5. Graphical User Interface

5.1. GUI Objectives .............................................. 102
  5.1.1. Lowering the Uptake Threshold .................. 103
5.2. Earlier Work .............................................. 106
  5.2.1. First GUI Efforts .................................. 106
  5.2.2. Honours Work ..................................... 107
    5.2.2.1. Status View ................................ 108
    5.2.2.2. Task View ................................ 109
    5.2.2.3. Classroom View ................................ 109
5.3. Current GUI ............................................. 110
  5.3.1. Splash Screen ..................................... 111
  5.3.2. Introduction Window ........................... 113
  5.3.3. Student Report Window ......................... 116
  5.3.4. Main Window .................................. 117
Contents

5.3.4.1. Classroom View .................................. 118
5.3.4.2. Status View .................................. 121
5.3.4.3. Task View .................................. 124
5.3.5. Results Window .................................. 125
5.3.6. About Dialog .................................. 129
5.4. Graphical Representation of the Classroom and Students .......... 132
5.4.1. Desired Representation ................................ 132
5.4.2. Challenges .................................. 132
5.4.3. FaceGen .................................. 134
5.5. Third Party Technologies .................................. 135
5.6. Summary .................................. 136

6. Research Design .................................. 139
6.1. Population .................................. 140
6.2. Ethical Considerations ................................ 141
6.3. Methods .................................. 141
  6.3.1. STIC Questionnaire .......................... 141
  6.3.2. VCS Introductory Lecture ......................... 144
  6.3.3. VCS Trials .................................. 145
  6.3.4. VCS Education Survey .......................... 147
  6.3.5. VCS HCI Survey ................................ 147
  6.3.6. VCS Assignment ................................ 149
6.4. Data Collection (VCS Surveys) ................................ 149
  6.4.1. Method of Collection .......................... 152
  6.4.2. Survey Software ................................ 153
6.5. Collected Data .................................. 154
6.6. Qualitative Procedures Employed ................................ 156
  6.6.1. Computerised Text Analysis (CTA) ................. 156
  6.6.2. Objectivity and Truth .......................... 157
  6.6.3. Bias Reduction and Validation ...................... 158
6.7. Statistical Procedures Employed ................................ 159
  6.7.1. Scale Reliability: Cronbach’s Alpha ............... 159
6.7.2. Confirmatory Factor Analysis: Instrument Reliability and Validity ........................................ 160
  6.7.2.1. Assessment of Model Fit ........................................ 163
6.7.3. Rasch Measurement Model ........................................ 165
  6.7.3.1. Rating Scale Model ........................................ 167
  6.7.3.2. Model Fit Statistics ........................................ 167
6.7.4. Path Analysis ........................................ 168
6.8. Summary ........................................ 170

7. VCS Qualitative Measures ........................................ 173

  7.1. Data ........................................ 174
  7.2. Qualitative Data Analysis Software ........................................ 175
    7.2.1. SPSS Text Analysis for Surveys ........................................ 175
    7.2.2. RapidMiner ........................................ 176
  7.3. VCS STIC Questionnaire ........................................ 178
    7.3.1. Question 1 ........................................ 179
    7.3.2. Question 2 ........................................ 179
    7.3.3. Question 3 ........................................ 180
    7.3.4. Summary ........................................ 181
  7.4. VCS Education Survey ........................................ 182
    7.4.1. Questions 1-3: Quantitative Transformation and Analysis ........................................ 184
      7.4.1.1. Categorisation ........................................ 186
      7.4.1.2. Inter-Rater Agreement ........................................ 186
    7.4.2. VCS Education Survey: Findings ........................................ 188
      7.4.2.1. Question 1 ........................................ 189
      7.4.2.2. Question 2 ........................................ 190
      7.4.2.3. Question 3 ........................................ 191
    7.4.3. Questions 4-18: Qualitative Analyses Through Double Extraction and Validation ........................................ 193
      7.4.3.1. Question 4 ........................................ 194
      7.4.3.2. Question 5 ........................................ 196
      7.4.3.3. Question 6 ........................................ 198
      7.4.3.4. Question 7 ........................................ 200
8. Computer Familiarity Scale 221

8.1. Data ........................................................................ 222
8.2. The Instrument .......................................................... 223
8.2.1. Comfort With and Perceived Ability to Use Computers Scale (COMAB) .................. 224
8.2.2. Computer Usage Scale (COMUSE) .......................... 224
8.2.3. Interest in Computers Scale (COMATT) .................. 226
8.2.4. Computer Usage Frequency Scale (COMFREQ) ........ 226
8.3. Scale Structure Analysis ............................................. 227
8.3.1. Reliability of Scales ................................................ 227
8.3.2. Confirmatory Factor Analysis ................................. 229
8.3.2.1. Comfort With and Perceived Ability to Use Computers (COMAB/COMCOMF) ........ 230
8.3.2.2. Interest in Computers (COMATT) ..................... 231
8.3.3. Rasch Model Item Analysis ..................................... 233
8.3.3.1. Comfort With and Perceived Ability to Use Computers (COMAB/COMCOMF) ........ 233
8.3.3.2. Interest in Computers (COMATT) ..................... 234
8.4. Considerations and Limitations ................................. 235
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.4.1. CFA and Sample Size</td>
<td>235</td>
</tr>
<tr>
<td>8.5. Summary</td>
<td>236</td>
</tr>
<tr>
<td>9. User Interaction Satisfaction Scale</td>
<td>237</td>
</tr>
<tr>
<td>9.1. Data</td>
<td>238</td>
</tr>
<tr>
<td>9.2. The Instrument</td>
<td>238</td>
</tr>
<tr>
<td>9.2.1. Overall User Reactions Scale (VCSREA)</td>
<td>240</td>
</tr>
<tr>
<td>9.2.2. Screen Preferences Scale</td>
<td>241</td>
</tr>
<tr>
<td>9.2.3. Terminology and System Information Scale</td>
<td>242</td>
</tr>
<tr>
<td>9.2.4. System Operations and Learning Scale</td>
<td>243</td>
</tr>
<tr>
<td>9.2.5. System Capabilities Scale</td>
<td>243</td>
</tr>
<tr>
<td>9.2.6. Comments (Qualitative)</td>
<td>244</td>
</tr>
<tr>
<td>9.3. Reduction of Item Response Options</td>
<td>245</td>
</tr>
<tr>
<td>9.4. Scale Structure Analysis</td>
<td>246</td>
</tr>
<tr>
<td>9.4.1. Reliability of Scales</td>
<td>246</td>
</tr>
<tr>
<td>9.4.2. Confirmatory Factor Analysis</td>
<td>247</td>
</tr>
<tr>
<td>9.4.2.1. Overall User Reactions Sub-Scale (VCSREA)</td>
<td>249</td>
</tr>
<tr>
<td>9.4.2.2. Screen Sub-Scale</td>
<td>251</td>
</tr>
<tr>
<td>9.4.2.3. Terminology and System Information Sub-Scale</td>
<td>252</td>
</tr>
<tr>
<td>9.4.2.4. Learning Sub-Scale</td>
<td>252</td>
</tr>
<tr>
<td>9.4.2.5. System Capabilities Sub-Scale</td>
<td>253</td>
</tr>
<tr>
<td>9.4.3. Rasch Model Item Analysis</td>
<td>253</td>
</tr>
<tr>
<td>9.4.3.1. Overall User Reactions (VCSREA)</td>
<td>254</td>
</tr>
<tr>
<td>9.5. Considerations and Limitations</td>
<td>254</td>
</tr>
<tr>
<td>9.5.1. CFA and Sample Size</td>
<td>254</td>
</tr>
<tr>
<td>9.6. Summary</td>
<td>256</td>
</tr>
<tr>
<td>10. Improving Education Students’ Understanding of Classroom Interactions</td>
<td>257</td>
</tr>
<tr>
<td>10.1. Structural Equation Modelling and Causal Relationships</td>
<td>259</td>
</tr>
<tr>
<td>10.1.1. Reliability and Validity of Variables</td>
<td>259</td>
</tr>
<tr>
<td>10.1.2. W-Scale and Latent Variable Scores (LVS)</td>
<td>259</td>
</tr>
<tr>
<td>10.1.3. Missing Values</td>
<td>261</td>
</tr>
</tbody>
</table>
## Contents

10.2. Path Analysis .................................. 261  
10.2.1. Limitations .................................. 270  
10.3. VCS Assignment: Summative Assessment in the STIC Course ........ 270  
10.4. Observations From the Assignments .......................... 271  
10.4.1. ST0058 (Male) ................................ 272  
10.4.2. ST0159 (Female) ............................ 273  
10.4.3. ST0087 (Male) ................................ 274  
10.4.4. ST0148 (Female) ............................ 275  
10.4.5. ST0059 (Male) ................................ 275  
10.4.6. ST0139 (Female) ............................ 276  
10.4.7. Discussion ................................. 278  
10.5. Summary ..................................... 278  

11. Conclusion ..................................... 279  
11.1. Research Problem 1 (RP1) ............................ 281  
11.1.1. Outcomes ................................... 281  
11.1.2. Research Findings ............................ 282  
11.1.3. Comments ................................... 283  
11.2. Research Problem 2 (RP2) ............................ 284  
11.2.1. Outcomes ................................... 284  
11.2.2. Research Findings ............................ 287  
11.2.3. Comments ................................... 289  
11.3. Research Problem 3 (RP3) ............................ 289  
11.3.1. Research Findings ............................ 291  
11.3.2. Concluding Remarks .......................... 293  
11.4. Implications of the study ............................ 293  
11.4.1. Theoretical Implications ......................... 293  
11.4.2. Methodological Implications ...................... 294  
11.4.3. Implications for Simulation Design ................ 295  
11.4.4. Implications for Practice ....................... 296  
11.4.5. Implications for Further Research ................ 296  
11.4.6. Limitations of the Study ....................... 297  
11.5. Concluding Remarks ............................. 297
A. Software and Resources 299
  A.1. Operating Systems ........................................... 299
  A.2. For Software Development .................................... 300
    A.2.1. Platforms ................................................. 300
    A.2.2. Applications .............................................. 300
    A.2.3. Libraries and Modules .................................... 301
  A.3. For Data Collection, Analysis and Reporting ............... 302
    A.3.1. Data Collection ........................................... 302
    A.3.2. Data Analysis and Mining .................................. 303
    A.3.3. Reporting .................................................. 304
  A.4. For Graphical Representation ................................ 305
  A.5. Other ....................................................... 306
    A.5.1. Utilities ................................................... 306
    A.5.2. Icons ..................................................... 306

B. VCS Virtual Students 309

C. Email Correspondence With a Professor From a Technology Institute in Sweden 311

D. Email Correspondence With an A/Prof From a University in the USA 315

E. Email Correspondence with J-Sim Developer 317

F. VCS Results Help Dialog 319

G. VCS About Dialog 323

H. Ethical Approval 327

I. Student Teacher Interaction in the Classroom 1 — Course Outline 329

J. VCS STIC Questionnaire — Pre-Lecture 337

K. VCS Student Report Cards 339

L. VCS STIC Lecture 341
## List of Tables

1.1. Population and Gender Distribution ........................................... 12

3.1. Original Class Attribute Listing (Honours Study, Skrødal, 2003) ... 43
3.2. Original Student Attribute Listing (Honours Study, Skrødal, 2003) ... 46
3.3. VCS Student Attributes (Current Study) ........................................... 48
3.5. Original Task Attribute Listing (Honours Study, Skrødal, 2003) ... 54
3.6. Original Teacher Attribute Listing (Honours Study, Skrødal, 2003) ... 60

5.1. Custom tags added to `about.html` .................................................. 131

6.1. Population and Gender Distribution ........................................... 141
6.2. VCS Education Survey: Question Items ........................................... 148
6.4. VCS STIC Questionnaire Respondents and Gender Distribution ... 156
6.5. VCS Education Survey Respondents and Gender Distribution ... 156
6.6. VCS HCI Survey Respondents and Gender Distribution ........ 157

7.1. Word Frequency, Question 1 ....................................................... 180
7.2. Word Frequency, Question 2 ....................................................... 181
7.3. Word Frequency, Question 3 ....................................................... 182
7.4. Response Themes and Categorisation, Question 3 ................. 182
7.5. VCS Education Survey: Question Items ........................................... 183
7.6. Categories and Schemes Established for Question 1 ............... 187
7.7. Categories and Schemes Established for Questions 2 and 3 ........ 188
7.8. Inter-Rater Agreement for Questions 1, 2 and 3 ................. 188
7.9. Response Frequencies, Question 1 .................................................. 189
7.10. Response Frequencies, Question 2 .................................................. 191
7.11. Response Frequencies, Question 3 .................................................. 192
List of Tables

7.12. Response Themes and Categorisation, Question 4 ........... 195
7.13. Word Frequency, Question 4 .................................. 196
7.14. Response Themes and Categorisation, Question 5 ........... 197
7.15. Word Frequency, Question 5 .................................. 198
7.16. Response Themes and Categorisation, Question 6 ........... 199
7.17. Response Themes and Categorisation, Question 7 .......... 200
7.18. Word Frequency, Question 7 .................................. 201
7.19. Response Themes and Categorisation, Question 8 ........... 202
7.20. Response Themes and Categorisation, Question 9 .......... 204
7.21. Response Themes and Categorisation, Question 10 .......... 206
7.22. Response Themes and Categorisation, Question 11 .......... 209
7.23. Response Themes and Categorisation, Question 12 .......... 209
7.24. Response Themes and Categorisation, Question 13 .......... 210
7.25. Response Themes and Categorisation, Question 14 .......... 211
7.26. Response Themes and Categorisation, Question 15 .......... 213
7.27. Response Themes and Categorisation, Question 16 .......... 215
7.28. Response Themes and Categorisation, Question 17 .......... 217
7.29. Response Themes and Categorisation, Question 18 .......... 217

8.1. PISA Sub-Scale of Comfort With and Perceived Ability to Use
Computers ......................................................... 224
8.2. VCS Sub-Scale of Comfort With and Perceived Ability to Use
Computers ......................................................... 224
8.3. PISA Sub-Scale of Computer Usage .............................. 225
8.4. VCS Sub-Scale of Computer Usage .............................. 225
8.5. PISA Sub-Scale of Interest in Computers ...................... 226
8.6. VCS Sub-Scale of Interest in Computers ...................... 226
8.7. PISA Sub-Scale of Computer Usage Frequency ................ 227
8.8. VCS Sub-Scale of Computer Usage Frequency ................ 227
8.9. Reliability Comparison for Computer Familiarity Scales ........ 228
8.10. Factor Loadings of the Single-Factor Model for Computer Comfort .. 231
<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.13</td>
<td>Response Model Parameter Estimates for Comfort With and Perceived Ability to Use Computers (COMCOMF)</td>
<td>233</td>
</tr>
<tr>
<td>8.15</td>
<td>Response Model Parameter Estimates for Interest in Computers (COMATT)</td>
<td>235</td>
</tr>
<tr>
<td>9.1</td>
<td>Overall User Reactions Sub-Scale</td>
<td>241</td>
</tr>
<tr>
<td>9.2</td>
<td>Screen Sub-Scale</td>
<td>241</td>
</tr>
<tr>
<td>9.3</td>
<td>Terminology and System Information Sub-Scale</td>
<td>242</td>
</tr>
<tr>
<td>9.4</td>
<td>Learning Sub-Scale</td>
<td>243</td>
</tr>
<tr>
<td>9.5</td>
<td>System Capabilities Sub-Scale</td>
<td>244</td>
</tr>
<tr>
<td>9.6</td>
<td>Reliability Comparison for User Interaction Satisfaction/QUIS Sub-Scales</td>
<td>247</td>
</tr>
<tr>
<td>9.7</td>
<td>QUIS Interface Factors</td>
<td>248</td>
</tr>
<tr>
<td>9.8</td>
<td>Factor Loadings of the Single-Factor Model for Overall Reactions to the VCS</td>
<td>250</td>
</tr>
<tr>
<td>9.9</td>
<td>Goodness of Fit Statistics for Interest in Computers</td>
<td>251</td>
</tr>
<tr>
<td>9.10</td>
<td>Response Model Parameter Estimates for Overall User Reactions (VCSREA)</td>
<td>255</td>
</tr>
<tr>
<td>9.11</td>
<td>Response Model Parameter Estimates for Overall User Reactions (VCSREA)</td>
<td>255</td>
</tr>
<tr>
<td>10.1</td>
<td>VCS-Specific Variables in the Theoretical Model</td>
<td>262</td>
</tr>
<tr>
<td>10.2</td>
<td>Standardised Estimates and t-Values (t-values in parenthesis)</td>
<td>265</td>
</tr>
<tr>
<td>10.3</td>
<td>Variables Used in the Path Model</td>
<td>266</td>
</tr>
<tr>
<td>11.1</td>
<td>Core Entity Attributes of the Conceptual Model</td>
<td>282</td>
</tr>
<tr>
<td>11.2</td>
<td>User Interaction Satisfaction Scale— Summary of Responses</td>
<td>287</td>
</tr>
<tr>
<td>T.1</td>
<td>VCS Survey Codebook, Section 1: Personal Details</td>
<td>383</td>
</tr>
<tr>
<td>T.2</td>
<td>VCS Survey Codebook, Section 2: Experience in ICT</td>
<td>384</td>
</tr>
<tr>
<td>T.3</td>
<td>VCS Survey Codebook, Section 3: Overall User Reactions (VCS)</td>
<td>385</td>
</tr>
</tbody>
</table>
List of Tables

T.4. VCS Survey Codebook, Section 4: VCS Education Survey
(Quantification) ................................................. 386
List of Figures

1.1. Trans-Disciplinary Composition of the VCS .................. 2
1.2. Trans-Disciplinarity (Koizumi, 1999 in OECD, 2002, p. 85) ...... 4
1.3. Screen Captures of VCS Windows .............................. 6
1.4. Abstract View of the Theoretical Model ....................... 13
1.5. Research & Development Timeline .............................. 14

2.1. Intersect of Content and Pedagogy (based on Shulman, 2000, p. 64) . 19
2.2. Screen Capture of the simSchool Simulation .................. 28

3.1. Simplified Version of the Modelling Process (adapted from Sargent, 2005, p. 132) .................................. 34
3.2. System Deconstruction of an Analog Wristwatch ................ 39
3.3. Mood Range for Student Elias (see Appendix B for all students) .... 52
3.4. First Version of Generic Tasks ................................. 56
3.5. Final Version of Generic Tasks ................................. 58
3.6. VCS States of Interaction Overview ............................ 62
3.7. Inclusion of Interaction States in Results Charts .............. 63

4.1. Simulation Flowchart ............................................ 80
4.2. Basic system concepts (adapted from Zeigler et al., 2000, p. 4) .... 81
4.3. VCS Database Schema .......................................... 82
4.4. Overview of the Broadcast and Logging of a Question Event .... 85
4.5. VCS Database Initialisation Overview .......................... 88
4.6. Overview of the Ask Question Event ............................ 93
4.7. Overview of the Ask Student Event ............................. 94
4.8. VCS Console ..................................................... 96
4.9. User Confirmation Dialogs ...................................... 98
List of Figures

4.10. Modern Heap View Component ........................................... 98

5.1. Divide between markets (adapted from Moore, 1995, p. 19) .............. 104
5.2. One of the first GUI representations of the VCS classroom (2002) ........ 107
5.3. Honours version of the VCS (main window) .................................. 108
5.4. Status view (Honours version, ) .............................................. 108
5.5. Task view (Honours version) ................................................... 109
5.6. Class view (Honours version) .................................................. 110
5.7. VCS Splash Screen ............................................................... 112
5.8. VCS Introduction Window ...................................................... 114
5.9. Student Report Window .......................................................... 116
5.10. 3-Panel View of the Main Window ......................................... 117
5.11. Classroom Resolution Warning ............................................... 119
5.12. Classroom Views Before and After Lesson Start ......................... 120
5.13. Student Panels ................................................................. 121
5.14. Status View ................................................................. 122
5.15. Task View ................................................................. 124
5.16. Results Window ............................................................... 127
5.17. Student Chart (Maja) Explained .............................................. 128
5.18. Menu Access for the Event Table ........................................... 129
5.19. About Dialog ................................................................. 130
5.20. Student Representation in VCS Prototype 2003 .......................... 133
5.21. Student Faces Generated With FaceGen Modeller ...................... 135

6.1. Mixed Methods Approach of this Study (adapted from Hurmeint-Peltomäki and Nummela, 2006, p. 445) ....................... 140
6.2. Timeframe of the Population’s Involvement with the VCS .............. 142
6.3. Sequence of Activities Involving Participants ............................ 143
6.4. VCS Surveys ................................................................. 143
6.5. STIC Questionnaire Word Cloud .............................................. 145
6.6. VCS Trial: Sequence of Events .............................................. 146
6.7. VCS HCI Survey Composition ................................................ 149
6.8. Questionnaire for User Interaction Satisfaction v.5.0 (captured from Chin et al., 1988, p. 215) ........................................... 150
6.9. Computer Familiarity Questionnaire (captured from OECD, 2000) . . 151
6.10. Screenshot of a VCS HCI Survey Page ............................ 155
6.11. Measurement Model .................................................... 161
6.12. Statistical Data Analysis as Interaction Between Theory and Reality (Kühnel, 2001, p. 95) .................................................. 169
6.13. Detailed View of the Theoretical Model ............................ 171
7.1. Timeframe of the Population’s Involvement with the VCS ........... 174
7.2. RapidMiner Process Template for Analysis of VCS Qualitative Data . 176
7.3. Targeted areas of the VCS Education Survey ....................... 185
8.1. VCS HCI Survey Composition ........................................... 222
8.2. Computer Familiarity Scale ............................................. 223
8.3. Single-Factor Model for Computer Comfort (COMCOMF) ........... 230
9.1. VCS HCI Survey Composition ........................................... 238
9.2. Structure of the User Interaction Satisfaction Scale ................. 240
9.3. Structure of the Single-Factor Model for the Overall Reactions to the VCS Sub-Scale ......................................................... 249
9.4. Survey Layout of VCSREA Sub-Scale ................................ 251
9.5. Structure of the Single-Factor Model for the Screen Sub-Scale .... 252
9.6. Structure of the Single-Factor Model for the Terminology and System Information Sub-Scale .............................................. 253
9.7. Structure of the Single-Factor Model for the Learning Sub-Scale . . 253
9.8. Structure of the Single-Factor Model for the System Capabilities Sub-Scale ................................................................. 254
10.1. Types of Mixed Methods Designs (adapted from Creswell, 2008, p. 557) ................................................................. 258
10.2. Detailed View of the Final Theoretical Model for Analysis .......... 260
10.3. Confirmed Theoretical Model (N=165) ............................. 264
10.4. STIC Assignment Diagrams ............................................. 272
11.1. VCS Feedback Cycle .................................................... 294
List of Figures

B.1. VCS Students’ Mood States ............................................. 309
F.1. VCS Results Help Dialog .............................................. 319
F.2. VCS Results Help File, Page 1 ....................................... 320
F.3. VCS Results Help File, Page 2 ....................................... 321
F.4. VCS Results Help File, Page 3 ....................................... 322
G.1. VCS About Dialog Information, Page 1 of 2 .................... 324
G.2. VCS About Dialog Information, Page 2 of 2 .................... 325
H.1. Ethical Approval ........................................................... 328
I.1. STIC 1 Course Outline 1/6 ............................................ 330
I.2. STIC 1 Course Outline 2/6 ............................................ 331
I.3. STIC 1 Course Outline 3/6 ............................................ 332
I.4. STIC 1 Course Outline 4/6 ............................................ 333
I.5. STIC 1 Course Outline 5/6 ............................................ 334
I.6. STIC 1 Course Outline 6/6 ............................................ 335
J.1. VCS Questionnaire — Pre-Lecture .................................. 338
K.1. VCS Student Report Cards ............................................ 340
L.1. Slides 1-3 .................................................................. 342
L.2. Slides 4-6 .................................................................. 343
L.3. Slides 7-9 .................................................................. 344
L.4. Slides 10-12 ............................................................... 345
L.5. Slides 13-15 ............................................................... 346
L.6. Slides 16-18 ............................................................... 347
L.7. Slides 19-21 ............................................................... 348
L.8. Slides 22-24 ............................................................... 349
M.1. Research Project Information Sheet ................................ 352
N.1. Consent Form .............................................................. 354
O.1. VCS Trial Instruction Sheet .......................................... 356
List of Figures

Q.1. VCS STIC Assignment .......................................................... 362
Q.2. Student Graph 1 ................................................................. 363
Q.3. Student Graph 2 ................................................................. 364

R.1. VCS Education Survey, Page 1/7: Information .................... 366
R.2. VCS Education Survey, Page 2/7: Personal Details .............. 367
R.3. VCS Education Survey, Page 3/7: Part A ............................ 368
R.4. VCS Education Survey, Page 4/7: Part B ............................ 369
R.5. VCS Education Survey, Page 5/7: Part C ............................ 370
R.6. VCS Education Survey, Page 6/7: Part D ............................ 371
R.7. VCS Education Survey, Page 7/7: Thank You ..................... 372

S.1. HCI Online Survey, Page 1/10: Information ......................... 374
S.2. HCI Online Survey, Page 2/10: Personal Details .................. 375
S.3. HCI Online Survey, Page 3/10: Experience in ICT ................. 376
S.4. HCI Online Survey, Page 4/10: Overall Reactions ................. 377
S.5. HCI Online Survey, Page 5/10: Screen ................................ 378
S.6. HCI Online Survey, Page 6/10: Terminology and System Information 379
S.7. HCI Online Survey, Page 7/10: Learning .............................. 380
S.8. HCI Online Survey, Page 8/10: System Capabilities ............... 381
S.9. HCI Online Survey, Page 9/10: Comments ............................ 382
S.10. HCI Online Survey, Page 10/10: Thank You ....................... 382

W.1. VCS Assignment (Student 0058), Page 1 .......................... 392
W.2. VCS Assignment (Student 0058), Page 2 .......................... 393
W.3. VCS Assignment (Student 0058), Page 3 .......................... 394
W.4. VCS Assignment (Student 0058), Page 4 .......................... 395
W.5. VCS Assignment (Student 0058), Page 5 .......................... 396
W.6. VCS Assignment (Student 0159), Page 1 .......................... 398
W.7. VCS Assignment (Student 0159), Page 2 .......................... 399
W.8. VCS Assignment (Student 0159), Page 3 .......................... 400
W.9. VCS Assignment (Student 0087), Page 1 .......................... 402
W.10. VCS Assignment (Student 0087), Page 2 .......................... 403
W.11. VCS Assignment (Student 0148), Page 1 .......................... 405

xxiii
List of Figures

W.12 VCS Assignment (Student 0148), Page 2 ........................................ 406
W.13 VCS Assignment (Student 0148), Page 3 ........................................ 407
W.14 VCS Assignment (Student 0148), Page 4 ........................................ 408
W.15 VCS Assignment (Student 0148), Page 5 ........................................ 409
W.16 VCS Assignment (Student 0059), Page 1 ........................................ 411
W.17 VCS Assignment (Student 0059), Page 2 ........................................ 412
W.18 VCS Assignment (Student 0059), Page 3 ........................................ 413
W.19 VCS Assignment (Student 0139), Page 1 ........................................ 415
W.20 VCS Assignment (Student 0139), Page 2 ........................................ 416
W.21 VCS Assignment (Student 0139), Page 3 ........................................ 417
W.22 VCS Assignment (Student 0139), Page 4 ........................................ 418
List of Algorithms

4.1. XML Structure of a VCS Class ........................................ 75
4.2. SQL Statement for the Events Table .......................... 83
4.3. Mapping of Event Codes and Descriptors ..................... 84
4.4. Student Instantiation .............................................. 90

5.1. VCS Session File (’.vcs’) .......................................... 115
Abstract

“The Virtual Classroom Simulation, Design and Trial in a Preservice Teacher Education Program” (VCS), is trans-disciplinary research study that aimed to design, embed, trial and evaluate a simulation system and its learning outcomes. This document encapsulates the motivation, conceptualisation, theory, development, trials and evaluation behind the study. Expert technology transfer, particularly from areas in education, psychology, social sciences, conceptual modelling, computer science and underlying mixed methods research design, has been instrumental in underpinning the research and development of the VCS.

Prospective education students have preconceived ideas, or mental models, about teaching and learning that are often based on their own experiences as students. The School of Education at the University of Adelaide offers a number of courses that provide insights into both the theory and practice of education. The practicum component provides a valuable, real-life, experience that may improve education students’ understanding about teaching, learning and classroom interactions. It may also enable them to better understand and apply effective teaching strategies to enhance student learning outcome. Some research studies, however, suggest that providers of teacher education do not sufficiently stimulate education students to challenge their own preconceptions about teaching and learning.

This study aimed to identify and deconstruct essential attributes of a specific teaching-learning context and reconstruct these in a virtual environment. It involved the development of an interactive computer simulation training tool to be trialled in a population of education students. The simulation was projected to be an important enabler of praxis (the nexus between theory, reflection and practice), thus useful in challenging and adjusting education students’ mental models about student-teacher interaction.

The VCS and related materials (lecture, trial, surveys and assignment) were
integrated in the first-semester course “Student-Teacher Interaction in the Classroom 1”, a compulsory course for students enrolled in the degrees of Bachelor of Teaching (4th year) and Graduate Diploma in Education. Prior to the delivery of an introductory lecture and administration of VCS user trials, student perceptions and views about the teacher, students, task and learning environment were elicited. The VCS and associated activities provided a gauge to understand changes to education students’ mental models. *To determine and evaluate the effectiveness of the VCS and related learning, a number of objective measurement techniques and methods were used. In order to complement the quantitative methods utilised, qualitative research methods were used to examine the rich data source obtained through open-ended questions posed to the students.*

Many research studies have positioned the value of mixed-methods. *This study highlights the value of triangulation and the use of exploratory, explanatory and confirmatory models in understanding the interactions between the variables under study.* The research adapted carefully chosen instruments utilised in international studies, and these were re-validated through well established techniques such as confirmatory factory analysis and the Rasch Model. A substantial amount of qualitative data was quantified to add more detail in the structural equation model.

Path analysis of quantitative data suggests that the overall reactions to the VCS system were influenced by participants’ comfort with computers. The educational value of the simulation, as perceived by the population, was strongly linked to the overall reaction to the VCS. More than 80% of the population viewed the educational value of the VCS as either high (~62%) or moderate (19%). A further ~70% thought that the VCS delivered an effective means of training. A majority of the participants (~75%) also believed that the VCS generated a valuable learning experience.

The findings are supported and enriched by the analysis of qualitative data, which shows that participants demonstrated a noticeable advancement in their level of thinking and understanding of educational theories induced through VCS interaction. Results from a VCS-related assignment, which made part of the education students’ formal assessment in the course, validate these findings.

One cycle of VCS development, course integration, and user trials was implemented in this study. The final outcomes suggest that the VCS added value
to a population in teacher education. Experiences and feedback from the population also introduced a number of areas to consider for future research and development.

The study concludes that more research and development be put into the VCS with the aim of making the system available to all providers of teacher education in Australia. It further highlights the need for quality assurance for any simulation (or objects) developed for learning. The triangulation of research methods highlights the contribution of mixed methods to this pertinent study.
Acknowledgments

It has been said more than a couple of times that a PhD research study can be a daunting and prolix affair. This could not be any further from the truth if you ask me. True, the past few years do feel like a lifetime, but only because they have been filled with so many diverse and rewarding experiences.

A rather important objective of a candidature is to receive a certificate of PhD. Along the way, I have managed to pick up a few others as well. No more than one wedding certificate (thankfully) and no less than two birth certificates are certainly the most precious awards that I will ever receive in my lifetime. A very special thank you is therefore apposite for my wife Rikki, who is such an amazing, inspirational, supportive and loving partner, friend, mother and teacher; you are the best ‘better half’ that has ever existed in the history of the world.

Of the many certificates that I have received, none would have come to existence had it not been for the man responsible for my returning to Australia in the early beginnings of this millennium (2002, that is, should someone happen to be reading this in future millennia). I certainly have more than just a thing or two to thank my main supervisor Sivakumar ‘Siva’ Alagumalai for, though I have to be careful not to turn this section into another dissertation. Siva, you have been a constant source of inspiration, wisdom, passion and all the other fabulous adjectives one would find in a dictionary. Thank you for your support and for sharing what it means to be a true academic, a great leader and a compassionate individual. Behind a great man is a great family, so I would like to extend my sincere thanks to the Sivakumar family as well.

To my co-supervisors Michael J. Lawson and Paul Calder at Flinders University; you were there at the very beginning and you are still here today. Thank you for your continuous support and for sharing your valuable insights, it has been an honour to have someone of your calibre as supervisors.
Thank you to Dr. Nina Maadad and Mr. Alan Larkin for allowing me to conduct my research in their course. To all students in the STIC 1 course, class of 2008; this research would not have been possible without your participation, thank you.

Jeni Thomas, thank you for proof reading this document on such short notice. For the record, my ESL takes full responsibility for any miss-spellings in this dissertation.

Another great man and friend for life is the Pinoy with whom I have shared this entire journey. To have the very talented and very recently appointed Dr. Francisco Ben study along side of me from day one has been a privilege and a lot of fun. Thank you for your friendship, great collaborations in the many projects in which we have been involved and for teaching me how to play tennis, somewhat.

On the other side of the world, there are two parents (a.k.a. ‘mamma’ and ‘pappa’) who deserve a very special thank you. While it is beyond reasonable doubt that I would never have been here had it not been for them, they have also been most loving and supportive throughout my life. You were always my number one role models and, if possible, even more so now that I am a parent myself. I sincerely hope that my own children won’t move to the other side of the world, though. I am not sure if it is appropriate in a thesis, but if it were, I would have put a special typographical sign for a smile behind that last sentence :) Oops. Thank you also to my new parents in Australia; I am very grateful to have the two of you in both mine and your grandchildren’s life.

To my very good friends and colleagues at the wonderful organisation that is EduPEx Australia; let’s keep the momentum and friendship going and continue the journey together wherever it may take us.

Dear examiners of this work, whoever you may be, thank you for your time and for finding this research worthy of a PhD (well they must have if you are reading this... right?).

To all the good staff and fellow students at the School of Education; thank you for a great time, the tea room is now all yours.

xxxii
Finally, I want to sincerely acknowledge the late Professor Kevin Marjoribanks for taking a chance and inviting me, a computer scientist, to the School of Education at the University of Adelaide. Professor Marjoribanks demonstrated tremendous faith, not only in my research, but in the importance of trans-disciplinarity. I wish he was still with us today so I could thank him for that. He was a visionary who believed in this study right from the start.
Awards and Publications

Awards

- This research study was supported by the Australian Postgraduate Awards Scheme (APAs).

- The researcher was successful in receiving the Commercialisation Training Scheme (CTS), an award designed to develop the commercialisation skills of up and coming researchers. It covered tuition fees up to the value of $8,500AUD and scholarship payments to the researcher of $12,000AUD in total. The award was put towards a Graduate Certificate in Science and Technology Commercialisation.

- The researcher received a Graduate Certificate in Science and Technology Commercialisation from the Entrepreneurship, Commercialisation and Innovation Centre (ECIC), University of Adelaide, in 2009.

Scholarly book chapters


Refereed conference papers


**Other**

- **Alagumalai, S., Skrødal, S.** and **Ben, F.** (2009). Funding awarded by the PVC (L&Q), University of Adelaide, to undertake the Effective Feedback Project. Poster selected to be presented at the Inaugural Education Expo (May, 2010).

- **Ben, F., Skrødal, S., Maniam, V.,** **Alagumalai, S.** (2010). Funding awarded by the Faculty of the Professions, University of Adelaide, to undertake a faculty-wide research study on Blended Learning; a longitudinal study which involves all 1st year students in the Faculty. A final report will be presented to the Faculty in late 2010.