



**UNIVERSITI PUTRA MALAYSIA**

***EFFECTS OF PROJECT-BASED LEARNING STRATEGY ON IRANIAN  
EDUCATIONAL TECHNOLOGY STUDENTS' SELF-DIRECTED LEARNING  
READINESS, TECHNOLOGY COMPETENCY, AND LEARNING  
PERFORMANCE***

**MOHSEN BAGHERI**

**FPP 2013 35**



**EFFECTS OF PROJECT-BASED LEARNING STRATEGY  
ON IRANIAN EDUCATIONAL TECHNOLOGY  
STUDENTS' SELF-DIRECTED LEARNING READINESS,  
TECHNOLOGY COMPETENCY, AND LEARNING  
PERFORMANCE**

By

**MOHSEN BAGHERI**

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia  
in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

January 2013

## **COPYRIGHT**

All material contained within the thesis, including without limitation text, logos, icons, photographs and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Unversiti Putra Malaysia.

Copyright © Universiti Putra Malaysia



## DEDICATIONS

*I dedicate this thesis to my loving family for providing me with the support needed*



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

**EFFECTS OF PROJECT-BASED LEARNING STRATEGY ON  
IRANIAN EDUCATIONAL TECHNOLOGY STUDENTS'  
SELF-DIRECTED LEARNING READINESS, TECHNOLOGY  
COMPETENCY, AND LEARNING PERFORMANCE**

By

**MOHSEN BAGHERI**

**January 2013**

**Chairman : Professor Wan Zah Wan Ali, PhD**

**Faculty : Educational Studies**

This study sought to examine the effects of project-based learning strategy (PoBL) on self-directed learning readiness, technology competency, and learning performance among Educational Technology undergraduate students of Iran. In order to achieve this objective, a sample of 78 students who enrolled in the System-Based Education course were randomly assigned to experimental group (PoBL strategy) and control group (conventional teaching strategy). As the research instrumentation, a self-directed learning readiness scale, technology competency questionnaire, and System-Based Education achievement test were administrated at three phases namely, pre-test, mid-test, and post-test.

Data analysis consisted of descriptive statistics and inferential statistics. The descriptive results showed that: 1) students in experimental group achieved higher mean scores than control group in terms of overall self-directed learning readiness ( $M_{exp}=169.2$  vs

$M_{cont}=153.4$ ), and its components such as self-management ( $M_{exp}=51.60$  vs  $M_{cont}=45.95$ ), desire for learning ( $M_{exp}=56.26$  vs  $M_{cont}=51.82$ ) and self-control ( $M_{exp}=61.60$  vs  $M_{cont}=55.70$ ). 2) students in experimental group obtained higher mean scores than control group students in overall technology competency ( $M_{exp}=209.4$  vs  $M_{cont}=175.28$ ) and its components such as technology knowledge ( $M_{exp}=16.34$  vs  $M_{cont}=15.81$ ), technology skills ( $M_{exp}=56.34$  vs  $M_{cont}=41.10$ ), and attitude toward technology ( $M_{exp}=138.6$  vs  $M_{cont}=118.02$ ). 3) learning performance mean score of students in experimental group was higher than that of the control group ( $M_{exp}=15.78$  vs  $M_{cont}=15.42$ ).

For inferential analysis the statistical tests employed were the mixed between-within subjects ANOVA, independent sample t-test, two-way ANCOVA, and two-way ANOVA. The following results were indicated: 1) experimental group performed significantly better than control group in terms of their overall level of self-directed learning readiness ( $F(2, 152) = 27.42, p < .001$ ), self-management ( $F(2,152)=14.80, p<.001$ ), desire for learning ( $F(2,152)=12.86, p<.001$ ), and self-control ( $F(2,152)=12.86, p<.001$ ). 2) Experimental group significantly gained better than control group regarding their overall level of technology competencies ( $F(2,152)=49.25, p<.001$ ), technology skills, ( $F(2,152)=.46.76, p<.001$ ), and attitude toward technology ( $F(2,152)=24.84, p<.001$ ). In terms of technology knowledge, however, there was no significant difference between the two groups ( $F(2,152)=2.60, p>.05$ ). 3) there was no significant difference between the experimental group and the control group in terms of their learning performance ( $t(76)=.945, p>.05$ ). Additionally, it was observed that low achiever students obtained higher mean scores in PoBL strategy, whereas high achiever students fared

better only when exposed to conventional teaching strategy. mid achiever students, however turned out to perform equally with both teaching strategies. Finally, it can be reasonably argued that since PoBL strategy proved to improve students' self-directed learning readiness, technology competency, and learning performance, this strategy could be fairly integrated into the Iranian ET curriculum.



Abstrak thesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**KESAN STRATEGI PEMBELAJARAN TERHADAP KESEDIAAN  
PEMBELAJARAN KENDIRI, KOMPETENSI TEKNOLOGI DAN  
PRESTASI PEMBELAJARAN BERDASARKAN PROJEK  
TEKNOLOGI PENDIDIKAN IRAN**

Oleh

**MOHSEN BAGHERI**

**Januari 2013**

**Pengerusi : Professor Wanzah Wan Ali, PhD**

**Fakulti : Pengajian Pendidikan**

Kajian ini bertujuan untuk mengkaji kesan strategi pembelajaran terhadap kesediaan pembelajaran sendiri, kopetensi teknologi dan prestasi pembelajaran berasaskan projek Teknologi Pendidikan pelajar ijazah Iran(PoBL). Untuk mencapai objektif kajian ini, seramai 78 orang pelajar yang mendaftar dalam kursus System-Base Educaton dijadikan sampel dan dipilih secara rawak untuk kumpulan eksperimen (strategi PoBL) dan kumpulan kawalan (strategi pengajaran konvensional). Bagi mendapatkan data kajian, Sampel kajian diberikan tiga jenis ujian, iaitu pre-test, mid-test, dan post-test.

Data dianalisis menggunakan kaedah statistik deskriptif dan statistik inferensi. Hasil statistik deskriptif menunjukkan bahawa: 1) secara keseluruhan pelajar dalam kumpulan eksperimen mencapai skor min yang lebih tinggi daripada kumpulan kawalan daripada segi kesediaan pembelajaran sendiri ( $M_{exp}=169.2$  vs  $M_{cont}=153.4$ ), dan komponen-komponen seperti pengurusan diri ( $M_{exp}=51.60$  vs  $M_{cont}=45.95$ ), keinginan

untuk pembelajaran ( $M_{exp}=56.26$  vs  $M_{cont}=51,82$ ) dan kawalan diri ( $M_{exp}=61,60$  vs  $M_{cont}=55.70$ ). 2) pelajar dalam kumpulan eksperimen mendapat skor min yang lebih tinggi daripada pelajar kumpulan kawalan dalam kecekapan keseluruhan teknologi ( $M_{exp}=209.4$  vs  $M_{cont}=175,28$ ) dan komponen seperti pengetahuan teknologi ( $M_{exp}=16.34$  vs  $M_{cont}=15.81$ ), kemahiran teknologi ( $M_{exp}=56.34$  vs  $M_{cont}=41,10$ ), dan sikap terhadap teknologi ( $M_{exp}=138.6$  vs  $M_{cont}=118,02$ ). 3) pembelajaran prestasi skor min pelajar-pelajar dalam kumpulan eksperimen adalah lebih tinggi berbanding dengan kumpulan kawalan ( $M_{exp}=15.78$  vs  $M_{cont}=15.42$ ).

Untuk analisis statistik inferensi pula data dianalisis menggunakan kaedah campuran subjek ANOVA, ujian-t, dua hala ANCOVA, dan ANOVA dua hala. Keputusan kajian menunjukkan: 1) kumpulan eksperimen menunjukkan persembahan yang lebih baik daripada kumpulan kawalan daripada segi tahap keseluruhan kesediaan pembelajaran sendiri ( $F(2,152)=27,42$ ,  $p<.001$ ), pengurusan diri ( $F(2,152)=14.80$ ,  $p<.001$ ), keinginan untuk pembelajaran ( $F(2,152)=12.86$ ,  $p<.001$ ), dan kawalan diri ( $F(2,152)=12.86$ ,  $p<.001$ ). 2) kumpulan Eksperimen ketara mendapat yang lebih baik daripada kumpulan kawalan mengenai tahap keseluruhan kompetensi teknologi mereka ( $F(2,152)=49.25$ ,  $p<.001$ ), kemahiran teknologi, ( $F(2,152)=46.76$ ,  $p<.001$ ), dan sikap terhadap teknologi ( $F(2,152)=24.84$ ,  $p<.001$ ). Walau bagaimanapun daripada segi pengetahuan teknologi, tidak terdapat perbezaan yang ketara antara kedua-dua kumpulan ( $F(2,152)=2.60$ ,  $p>.05$ ). 3) tidak terdapat perbezaan yang signifikan antara kumpulan eksperimen dan kumpulan kawalan daripada segi prestasi pembelajaran mereka ( $t(76)=0,945$ ,  $p>.05$ ). Selain itu, didapati pelajar yang berprestasi rendah, skor minnya lebih

tinggi dalam strategi PoBL, manakala pelajar yang berpencapaian tinggi memperlihatkan pencapaian lebih baik hanya apabila terdedah kepada strategi pengajaran konvensional. Bagi pelajar yang berpencapaian pertengahan, hasil pembelajaran yang baik jika melaksanakan kedua-dua strategi pengajaran. Akhirnya, bolehlah dianggap bahawa strategi PoBL terbukti dapat meningkatkan kesediaan pembelajaran sendiri, kompetensi teknologi, dan prestasi pembelajaran, strategi ini boleh disepadukan dalam kurikulum ET Iran.



## ACKNOWLEDGEMENTS

My first and foremost debt of gratitude is to Allah, the most compassionate, the merciful. There is just too much of His blessing in this life to count. I thank Him for giving me the strength, inspiration and diligence to complete this thesis. I owe special thanks and appreciation to my supervisor, Professor Dr, Wan Zah Bt Wan Ali for her awe-inspiring contributions, insightful input, intellectual support, comments, and cheering which made this research possible. Without her help, encouragement, and patience, this research would still be in the evolutionary stage.

I would like to express my special gratefulness and appreciation to my committee members Dr. Maria Chong Biniti Abdullah and Dr. Shaffe Mohd Daud for their professional guidance, constructive ideas and suggestions in the preparation and completion of this thesis.

My deep appreciation also goes to Dr. Mohammad Seifi, Dr. Mohammad Mina, faculty members of Educational Technology of Arak University, for cooperating with me to handle this research. Last but not least, I extend my sincere thanks to those whose names have not been brought herein, but have contributed directly and indirectly to the completion of this thesis

I certify that an Examination Committee has met on 29 January 2013 to conduct the final examination of Mohsen Bagheri on his thesis entitled "Effects of Project-Based Learning Strategy on Iranian Educational Technology Students' Self-Directed learning Readiness, Technology Competency, and Learning Performance" in accordance with Universities and university College Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

Members of the Thesis Examination Committee were as follows:

**Rosnaini binti Mahmud, PhD**

Senior Lecturer  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Chairman)

**Hj. Mokhtar b Dato'Hj. Nawawi, PhD**

Senior Lecturer  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Internal Examiner)

**Abdullah bin Mat Rashid, PhD**

Senior Lecturer  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Internal Examiner)

**Gary G. Bitter, PhD**

Professor  
Educational Technology  
Arizona State University  
United States  
(External Examiner)

---

**NORITAH OMAR, PhD**

Assoc. Professor and Deputy Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date: 29 Jan 2013

This thesis is submitted to the senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the Degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

**Wan Zah bt Wan Ali, PhD**

Professor  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Chairman)Universiti Putra Malaysia

**Maria Chong binti Abdullah, PhD**

Senior Lecturer  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Member)

**Shaffe Mohd Daud, PhD**

Senior Lecturer  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Member)

---

**BUJANG BIN KIM HUAT, PhD**

Professor and Dean  
School of Graduate Studies  
Universiti Putra Malaysia

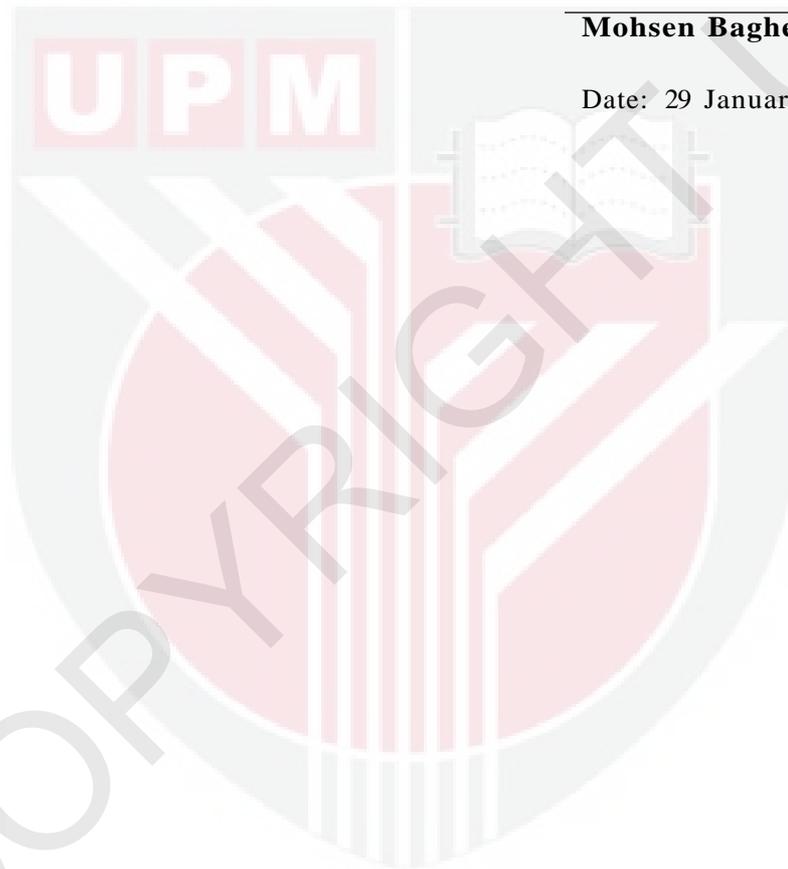
Date:

## DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

**Mohsen Bagheri**

Date: 29 January 2013



## TABLE OF CONTENTS

	Page
<b>DEDICATIONS</b>	ii
<b>ABSTRACT</b>	iv
<b>ABSTRAK</b>	vii
<b>ACKNOWLEDGEMENTS</b>	x
<b>APPROVAL</b>	xi
<b>DECLARATION</b>	xiii
<b>LIST OF TABLES</b>	xvii
<b>LIST OF FIGURES</b>	xxi
<b>LIST OF ABBREVIATIONS</b>	xxii
<b>CHAPTER</b>	
<b>1 INTRODUCTION</b>	<b>1</b>
1.1 Background	1
1.2 Project-Based Learning	6
1.3 Self-Directed Learning	9
1.4 Self-Directed Learning Readiness	10
1.5 Technology Competency	11
1.6 Learning Performance	12
1.7 Statement of Problem	13
1.8 Research Objectives and Hypothesis	16
1.9 Significance of the Study	18
1.10 Scope and Limitations of the Study	20
1.11 Definition of Terms	22
1.11.1 Project-Based Learning Strategy	22
1.11.2 Conventional Teaching Strategy	24
1.11.3 Self-Directed Learning Readiness	25
1.11.4 Technology Competency	25
1.11.5 Learning Performance	26
1.11.6 Students	26
1.12 Summary	27
<b>2 LITERATURE REVIEW</b>	<b>28</b>
2.1 Introduction	28
2.2 Project-Based Learning	28

2.3	Theories Underling Project-Based learning	31
2.3.1	Constructivism Learning Theory	31
2.3.2	Social Development Theory	35
2.3.3	Situated Learning Theory	42
2.4	Project-Based Learning vs. Problem-Based Learning	49
2.5	Advantages and Disadvantages of Project-based Learning	53
2.6	Project-Based Learning and Educational Technology Program	58
2.7	Educational Technology Graduates in Iran	62
2.8	Self-Directed Learning	65
2.8.1	Self-Directed Learning as a Process	68
2.8.2	Self-Directed Learning as Personal Characteristics	71
2.9	Self-Directed Learning Readiness	73
2.10	Facilitating Self-Directed Learning	77
2.11	Project-Based Learning and Self-Directed Learning	80
2.12	Technology Competency	83
2.13	Students' Technology Standards	86
2.14	The Classification of Technology Applications	87
2.14.1	Instructional Software Tools	88
2.14.2	Instructional Support Tools	91
2.14.3	Multimedia and Hypermedia Tools	95
2.14.4	Internet-Based Tools	97
2.15	Project-Based Learning and Technology competency	100
2.16	Learning Performance	103
2.17	Project-Based learning and Learning Performance	107
2.18	Project-Based Learning Stages	112
2.18.1	Project Designing	113
2.18.2	Specification of Objectives and Learning Purposes	114
2.18.3	Project Implementation	115
2.18.4	Assessment	118
2.19	The Role of Teachers and Students in Project-Based Learning	123
2.20	Theoretical Framework of the Study	127
2.21	Conceptual Framework of the Study	134
2.22	Summary	139
3	<b>METHODOLOGY</b>	140
3.1	Introduction	140
3.2	Research Design	140
3.3	Threat to Experimental Validity	143
3.3.1	Threat to Internal Validity	143

3.3.2	Threats to External Validity	150
3.4	Population, Sampling and Location of the Study	150
3.5	Instrumentation	153
3.5.1	Self -Directed Learning Readiness Scale	154
3.5.2	Technology Competency Questionnaire	155
3.5.3	System-Based Education Course Achievement Test	157
3.6	Validity of Instruments	159
3.7	Reliability of Instruments	160
3.8	Pilot Study	162
3.9	Procedures of the Study	165
3.10	Data Collection Procedure	174
3.11	Data Analysis	179
3.11.1	Exploratory Data Analysis	179
3.11.2	Statistical Tests	181
3.12	Summary	184
<b>4</b>	<b>RESULTS</b>	186
4.1	Introduction	186
4.2	Profile of Participants	187
4.3	Descriptive Analysis	188
4.3.1	Self-directed Learning Readiness	189
4.3.2	Technology Competency	203
4.3.3	Learning Performance	212
4.4	Inferential Statistic	215
4.4.1	Effect of PoBL Strategy and CT Strategy on Self-directed Learning Readiness	216
4.4.2	Effect of PoBL Strategy and CT Strategy on Technology Competency	228
4.4.3	Effect of PoBL Strategy and CT Strategy on Learning Performance	240
4.5	Summary	247
<b>5</b>	<b>SUMMARY, DISCUSSION, CONCLUSION, IMPLICATIONS, AND RECOMMENDATIONS</b>	248
5.1	Introduction	248
5.2	Summary	248
5.3	Discussion	251
5.3.1	Enhancing Self-directed Learning Readiness	252
5.3.2	Enhancing Technology Competency	258
5.3.3	Promoting Learning performance	264

5.4	Conclusion of the Study	268
5.5	Implication of the Study	269
5.5.1	Theoretical Implication	269
5.5.2	Practical Implication	272
5.6	Recommendations	274
5.6.1	Recommendations for Future Research	274
5.6.2	Recommendations for Practice	277
5.7	Epilogue	279

<b>REFERENCES</b>	280
-------------------	-----

<b>APPENDICES</b>	288
-------------------	-----

<b>BIODATA OF STUDENT</b>	288
---------------------------	-----

<b>LIST OF PUBLICATIONS</b>	290
-----------------------------	-----

