Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.
Learning Business English in Virtual Worlds:
Effectiveness and Acceptance in a Malaysian Context

A thesis submitted in partial fulfilment of
the requirements for the degree
of
Doctor of Philosophy
in
Management Information Systems
at
Massey University
Palmerston North

Harmi Izzuan Bin Baharum
2013
Abstract

Motivated by the need to provide better opportunities for Malays in Malaysia to improve their oral business English communication skills, the research focused on the use of multiuser virtual environment (MUVE) for learning English and pursued the following research questions: (1) Is MUVE based learning effective in facilitating situated scenario-based learning of oral business English communication skills by Malay learners? (2) Which factors influence the acceptance of MUVE based learning of oral business English communication skills by Malay learners? To address the first research question, a controlled experiment was conducted to compare the learning gains in traditional classroom and in MUVE environment. To address the second research question, an acceptance model based on the social cognitive theory and the technology acceptance model was tested by fitting it to the data obtained by using a questionnaire. The experiment involved 152 Malay tertiary learners, who also filled in the questionnaire. Findings indicated that MUVE was effective in facilitating scenario-based learning of business English by Malay learners. Learners’ oral skills showed statistically significant improvement following learning in MUVE. However, the difference between the improvement in the classroom environment and in MUVE was not statistically significant. As for MUVE acceptance, Video Games Affect, English Class Anxiety, and Perceived Usefulness affected the learners’ Intention to Use MUVE for e-Learning, although the effect size for Video Games Affect and English Class Anxiety was small. The results of the study suggest that MUVE based learning is an effective environment for learning oral business English communication skills. MUVE is particularly suitable for distance learning, when traditional classroom learning is not available. The study confirmed the claims in the literature that MUVE is particularly suitable for anxious learners and for learners who like to play video games. The study involved Malay university students as participants, and the results are not necessarily generalizable to other types of learners.
Acknowledgement

Studying for a PhD is a challenging journey. It would not be possible to finish without the help, support, guidance, and encouragement from a number of individuals.

First and foremost, I would like to express my deepest gratitude and thanks to my supervisors, Dr Alexei Tretiakov and Dr Barbara Crump from School of Management, Massey University. Moreover, I am also indebted to my other supervisors, Dr Penny Haworth (Massey University), Dr Bill Anderson (Otago University, New Zealand), Assoc Prof Dr Supyan Hussin (National University of Malaysia, Malaysia), and Prof Dr Kinshuk (Athabasca University, Canada). I am grateful for their advice, guidance, and encouragement throughout my PhD journey.

I am grateful to the University of Technology, Malaysia, and to the Public Services Department, Malaysia, for granting me study leave and scholarships for pursuing PhD studies. Further, I thank my colleagues who have taken over my job responsibilities during my absence from work.

Finally, I would like to extend my deepest gratitude and love to my family for being the source of strength and inspiration. Not forgetting my friends and the McQuinlan’s family for their continuous support to me.
# Table of Contents

Abstract ....................................................................................................................................... i

Acknowledgement ..................................................................................................................... ii

Table of Contents ....................................................................................................................... iii

List of Figures ........................................................................................................................... xi

List of Tables ............................................................................................................................. xiii

Chapter 1: Introduction ......................................................................................................... 1

1.1 Background of The Study ............................................................................................ 1

1.1.1 Virtual Worlds as Learning Environments ............................................................. 1

1.1.2 The Role of the English Language in Business Communication ....................... 3

1.1.3 Malay Learners of English ...................................................................................... 4

1.1.3.1 Lack of Exposure ............................................................................................. 5

1.1.3.2 Negative Attitude Towards English because of the Colonial Past .................. 5

1.1.3.3 Cultural Features Hindering Engagement ....................................................... 5

1.2 Motivation behind Choosing the Problem to Address in this Study ....................... 6

1.3 Statement of the Problem ............................................................................................ 9

1.4 Research Questions ..................................................................................................... 10

1.5 Theoretical Foundations ............................................................................................. 11

1.6 Summary of Methods: How the Research Methodology Addressed the Research Problem .................................................................................................................. 12

1.7 Significance of the Study ........................................................................................... 13

1.8 Scope of the Study and its Limitations ...................................................................... 14

1.9 Thesis Structure ......................................................................................................... 16
Chapter 2: Review of Literature

2.1 Introduction

2.2 English Language in Malaysia

2.2.1 The Role of English in Malaysian Society

2.2.2 Gap Between Industry Needs and Graduates’ Proficiency in English

2.2.3 Practice of Teaching English in Malaysia

2.3 Language Teaching Paradigms and Instructional Designs

2.4 Business English as English for Specific Purposes

2.5 Language Learning and Technology

2.6 Effectiveness of Using e-Learning for Second Language Learning: Comparisons with Face-to-face Learning

2.7 Multi-user Virtual Environment as an E-learning Platform

2.7.1 MUVE as an Environment Suitable for Digital Natives—the Effect of Video Games Experience

2.7.2 Specific Examples of MUVE Environments

2.7.2.1 Active Worlds

2.7.2.2 Second Life

2.8 MUVE versus Other Technologies: Technology Trends in e-Learning

2.8.1 Social Web

2.8.2 Learning Objects

2.8.3 Augmented Reality

2.8.4 Mobile Devices

2.8.5 Educational Computer Games and Virtual Worlds

2.9 Learning Paradigms Relevant to MUVE
2.9.1 Constructivism ...................................................................................................... 60

2.9.2 Situated Learning ................................................................................................. 62

2.9.3 Scenario-based Learning ....................................................................................... 64

2.10 Applications of Multi-user Virtual Environments to Promote Language Learning .. 65

2.11 MUVE e-Learning Effectiveness Studies ............................................................... 66

2.11.1 Learning Gains in a Virtual Lab ........................................................................ 67

2.11.2 Learning Gains in a Virtual Ecosystem ............................................................... 69

2.12 Theories Relevant to Technology Acceptance ....................................................... 70

2.12.1 Innovation Diffusion Theory ............................................................................. 71

2.12.2 Technology Acceptance Model (TAM) ............................................................... 72

2.12.3 Social Cognitive Theory ................................................................................... 74

2.12.4 Unified Theory of Acceptance and Use of Technology ..................................... 76

2.13 MUVE Acceptance Studies .................................................................................. 78

2.13.1 The Study by Fetscherin and Lattemann (2008)—the Effects of Community, 
Attitude towards Technology, Social Norms and Anxiety .............................................. 79

2.13.2 The Study by Saeed et al. (2008)—the Effects of Perceived Media Richness on
Perceived Usefulness and Perceived Ease of Use .......................................................... 81

2.13.3 The Study by Saeed et al. (2009)—the Effects of Subjective Norms, Perceived
Emotional Involvement, Perceived Enjoyment and Perceived Role Projection on
Intention to Use ................................................................................................................ 83

2.13.4 The Study by Shen and Eder (2009)—the Effects of Computer Playfulness,
Computer Self-Efficacy and Computer Anxiety on Perceived Ease of Use ................. 85

2.14 Knowledge Gaps to be Addressed in This Study ................................................ 86

2.15 Summary .............................................................................................................. 87
Chapter 3: Research Hypotheses ................................................................. 88

3.1 Introduction ................................................................................................. 88

3.2 Hypotheses Relating to MUVE Effectiveness: E1 and E2 ...................... 88

3.3 Hypotheses Relating to MUVE Acceptance: A1 to A14 ......................... 89

3.3.1 A1, A2, and A3: The Impact of Subject Matter Self-Efficacy ............... 90

3.3.2 A4: The Impact of English Class Anxiety .............................................. 91

3.3.3 A5: The Impact of Attitude Towards Learning English ....................... 92

3.3.4 A6: The Impact of Desire to Learn ......................................................... 92

3.3.5 A7, A8, and A9: The Impact of Video Games Self-efficacy ................. 92

3.3.6 A10: The Impact of Video Games Anxiety ............................................ 93

3.3.7 A11: The Impact of Video Games Affect .............................................. 93

3.3.8 A12 and A13: The Impact of Perceived Ease of Use ......................... 94

3.3.9 A14: The Impact of Perceived Usefulness ............................................. 94

3.3.10 The Target Dependent Construct - Intention to Use ......................... 95

3.4 Summary ..................................................................................................... 95

Chapter 4: Research Design and Methodology .............................................. 96

4.1 Introduction ................................................................................................. 96

4.2 Choosing the Research Paradigm .............................................................. 97

4.3 Choosing the Overall Research Design ................................................... 99

4.3.1 Experiments ............................................................................................ 99

4.3.2 Quasi-experiments .................................................................................. 99

4.3.3 Surveys .................................................................................................... 100

4.3.4 The Overall Research Design of This Study ......................................... 101
Chapter 5: Results

5.2 Results for MUVE Effectiveness ........................................................................................................ 126

5.2.1 Inter-rater Reliability ....................................................................................................................... 126

5.2.2 Learning Gains ................................................................................................................................. 128

5.2.2.1 Descriptive Statistics for Learning Gains—Outcome for Hypothesis E2 .................. 128

5.2.2.2 Checking Prerequisites for Using t-tests ....................................................................................... 130

5.2.2.3 Testing if There Were Learning Gains in the Classroom ......................................................... 130

5.2.2.4 Testing if There Were Learning Gains in MUVE—Testing the Hypothesis E1 .......... 130

5.2.2.5 Exploring the Difference Between the Learning Gains in MUVE and in the Classroom—Testing the Inverse of the Hypothesis E2 ................................................................. 131

5.3 Results for MUVE Acceptance ........................................................................................................... 132

5.3.1 Testing the Research Model Using PLS .......................................................................................... 132

5.3.1.1 Test of the Measurement Model—Convergent and Discriminant Validity ............... 133

5.3.1.2 Test of the Structural Model for MUVE Acceptance—Testing Hypotheses A1 to A14 ........................................................................................................................................ 142

5.3.2 Confirming Convergent and Discriminant Validity by Using Exploratory Factor Analysis ................................................................................................................................. 144

5.3.3 Confirming PLS Results by Using Covariance-based SEM ....................................................... 150

5.3.3.1 Formulating a Reduced Model and Checking the Prerequisites for Using Covariance Based SEM ................................................................................................................................. 150

5.3.3.2 Testing the Measurement Model ................................................................................................. 153

5.3.3.3 Testing the Structural Model ...................................................................................................... 156

5.4 Summary .............................................................................................................................................. 157

Chapter 6: Summary, Discussion and Conclusions .................................................................................... 159

6.1 Introduction ......................................................................................................................................... 159

6.2 Summary of the Study .......................................................................................................................... 159
6.3 Discussion of Findings

6.3.1 Is MUVE Based Learning Effective in Facilitating Situated Scenario-based Learning of Oral Business English Communication Skills by Malay Learners? ........162

6.3.1.1 The Use of Scenario-based Approach in MUVE Is Effective to Teach Oral Business English Communication Skills .................................................................162

6.3.1.2 There Was No Significant Difference Between Learning Gains in MUVE and In The Classroom ..........................................................................................162

6.3.2 Which Factors Influence the Acceptance of MUVE Based Learning of Oral Business English Communication Skills by Malay learners? ..........................164

6.3.2.1 Factors Relating to the Technology Acceptance Model ..................................164

6.3.2.2 Factors Relating to Social Cognitive Theory .................................................164

6.4 Contribution to Knowledge ................................................................................166

6.5 Implications for Practice ....................................................................................168

6.5.1 Implications for Policy Makers ........................................................................168

6.5.2 Implications for Instructional Designers .........................................................168

6.5.3 Implications for Instructors .............................................................................169

6.5.4 Implications for Learners ................................................................................170

6.5.5 Implications for the Use of MUVE in Malaysia to Improve English Language Proficiency of Malay Learners .................................................................170

6.6 Limitations of the Study .....................................................................................171

6.7 Suggestions for Future Research .......................................................................172

6.8 Conclusion ...........................................................................................................173

References ..................................................................................................................175

Appendix A Information Sheet Distributed to Participants .......................................192

Appendix B Participant Consent Form ......................................................................194
List of Figures

Figure 1. The theoretical foundations of this research.................................................................12

Figure 2. Advanced Google Scholar query used to assess the influence of topics devoted to wikis in 2008........................................................................................................................................47

Figure 3. Popularity (θ) of Social Web learning technologies measured by the number of hits in Google Scholar relative to the number of hits for 2008. .................................................................50

Figure 4. Popularity (θ) of learning objects measured by the number of hits in Google Scholar relative to the number of hits for 2008. Social networking, blogs, and wikis are included to enable comparison. ..................................................................................................................51

Figure 5. Popularity (θ) of augmented reality measured by the number of hits in Google Scholar relative to the number of hits for 2008. Social networking, blogs, and wikis are included to enable comparison..................................................................................................................53

Figure 6. Popularity (θ) of mobile devices measured by the number of hits in Google Scholar relative to the number of hits for 2008. Social networking, blogs, and wikis are included to enable comparison ..................................................................................................................55

Figure 7. Popularity (θ) of virtual worlds and computer games measured by the number of hits in Google Scholar relative to the number of hits for 2008. Social networking, blogs, and wikis are included to enable comparison ..................................................................................................................58

Figure 8. The innovation diffusion theory—stages and characteristics (based on Rogers, 2003). ........................................................................................................................................................71

Figure 9. Technology acceptance model (taken from Davis, 1989). ...........................................72

Figure 10. Social cognitive theory and technology usage (based on Compeau et al., 1999). .74

Figure 11. Unified theory of acceptance and use of technology (Venkatesh et al., 2003). .....76

Figure 12. Fetscherin and Lattemann (2008, p. 239) research model. Solid arrows show paths found to be significant at p < 0.05. ........................................................................................................80
Figure 13. Saeed, Yang, and Sinnappan (2008, p. 853) research model. Solid arrows show paths found to be significant at p < 0.01.

Figure 14. Saeed et al. (2009, p. 6) research model. All paths were significant at p < 0.01.

Figure 15. Shen and Eder (2009, p. 227) research model. Solid arrows show paths found to be significant at p < 0.01.

Figure 16. Research model presenting in a single diagram the hypotheses relating to MUVE acceptance introduced in section 3.3 of the present study.

Figure 17: The steps followed in the present study.

Figure 18: PLS results for the MUVE e-Learning acceptance model.

Figure 19. Reduced MUVE e-Learning acceptance model tested using covariance-based SEM, introduced in section 5.3.3.1.

Figure 20: Specification of the CFA model for the reduced MUVE e-Learning acceptance model (introduced at the beginning of section 5.3.4).

Figure 21. Specification of the SEM model for the reduced MUVE e-Learning acceptance model. Numbers show path coefficients obtained by fitting the data, with the respective p values given in parentheses.
List of Tables

Table 1: Studies Comparing Text Chat to Face to Face Learning ........................................... 31
Table 2: Studies Comparing Video Games, Wikis, and Blogs to Face to Face Learning ...... 32
Table 3: Relationships Tested in Prior Studies of MUVE Acceptance ................................. 78
Table 4: Experimental and Survey Procedures ...................................................................... 104
Table 5: Gender Composition of the Two Groups ................................................................. 105
Table 6: Perceived Ease of Use Scale (PEOU) ...................................................................... 108
Table 7: Perceived Usefulness Scale (PU) ............................................................................. 108
Table 8: Intention to Use Scale (INT) .................................................................................... 109
Table 9: Video Games Self-efficacy Scale (VGSE) .............................................................. 109
Table 10: Video Games Affect Scale (VGAFF) ...................................................................... 111
Table 11: Video Games Anxiety Scale (VGAN) ................................................................... 111
Table 12: Attitude Towards Learning English Scale (ATLE) ............................................... 112
Table 13: Subject Matter Self-efficacy Scale (SMSE) .......................................................... 113
Table 14: English Class Anxiety Scale (ECAN) ................................................................... 114
Table 15: Desire to Learn Scale (DLE) ................................................................................. 115
Table 16: Scores Between the Two Raters ............................................................................ 127
Table 17: Pre-test and Post-test Scores of Classroom and Second Life ............................ 129
Table 18: The Results of The Paired t-test for Classroom Learning ................................. 130
Table 19: The Results of The Paired t-test for Second Life ................................................. 131
Table 20: The Results of The Unpaired t-test Between Classroom Learning and Second Life 131
Table 21: Factor Structure Matrix of Loadings and Cross-loadings for the Video Games Self-efficacy Construct .............................................................. 134

Table 22: Factor Structure Matrix of Loadings and Cross-loadings for Video Games Anxiety Construct .................................................................................................................. 135

Table 23: Factor Structure Matrix of Loadings and Cross-loadings for the Video Games Affect Construct .................................................................................................................. 135

Table 24: Factor Structure Matrix of Loadings and Cross-loadings for the Subject Matter Self-efficacy Construct .................................................................................................................. 136

Table 25: Factor Structure Matrix of Loadings and Cross-loadings for the English Class Anxiety Construct .................................................................................................................. 136

Table 26: Factor Structure Matrix of Loadings and Cross loadings for the Attitude Towards Learning English Construct .................................................................................................................. 137

Table 27: Factor Structure Matrix of Loadings and Cross-loadings for Desire to Learn English Construct .................................................................................................................. 137

Table 28: Factor Structure Matrix of Loadings and Cross-loadings for Perceived Ease of Use ................................................................................................................................................ 138

Table 29: Factor Structure Matrix of Loadings and Cross-loadings for Perceived Usefulness ................................................................................................................................................ 138

Table 30: Factor Structure Matrix of Loadings and Cross-loadings for Intention to Use .......................................................................................................................... 139

Table 31: Internal Consistency Reliability Indices ................................................................ 140

Table 32: Correlation of Latent Variables & Square Roots of Average Variance Extracted (AVE)........................................................................................................................................ 142

Table 33: Results of Hypothesis Testing ............................................................................... 143

Table 34: Factor Loadings for Video Games Self-efficacy Indicators .................................. 145

Table 35: Factor Loadings for Video Games Anxiety Indicators .......................................... 146

Table 36: Factor Loadings for Video Games Affect Indicators ............................................ 146
Table 37: Factor loadings for Subject Matter Self-efficacy Indicators ................................. 147
Table 38: Factor Loadings for English Class Anxiety Indicators ......................................... 147
Table 39: Factor Loadings for Attitude Towards Learning English Indicators ..................... 148
Table 40: Factor Loadings for Desire to Learn English Indicators ................................. 148
Table 41: Factor loadings for TAM indicators (Perceived Ease of Use, Perceived Usefulness, and Intention to Use) ................................................................. 149
Table 42: Exploratory Factor Analysis for TAM Constructs' Items Only .............................. 150
Table 43: Global Fit Indices for The CFA Model (see Figure 20) ....................................... 154
Table 44: Factor Loadings from Confirmatory Factor Analysis with AMOS ...................... 154
Table 45: Correlations Between Constructs from CFA Analysis ....................................... 155
Table 46: Global Fit Indices for The SEM Model for The Reduced MUVE e-Learning Acceptance Model (see Figure 19) ................................................................. 157
Table 47: Path Coefficients in the Reduced MUVE e-Learning Acceptance Model ............ 157