EXAMINING COMMUNITY OF INQUIRY MODEL IN INFLUENCING E-LEARNING USAGE AMONG FEMALE STUDENTS

ALAA IBRAHIM MAHMOOD

MASTER OF SCIENCE (INFORMATION TECHNOLOGY)

SCHOOL OF COMPUTING

UUM COLLEGE OF ARTS AND SCIENCES

UNIVERSITI UTARA MALAYSIA

2016

EXAMINING COMMUNITY OF INQUIRY MODEL IN INFLUENCING E-LEARNING USAGE AMONG FEMALE STUDENTS

A dissertation submitted to Dean of Awang Had Salleh Graduate School in

Partial Fulfillment of the requirement for the degree

Master of Science in Information Technology

Universiti Utara Malaysia

By

ALAA IBRAHIM MAHMOOD

Permission to Use

In presenting this dissertation in fulfilment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the Universiti Library may make it freely available for inspection. I further agree that permission for the copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence, by the Dean of Awang Had Salleh Graduate School of Arts and Sciences. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part, should be addressed to:

Dean of Awang Had Salleh Graduate

School College of Arts and Sciences

Universiti Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman

Malaysia

Abstrak

Penggunaan permainan sosial atas talian kini begitu mendapat tempat terutamanya dalam kalangan pelajar pengajian tinggi. Hal ini kerana permainan sosial secara atas talian memberikan mereka cara untuk berinteraksi antara satu sama lain dengan berkongsi minat yang sama tanpa mengira lokasi. Penggunaan peralatan permainan sosial atas talian dikenal pasti tinggi dalam kalangan pelajar perempuan. Sementara itu, persekitaran e-pembelajaran yang mempunyai ciri peralatan rangkaian sosial seperti permainan mempunyai potensi yang besar untuk membuat pembaharuan dan merangsang penggunaan e-pembelajaran secara berterusan dalam kalangan pelajar dengan menggalakkan interaksi sosial dan perkongsian pengetahuan. E-pembelajaran merupakan peralatan atas talian penting yang boleh digunakan untuk mencapai kualiti pembelajaran dan pengajaran dalam kalangan pelajar pengajian tinggi. Alat teknologi atas talian perlu mengekalkan penggunaan yang cekap, terutamanya dalam kalangan pelajar perempuan untuk memudahkan interaksi sosial kerana pelajar perempuan lebih selesa berkongsi idea antara rakan sebaya. Oleh itu, kajian ini berhasrat untuk mempertimbangkan andaian masyarakat terhadap model pertanyaan yang memaparkan tiga konstruk penting yang memberikan butiran teori untuk dipertimbangkan dalam kajian ini. Kajian ini secara khususnya mengkaji kesan kehadiran sosial, kehadiran kognitif dan kehadiran pengajaran permainan sosial atas talian dengan penggunaan e-pembelajaran dalam kalangan pelajar wanita di institusi pengajian tinggi. Tiga hipotesis dirangka berasaskan kajian yang telah dilakukan bagi mencapai objektif kajian ini. Dalam usaha mengkaji hipotesis ini, data dikumpulkan dalam kalangan pelajar perempuan di Pusat Pengajian Pengkomputeran, Universiti Utara Malaysia. Sampel kajian melibatkan 80 orang pelajar perempuan, iaitu data tertakluk kepada ujian kebolehpercayaan, statistik deskriptif, korelasi, dan analisis regresi berganda. Hasil kajian ini menunjukkan bahawa sifat-sifat permainan sosial atas talian, kehadiran kognitif dan kehadiran pengajaran mempunyai impak positif yang besar terhadap penggunaan E-pembelajaran. Manakala kehadiran sosial tidak mempunyai kesan yang signifikan terhadap penggunaan E-pembelajaran.

Kata kunci: Komuniti model pertanyaan, kehadiran sosial, kehadiran kognitif, kehadiran pengajaran

ABSTRACT

The use of online social games, nowadays, is so rampant especially among students of higher learning. This provides them with means to interact with one another by sharing the same interests irrespective of locations. The use of online social games tools is noticed to be high among female students. Meanwhile, an e-learning environment that has the features of social network tools such as games has great potential to innovate and stimulate the continual usage of E-learning among students, by fostering social interaction and knowledge sharing among the students. E-learning is an important online tool that can be used to achieve quality of learning and teaching among students in higher education.It is thus pertinent for any online technological tools that will maintain efficient usage, especially among female students to be able to facilitate social interaction, since female students are more comfortable sharing ideas among their peers.To this end, the study intend to consider the assumptions of community of inquiry model which highlights three important constructs that provide theoretical details for consideration in this study. To be specific, this research examines the impact of social presence, cognitive presence and teaching presence of online social games on E-learning usage among female students of higher institutions .To achieve these objectives, three hypotheses were formulated based on previous studies .In order to examine these hypotheses, data was collected among female students at school of computing, Universiti Utara Malaysia . While the sample size of the study was 80 female students and the data was subjected to tests of reliability, descriptive statistics, correlations, and multiple regression analysis. The findings of this study revealed that, the attributes of online social games; cognitive presence and teaching presence have positive significant impact on E-learning usage. Meanwhile, social presence does not have a significant impact on E-learning usage.

Keywords: Community of inquiry model , social presence , cognitive presence , teaching presence

ACKNOWLEDGEMENT

In the name of Allah, the most merciful, the most compassionate.

First and foremost all praise and thanks go to Allah (God) for giving me the strength and patience, and providing me the knowledge to accomplish this research study.

My sincerest thanks and gratitude go to my supervisor, Dr. Shafiz Affendi Mohd Yusof for his guidance, encouragement and support in keeping my academic plans on schedule. I appreciate your patience and attention given to me during my research journey particularly the time that took you away from some of your personal and professional responsibilities.

To my extended family in Iraq, a special thanks and dedication go to my beloved father, and my beloved mother for their continuous encouragement, support and prayers. To my father for his faith and wisdom. To my mother for her soft heart and genuine love and special thanks to my sisters and my brother . To everyone stood by my side and advised, inspired and encouraged me. For the person who asked me to look at the glass half full and to live life with no regrets.

I would like also to extend my thanks and appreciation to all of my friends who have contributed in one way or another to help me complete this thesis successfully. Last, but not least, special thanks goes to all the students who have participated in this research and all the people who have helped me completing this thesis and challenging journey successfully.

Table of Contents

Permission to Use.....i
Abstrak.....ii
Abstract.....iii
Acknowledgment.....iv
Table of Contents.....v
List of Tables.....viii
List of Figures.....ix
List of Abbreviations.....x
List of Appendices.....xi

CHAPTER ONE INTRODUCTION.....1
1.1 Background of Study.....1
1.2 Problem Statement.....4
1.3 Research Questions.....7
1.4 Research Objectives.....7
1.5 Scope of the Study.....7
1.6 Methodology.....8
1.7 Significance of the Study.....9
1.8 Summary.....10

CHAPTER TWO LITERATURE REVIEW.....11
2.1 Introduction.....11
2.2 What is E-learning.....11
2.2.1 Characteristics of E-Learning.....13
2.2.2 Benefits/ Limitations of E-Learning.....14
2.3 Online Game.....16
2.3.1 Playing of Online Game.....17
2.3.2 Benefits/Limitations of Online Game.....17
2.4 Online Social Game.....18
2.5 Possible Contribution of Online Social Game to E-learning Platform.....21
2.6 The Implication of Using Online Social Game in E-learning Platform.....25
2.7 Enhancing usage of E-learning with the attributes of online social games.....27

2.8 Review of Previous Studies 35
2.8.1 Social presence and E-learning usage.....39
2.8.2 Cognitive presence and E-learning usage.....40
2.8.3 Teaching presence and E-learning usage.....41
2.9 Supporting theory.....42
2.9.1 Community of Inquiry Model 42
2.10 Summary 44
CHAPTER THREE RESEARCH METHODOLOGY 46
3.1 Introduction 46
3.2 Research Design.....46
3.3 Stimuli to responds.....48
3.3.1 The Choice of FarmVille 2.....48
3.3.2 Relating the Attribute of Farmville2 to E-learning.....50
3.3.2.1 Social presence in farmville2.....50
3.3.2.2 Cognitive presence in farmville2.....51
3.3.2.3 Teaching presence in farmville2.....51
3.4 Conceptual Framework 51
3.4.1 Variables Description.....54
3.4.1.1 Social Presence 54
3.4.1.2 Cognitive Presence 54
3.4.1.3 Teaching Presence 55
3.5 Subjects(Sampling Method) and data procedure 55
3.5.1 Sampling Technique 56
3.6 Research Instrument 57
3.7 Tests of Reliability and Validity 62
3.8 Pilot study 63
3.9 Data Analysis 65
3.9.1 Descriptive Analysis.....65
3.9.2 Pearson Product-Moment Correlation.....66
3.9.3 Multiple Regression 66
3.10 Summary 67
CHAPTER FOUR DATA ANALYSIS AND FINDIN1GS 68

4.1 Introduction 68
4.2 Data Screening and Treatment 68
4.2.1 Missing Data 69
4.2.2 Treatment of Outliers 69
4.2.3 Assessment of Normality 71
4.2.4 Linearity 72
4.2.5 Homoscedasticity 73
4.2.6 Multicollinearity Test 74
4.3 Reliability Test 76
4.4 Respondents Profile 77
4.5 Descriptive Statistics 80
4.6 Descriptive Statistics of the Constructs 85
4.7 Hypotheses Testing 90
4.7.1 Pearson Product-Moment Correlation Analysis 90
4.7.2 Multiple Regressions 93
4.8 Summary 98

CHAPTER FIVE DISCUSSION AND CONCLUSIONS 99
5.1 Introduction 99
5.2 Overview of the study 99
5.3 Discussions 100
5.3.1 The Impact of Social Presence on E-learning Usage 100
5.3.2 The Impact of Cognitive Presence on E-learning Usage 102
5.3.3 The Impact of Teaching Presence on E-learning Usage 103
5.4 Research Implications 105
5.4.1 Theoretical Implications 105
5.4.2 Practical Implications 106
5.5 Limitation of the Research 107
5.6 Recommendations for Future Studies 108
5.7 Conclusion 109
REFERENCES 112

List of Tables

Table 3.1: Summary of Variables 55
Table 3.2 : Number of Questions and Response Categories by Questionnaire Section. 60
Table 3.3 : Summary of the Pilot Test Reliability Analysis of Constructs.....64
Table 4.1 : Descriptive Result for Mahalanobis Distance.....71
Table 4.2 : Correlation Matrix of the Exogenous Latent Construct.....75
Table 4.3 : Test of Multicollinearity.....76
Table 4.4 : Reliability Test.....76
Table 4.5 : Summary of the respondents' profile.....77
Table 4.6 : Summary of the respondents' profile 81
Table 4.7 : Descriptive Statistics of Social Presence.....86
Table 4.8 : Descriptive Statistics of Cognitive Presence.....87
Table 4.9 : Descriptive Statistics of Teaching presence.....89
Table 4.10 : Descriptive Statistics of E-learning usage.....90
Table 4.11 : Cohen's Guideline of Correlation Strength 91
Table 4.12 : Pearson Product-Moment Correlation Analysis.....91
Table 4.13 : Correlations among Independent and Dependent Variables.....92
Table 4.14 : Regression Analysis for structure readiness.....94
Table 4.15 : Anova.....95
Table 4.16 : Coefficient of the regression.....97
Table 4.17 : Summary of Findings.....97

List of Figures

Figure 2.1: Overview of Some Social Applications already in some E-leaning platform 22
Figure 2.2 : The Role of online social games in E-learning 29
Figure 2.3 : Community of Inquiry model framework 44
Figure 3.1. Conceptual Frame work.....52
Figure 4.1 : Histogram for Normality.....72
Figure 4.2 :Test of Linearity for E-learning (EDV).....73
Figure 4.3 : Scatterplot for Normality.....74
Figure 4.4 : Frequency Distribution for Respondent Age.....78
Figure 4.5 : Frequency Distribution for Academic qualification.....79
Figure 4.6 : Frequency Distribution for Academic Field 80
Figure 4.7 : Frequency Distribution of Respondents Playing Online Social Game...82
Figure 4.8 : Frequency Distribution of Respondents Usage of E-Learning.....82
Figure 4.9 : Frequency Distribution of Respondents Hours of Playing Online Social Games.....83
Figure 4.10: Frequency Distribution of Respondents Hours of Using of E-Learning 84

List of Abbreviations

LMS	Learning management system
ICT	Information and Communication Technology
H	Hypotheses
COI	Community of Inquiry Model
SPSS	Statistical Package for Social Science
SIV	Social Independent variable
CIV	Cognitive Independent variable
TIV	Teaching Independent variable
EDV	Electronic learning Depended variable
VIF	Variance Inflation Factor
M	Mean
SD	Standard Deviation

List of Appendices

Appendix A: Survey Questionnaire 128
Appendix B : Descriptive Result for Z score.....134
Appendix C : Chi-Square Probabilities.....135
Appendix D : Normality 137
Appendix E: Correlations 138

CHAPTER ONE
INTRODUCTION

This chapter provides the general overview of the proposed study. This includes background of the study, problem statement, the research questions and objectives, significance of the study and the study scope that summarizes the focus of the study as well as the methodology to be adopted.

1.1 Background of Study

Learning is known as a process where new knowledge, skills and habits are gained (Kuhlthau, 2010). With the advent of information and communication technologies (ICT), learning process is witnessing a remarkable progress and advancement through the adoption of e-learning system (Olson, Codde , deMaagd , Tarkleson , Sinclair ,Yook &Egidio,2011; Almarabeh &Mohammad, 2013). E-learning may be regarded as an Internet technological tool used to provide a set of solutions at a distance to the acquisition and practical use of knowledge in the academic sphere(Amaral & Leal, 2006). This process being more supported by technological devices, offers various ways of communication among users engaging in sophisticated educational software applications (Hoic-Bozic , Mornar, &Boticki, 2009). The main advantage of this kind of tool is that, it can be used regardless of time and location.

However, one of the main limitation particular to this is that, it lacks the ability to stimulate its continual use among students (Rodrigues , Sabino& Zhou,2011; Lazim

, Hafriz ,Yazid ,Noor &Wan , 2013; Essam & Al-Ammary , 2013; Mahmood, Dahlan& Hussin, 2013a). This is why most today's forms of e-learning focused only on enhancing collaboration and communication between students and teachers alone in the learning process (Hoic-Bozic et al., 2009).

Recently, significance evolutions of Internet connectivity and information and communication technologies have emerged. These turn the Internet into an extremely important medium to enhance information sharing among students (Bauerova, & Sein-Echaluce, 2007). Therefore, in line with this, the development of software to aid e-learning process becomes a necessity, so as to play key role in stimulating its continual use among students (Sabino, 2010 ;Rodrigues et al., 2011).

Although, in the past, related application-software such as learning management system (LMS) are being used to manage tasks on online courseware. This is designed to assist teachers in delivering course content and tracking student's progress (Nasser, Cherif& Romanowski, 2011 ; Rodrigues et al., 2011; Sejzi, & Arisa, 2013). Such platform also provides opportunity for the students to download course material, interact with the teachers , participate in online discussions and submit home works. However, one of the limitations of this system is that, it lack specific feature that can foster interaction among groups of students (Kakasevski, Mihajlov,Arsenovski& Chungurski ,2008; Dron & Bhattacharya, 2009; Rodrigues et al., 2011).

Meanwhile, an e-learning environment that has the features of social network tools such as games has great potential to innovate and stimulate the continual usage of e-learning among students, by fostering social interaction and knowledge sharing among the students (Mahmood et al.,2013b; Muntean ,2011; Rodrigues et al., 2011; Balakrishnan, & Loo,2013).

The use of online social games, nowadays, is so rampant especially among students of higher learning (Silva, 2010). This provides them with means to interact with one another by sharing the same interests irrespective of locations (Mahama, 2012). The use of such tools is noticed to be high among female students (Hicks, 2011; Mihaela, Vlad , Alexandru & Alexandru, 2011). In contrary, the male ones use e-learning more for academic purpose irrespective of its lack of feature of social interaction (Li, & Liu, 2009).

It is thus pertinent for any online technological tools that will maintain efficient usage, especially among female students to be able to facilitate social interaction, since female students are more comfortable sharing ideas among their peers (Premagowrie, Kalai& Ho, 2014; Akyildiz, & Argan, 2012; Rodrigues et al., 2011) . Therefore, an e-learning platform that can facilitate adequate sense of community, relationship and interaction among its users, especially the female ones can be very useful in the academic sphere (Silva, 2010).

In addition, this could be used to adapt the structure of informal knowledge sharing common in social games to the formal knowledge present in e-learning

with the aim of defining curricula and educational contents whose objectives is to achieved efficient usage of e-learning among students (Figl, Kabicher, & Toifl, 2008).

1.2 Problem Statement

E-learning is an important online tool that can be used to achieve quality of learning and teaching among students in higher education (Jovanovic, 2013). It is capable of providing platform that can change the learning and teaching system from traditional to a new pedagogy structure (Josephine & Jennifer, 2013; John, 2011; Hicks, 2011). It is being designed to promote efficient communication among teachers and students through sharing of courseware as well as discussions related to academics and class activities but not social interactions and problem solving(Rodrigues et al., 2011; Essam, & Al-Ammary, 2013; Mahmood et al. , 2013a).These factors contribute to the lack of the ability of e-learning to stimulate students' attention towards continual usage and as such it is inefficient in most academic environments (Rodrigues et al., 2011; Mahmood et al. ,2013b).

Researchers' findings in information system, such as Arunachalam, (2014); Rodrigues et al., (2011), concluded that the impact of e-learning especially among female students of higher education is insignificant. The studies found that this is due to the lack of social presence and cognitive ability that affect the rate of use of e-learning among students, especially the female ones because it is seen as teachers-centered (Hoic-Bozic et al., 2009; Rodrigues et al., 2011; Mahmood et al., ,2013a).

Studies have referred to this lack of social interaction and cognitive ability as the main cause of the low level of usage of e-learning among students, especially the female ones (Arunachalam, 2014; Mihaela et al., 2011; Rodrigues et al., 2011). Meanwhile, in contrary, some studies reiterated that female students play more of online social games nowadays because, it provide them with the opportunity to interact in online community by cognitively implementing ideas that can be useful in problem solving (Cunha, Raposo & Fuks ,2008;Garrison, 2011). These features make online social games attractive to female students, by giving them the opportunity to share ideas and knowledge when engaged in games in the online community. This brings to the fore, hypothetically, that the absence of social and cognitive presences which affect teaching presence in the e-learning systems are determining factors for the usage of online social games for e-learning purpose.

In the same light, Charles, Bustand and Black (2009) affirmed that students' involvement is paramount to the success of e-learning, although the level of students' usage of e-learning is often insignificant. The reasons for the insignificant level of students usage of e-learning are said to be lack of enticing learning materials and environment, hence, lack of social presence. The study argued that little studies have delved into enhancing the usage of e-learning applications among female students by considering the attributes of digital games.

Therefore, this study proposes to examine the determining roles of social presence, cognitive presence and teaching presence in the usage of online social game for e-learning among female students. Thus , to establish how the use of online social

game can have positive influence on e-learning usage of female students to continuing using e-learning for both academics and social benefits. To this end, the study intend to consider the assumptions of community of inquiry model which highlights three important constructs that provide theoretical details for consideration in this study .

In the community of inquiry model, social presence, cognitive presence and teaching presence are the major constructs highlighted in the theory. This means that, any learning platform that will capture the participations of users must have the ability to provide social interactions among the users (social presence). Users must be able to construct and confirm meaning through the interaction (cognitive presence) and realize the outcome that will be personally and educationally worthwhile (teaching presence).

Meanwhile, it is worthy of note that community of inquiry model is yet to be applied in the context of online social games for e- learning usage (Anderson, 2008;Garrison ,2011; Roither, 2012; Iowa State University, 2013) . This study also explored this opportunity to implement community of inquiry model as the theory and provided deeper understanding of the implication of possible relationship between online social games and e-learning.

1.3 Research Questions

In achieving the aim of this study, the following research questions are proposed in this study.

1. What is the impact of social presence in online social games on the usage of e-learning among female students?
2. What is the impact of cognitive presence in online social games on the usage of e-learning among female students?
3. What is the impact of teaching presence in online social games on the usage of e-learning among female students?

1.4 Research Objectives

The objectives of this research are:

1. To determine the impact of social presence in online social games on the usage of e-learning among female students.
2. To examine the impact of cognitive presence in online social games on the usage of e-learning among female students.
3. To determine the impact of teaching presence in online social games on the usage of e-learning among female students.

1.5 Scope of the Study

This study examines the social presence, cognition presence and teaching presence as suggested factors that contribute to e-learning usage through playing online social games. It aims to empirically validate if these constructs affect the preferential e-learning usage through playing online social game among female students.

Specifically, studies have stressed that playing of social game in online involves different people of diverse ideas at different locations, thus inspires knowledge sharing in a remote location (Andrew, 2010; Paechter ,Maier& Macher,2010). This implies that playing online social game by the female students can serve as motivation for their involvement in e-learning. The online social game used in the study for the experimental study is Farm Ville2. It is chosen because, according to its description and playing rules, it has elements of social presence, cognitive presence and teaching presence.

Therefore, in achieving this, the study proposed to implement the theoretical perspectives of the community of inquiry model to examine the social presence, cognitive and teaching presence of online social games. Hence, this research aims at establishing the presence of social, cognitive and teaching constructs in online social games and examine their impact on the usage of E-learning among students. As such, this study adopts an experimental research design by recruiting 80 female students in School of computing , Universiti Utara Malaysia to participate in the study.

1.6 Methodology

This study intends to engage 80 female students from School of Computing, Universiti Utara Malaysia, who were randomly selected to participate in the controlled laboratory experiment due to their familiarity to the use of online social game and e-learning. Respondents which are selected for the experiment would be briefed on the purpose of the research. Respondents were given ample time to understand and play Farmville2 on a computer in the controlled laboratory experiment. After this, the

participants were debriefed through an administration of questionnaire to gather their respective experiences .The sample is used for the investigation in this study through an experimental design research . Besides, the collected data were analyzed by using Statistical Package for Social Sciences (SPSS) version 20 and testing for the reliability and validity of the data using Cronbach's coefficient alpha test.

1.7 Significance of the Study

The use of e-learning in education and social game in the context of social events have been introduced towards ease of activities for the people that are involved (Jarmo &Jonna, 2010; Arunachalam, 2014). The studies of Ofori-Dwumfuo and Paatey (2011); Jeremy, Ramanuja , Nicolas , Xiang , Matei , John and Adriana (2012) stressed that the collective involvement of academicians and practitioners are required for delivering the success of technology and innovation. Thus, the significance of this study is to examine the roles of the listed constructs in the e-learning usage through playing online social games, and propose its advantage in encouraging students in using conventional e-learning applications. This is because, by ensuring e-learning applications' design with social and cognitive presence, the teaching presence will be enhanced and increase the rate of its usage.

In addition, this research validates the application of the community of inquiry model in determining the role of social presence, cognitive presence and teaching presence in online social games towards the usage of e-learning applications.

1.8 Summary

This chapter has provided the highlight of the study and stated its background. It shows that the advent of technologies has changed the learning face to e-learning which is not constrained by geographical location (i.e. country) or physical space (i.e. classroom). This has been further supported by online social games which are more played by female students because of the possibility of the presences of social interaction, cognition and teaching experiences. This study aims to empirically investigate the roles of these presences in the e-learning usage through playing online social games. The research questions and objectives that further attend to this are stated. The scope of this study also shows that female students are the respondents because literature suggests that they play online social game more, and found conventional e-learning applications more boring. This is further supported by review of related literature in chapter 2.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This section discusses the relevant literatures related to the context of the study. More so, it highlights the need to achieve the stated objectives. This section basically contains overview of e-learning, online social game, possible impact of online social game on e-learning, related issues and benefits of e-learning. Moreover, the constructs of the chosen theory are discussed in detail.

2.2 What is E-Learning?

The design of Electronic Learning (E-Learning) system has undergone radical changes over the years by allowing users to learn at any time when they are connected to the Internet. This use of new information technology facility provides enormous benefits for school education, courses, and lifelong learning classes. Technology, thus, changes the way students and teachers interact (Gachter, Daniel & Martin, 2012; Galamoyo& Colin, 2011).

When students use technology for the purpose of identifying and collecting information, they will no longer depend on the teacher as the sole source of information. Thus, the age of information and communications technology (ICT) provide leading institutions the benefits to define the processes of information access and delivery.

Previous studies have revealed that E-learning systems have greatly expanded in recent years. About 3.2 million students had one or more online course in the United States in 2005 (Allen & Seaman, 2007; Desai, 2010).

Similarly, a growing number of universities across the world are now offering many courses that require either no or very little student attendance (AlBarrak, 2010). E-learning is expected to grow even more with the growth of the Internet and information technology infrastructure (Li, 2013). Hence, in order for any e-learning system to be successful, it must have some features including flexibility, which allows the system to adapt to the capabilities and goals of every student ease of use . In other words, learner requires focusing on the material itself rather than focusing on how to use the system.

There has been a longstanding inconsistency in the course of providing an all-encompassing definition for e-learning. Meanwhile, Sangra, Vlachopoulos and Cabrera (2012) reviewed that, e-learning cut across education, learning and teaching with aid of computer or any form of information communication technology. Hence, the reason why educational technology and distance learning are the most relevant and prominent fields when discussing e-learning. Consistently, Friesen (2009) argued that, e-learning is regarded as a distance-based learning that rely solely on evolving and digital technologies. In other words, Garrison and Anderson (2003) elucidated that e-learning is technology-based learning where learning takes place in spite of long distance. To put these definitions into perspectives, e-learning is a form of learning, teaching and acquisition of education with the aid of modern and digital

technologies such as; Internet, computer, mobile technologies and educational software (Governors State University, 2008). In that regard, Guri-Rosenblit (2005) defined e-learning as a technology-driven form of learning using. In other words, using electronic media for different educational, learning and teaching purposes. Examples of e-learning functions include, downloading and uploading of learning materials, conducting digital classrooms, online-learning interactions and so forth.

2.2.1 Characteristics of E-Learning

Nowadays learning involves the acquisition, generation and transfer of knowledge using the various methods and techniques to develop and enhance the learning system for different topics which can be much more effective, and cheaper than more traditional learning methods (Josephine & Jennifer, 2013; John, 2011; Hicks, 2011).

With the rapid progress of the communication tools in many fields, the teacher should to have a mastery of the medium to achieve a correct handling of new technologies (Hicks, 2011). E-leaning can be defined as the acquisition and use of knowledge, distributed and facilitated primarily by electronic means (Behera,2013). This mean, it is an educational system that transport the information using the Information technology resources like the Internet, satellite broadcast and multimedia applications.

In view of the multimedia and digital technology that are responsible for anchoring the electronic based learning known as e-learning, interactivity of the technology aiding e-learning is a major characteristic of e-learning (Roy, 2006). According to Aldrich (2005), there are four different phases of explaining interactivity of e-

learning namely; simple clicking/activity, making basic choices, problem solving, and learning creation. These levels can be used sequentially, primarily to build learner confidence in the content or the instruction, or they can be used to complement one another. Thus interaction is a strategy to engage learners through a hierarchy of tasks beginning at the basic level of navigation and ending in a more dynamic interaction of creating in real-life stimulations .Indeed, interactivity where the learners can interact with each other and with their teachers through video conferencing or discussion boards is brought about by e-learning (Gachter et al., 2012; Galamoyo & Colin, 2011). Hence, there should be a solid infrastructure to support the system and provide the learners with easy and fast access to the system. Meanwhile, in theoretical perspectives of community of enquiry model, the interactivity of the e-learning characteristics is divided into three categories namely' social presence, cognitive presence and teaching presence (Garrison, Anderson & Archer, 2000).

2.2.2 Benefits/ Limitations of E-Learning

Electronic learning systems was initiated to enhance interaction between learners and educators and the entire educational systems (Jovanovic, 2013). Fundamentally, e-learning is a tool for enhancing connection and interaction between learners and educators regardless of geographical locations especially students that are from rural areas with little or no access of learning materials and facilities (Kaplan &Haenlein, 2010).

It is a fundamental fact that, dwellers of rural areas have limited access to learning facilities and learning materials. The challenges of students living in rural area include lack or limited availability of teachers and educators.

Conceptually, E-learning is entailed with myriad of applications such as; web-based learning , virtual classroom , computer-based learning, and digital collaboration that assists in the transfer of skill and knowledge (Lena & Marlene, 2013). Content is delivered through internet, audio or video tape, intranet/extranet, CD-ROM and satellite TV. Moreover, E-learning involves the assessment and evaluation of students and their activities in a real time unlike the traditional learning style.

This shows that learning in an online environment assists in achieving the educational objectives by the students. Meanwhile, researchers have argued thatone of the main limitations to e-learning is the lack of ability to stimulate its continual usage, especially among students (Sabino,2010). This is part of the reason why most today's forms of e-learning focused only on enhancing collaboration and communication between students and teachers alone(Hoic-Bozic et al., 2009).

Thus, the significance evolution of Internets and information technology provide means to enhance information sharing among students (Bauerova, & Sein-Echaluce, 2007). This development could be used to aid e-learning process in stimulating the attention of the students towards achieving better academic process.

One of such technology nowadays is the emergence of various types of online social games that can be used in different location (Mahama, 2012). Online social games

are mostly used by students to create social interactions. The use is mostly significant among females student that use them to enhance interaction among their peers (Hoic-Bozic et al., 2009). Hence, if this technology is used in the platform of e-learning, may cater for the limitation identified and as such the use of e-learning might significantly improve, especially among female participants in the academic sphere.

2.3 Online Game

Gaming interactions have been described as real-world interactions between groups of people.Understanding cheaters' position in the online social network that connects gamers is relevant not only for evaluating and reasoning about anti-cheat actions and policies in gaming environments, but also for studying social networks at large (Sukanlaya, Cameron & Kieren, 2013; Xiao & Daniel, 2011). Studying cheaters can serve to better understand the behavior of individuals that abuse the shared social space in large-scale non-hierarchical communities.

Moreover, online social networks reveals that individual participants abuse available, legal tools, such as communication or tagging features, for marketing gains or political activism (Sophie, Elizabeth & Mohammad,2010; Susan & Bradley, 2010). Indeed, all game players become cheaters and then abandon the game, or corruption escalates and ensures chaos. For instance, gaming environments like Steam allow its members to declare social relationships and connect themselves to Steam Community in an online social network.

2.3.1 Playing of Online Game

Possible divisions in players' attention, physical environment, and digital interactional devices (such as games) have been examined. It is found that, to design a game with mixed-reality such as those that can be played in a car required that players be aware of traffics and also pay cognizance to other players in the nearby cars. These studies showed that the control of this type of game depends on substantial interaction devices that can reduce the need for regular visual attention (Powell, Finkelstein , Hicks , Phifer , Charugulla , Thornton , Barnes & Dahlberg , 2010 ; Rodrigo, Mauro& Nuria, 2010).

In addition, many studies examined the social aspects in interacting devices that has dual-screen image feature for personal and social use. It is claimed that this device has the capability to be used for collaborative purposes compared to the single large display screen (Xiao & Daniel, 2010; Xu ,Cao, Sellen ,Herbrich & Graepel,2011). Similarly, researchers have identified that sensor node device in gaming can be used for calculating the relative positions of multiple users of a mobile device in a peer-to-peer manner. Meanwhile, no study have shown a combine game device that share multi-display setup (Xu et al., 2011). Therefore, there is the need for a relative positioned system that can guarantee better accuracy for automated configuration of multi-display setup for smooth operation of online gaming (Xiao & Daniel, 2010).

2.3.2 Benefits/Limitations of Online Game

It is undisputable that interacting in a wider distance is a characteristic feature of online game. Meanwhile, limited sense of community due to partial social presence

that mediates the interface of such designs limits their usages (Powell , et al. ,2010). This means that the game consoles only allow physical presence of players to play together, but limits players themselves from enjoying games in specific places such as living rooms. In a more critical view, being together in a physical environment alone may not socially enrich game experience, but playing together in a community game may facilitate social interaction (Powell et al.,2010; Rodrigo et al., 2010).

Furthermore, though, online games provide some interesting games that permit players to explore situations as well as geographical locations. Specifically, the hand held game devices has the capabilities to connect to the internet and allow players to remotely locate and coordinate their activities with friends (Powell et al., 2010). However, studies have revealed that there some factors that relate to the design of such technological devices that do not support social aspects, mainly because they do not provide shared screen that allow players to observe others' players in the game environment. Hence, this aspect need be catered for so as to enhance sociability of online games.

2.4 Online Social Game

Traditional games are now becoming online social games (Ahmad,Keegan , Sullivan ,Williams,Srivastava & Contractor , 2011 ; Alahakoon , Tripathi, Kourtellis ,Simha& Iamnitchi,2011). This is due to the difficulties usually encountered through the face to face games and which has affected the objectives of creating the traditional games. Therefore, games like bridge, chess, and go are now played online by millions of gamers. Other online social games, such as FarmVille and Cafe World, are already

exploiting the characteristics of the social network to improve and grow online communities. This invariably affects the learning skills of the participants (Bader & Zotte, 2012).

Furthermore, one of the popular social game that have a long history allowing families and friends to spend time with each other is board games and conventional card (Ben, Shaun ,Conor , Francesco , Luciano & Andrea, 2010; Dumitrica, 2011).

Although, digital games have been viewed as an isolated and anti-social activities (Hicks, 2011; Mihaela et al.,2011), but recently this view has changed due to that, the social aspects of digital games is gaining more emphasis.

Researchers have stressed that there is now change of focus in the academic research as well as games industry (Mihaela et al. , 2011). This is evident from the increase popularity of the massive multiplayer online games such as World of Warcraft, games played in social network media such as Facebook and party games like SingStar.

In addition, FarmVille game could routinely gives high-level (expert) players new items while at the same time broadcasting game play achievements through the social links (Posea ,Balint,Dimitriu& Iosup,2010; Powell et al., 2010; Rodrigo et al., 2010).

User behavior, online social network and play style analysis are not new research subjects, but the study of social gaming communities provides a new environment of application with the potential to influence millions of lives (Szell & Thurner, 2010).

Furthermore, a good understanding of online social networks, which are large-scale Internet-based applications, may shape the way individual maneuver the large-scale socio technical systems (Wei ,Yang, Adamic, Ara´ujo &Rekhi,2010).

As opposed to many other social networks which are based on friendship and cooperation among participants, gaming social networks may grow because an adversarial context (Xiao & Daniel, 2010; Xu et al., 2011). Based on this, gamers may be motivated to be active longer than they would in a traditional social network.

Researchers have shown that the adversarial context present in games always leads to two additional pro-social emotions; happy social embarrassment (being happy for getting embarrassed in front of friends) and vicarious pride (being happy for the success of your students). This complements the pro-social emotions found in traditional social networks, such as admiration ,compassion, and devotion (Susan & Bradley, 2010).

However, studying online social gaming may lead from complementary results to many of the classic social network studies.

2.5 Possible Contribution of Online Social Game to E-learning Platform

Although, most universities in the world are commonly using e-learning, still its impact on education have little significance (Essam & Al-Ammary,2013; Rodrigues et al., 2011). The main functions of e-learning includes tasks such as accounting and courses management, user's management, and their learning content program. Meanwhile, students have the right to check the content of any online activity and interact with their classmates and teachers(Sher , 2009; Murray, Pérez ,Geist& Hedrick,2012). Thus, the non-flexible nature of the common e-learning, fail to stimulate the student's proactive participation in the development of the learning process and the subsequent resolution of social interaction (Sabino, 2010).

However, this limitation can be catered for using several available tools to support the e-learning environment. These include file sharing, blogs, chats, video conferences, e-portfolios, wikis and discussion fora (Safran ,Gütl& Helic,2007; Dalsgaard, 2006; Bridges, Chan&Hmelo-Silver,2015) . These can support activities that involve the learning process (Namisiko ,Mindila,Chepkoech& Nyeris,2014; Lazim et al.,2013). Though, some of these are already in use in some e-learning platforms which are currently under use (Balakrishnan, & Loo,2013 ; Rodrigues et al., 2011). An example of this can be seen in figure 1 shown below.

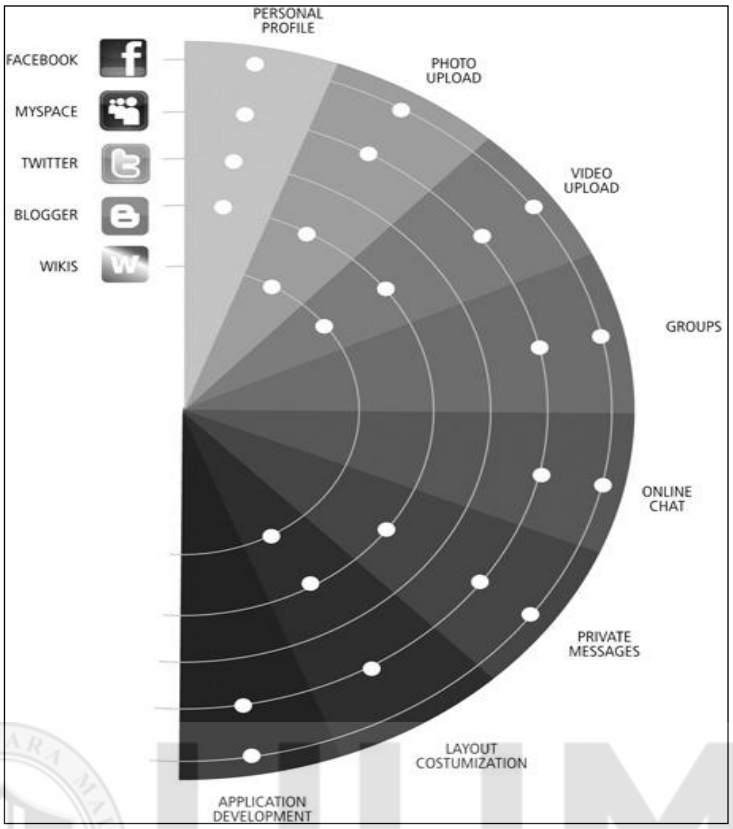

Figure 2.1: Overview of Some Social Applications already in some E-leaning Platform (Source: Rodrigues et al., 2011).

Figure 1 above, show some of the well known social networks applications that have been integrated in the e-learning environment. The use of such applications provides different features to e-learning and that enhance its usage among the users (Sabino,2010 ; Rodrigues et al.,2011; Mahmood et al.,2013b).

Similarly, though, most of online social games which are in existence were not designed for educational purposes, but have features that may be of benefits in the educational settings (Muntean, 2011).

Most importantly, the great sense of interaction that is predicated in online social game enhance interaction and information sharing among its participants (Trepte, Reinecke& Juechems,2012) . Such sharing encourages people to learn in group and share views as well as contents related to the matters in question (Figl et al. ,2008; Paechter et al. , 2010).

Thus, the use of online social game to support e-learning is part of an important social orientation in which students could be active in problem solving, since the main points of the learning process are self-regulated activities of problem solving(Sabino,2010). This takes an approach of social constructivism in which the students are bound to steer their own learning process. This type of learning implies that , it is not possible to structure or pre-define the activities of the student through the learning process. Meanwhile, Activities need start with a problem or a project, and it provides resources that will support the student through the process in order to solve the problem (Vassileva, 2008).

By using this concept to access a wide range of possible contacts with a flexible structure of collaboration, students can take the process of problem solving in a collaborative environment improved with possibility of enriching their learning (Neo&Neo,2009). This could create an improved and strengthened social relationships among the students and the teachers to enhance information sharing and around the topic under discussion (Muntean, 2011; Ilias & Nor, 2012).

The kind of discussion here is different from those available in a forum discussion included in the formal e-learning platform but originated by personal entries

of each student and the players will discuss a personal content provided by students, with benefits for the concerned student (Rodrigues et al.,2011; Sabino,2010).

Student will be confronted with questions and doubts that need more clarification across the learning process. Therefore, the easy access will allow contact with various people. In addition , while different people do not work in the same problem area they share common interests and backgrounds, thus facilitating the sharing of a knowledge with one party or both the parties (Li & Liu, 2009).

Contact is enhanced with new perspectives and viewpoints which can enrich the work in progress by the student when inserted in online social game and the contact with other (Muntean, 2011).

This approach differs from the rigid structure of the formal e-learning, where content is made available for student use, and where interaction occurs between students and teachers only, these greatly limit the exchange of opinions and point of views (Murray , et al. , 2012).

In the online social game there is an environment of cooperation between players, perfect for a student to work on solving problems and progress in their learning process (Cunha, Raposo&Fuks,2008), thereby promoting knowledge creation.

It is obvious that e-learning by definition is close to its group of users (Nee&Gim,2015) . Hence, by establishing possible relationship between e-learning platforms and online social game, the usage of e-learning may be enhanced significantly (Parise & Crosina,2012 ;Rodrigues et al., 2011). This will enable such platform previously confined to the teachers, to be released and also accessible to students and their friends.

Additionally , sharing and content is one of the main characteristics of online social game (Chang, 2013). This environment of social interaction and sharing can creates an atmosphere highly fascinating for knowledge sharing in an academic context (Griffiths ,2002). It can therefore be summed up that the two advantages of online social game are the an enormous range they have in terms of interactions and sharing information and social contact they provide. Furthermore, taking into account that today a majority of the population both males and females uses one or more social games, particularly female students, it is proper to say that online social games are an important resource to enhance learning process of students and hard to ignore (Sabino,2010). Thus, e-learning platforms, in addition to gain relevance among students with the use of features available in online social networks, still need bridge with them online social games in order to motivate students, especially the female ones for using them more productively.

2.6 The Implication of Using Online Social Game in E-learning Platform

As mentioned earlier, electronic learning platforms tend to be closed and inflexible for students(Nee&Gim,2015). This is because the use and adoption of e-learning is

currently limited to settings made and characterized by e-learning system developers and administrators. The role of a student is passive, passing often by consulting content provided by the teachers responsible for the materials under study. furthermore, its main attributes are used for administration purposes, for example, registration of students, online courses and so on. This leads to the creation of environments, little exciting for students who do not enjoy the full potential of the platforms.

According to (Li, & Liu, 2009)Collaboration, content sharing and reviews are the sheer attributes of online social games and help in creating active and stimulating environments for students, who are encouraged to share and communicate learning materials among other learners . Undeniably, These attributes are important for the improvement of learning milieu(Figl, Kabicher, & Toifl (2008).

The capacity to provide learners with learning substance and the ability of students to fundamentally make basic positions in connection to the learning substance and propose contributions for improvement of the learning materials. The development of critical thinking and pro-activity in students is enhanced in an environment of sharing lived in an online game ,making a student as an active agent able to define the learning process and solving problems, rather than just a receiver of information(Li, & Liu, 2009).

Internet has overwhelmingly become a social instruments (Murugesan, 2007), which allows the users to associate and share content with other users in different

locations. In this manner, the trend increasingly visible is to establish points of connections in the most changed existing stages that make up the new e-learning system. This vision of worldwide connections could bring a large group of advantages for enhancing the living environment on a conventional e-learning application.

2.7 Enhancing Usage of E-learning with the Attributes of Online Social Games

Continuous usage of e-learning is pertinent to continuous engagement in learning (Charles , Bustard& Black,2009). Meanwhile, with a growing use of technological tools at all levels of educational activities, teaching and learning, the importance of improving engagement in e-learning has increased. Thus, as more technology devoted for e-learning continue to emerge, researchers' attentions on enhancing usage of learning technologies continue to rise.

Parise and Crosina(2012) added that, experimental learning is being digitalized lately. In that capacity, computer-based games are being utilized more to enhance participation, support engagement, and at last enhance learning results. The author reiterated that, the possibility of using computer games and online social games for learning is pertinent to the constructivist learning model, in which students become dynamic participants in the learning process, where students are the core elements in the learning process. The learning environment through online social games, specifically, the transformation from latent to dynamic as learning exercises require dynamic engagement and tend to influence students practical and real life experiences.

Figure 2.2 illustrates the role of online social games in learning engagements as propounded by (Lewis ,1992) is often used in Soft Systems Methodology to illustrate the possibility of enhancing engagement in learning through the attributes and features of e-learning (Checkland ,1999). Figure 2.2 depicts a class of students studying material through engagement in a conventional structured teaching and learning process, which is often involved teachers or tutors and students engaging in learning activity with aid of computer and sometimes Internet as the conventional representation of e-learning setting. The figure also depicts another form of e-learning engagement whereby learning applications and software can support learning outside the traditional learning environment. The effects of introducing technology to learning, either positively or negatively are also illustrated in the Figure 2.2. At the lower part of the Figure it is demonstrated that the trouble with engagement might be aided by embracing concepts from the attributes of computer games.

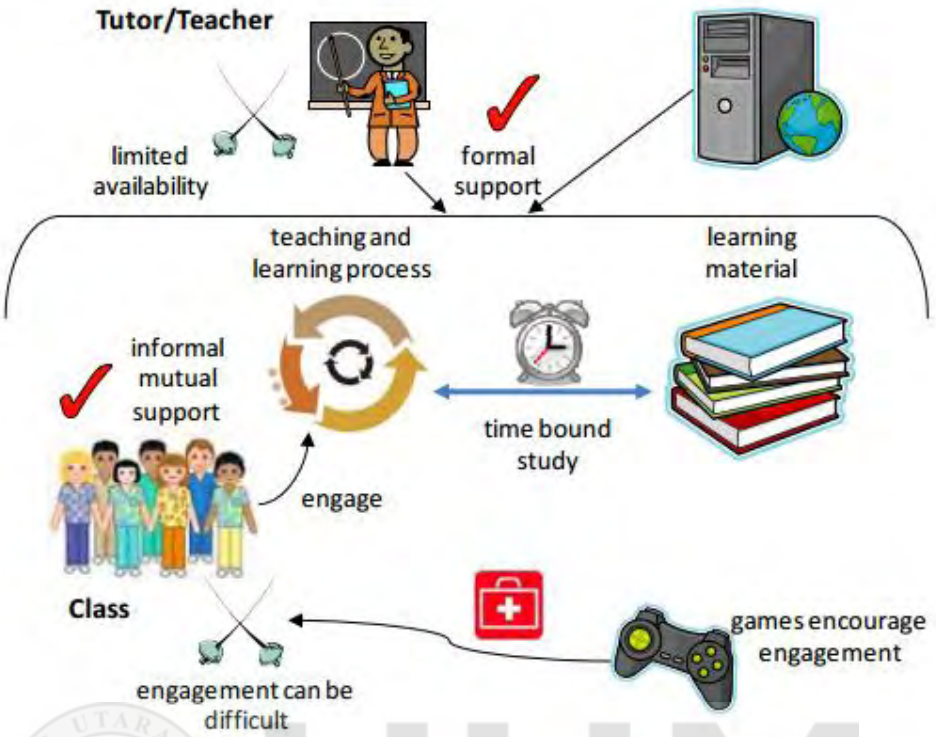

Figure 2.2: The Role of Online Social Game in E-Learning (Charles, et al. ,2009).

The presumption of using online social game attributes to enhance the usage of e-learning is supported with the notion that, computer games are known to be very engaging and yet, students are actively involved in playing it (Charles et al., 2009). This is because the inherent rule-bound structure of a game engages a player in an imaginative world in which tasks influence skills and knowledge development that help in achieving specific goals. The rule-bound structure is a replica to the goal of a learning process (Gee, 2005; Prensky, 2006). This explain the feasibility in the idea of using games to enhance e-learning engagement or usage (Cordova & Lepper ,1996; Jonassen & Land ,2000; Ricci , Cannon-Bowers&Salas,1996 ; Squire & Jenkins, 2004).

Consequently, the social, cognitive and teaching attributes present in a typical online social game can be used in both the learning process and the design of e-learning application (Charles et al., 2009). This notion has been the focus of some previous studies whereby computer games attributes are proposed to increase learning contents (McFarlane , Sparrowhawk & Heald,2002) or learning process (Charles et al., 2009). Unanimously, studies have emphatically shown the possibility of using the attributes of games to improve the engagement and usage of e-learning materials among students.

Digital or online social games which is also known as computer-based games have become a popular learning tools in modern higher institutions used to increase engagement among students. The use of computer-based games enhances education discourse among students and ultimately improve learning results (Chaudhary, 2008; Gros, 2007). The adoption of digital or computer-based games for educational purposes takes different methods which include online simulations, and also social media applications (Klopfer,Osterweil, Groff & Haas,2009). The introduction of computer games in educational sector similar to its introduction in corporate, military, and healthcare training (Jong ,Shang, Lee& Lee,2008). Graduate and postgraduate students have become accustomed with video and online social games and social in their personal lives, and this acquaintance makes it easier to test with these technologies in their conventional learning milieu (Klopfer et al., 2009) and can arguably motivate their usage of e-learning applications.

Social media technologies like the Facebook and Twitter have increasingly been used in universities and colleges to enhance learning and engagement (Alexander, 2006 ; Rodrigues et al., 2011). In other words, the introduction of social media

platforms and computer-based learning are similar development borne out of improving the convenience and efficacy in learning with experiments (Parise&Crosina, 2012; Junco , Heiberger& Loken,2010).

Arguably, online social game have been proven to be effective tool for learning because they are embedded with one or more of the following attributes:

The first attribute is wining ambitions where players aim and fight to reach the highest level . The second feature of the online social game that makes it attractive is the rules and outcomes that is laid for gaming guidance. The third is the challenging that is set to overcome gaming obstacles . The fourth attribute the explorative and creative gaming environment . The fifth attractive attribute is the competitive element where goals motivates actions . Finally, the interaction with other gamers increase the learning and overall creativity of the entire process (Jong et al., 2008; Prensky, 2001; Lepper & Cordova, 1992).

Meanwhile , effective online social games also encompass attribute such as points awarded for accomplishing some statuses or overcoming specific hurdles in a public score board so that players can monitor their performances relative to others. Thus , spurring competition ; and "badges" that convey status, expertise area or group identification. Sometimes, players receive digital medals as rewards for overcoming certain huddles before other players (Parise&Crosina, 2012).

Lately, studies delving on the effect of computer-based gaming and online social games especially with regards to their impact in enhancing the usage of e-learning

applications have started evolving (Gros, 2007). It has been unanimously discussed that the adoption of online social games is theoretically guided with the constructivist model of learning. The constructivist model proffers students are active learners whereby learning occurs through exploration and problem-solving activities (Dickey, 2005; Gee, 2003; Gros, 2007). In other words, constructivist perspective affirms that, individual learner can acquire knowledge from engaging amid social and collaborative processes (Jonassen, 1999).

In addition, Griffiths (2002) argued on the ripple effects of digital games and online social games in the educational realm. It was asserted that experiences of gamers in the gaming environments offered learning environments and techniques where new things can be learnt. Arguably gaming might be detrimental to educational developments of students, especially when they become too enthusiastic or over addicted with it. Personal experiences and exposures in gamin environments sometimes serve as a digital environments for gamers where soft skills and critical traits such as time managements can be acquired.

Oblinger (2006) corroborated that scores of researchers have documented both the pros and cons of digital gaming and online social gaming experiences to student. One of salient and unarguable benefits of online social games is that, the instructions of navigating around and between the levels of the games are educating as well as entertaining. Apart from the entertaining objective which is core aim of every games, the instructions received in gaming environments and the skills of navigating around the gaming environment are part of the important benefits of playing digital and online social games.

As highlighted by DeKanter (2005), online social games is a platform that can be incorporated into learning and teaching with regards to the fact that it encouraging learners to explore online course concepts and learn by trial and error, also by enhancing continuous usage of e-learning software (Thomas & Brown, 2011). In addition, Parise and Crosina (2012) reviewed that online social games reflect the concept of experiential learning cycle (Kolb,1984), where in students examine and act in the virtual environment, reflect on their findings, and then further investigate the environment. Often, the learning cycle cultivates enhanced decision-making skills as students have to make judgments in complex situations. These environments also teach students to be creative as game goals may require them to create content, characters ,or solutions (Royle, 2008). Hence, online social games are imbibed with social, cognitive and teaching constructs.

The implementation of gaming technologies in educational settings has produced evidence of improvement in analytical skills among various groups of students (Schmidt &Vandewater, 2008). Another significant impact of online social games in learning is that, gaming technologies can improve thinking and imbued efficient problem solving in students (Green & McNeese, 2007; Salomon, 2002). This is because with online social games, students can improve on their thinking skills and problem solving skills as the cognitive attributes of online social games presents students with numerous challenges and problem solving skills for learning (Dawes &Dumbleton, 2001) . Online social games were found to be highly socially interactive environments providing the opportunity to create strong friendships and emotional relationships, social interactions in online gaming form a considerable

main element in the enjoyment of playing , also offer a place where teamwork, encouragement, and fun can be experienced (Cole& Griffiths, 2007) .

Facing such gaming challenges result in metacognitive which is an important skill for problem solving (Henderson, 2002). There are empirical evidence to this fact, for instance, empirical studies have shown the relationship between fun, enjoyment and effective learning process (Bisson & Lunckner, 1996). In another study, Thomas and Brown (2011) reported that, computer games spark improve learning curiosity and mental imagination that are significant to learning. In other words, online social games have significant impact on learning environment by incorporating social features to learning milieu. Online social games can enable an environment in which students are able to have fun and at the same time are challenged and rewarded (Prensky, 2001) . In addition to that , the motivation and the activities inspired by playing online games can give rise to an engaging and continuous usage of e-learning applications ,which forms fertile grounds for learning(Barab,Thomas, Dodge ,Carteaux& Tuzun, 2005).

Important improvements in student interest, motivation, and retention have been witnessed by many lecturers introducing games as a supplement to their traditional lectures (Baid& Lambert, 2010; Kritz&Hense, 2006). Furthermore, online social games foster cooperation. Such online social games require players to work by groups to solve challenges under time constraints and pressure (Chaudhary, 2008).

According to Prensky(2001), the "gamer generation" prefers interacting (collaborating or competing) with others over playing alone with the computer. Working in teams within online social game environments also reflects the increasing emphasis on virtual work structures in higher education and in organizations. . ICT tools which offer both educators and learners with myriad of interactive functions that help socialize learning engagement and learning culture. However, the significance of these tools is significantly determined by the pedagogical strategies adopted (Ferdig, 2006).

In ending, online social game is playing an increasingly key role in motivating learning. Hence, adopting the community of enquiry model propounded by Garrison (2011), the social, cognitive and teaching attributes of online social games can serve as the motivating factors to enhance the usage of e-learning applications among female students in higher institutions.

2.8 Review of Previous Studies

As earlier stated, the limitations of e-learning in relation to today's educational system, is that it cannot engage the students to interact socially (Muntean, 2011; Rodrigues et al., 2011; Silva, 2010; Sabino, 2010). The attributes of online social game is discussed as potential motivating factors that can enhance and at the same time maximize the experience of e-learning usage among female students. Therefore, this section present previous findings of studies that explored similar approach in order to enhance the usage of e-learning among learners

Rodrigues et al.,(2011), studied how e-learning experience could be enhanced using online social networks. The authors introduced Web 2.0 which is a module comprising online social networks to create an atmosphere of cooperation and interactions among e-learning users. The module is implemented in the design of e-learning platform. The performance evaluation carried out using a survey questionnaire among selected sample of users indicated that both students and teachers agreed that the module enhance adequate information sharing. Meanwhile, the final survey was carried out on 187 populations of users, 176 of them were students and 11 were teachers. The outcome of the study indicated that, all students agreed that Web 2.0 provide privilege to share information and to interact while in the e-learning platform. In addition, over 90% of the teachers sampled for the survey were reported to agree that the system is easy to use and the performance is great.

In the same vein, Li and Liu (2009) studied the role of online social networks in students' e-learning experience. The authors considered the use of Xiaonei because it is one of the most popular online social network sites in China which students use frequently for enjoyment and learning. The outcome of the investigation indicated that, since Xiaonei is well valued by students, its use in the e-learning platform contributed greatly to improving the usage of e-learning among the students.

Essam & Al-Ammary, (2013), The study sample is comprised of postgraduate students enrolled in the Arab Open University , Kingdom of Bahrain. One hundred and fifty surveys were distributed both in person and as a web survey. Results show that motivation is the main factor that has the most significant impact on using e-learning . Meanwhile, among other motivating factors, social interactions was

found to be a strong significant factor in influencing the usage of e-learning among postgraduate students.

Moreover, Dominguez ,Saenz-de-Navarrete,De-Marcos,Fernández-Sanz, Pagés and Martínez-Herráiz (2013) studied the impact of gamifying leaning experience. The authors observed that, the practical implication is that, it could enhance students' motivation and engagement in the learning process when used in educational based web service such as e-learning. They further stressed that gamifying learning experience can have a great social and emotional impact on students, as reward systems and competitive social mechanisms can seem to be motivating for them, thus, capturing their interest in using e-learning more.

In a different focus, Hernandez ,Montaner,Sese and Urquizu (2011) studied the implication of enhancing the platform of e-learning, so that it can be socially motivating. The authors concluded that, two important variables usually play role among users of any online tools. One is that, every user usually anticipates reciprocal relationships among others in an online environment. Two, that they anticipate extrinsic rewards when interacting with others using online tools. These two factors are capable of determining their level of social motivation in the usage of any learning tool (Hernandez et al., 2011).

Meanwhile, in term of mechanisms for consideration, author such as Silva proposed a list of gamification elements that focused specifically on how social game mechanisms could be included in e-learning platform to increase motivation

for students by means of new interaction mechanisms with classmates (Silva , 2010) Customization , community interaction or leader boards are some of the proposed mechanisms. Meanwhile, the author provided little guidance of how to apply them on education.

Similarly, Gaasland presents a detailed experiment in which she developed a web platform for a gamified e-learning experience. The web platform was evaluated using university students. It was concluded that the platform served as a collaborative database where students creates and answer questions (Gåsland, 2011). Apart from the collaborative aspect, the gamification mechanisms used is experience points, and a classic video game mechanic that was used to keep track of progression. The results showed that the platform was somewhat motivating, but need to be further tested on other gamification mechanisms.

Therefore, it could be seen that, the impact of game on e-learning platform have been well researched and outstanding conclusion for likely implication on e-learning usage have been identified. Meanwhile, the possible outcome of using online social game have not been the specific focus in most of the researches and most importantly, how this could impact e-leaning usage among female students. Thus, this aspect is the focus of this study. In doing this, we consider the relevance of community of inquiry model, being one of the popular theory used in this domain to explain the importance of three basic constructs (social presence, cognitive presence and teaching presence) in any online learning system to facilitate its usage and acceptance by the users. The relationship among these three constructs with e-learning usage are discussed in the following sections.

2.8.1 Social Presence and E-learning Usage

Social presence is learners' ability to project themselves as real persons in an online community (Garrison et al., 2000). Social presence concerns how learners use their full personality to communicate with others in a sociable and emotional manner over the electronic medium. There have been numerous findings from previous studies (such as; Picciano, 2002; Lee & Faulkner, 2010; Iahad, Dafoulas, Kalaitzakis, & Macaulay, 2004; Oliver & Omari, 2001) on the relationship between social presence and usage and experiences of learners on e-learning applications. For instance, Picciano (2002) reported that the social presence in an online course stipulated learners' performance during their course assignments and examinations. The study asserted that, social presence is positively and significantly impactful on students' performance in written assignments . social presence was strong because students had to participate in the weekly online discussions, which encouraged students to identify with and learn from other students. By contrast, social presence did not relate to the examination . Another study conducted by Richardson and Swan (2003) affirmed that learners' perceived social presence is significantly related to perceived learning experience and satisfaction from using e-learning packages.

Lee and Faulkner (2010) illustrated in another study where the community of enquiry model was adopted and expanded to study the experience of postgraduate students in using e-learning application. Their study affirmed that, social presence especially in terms of process and structure have significant effect on e-learning usage experience. Rovai (2002) added that, the social presence is such a determining factor to the extent that learners can abandon e-learning for the main purpose of lack

of social presence. Hence, this imply that, in order to enhance impressive usage of e-learning among student, a strong sense of community must be created in the e-learning environment. The presence of social presence in other words is believed to stimulate satisfaction, increase usage and ensure continues usage of e-learning among students (Lee & Faulkner, 2010).

2.8.2 Cognitive Presence and E-learning Usage

Cognitive presence is one of the important factors that enhances e-learning usage among students according to the community of enquiry model (Lee & Faulkner, 2010). According to Garrison et al., (2000), cognitive presence explains learners meaning and learning acquisitions in a social learning environment. Understanding and learning in a social milieu does not happen in a vacuum, rather it happens through process which involves initially understanding the problem, followed by communicating the problem to others, then meaning are constructed from the communications and finally problem can be solved in consensus. There have been quite a number of previous studies that examine the impact of cognitive presence on e-learning usage and experience. For example, Lee and Faulkner (2010) reported that, cognitive presence is a significant factor to e-learning experience. Also, Oriogun (2003) affirms that learning in a social platform happens through social nexus and connections. In other words, learners acquire knowledge and meaning by interacting and exchanging ideas within networks. Support for the influence of cognitive presence on e-learning experience also come from a focus group that suggests effective e-learning takes place when students collaborative via online projects .The findings of Kanuka and Garrison (2004) affirmed that effective

learning takes place in an e-learning environment because of the collaborative and interactive nature of the platform. Such collaborative projects encourage students to critique each others' solutions and think creatively when building a consensus-based solution, thereby leading to higher-order learning.

2.8.3 Teaching Presence and E-learning Usage

Teaching presence is the third and arguably the most important construct of the community of enquiry model. In fact, Bangert (2008) argued that, teaching presence is the construct that binds the other two constructs. In other words, teaching presence anchors the functionalities of both social and cognitive presence in the e-learning environment. Garrison et al. (2000) also added that, teaching presence involves various actions, including designing a course for online delivery, sharing personal experience and direct instructions to manage students learning .Shea et al. (2003) elaborated that, teaching presence exceed the presence of learning and teaching interactions on electronic platforms but also include course design, operation, and direct instruction. Therefore, teaching presence has been examined empirically, for instance, Bangert (2008) reported that, teaching presence is a significant predictive factor to learners' usage experience of e-learning. Some other studies have presented findings that imply that teaching presence is the most significant predictive factors compare with both social and cognitive presence (Kanuka& Garrison, 2004; Shea et al., 2003). In other words, when teaching presence is not perceived positively or favorably it would detrimentally affect users' perception and usage of e-learning (Lee & Faulkner, 2010).

2.9 Supporting theory

2.9.1 Community of Inquiry Model

Community of inquiry (COI) is a popular theory in the domain of Information System (IS). It is proposed by Garrison, Anderson and Archer (2000) to develop a comprehensive framework for online learning tool. This theory focus on how learning experience and interaction may drive the learning process.

The model emphasized that learners interact in a community and should not be denied the responsibility to learn on their own. In a manner to provide a philosophical view of fundamental elements that can impact the usage of any online educational tool, Garrison, Anderson and Archer (2000) identified three basic elements which analyze the features that must be present in any online social service.

The first is the social presence which was referred to as the ability for participants using online educational tool to project themselves socially and interact as real individuals of a particular learning community through the medium of communication being used.

The second is the cognitive presence which states the extent to which learners should be able to construct and confirm meaning through sustained interaction, reflection and discourse in a critical community.

The third is teaching presence that relates to how the design and organization of online educational tool should facilitate discourse and direction of cognitive and social processes mainly for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes (Garrison, 2011).

Therefore, since the challenge is to understand how the emerging educational tools can create learning environments that can facilitate development of social interactions and higher-order cognitive abilities in which teaching and learning process can be adequately enhanced. The use of these concepts to explain the impact of online social game on e-learning platform may enhance our understanding of what online social game is intended to achieve in e-learning environment towards enhancing its usage especially among female students.

Subsequently ,the community of inquiry model is presented in the framework that identified the elements of the theory namely; social, cognitive and teaching presence dimensions for studying online social game and learning experiences. Swan et al., (2008)explained that, these three dimensions characterize the experiences and the encounters of online learners. In other words, the community of inquiry model is a comprehensive model that provide significant help in studying online community learners. In the context of this study, the community of online social gammers and their learning experiences were examined using the perspectives of the community of inquiry model. The framework provided in Figure 2.3 consisted of three elements namely; social, cognitive and teaching presence. Garrison and Archer (2003) and Garrison et al., (2006) asserted that the community of inquiry model provides

significant insights and methodological solutions for studying e-learning experiences of using online platforms.

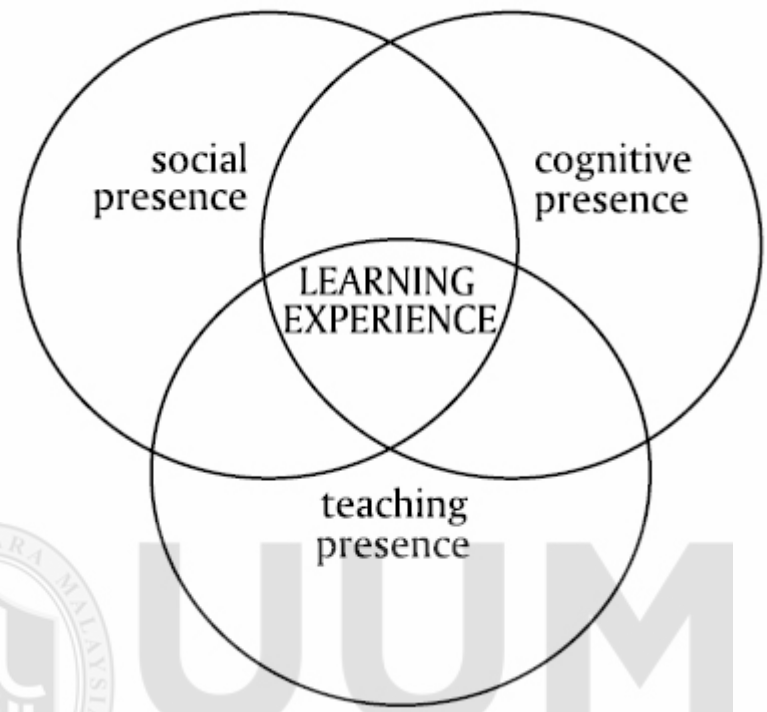

Figure 2.3 Community of Inquiry Model Framework. Source; Swan et al., (2008).

2.10 Summary

This chapter has reviewed relevant literatures that could help in achieving the objectives of this research. Most of the literatures that are highlighted in this chapter are part of the need for achieving the objectives of this study. It basically contains overview of e-learning. The benefits and attributes of e-learning are discussed towards achieving objective of the study. Also, the direction for investigation in this study have been identified which is linked to the associated theory in the domain of

investigation. Therefore, this research reflects the impact of online social game in achieving efficient use of e-learning among female students.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

The approach to be followed to achieve the objectives of this study is presented in this chapter . This section in particular comprise of the Research design, Stimuli to responds **,** conceptual framework, Sampling Method , Sampling Technique , Research Instrument , Tests of Reliability and Validity , Pilot study and Data Analysis. These shall be systematically discussed to provide direction for the study.

3.2 Research Design

Research design is the structure and strategy of investigation to obtain answers to research questions or problems (Kerlinger, 1986). According to Davis and Cosenza (2000) , research design is a road map for the researcher to find answers for certain issues. On a similar note, Zikmund (2003) described research design as a master plan specifying the techniques and procedures for collecting and analyzing the needed information, which is considered important in any research . Babbie (2010) also referred to research design as a method of structuring inquiry. The author further explains that social science research in its essence necessitates varieties of approaches to attend to its diverse demand of human curiosity. Hence, this can be achieved through exploration, description, and explanation, which are the three main purposes of research to analyze the cause and effect of hypothetical relationships. Attending to this curiosity has been responsible for the emergence of

research paradigms with diverse approaches and peculiarities, as symbolizes by social constructivism, post-positivism, and pragmatism (Creswell, 2010).

From the fore-going, it is evident that the importance of understanding the intricacies of research design cannot be overemphasized. Apart from serving as guide in the selection of the problem inquiry, data collection and data analysis methods, understanding one's research design paradigm serves as a philosophical support that helps in maintaining the course of the research. According to Creswell, (2010), there are various ways to investigate hypothetical relationships in science researches and these include: laboratory experimentation, field survey, case studies and analysis, simulation, forecasting, and phenomenological investigation. Therefore, without further deviation, this research employ an experimental research design to achieve the objectives of this research.

Meanwhile, on a general perspective to experimental research design, it has been discovered to be a common methodological design in the realm of examining causal relationships between variables (Smith, 2012). An experimental research design, using controlled laboratory experiment, is considered appropriate for this study because researcher can reliably establish the causal effect between the variables. It further helps in empirically establishing the real cause and effect relationship among different variables (Salkind, 2009), due to the fact that other extraneous variables which can be intervening are controlled.

3.3 Stimuli To Responds

According to the analysis presented by Phan, Jardina , Hoyle and Chaparro (2012), it was found that female student like to play non-violent games such as FarmVille2 (https://www.zynga.com/games/farmville-2). Respondents which are selected for the experiment would be briefed on the purpose of the research. Respondents were given ample time to understand and play Farmville2 on a computer in the controlled laboratory experiment. After this, the participants were debriefed through an administration of questionnaire to gather their respective experiences . Aside the popularity of FarmVille2 among students, other rationale for choosing FarmVille2 for the purpose of data collection is presented in the following section.

3.3.1 The Choice of FarmVille 2

According to Gåsland(2011), Wikia, Wikipedia and Water.org, FarmVille2 is Launched in September 2012 and currently the most popular social game on Facebook according to AppData, FarmVille 2 is Zynga's first social game built entirely in 3D – delivering players a brand new farming experience with stunning visuals, new neighbor interactions, rich characters, and a beautiful farm that comes alive with every touch. The game invites players to restore their old family farm, working with friends to harvest crops, craft goods and raise animals, as they bring the farm back to its original glory.farmville2 is attracting about 8 million players every day (Bort,2013) .

The game's characters which are Farmer and Neighbor help in fostering social relationship .Players can add their friends as neighbors in FarmVille2 .

These neighbors can, thus, visit each other. They can likewise send gifts to each other. If a player visits a neighbor's farm, they may sometimes be asked to help out. If the farmer accepts, they will earn a small amount of coins and experience. As well as this, if the farm has enough crops, the player can choose to fertilize up to five of their neighbor's harvests. This procedure and general movement in FarmVille2 demonstrates that the gaming background has social presence.

Moreover, the fundamental objective of FarmVille2 is making a major and flourishing farm. This is accomplished by planting crops, buying animals, planting trees and building decorations , by the player. At the point When a player plants a crop, it will grow for a period of time. After this period, the crop can be harvested, gaining the farmer coins. This process aids and builds cognitive and thinking processes of the players. It supports cognitive presence experience.

Furthermore, if the farmer which is the player (a gamer) does not collect a harvest in time, it will wither. Every harvest will wither in a different time. Crops wither after the same measure of time it takes to grow them, if a product takes 2 hours to grow then it will wither after 4hr from the time it is planted. Be that as it may, a fruitful farmer can develop more harvest; buy bigger farms, extra farms and more farm equipment. This shows that, apart from cognitive and social presences in FarmVille2, the direct instructions received from the gaming environment as well as the personal experience of playing the online social games such as FarmVille2 are educating. Hence, the presence of teaching factors which can have ripple effect on gamers in their usage of e-learning applications.

3.3.2 Relating the Attribute of Farmville2 to E-learning

As detailed discussed under the literature review, the contributions of online social games in the advancement of e-learning concepts and application cannot be undermined (Sabino, 2010). Going by the community of inquiry model that is adopted in this study for the development of the proposed hypotheses, three attributes namely; social presence, cognitive presence and teaching presence are what predetermine users experience of e-learning usage. Similarly, this study aim at establishing the impact of online social games using these aforementioned attributes. Therefore, the presence of these three attributes on FarmVille2 are discussed below.

3.3.2.1 Social presence in farmville2

Social presence is anchored in FarmVille2 with the attribute and the possibility of interacting among the gammers community. With FarmVille2, a gammer can participate and interact with other gammers. The FarmVille2 game can serve as a platform for gammers to socially exchange ideas and interact among themselves. This attribute is in line with e-learning social presence attribute. Evidently, e-learning application is also embedded with social presence which is referred to as the ability for participants using online educational tool to project themselves socially and interact as real individuals of a particular learning community through the medium of communication being used (Garrison,2007).

3.3.2.2 Cognitive presence in Farmville2

Cognitive presence in FarmVille2 can be attributed to the gaming experience. Through farm management and corps plantations, a farmer (gammer) faced the challenges of keeping of with time, earning coins and obtaining high scores. Ultimately, though FarmVille2, a gammer can learn time management and overcoming obstacles among other things. Connectedly, the cognitive presence in FamVille2 is similar to that e-learning cognitive presence attribute whereby learners are able to construct and confirm meaning through sustained interaction, reflection and discourse in a critical community(Garrison,2007).

3.3.2.3 Teaching presence in Farmville2

FarmVille2 teaching presence is embedded through the direct instructions that gammers received from the game to navigate around. FarmVille2 gives instructions and next point of actions. This feature is related to the teaching presence of e-learning that relates to how the design and organization of online educational tool facilitate discourse and direction of cognitive and social processes mainly for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes.

3.4 Conceptual Framework

The conceptual framework proposed in this study is an indication of the study hypothesized relationship between the variables understudied in this research . Hence, the impact of online social game on e-learning usage using the constructs of

community of inquiry mode .As previously explained, several studies have suggested that online social networks when used in e-learning platform improved the usage of e-learning. Similarly, the effect of gamifying the learning process has been explicitly indicated. Hence, since, little attention was paid to the specific implication of online social game in improving the usage of e-learning especially on female students .This study explores the relationship between online social game and the e-learning usage by investigating the impact of social presence, cognitive presence and teaching presence on e-learning usage . Thus, Figure 3.1 depicts the conceptual framework proposed in this study.

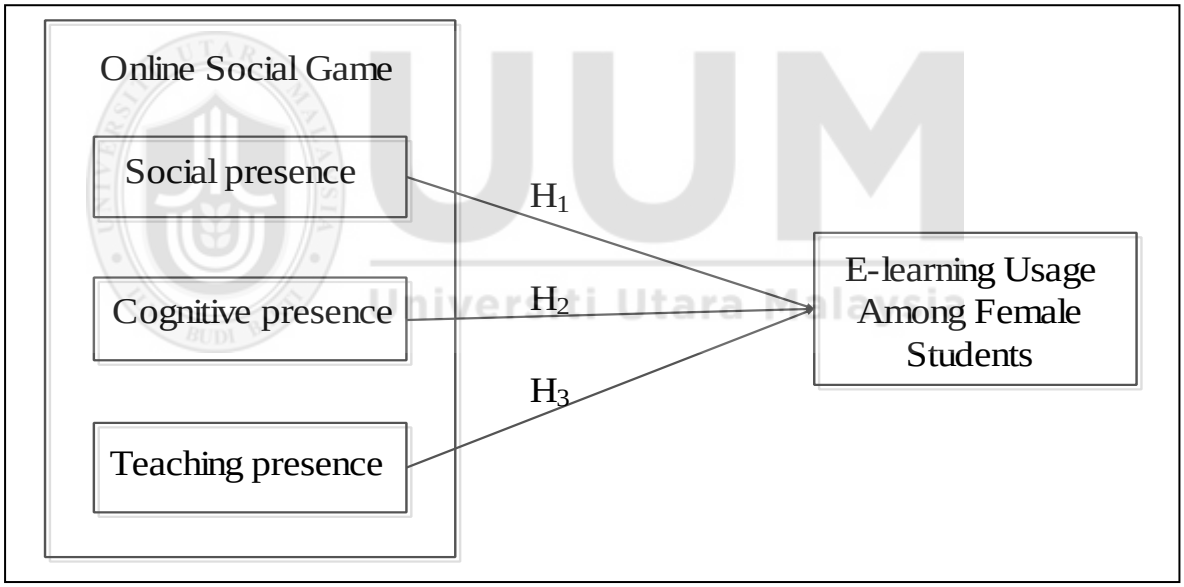

Figure 3.1.*Conceptual Frame work*

Putting the community model into perspective, social presence is the ability for participants using online educational tool to project themselves socially and interact as real individuals of a particular learning community through the medium of communication being used (Garrison, 2011) . Also, studies have reported that social

presence have a positive impact on e-learning usage(Lee & Faulkner, 2010; Picciano 2002; Iahad et al., 2004; Oliver & Omari, 2007 ; Richardson&Swan , 2003 ; Rovai , 2002). Therefore, the following hypothesis is proposed:

H_1: Social presence in online social games has positive impact on the usage of e-learning among female students.

According to Garrison, (2011) cognitive presence is the extent to which learners should be able to construct and confirm meaning through reflection ,sustained interaction, and group discussion in a critical community. Hence, it can be presumed that the cognitive engagement of gamers on online social games attracts gamers to play the games again and again. Also, studies have reported that cognitive presence have a positive impact on e-learning usage (Garrison et al., 2000; Oriogon 2003; Lee & Faulkner, 2010; Kanuka &Garrison ,2004) . In the same vein, the following hypothesis is presented:

H_2: Cognitive presence in online social games has positive impact on the usage of e-learning among female students.

Teaching presence refers to how the design and organization of online educational tool should sharing personal experience and direction of cognitive and social processes mainly for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes(Garrison, 2011). It has been established in literature, that there is a significant relationship between teaching presence and

e-learning usage (Bangert,2008; Shea et al., 2003; Garrison et al., 2000; Kanuka & Garrison, 2004; Lee and Faulkner, 2010) . Therefore, it is hypothesized as thus:

H_3: Teaching presence in online social games has positive impact on the usage of e-learning among female students.

3.4.1 Variables Description

3.4.1.1 Social Presence

Based on the proposition of the Community of Inquiry Model, social presence is the ability to project one's self as real participant of online community by establishing personal and purposeful relationships with people in online activities (Garrison, 2007; Akyol & Garrison, 2014). This construct describes three important aspects which are; group cohesion, open communication and affective expression which are the main dimensions that describe social presence in online social games.

3.4.1.2 Cognitive Presence

Cognitive presence is operationally defined as the confirmation, exploration, resolution and construction of understanding through collaboration and reflection in an online community (Garrison, 2007; Akyol& Garrison, 2014). This also relates to sense of puzzlement that shows how information is being exchanged, how ideas are connected and how new ideas are applied while playing online social games.

3.4.1.3 Teaching Presence

According to Akyol and Garrison(2014)and Garrison (2007) and several evidences have emerged that teaching presence is an important determinant for students' perceived learning, satisfaction and sense of community. This relates to how students shared personal experience to activities in social online games and the level to which such activities is able to capture their interest and encourage them to continuously play online social games.

Table 3.1: *Summary of Variables*

Variables	**Dimension**	**Authors**
Social presence	Group cohesion Open communication affective expression	Garrison (2007); Swan et al.(2008); Swan and Shih (2005); Lambert & Fisher(2013); Akyol and Garrison (2014);
Cognitive presence	Information exchange Connecting ideas Apply new ideas	Garrison (2007) ; Swan et al.(2008); Lambert and Fisher(2013); Akyol and Garrison (2014)
Teaching presence	Sharing personal experience Direct Instruction	Garrison (2007); Swan et al.(2008); Lambert and Fisher(2013); Akyol and Garrison (2014)

3.5 Subjects (Sampling Method) and Data Procedure

The essence of representativeness in selecting subjects for one-shot case study such as in other social sciences research methods(Babbie,2010). The source also affirmed that it is common among experimental researchers to select university students in

conducting their study. The two possible ways of selecting subjects for the purpose of experimental research design are probability and randomization (Neuman, 2007 ; Babbie, 2010). In an experimental research design, the representativeness of the selected subjects is more crucial than the sample size (Babbie, 2010). Random subject selection is preferably appropriate in this kind of study as compared to probabilistic selection .Therefore, 80 female students from the School of computing, Universiti Utara Malaysia, who were randomly selected to participate in the controlled laboratory experiment due to their familiarity to the use of online social games and e-learning .

Hence, the fact that this study conducts the investigation on how online social games could impact on e-learning usage through female students, the study selects participants among the students for the investigation . The selection of sampling was done through convenience method. Considering the fact that this study employs an experimental research design, the respondents were met in their classrooms. The lecturers were consented. Both the lecturer and the student were informed about the research objective. The participants were first given an ample time to play FarmVille2 in the laboratory and subsequently a survey questionnaire was distributed for their response based on their experience.

3.5.1 Sampling Technique

Considering the fact that this study adopts an experimental research design, convenience sample technique is adopted in this present study. Justifiably, the convenience sample technique allows the researcher to determine a sample size for

the data collected considering the accessibility of the respondents and the visibility of administering the research instruments (Sekaran&Bougie, 2010). Also, the convenience sample technique is the most commonly used technique in experimental studies (Sekaran&Bougie, 2010). This sampling technique allow the researcher to visit participants in classrooms where participants can have access to computers to play online social games and fill the research questionnaire afterwards. After their lecturers were consented and participants were informed, the researcher was granted the permission to conveniently conduct the research among the participants in their classrooms.

3.6 Research Instrument

Previous studies have stressed the needs for designing of research instrument in order to understand some underlying assumptions which help in formulating good questions that need to be answered by the participants (Daniel, 2012; David & Robert, 2007). Redesigning of research instrument for data collection is necessary in some cases that the previous and existing instruments are to be used in a scope that different from previous research (Leiyu, 2008). Indeed, Leiyu (2008) argued that the objectives of study, research concept and dimensions require proper understanding before designing of the research instrument. Besides the research design to be adopted in a research, instrumentation is one of the major important issues (Sekaran&Bougie, 2010). This study aims to collect data by using survey questionnaires .

Some of the advantages of using questionnaires in this study are (1) The responses are gathered in a standardized way, so questionnaires are more objective; (2) It is quick to collect information using a questionnaire; (3) It is a potent way of collecting information from a large portion group in a short period and in a relatively cost effective way; (4) The results of the questionnaires can usually be quickly and easily quantified through the software, SPSS. (5) The data can be quantified to compare and identify changes during the evaluation process(Bonn , Lagerros , Christensen , Möller ,Wright , Sjölander& Bälter, 2012; Soer , Reneman ,Vroomen ,Stegeman & Coppes , 2012; Weintraub , Mamikonyan ,Papay ,Shea, Xie& Siderowf,2012).

There are two distinctive methods of questionnaire structure namely ; open-ended question and closed-ended question. Open-ended questions allow respondents to provide their own answer. While, a close-ended question is a list answer, and respondents select either one or more multiple response, it is only in one word or very short phrase answer. Furthermore, close-ended questionnaire had numerous types of responses, such as, two-option responses, rating scale , paired comparisons, one best answer, , ordered choice, items in a series, matching and multi-choice answer (Friborg & Rosenvinge, 2013). We decided to use the questionnaire in way of close-ended questions with the rating scale to investigate and collect the data. In addition , the answer was measured with the scale of strongly disagree to strongly agree. The potential advantages to use a rating scale that establishment the answer to be more clear and balanced.

The questionnaire is divided into five parts. Part A addressed the demographic profile of the respondents. Part B focuses on the measurement of social presence. Followed by Part C which entails measurement of cognitive presence. Part D presents measurement of teaching presence and Part E entails measurement of E-learning. The items of the questionnaire were adapted from previous research . Items for social presence were adapted from (Garrison, 2007; Swan et al., 2008; Swan & Shih,2005; Lambert & Fisher,2013; Akyol& Garrison, 2014). Items for Cognitive and teaching presence were adapted from (Garrison, 2007; Swan et al., 2008; Lambert & Fisher,2013; Akyol& Garrison, 2014) and Items for e-learning usage were adapted from (Spears,2012; Steckbauer ,2005;Cobb,2009 ;Gåsland , 2011).The questionnaire adopted a Likert type scale on which the respondents are requested to select the appropriate option that suites their responses based on the Five point likert scale . Krosnick and Fabrigar(1997) argued that a scale between five and seven points is more reliable and valid than shorter or longer scales . Accordingly , this study used five points Likert scale from 1- strongly disagree to 5- strongly agree . Table 3.2 presents the number of questions and response categories in each section of the survey . (Please refer to Appendix A).

Table 3.2 Number of Questions and Response Categories by Questionnaire Section

Section	Number of Questions	Codes	Questions	Adapted or modified
Demographic	7	1-	What is your approximate age?	Literature Review
		2-	What is your highest academic qualification?	
		3-	What is your academic field?	
		4-	Do you play online social games?	
		5-	Do you use any e-learning applications?	
		6-	How many hours you play online social game daily?	
		7-	How many hours you use e-learning application daily?	
Social presence	8	1-	Playing online social games can enhance interactions with other gamers	Garrison (2007); Swan et al.(2008); Swan and Shih(2005) Lambert and Fisher (2013) ; Akyol and Garrison (2014) ;
		2-	Playing online social games makes interpersonal relationship to be of fun	
		3-	Playing online social games increases the closeness among players	
		4-	I will use e-learning websites if they have similar fun with online social games.	
		5-	Playing online social games makes interpersonal relationship to be stronger	
		6-	Playing online social games allows players to freely communicate with one another	

		7-	Online social games into encourage collaborations with other players	
		8-	I enjoy playing online social games with other gamers	
Cognitive presence	7	1-	Through exploration of the online social games, I feel there is a free flow of information exchange	Garrison (2007); Swan et al.(2008); Lambert and Fisher (2013); Akyol and Garrison (2014)
		2-	I can comment on other people's idea, through online social games	
		3-	I gain new ideas from playing online social games	
		4-	Online social games enhances my thinking process	
		5-	The brainstorming activity in playing online social game helps me in problem solving	
		6-	I like to play online social games because it challenge my brain	
		7-	Because I play online social games, it is not difficult for me to use e-learning applications	
Teaching presence	5	1-	I learn new things by playing online social games	Garrison (2007); Swan et al.(2008); Lambert and Fisher
		2-	The instructions I receive in online social games are helpful in using e-learning	
		3-	I learn how to focus in learning from playing online social games	
		4-	I receive direct instructions in online social games	

		5-	I can share my personal experience from online social games with friends	(2013); Akyol and Garrison (2014)
E-learning usage	2	1-	I like to use the e-learning applications	Spears(2012); Steckbauer(2005); Cobb(2009); Gåsland(2011)
		2-	I am motivated to use the e-learning applications because it is similar to online social games.	

3.7 Tests of Reliability and Validity

Assessment of the validity and reliability of the items was conducted before the questionnaires were distributed to the respondents to ensure that items are suitable for measuring the variables of the study. The validity is related to the accuracy of measures, and the reliability is related to consistency of items and stability (Sekaran & Bougie, 2010). The researcher conducted both content and construct validity to ensure validity and reliability of the study's instrument.

Content validity ensures that the instruments include an adequate and representative set of item, which related to the concept of the study. In the content validity, the expert did the validity test in order to ensure the item in each instrument. Further, the study makes sure the content validity in relation to all dimensions, incorporated into questionnaire. Construct validity helps encourage the researcher to deduce hypotheses from a theory that is relevant to the concept .According to Buchanan and Bryman(2007),when the researcher could gather that unit of investigation utilized

has a complex quality and supports predictions that are made by hypothesis can make the instrument has high construct validity. Three experts at Universiti Utara Malaysia (UUM) were consulted to assess on the content validity of the questionnaire. The comments were used to correct and remove ambiguity and redundancy in the wording of the research questionnaire. All the notes or comments were considered through the researcher and changed upon the experts point of view.

To check the reliability of the questionnaire, Cronbach's Alpha test is used . The reliability coefficient scores are considered poor when the Alpha coefficient range < 0.6, is moderate when the range is between 0.6 and 0.7, good when the range is between 0.7 and 0.8, very good between 0.8 and 0.9, and excellent when the Alpha coefficient range is equal to or more than 0.9 (Hair, Black, Babin & Anderson, 2010). According to Hair et al., (2010) the acceptable threshold for the reliability of this kind of study is 0.60 and above.

3.8 Pilot Study

Pilot study is an important aspect of research methodology because it focus on the perfection and correction of research instrument, by exposing it to a small group of population which is not necessarily the main targeted population of the study , in order to pretest the originality and consistency of the instrument (Sekaran, 2000). Edwin and Vanora (2001) believed that pilot study is an important part of a research activity as it is often used to presume the success of the entire research. John (2008) explained that, pilot study is the procedure of testing a research questionnaire before proceeding the main that collection.

According to Edwin and Vanora (2001) , Pilot study is conducted in this research to test the reliability and validity among the items adopted for data collection in this research , pilot study is conducted to ensure such as such as; eradicating ambiguities and difficulties of understanding the constructs , the proper ways of administering the questionnaire to the targeted sample, discarding all unnecessary items from the questionnaire , recording time taken to complete the questionnaire, , ensuring that respondents can answer easily to all questions and restructuring all questions that are not answered expectedly. According to Sekaran(2000) and Chau&Hu, (2001) ,the sample size for conducting pilot study should not necessarily be big; therefore, 30 respondents were selected for pilot testing the research instrument. Subsequently, 30 questionnaires were found useful and reported. The result of the pilot study revealed that the Cronbach's Alpha obtained for the items under each variables are reliable. Table 3.3 shows the Cronbach's Alpha for social presence (0.697), cognitive presence (0.704), teaching presence (0.804) and E-learning usage (0.771)

According to Hair et al., (2010) the acceptable threshold for the reliability of this kind of study is 0.60 and above. The Cronbach's Alpha from the pilot study was more than .60 as a result no item was deleted . All items were well understood by the respondents . The summary of the result of the pilot study is showed in table 3.3 below

Table 3.3 :*Summary of the Pilot Test Reliability Analysis of Constructs.*

No	Variables	Items	Cronbach's Alpha
1	Social Presence	8	0.697
2	Cognitive Presence	7	0.704
3	Teaching Presence	5	0.804

4	E-Learning Usage	5	0.771

3.9 Data Analysis

The data collected in this study is analyzed by using the Statistical Package for Social Sciences (SPSS) version 20 to put the hypothesized relationships in this study into test . Prior to the main data analysis, data preparation, cleaning and screening such as coding, data editing, missing data , outlier treatment and tests the of normality that will be done to ensure that the collected data are qualified to be used for the main data analysis. Descriptive analysis was conducted using frequency, mean, and percentage to describe the profile of the respondents and the data distributions. Correlation analysis is described as the assessment of the relationship between two variables . The regression analysis is used to examine the impact of more than one independent variable on one single dependent variable , hence to test the hypotheses proposed in this study.

3.9.1 Descriptive Analysis

The descriptive statistics option in SPSS version 20, such as frequency and standard deviation, was used to understand the profile of the respondents as well as to get a feel for data. This technique presents a description of the overall responses obtained, and at the same time, it was used to examine the data for erroneous entries.

3.9.2 Pearson Product-Moment Correlation

Pearson product-moment correlation is utilized to decide the strength of relationship between two variables (Hair et al.,2010). This study employed correlation analysis to determine the bivariate relationship social presence, cognitive presence, teaching presence and e-learning usage. According to Pallant (2011), the quality, direction and significance of the relationship between the variables were discovered by utilizing person product-moment correlation. . Correlation analysis is conducted for this study between (social presence, cognitive presence, teaching presence) and e-learning usage, for three main purposes. Firstly, the tests are conducted to determine the direction of the relationship between these variables. Secondly, the tests are conducted to determine the strength of these relationships of these variables. Thirdly, the tests are conducted to examine if there is any multicollinearity between the independent variables.

3.9.3 Multiple Regression

Multiple regression was used in analyzing the relationship of the variables. It is used when more than one variable jointly regressed to provide explanations about the variance in the dependent variable. In multiple regressions, R^2 indicates the amount of variance explained in the dependent variable. The result of the multiple regression can be interpreted when the F-statistics and its significance level is known.

3.10 Summary

This chapter discusses the methodologies and research techniques employed by this study. It explains research design and specifies Experimental design as the appropriate research method employed by this study so as to establish the causal relationship between the investigated constructs. The experimental setting is said to be controlled laboratory of a users' experience experiment with 80 participants drawn from the female students of School of Computing, Universiti Utara Malaysia. The data instrument design process is equally discussed and the preliminary pilot study for reliability and validity of the instrument. Lastly, the data analysis will be further done, and in both cases, SPSS is the statistical analysis tool.

CHAPTER FOUR

Data Analysis and Findings

4.1 Introduction

This chapter discusses the findings of the statistical analysis conducted in this study. The first section presents the results of the preliminary test undertaken, followed by the presentation of the results of the descriptive analysis of the respondents and the constructs, in addition, the results of the test stated hypotheses in the study are as well presented. The results of the data screening and cleaning are presented in the following section.

4.2 Data Screening and Treatment

Screening of the collected data for error and anomalies is the first and important step to be taken before conducting any statistical analysis (Van den Broeck & Fadnes, 2013; Pallant, 2001). Therefore, screening of data for error that might have arisen due to missing values and researchers mistakes while in putting the data becomes important prior to conducting any statistical analysis. The reason for conducting data screening is to avoid errors such as Type 1 and/or Type 11 error). Type 1 error is the probability of rejecting a hypothesis when it is indeed true, while Type 11 error indicates that a null hypothesis is accepted when it should have been rejected (Sekaran, 2003). Based on the reasons given above, the data collected in this study were screened for missing data and treated with SPSS version 20.

4.2.1 Missing Data

In order to detect the missing data, the researcher used SPSS version 20 for checking the missing data . Missing data is regarded as a source of threat to the validity of the conclusion made by researchers. The degree of threat caused by missing data differs depending on its frequency in a set of data. 1% missing data causes no threat to validity, while the threat caused by 5% is regarded as bearable and it is treated by replacement with the mean of the nearest k-value. 15% missing data possess a great threat and thus requires a sophisticated statistical treatment (Acuna & Rodrigues, 2004). As such, the missing data in this study were replaced with the mean of the nearest k-value as the percentage of the missing data falls within the bearable range.

In addition to the error due to missing value, error due to out-of-range data was also detected and treated by tracing it back to the source in the questionnaire to retrieve the correct response. Hence the incorrect response was replaced by the accurate response. Subsequently, descriptive analysis was re-conducted to confirm the correction made. Upon the confirmation of the successful data screening and treatment of the errors due to missing value and out-of-range error, the researcher checked for the presence of outliers.

4.2.2 Treatment of Outliers

The researcher has also checked for possible outliers after the checking for missing data is completed . In the phases of data collection or/and data entry, a researcher may make mistakes that result in distinctly varying values from those of the other respondents which are considered to be outliers (Hair et al., 2010). An outlier can

also include an accurate observation that reflects the true characteristics of the population but still distorts the results of the study. In other words, an outlier is an extremely high or low data value when compared with the rest of data . The existence of outliers can affect the validity of a study; therefore, a researcher has to identify the outliers and deal with these issues (Denscombe, 2010; Hair et al., 2010; Pallant, 2013).. There are various methods in which outliers in a data set can be detected and treated (Pallant, 2011). In this study, a descriptive test was first conducted the descriptive entails the minimum and maximum statistics. The results present that there is no data excluding in the data range. The univariate analysis for detecting outliers was also conducted. Hence, the standardized values (Z score) was calculated for whole item in the dataset. The threshold was set at ±3.29 ($p < .001$) according to the recommendation by Tabachnick and Fidell (2007). The descriptive result for Z score is presented that the Z score for the entire items are below ±3.29 (Refer to Appendix B)

Furthermore, the study also employ the technique suggested by Tabachnick and Fidell's (2007) to detect outliers at the multivariate level. Hence, Mahalanobis distance (D2) was used to determine outlier cases at the multivariate level. Tabachnick and Fidell (2007) defined Mahalanobis distance (D2) as "the distance of a case from the centroid of the remaining cases where the centroid is the point created at the intersection of the means of all the variables" (p. 74). Therefore, the Mahalanobis was compared with the calculated Chi-square threshold using the Chi-Squire calculator. Based on the 22 observed variables in this study, the Chi-square threshold is 48.27 and p=0.001 (Refer to Appendix C). Hence, the Mahalanobis

value that exceed the chi-square threshold would be deleted. The descriptive result of the calculate Mahalanobis value presented in Table 4.1 below shows that, the highest Mahalanobis value (40.732201) in this study is below 48.27 . The table 4.1 shows that there is no outlier in the dataset used in this study

Table 4.1: *Descriptive Result for Mahalanobis Distance*

	N	Minimum	Maximum
Mahalanobis Distance	80	3.010890	40.732201
Valid N (listwise)	80		

4.2.3 Assessment of Normality

One of the challenges of inferential statistics in social and management sciences is the normality of the distribution of the data collected , normality is the way the data distributed in hierarchical way in order to ensure a reliable result for multiple regression analysis (pallant,2010;park,2008) . According to Pallant (2013), normality refers to the normal distribution of the residuals about the predicted dependent variable. Normality is checked using two types of normality tests namely: a histogram with a normal curve, and skewness and kurtosis. Firstly, the histogram tests were conducted for independent variables and dependent variable. Figure 4.1 present the histogram and normal curves of the normal distribution of the dataset. It can be seen that the normal curve is symmetrical and bell shaped . Thus, it can be accepted that the normality assumption is met. Secondly , Skewness value (measure of symmetry of a distribution) and Kurtosis value (measurement of the peakness or flatness of distribution when compared with a normal distribution) are two elements calculated to find the normality of the data (Norusis,2011) . According to

Hair et al., (2010), the acceptable value for skewness and kurtosis of below ±3 for skewness and below ±8 for kurtosis. The variables in this study all obtained acceptable values of skewness and kurtosis (Refer to Appendix D).

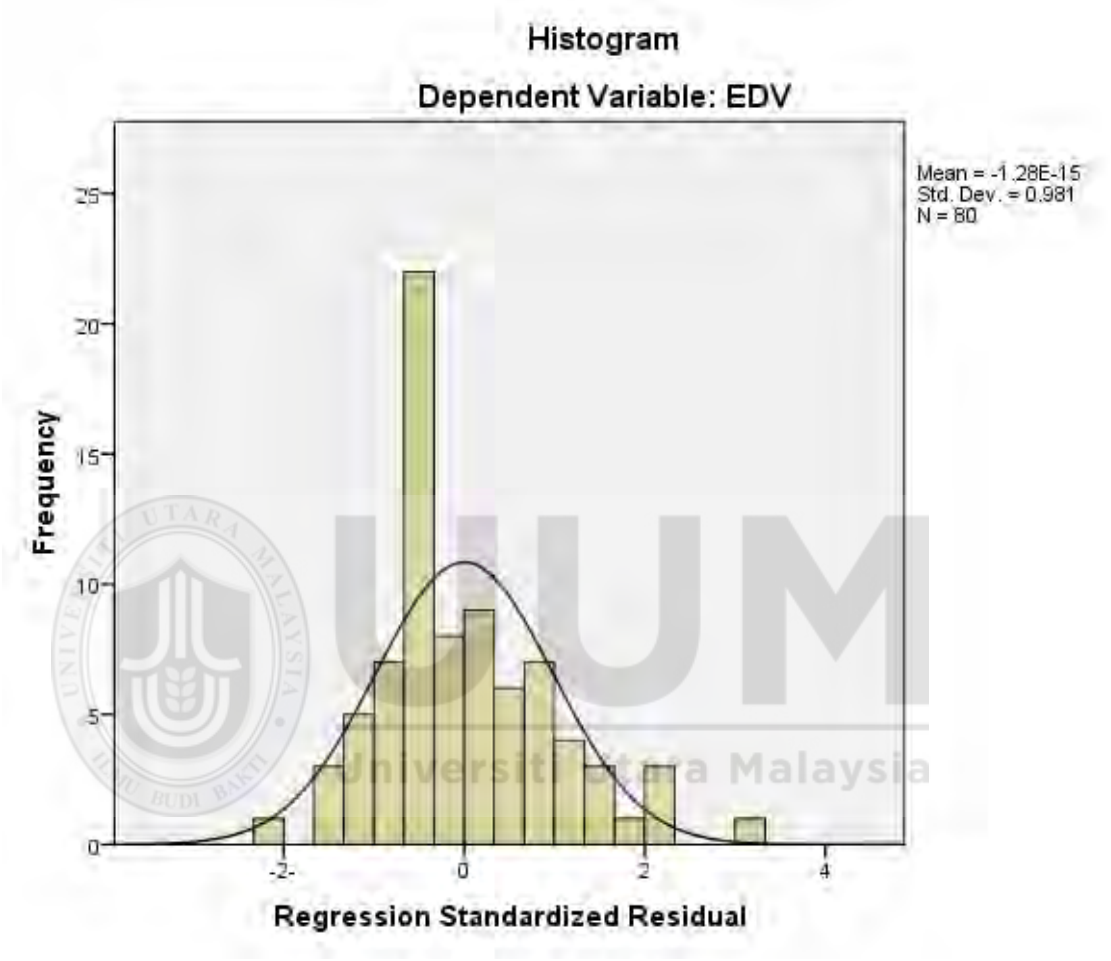

Figure 4.1: *Histogram for Normality*

4.2.4 Linearity

According to Pallant (2013), linearity means there is a straight-line relationship between residuals and the dependent variable. The linearity assumption is confirmed on normal probability plot of the regression-standardised residual , which several

authors have suggested. Conducting a linearity test for E-learning usage as dependent variable resulted in Figure 4.2 The following figure show that all the points‟ line in a reasonably straight diagonal line, the assumptions of normality are met and there are no major deviations from normality.

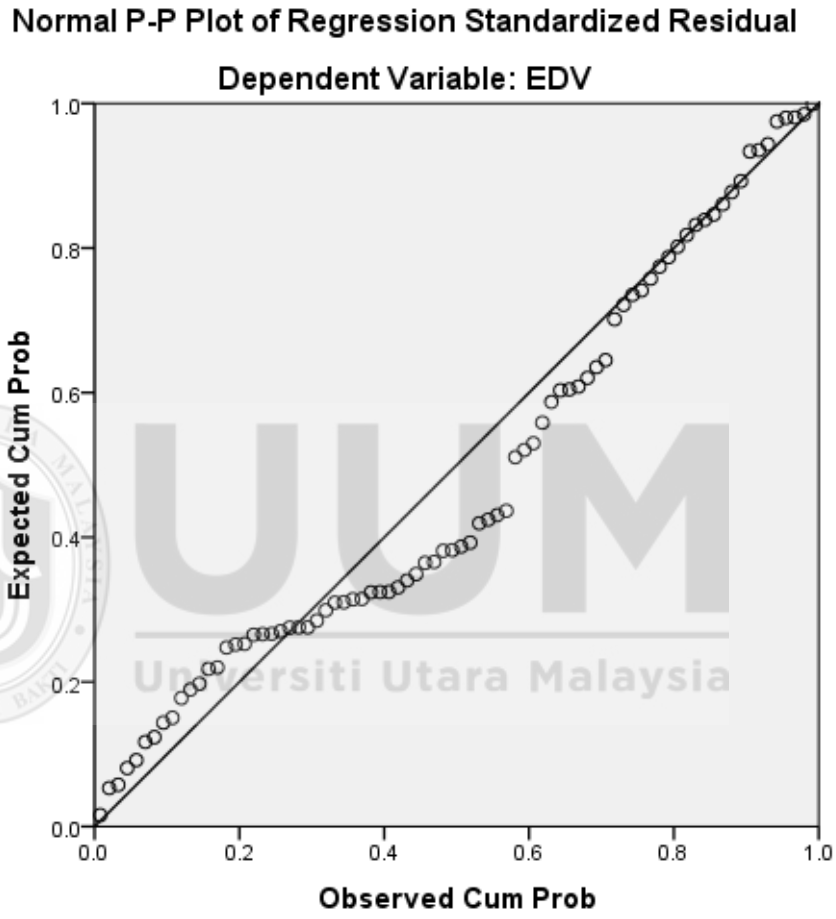

Figure 4.2 : *Test of Linearity for E-learning usage(EDV)*

4.2.5 Homoscedasticity

Homoscedasticity assumes that the variance of the residuals about dependent variable scores should be the same for all predicted scores (Pallant ,2013). Homoscedasticity test is conducted by using scatter plot, which has been suggested

by studies in literature (e.g. Hair et al.,2010; Pallant, 2013). Scatter plot diagrams of standardised residuals is used to test the homoscedasticity for E-learning usage . The Figure show that there is no systematic pattern such as curvilinear or the existence of the residuals in one side . Therefore, the assumption of homoscedasticity was met. Figure 4.3 present the scatterplots of the normal distribution of the dataset.

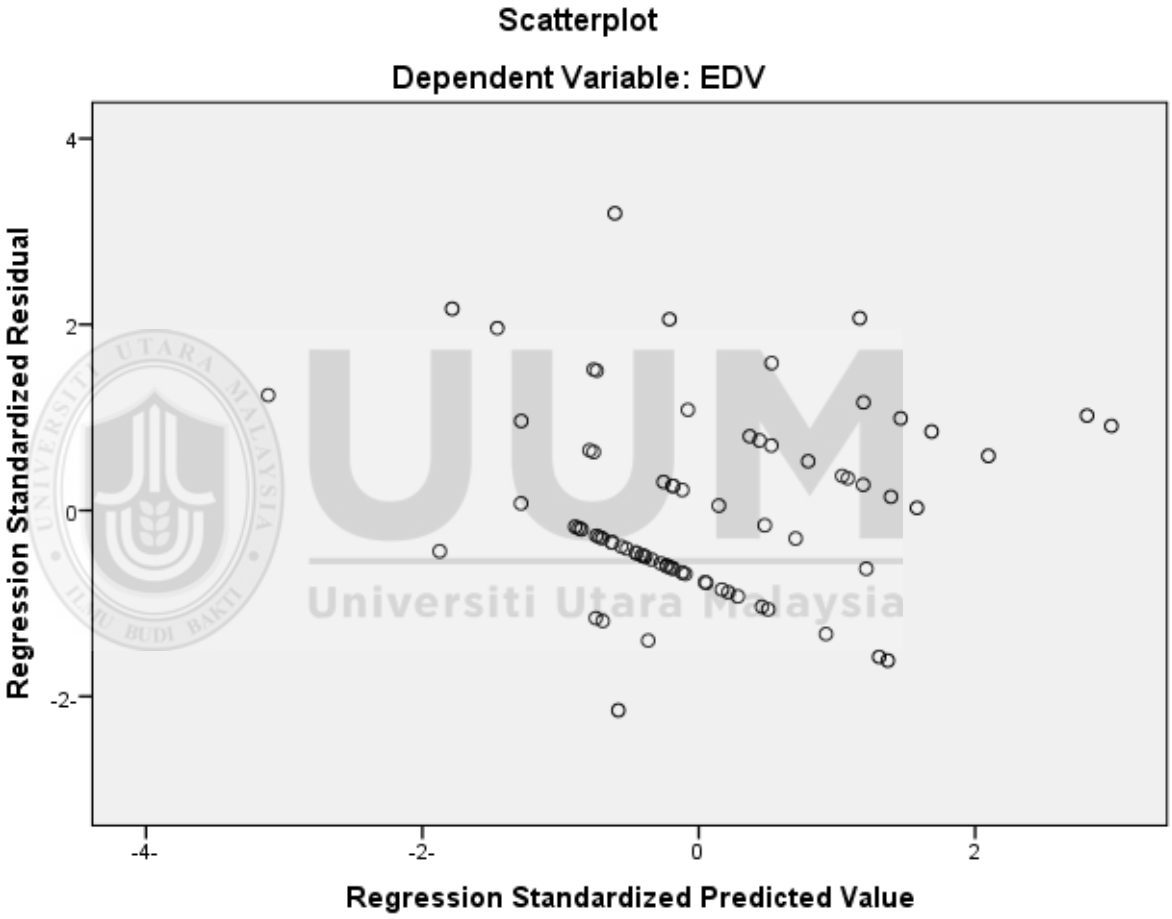

Figure 4.3 *:Scatterplot for Normality*

4.2.6 Multicollinearity Test

Testing for the presence of multicollinearity is important in a regression base analysis (Chatterjee &Yilmaz, 1992). The presence of multicollinearity is a situation

whereby exogenous latent constructs are highly correlated among themselves. It is believed that the presence of multicollinearity can distort the result of regression analysis (Hair et al.,2011). In other words, multicollinearity increases the standard errors of the coefficients, which subsequently make the coefficients insignificant(Tabachnick&Fidell, 2007). There are two main statistical techniques; the first one is by examining the correlation matrix of the exogenous latent variable. The first is a correlation coefficient of 0.90 and above indicates multicollinearity between exogenous latent constructs. Table 4.2 shows the correlation matrix of all exogenous latent constructs is below 0.90. Secondly , multicollonearity is examined by the variance inflated factor (VIF), tolerance value and condition index. Hair et al.,(2011) defined tolerance as the amount of variability of the selected independent variable not explained by the other independent variables, whereas VIF is the opposite of Tolerance Value. Hair et al., (2011) asserted that , multicollinearity is a concern if VIF value is higher than 5 and tolerance value is less than .20. Table 4.3 shows the VIF values and tolerance values of the independent constructs are entirely higher than 0.20 for the tolerance value and less than 5 for the VIF value. The following preliminary analysis conducted is common method variance.

Table 4.2 *:Correlation Matrix of the Exogenous Latent Construct*

No	Latent Construct	1	2	3
1	Social Presence	1		
2	Cognitive Presence	.597**	1	
3	Teaching Presence	.451**	.633**	1

Table 4.3 :*Test of Multicollinearity*

Latent Constructs	Collinearity Statistics	
	Tolerance	**VIF**
Social Presence	.599	1.670
Cognitive Presence	.797	1.255
Teaching Presence	.644	1.554

Note: Tolerance > 0.20 and VIF <5

4.3 Reliability Test

It is very important to perform the reliability analysis after cleaning the data . Reliability test was conducted in this study to assess the internal consistency among the collected data. Cronbach's Alpha value was computed for every single scale . According to Hair et al., (2010) the acceptable threshold for the reliability of this kind of study is 0.60 and above . Therefore , the researcher performed the reliability testing where the result of Cronbach's Alpha value for each scale is shown in Table 4.4 . The Result shows items used in measuring the variables in this study are reliable and internally consistent. The following section presents the respondents' profile.

Table 4.4 :*Reliability Test*

Constructs	**Cronbach's Alpha**	**No of items**
Social Presence	0.809	8
Cognitive Presence	0.636	7
Teaching Presence	0.700	5
E-Learning Usage	0.705	2

4.4 Respondents Profile

The Respondents profile for the 80 respondents were gathered in order to provide a clear understanding about the distribution of respondents in terms of Age , Academic qualification , Academic field . These properties were included in order to give demographic profile information on the sample. Table 4.5 explains the descriptive statistics respondents profile for each item in this study.

Table 4.5 : *Summary of the respondents' profile*

Demographic	**Categories**	**Frequency**	**Percentage (%)**
Age	19 - 24	37	46.3
	25 - 29	15	18.8
	30 - 39	17	21.3
	40 and Above	11	13.8
Academic Qualifications	Bachelor's Degree	48	60.0
	Master's Degree	20	25.0
	PhD	12	15.0
Academic Field	ICT	9	11.3
	Computer Science	4	5.0
	Information Technology	65	81.3
	Others	2	2.5

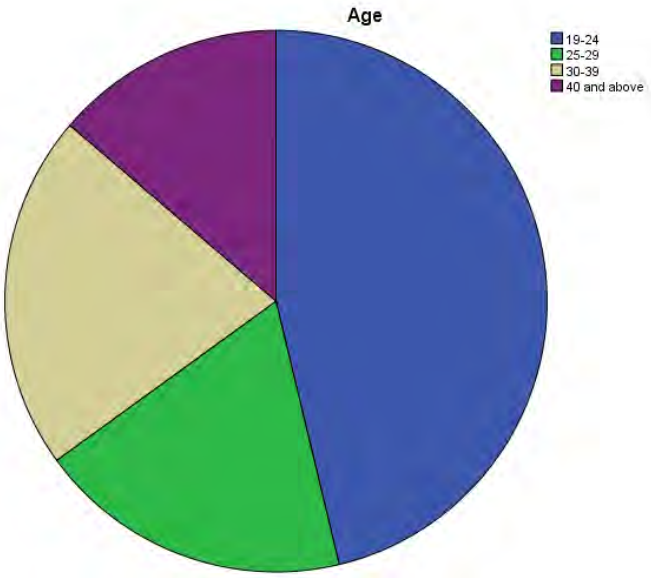

Figure 4.4 *:Frequency Distribution for Respondent Age*

Figure 4.4 showed that majority of respondents precisely 37(46.3%) are between the age of 19-24 years of age. 17(21.3%) respondents are between the age of 30-39years of age. 15(19%) respondents are between the age of 25-29. And lastly, 11(14%) are between the age of 40 years and above. Impliedly, it is fair to infer that majority of the respondents are early adults which reflects the representatives of respondents that are likely to be active on both online social games and e-learning application.

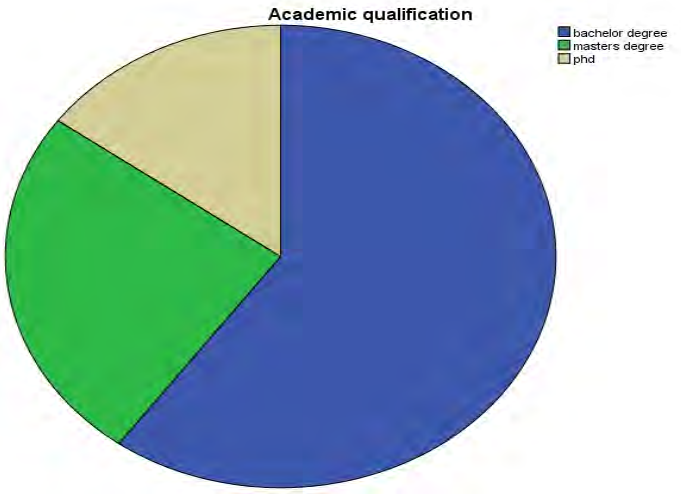

Figure 4.5: *Frequency Distribution for Academic qualification*

Figure 4.5 also shows that, 48(60%) respondents have Bachelor's Degree as their level of education. Meanwhile, 20(25%) respondents hold a Master's Degree certificate. Lastly, 12(15%) respondents are PhD students. Again, the distribution of this study's revealed that first degree student are highly represented in this study than the post graduate students .

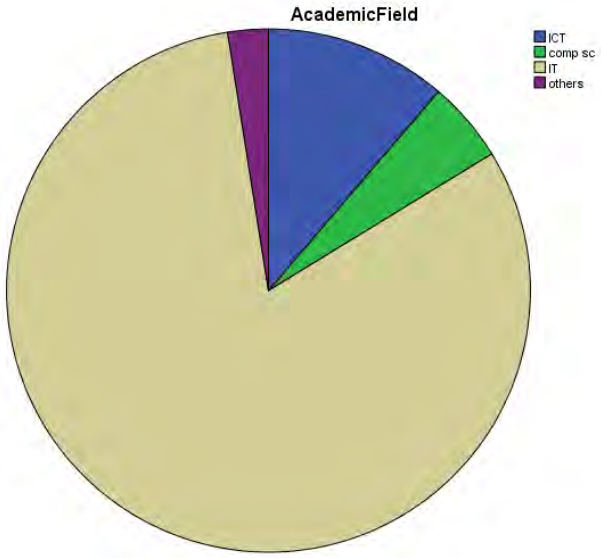

Figure 4.6 :*Frequency Distribution for Academic Field*

In addition, it is revealed in figure 4.6 that, 65(81.3%) respondents are information technology students. Following that, 9(11.3%) respondents are information and communication technology students. 4(5%) respondents are computer science students while the remaining 2(2.5%) respondents are students of System Intelligent and Technopreneurship .

This can be summarized as thus, the entire respondents selected for this study are students from computer or technology related courses. This imply that the respondents are technically knowledgeable of the context of this study.

4.5 Descriptive Statistics

Prior to conducting the part of the analysis that deals with hypotheses testing, this section presents the descriptive statistics of the usage of online social games and e-

learning application usage. This section is basically to affirm the representativeness of the respondents and to explore how abreast the respondents are with the context of this study . Table 4.6 explains the descriptive statistics respondents profile for each item in this study.

Table 4.6*: Summary of the respondents' profile*

Demographic	Categories	Frequency	Percentage (%)
Playing online social game?	Always	37	46.3
	Seldom	31	38.8
	Never	12	15.0
Usage of E-learning	Always	50	62.5
	Seldom	25	31.3
	Never	5	6.3
Hours of playing online social game	Below 1 Hour	25	31.3
	1-4 Hours	27	33.8
	Above 4 Hours	12	15.0
	Never	16	20.0
Hours of using E-learning applications	Below 1 Hour	29	36.3
	1-4 Hours	33	41.3
	Above 4 Hours	15	18.8
	Never	3	3.8

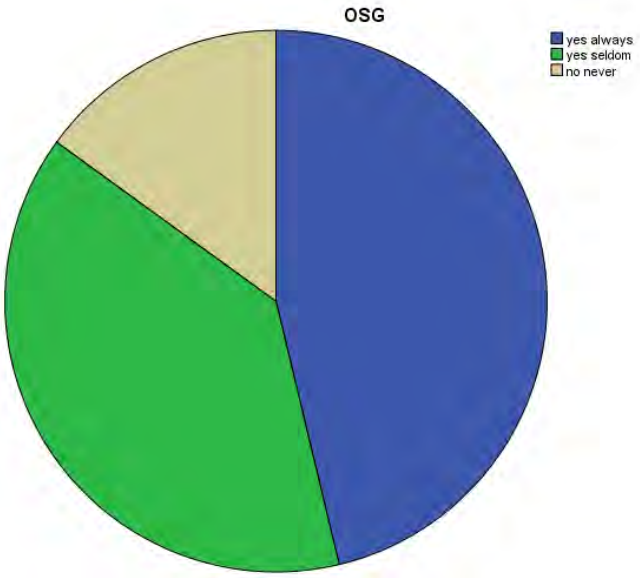

Figure 4.7: *Frequency Distribution of Respondents Playing Online Social Game*

Figure 4.7 shows that, 37(46.3%) respondents are always playing online social games. 31(39%) respondents seldom play online social games and only 12(15%) had never played online social games.

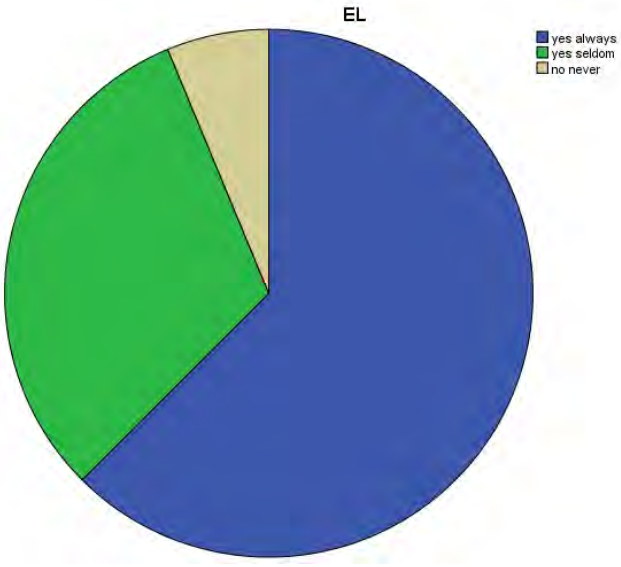

Figure 4.8 :*Frequency Distribution of Respondents Usage of E-Learning*

Figure 4.8 shows that , 50(62.5%) respondents use e-learning application always. 25(31.3%) respondents seldom use e-learning and just 5(6.3%) respondents had never used e-learning application.

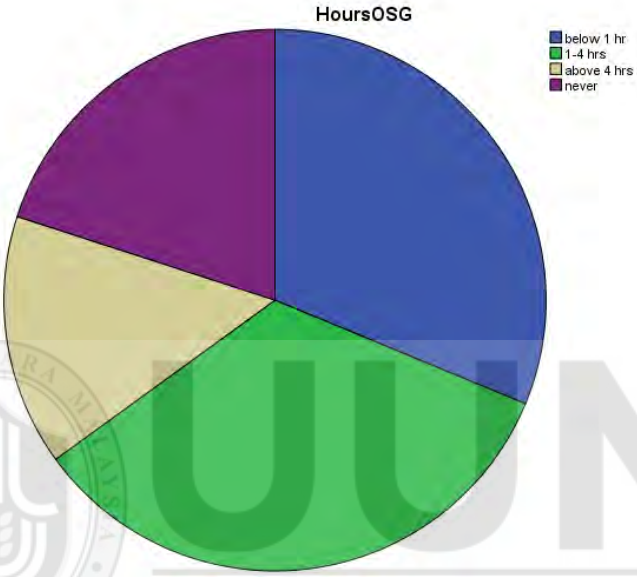

Figure 4.9 *:Frequency Distribution of Respondents Hours of Playing Online Social Games*

Figure 4.9 also show that 25(31.3%) and 27(34%) respondents use below one hour to four hours playing online social games daily. Meanwhile, 12(15%) respondents spend more than four hours playing online social games daily and 16(20%) respondents never spend their time playing online social games daily .

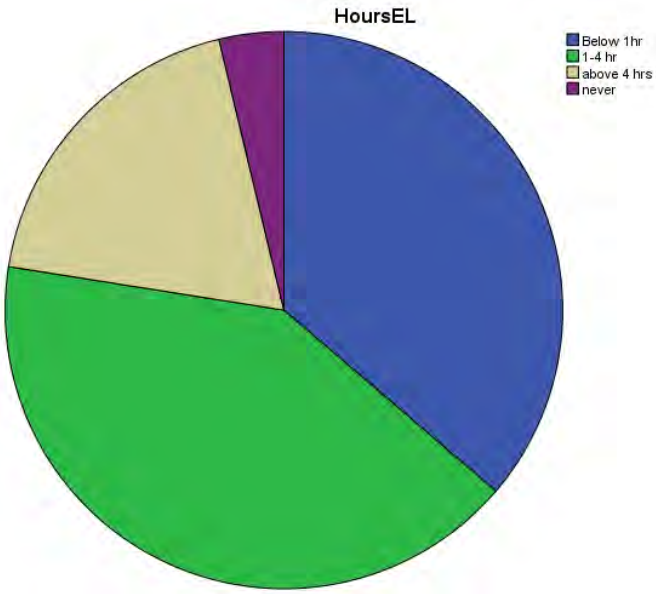

Figure 4.10 *:Frequency Distribution of Respondents Hours of Using of E-Learning*

Figure 4.10 revealed that, 29(36.3%) and 33(41.3%) respondents respectively spend below one hour to four hours using e-learning daily. 15(19%) respondents use e-learning more than four hours daily . 3(4%) revealed they had never used e-learning daily.

In summary, these findings imply that the respondents are familiar with both online social games and e-learning applications. These findings proffers that majority of the respondent are acquainted and conversant with both online social games and e-learning hence, have confidence in giving their sincere responses.

4.6 Descriptive Statistics of the Constructs

Descriptive analysis were utilized to demonstrate the characteristics of the data sample . It provides for simplicity of the respondents information sample in order to define a set of construct or items in a manner that is easy to comprehend . Respondents were asked to indicate their agreement towards the statements of the variables, using the five points Likert scale. The scale were ranged' between l=strongly disagree; to 5=strongly agree. In view of their score for every statement, researcher had discovered the average score (mean) for every variables. According to Mawaddah (2013) explains the mean value for low agreement between 1.00 to 2.33, also the mean value for moderate agreement between 2.34 to 3.66 and meanwhile the mean value for high agreement between 3.67 to 5.00.

The Table 4.7 shows the minimum and maximum values of the construct, mean value and standard deviation . For Social presence, the variable scored a mean value of 3.32 for all items that measures this construct with standard deviation of 0.596. Because the mean value is above the average of 5-point Likert scale (2.34), they can be deemed to have moderate agreement. Table 4.7 illustrates the agreement of each item of the social presence.

Table 4.7:*Descriptive Statistics of Social Presence*

Items	Minimum	Maximum	Mean	Std. Deviation
Playing online social games makes interpersonal relationship to be of fun	1	5	3.56	.824
Playing online social games can enhance interactions with other gamers	1	5	3.40	.908
Online social games into encourage collaborations with other players	1	5	3.33	.925
Playing online social games allows players to freely communicate with one another	1	5	3.29	.830
Playing online social games increases the closeness among players	1	5	3.28	.914
I enjoy playing online social games with other gamers	1	5	3.26	.951
I will use e-learning websites if they have similar fun with online social games.	1	5	3.24	.984
Playing online social games makes interpersonal relationship to be stronger	1	5	3.23	.941

N=80. Scale: 1 Strongly Disagree ---------- 5 Strongly Agree.

The mean values of the items ranged from 3.56 to 3.23. The highest value was for the item "Playing online social games makes interpersonal relationship to be of fun", while the lowest value was for the item "Playing online social games makes interpersonal relationship to be stronger". The remaining items were located between these two values in the following order: Firstly, "Playing online social games can enhance interactions with other gamers" with a mean value of 3.40, followed by "Online social games into encourage collaborations with other players" with a mean value of 3.33. Then "Playing online social games allows players to

freely communicate with one another" with a mean value of 3.29, followed by "Playing online social games increases the closeness among players" with a mean value of 3.28. The next item is "I enjoy playing online social games with other gamers" with a mean value of 3.26 and the final one, "I will use e-learning websites if they have similar fun with online social games." with a mean value of 3.24. For Cognitive presence , the variable scored a mean value of 3.36 for all items that measures this construct with standard deviation of 0.481. Because the mean value is above the average of 5-point Likert scale (2.34), they can be deemed to have moderate agreement. Table 4.8 illustrates the agreement of each item of the Cognitive presence .

Table 4.8 :*Descriptive Statistics of Cognitive Presence*

Items	Minimum	Maximum	Mean	Std. Deviation
Online social games enhances my thinking process	1	5	3.49	.827
Because I play online social games, it is not difficult for me to use e-learning applications	1	5	3.46	.954
The brainstorming activity in playing online social game helps me in problem solving	1	5	3.41	.822
Through exploration of the online social games, I feel there is a free flow of information exchange	1	5	3.30	.848
I like to play online social games because it challenge my brain	1	5	3.29	1.009
I can comment on other people's idea, through online social games	2	5	3.28	.729

I gain new ideas from playing online social games	1	5	3.28	.779

N=80. Scale: 1 Strongly Disagree ---------- 5 Strongly Agree.

The mean values of the items ranged from 3.49 to 3.28. The highest value was for the item "Online social games enhances my thinking process ", while the lowest value was for the item "I gain new ideas from playing online social games". The remaining items were located between these two values in the following order: Firstly, "Because I play online social games, it is not difficult for me to use e-learning applications" with a mean value of 3.46, followed by "The brainstorming activity in playing online social game helps me in problem solving" with a mean value of 3.41. Then "Through exploration of the online social games, I feel there is a free flow of information exchange" with a mean value of 3.30, followed by "I like to play online social games because it challenge my brain" with a mean value of 3.29. The final one, "I can comment on other people's idea, through online social games." with a mean value of 3.28 . For Teaching Presence , the variable scored a mean value of 3.36 for all items that measures this construct with standard deviation of 0.577. Because the mean value is above the average of 5-point Likert scale (2.34), they can be deemed to have moderate agreement. Table 4.9 illustrates the agreement of each item of the Teaching presence .

Table 4.9:*Descriptive Statistics of Teaching presence*

Items	Minimum	Maximum	Mean	Std. Deviation
The instructions I receive in online social games are helpful in using e-learning	2	5	3.40	.704
I receive direct instructions in online social games	1	5	3.40	.922
I learn how to focus in learning from playing online social games	2	5	3.36	.917
I can share my personal experience from online social games with friends	1	5	3.35	.828
I learn new things by playing online social games	1	5	3.28	.886

N=80. Scale: 1 Strongly Disagree ---------- 5 Strongly Agree.

The mean values of the items ranged from 3.40 to 3.28. The highest value was for the item "The instructions I receive in online social games are helpful in using e-learning", while the lowest value was for the item "I learn new things by playing online social games". The remaining items were located between these two values in the following order: Firstly, the item "I receive direct instructions in online social games" , has a mean value of 3.40, followed by the item, "I learn how to focus in learning from playing online social games" , which has a mean value of 3.36. Finally , item, "I can share my personal experience from online social games with friends " has a mean value of 3.35. For E-learning usage , the variable scored a mean value of 3.42 for all items that measures this construct with standard deviation of 0.658. Because the mean value is above the average of 5-point Likert scale (2.34), they can be deemed to have moderate agreement. Table 4.10 illustrates the agreement of each item of the E-learning usage.

Table 4.10 :*Descriptive Statistics of E-learning usage*

Items	Minimum	Maximum	Mean	Std. Deviation
I like to use the e-learning applications	2	5	3.50	.729
I am motivated to use the e-learning applications because it is similar to online social games.	2	5	3.41	.867

N=80. Scale: 1 Strongly Disagree ---------- 5 Strongly Agree.

The mean values of the items ranged from 3.50 to 3.41. The highest value was for the item "I like to use the e-learning applications", while the lowest value was for the item "I am motivated to use the e-learning applications because it is similar to online social games".

4.7 Hypotheses Testing

This study employed both Pearson correlation and Multiple regressions for the test of hypotheses. The Pearson product-moment correlation coefficient was employed to determine the significance of the linear bivariate relationship between the independent variables (Social presence, Cognitive presence and Teaching presence) and the dependent variable (E-learning usage). The result of the Pearson product-moment correlation is presented below.

4.7.1 Pearson Product-Moment Correlation Analysis

Correlation analysis is a statistical method used to describe the strength and direction of linear relationship between two variables (Pallant, 2011). Correlation coefficients

are usually used to determine either the positive or negative and either weakness or strength of the linear relationship between the two variables. One of the most commonly used methods for identifying the correlation coefficients between the two variables is the Pearson Product Moment Correlation Coefficient (r). It has a range of values between +1 and -1. If the value of r is close to +1, a strong positive relationship exists between the two variables, and when this value is close to -1, a strong negative relationship between the two variables exists. If value of r is equal to zero, no relationship (association) between the variables exists. Thus, using the Pearson Product Moment Correlation Coefficient is appropriate in this study to determine and interpret the strengths of the correlations between two variables. Table 4.11 illustrates that.

Table 4.11 :Cohen's Guideline of Correlation Strength

r Values	Strength of Relationship
r = +.l0 to .29 or r = -.l0 to -.29	Weak
r = +.30 to .49 or r = -.30 to -.49	Moderate
r = +.50 to l.0 or r = -.50 to -.l.0	Strong

Table 4.12 shows the results of the correlation analysis for all variables involved in the study.

Table 4.12: *Pearson Product-Moment Correlation Analysis*

	SIV	CIV	TIV	EDV
Social Presence	1			

Cognitive Presence	.597**	1		
Teaching Presence	.451**	.633**	1	
E-learning usage	.354**	.496**	.484**	1

**. Correlation is significant at the 0.01 level (2-tailed).

The correlations between independent variables and dependent variable of this study according to Cohen‟s Guideline are presented in Table 4.13.

Table 4.13 :*Correlations among Independent and Dependent Variables*

Type of the Relationship	**Correlations**	**Strength**
EDV and SIV	.354**	Moderate
EDV and CIV	.496**	Moderate
EDV and TIV	484**	Moderate

The results show that the all scales are significantly correlated with E-learning usage. From Table 4.13 , it is observed that E- learning usage (EDV) is positively significant and has Moderate correlation with Social presence(SIV) , coefficient of correlation value (r) = 0.354 . Hence, 35% of the variance in E-learning is explained by the variance in social presence. In addition, the correlation between E-learning usage (EDV) and Cognitive presence(CIV) is positively significant and have moderate correlation, coefficient of correlation value (r) = 0.496 . Impliedly, 49.6% of the variance in E-learning is explained by the variance in cognitive

presence. Finally , the relationship between E-learning usage (EDV) and teaching presence(TIV) is moderate positive and significant relationship with the coefficient of correlation value (r) = 0.484 (Refer to Appendix E) .

4.7.2 Multiple Regressions

Correlation analysis is usually used to determine the relationship between two variables in terms of the strength and direction of the relationship ,while multiple regression analysis is used to determine the impact among more than one independent variable and one or more dependent variable. In the process of multiple regressions, the researcher can in one equation predict a single dependent variable by entering several independent variables (Pallant, 2013).

Multiple regression analysis is used when the researcher assumes that there are several independent variables contributing to the variation of the dependent variable (Hair et al., 2010), added that using multiple regressions could increase the accuracy of the predictions for the dependent variable over one independent variable. One advantage of multiple regression analysis is that the researcher can explore the interdependency between variables (Lattin ,Carroll& Green,2003).

There are three types of multiple regressions that can be used by the researchers, namely: standard or simultaneous, hierarchical or sequential, and stepwise. The standard or simultaneous multiple regression for all the independent variables is where all the variables are entered at the same time in the equation, based on that all independent variables are assumed to be of equal importance (Pallant, 2013).

Therefore, this type of analysis is the appropriate method to be used in the present study.

To this end, Hair et al. (2010) established steps to evaluate the multiples as described as follows;

1. Checking the F value to determine the statistical significance of the model.
2. The R2 should be checked to determine if its value fits.
3. Examining the regression coefficients and their Beta coefficient (b) to determine the independent variables that have statistically significant coefficients.

The result of the multiple regression analysis in this study as shown in Table 4.14 shows that R- squared (R^2) for this model is fit ($R^2 = 0.296$) , therefore, 30% of the variance in E-learning usage is explained by the independent variables (Social presence, Cognitive presence and Teaching presence), 70% explain by other factors .

Table 4.14 : *Regression Analysis for structure readiness*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.544[a]	.296	.269	.56284	.296	10.675	3	76	.000

a. Predictors: (Constant), Social presence, Cognitive presence, Teaching presence

Furthermore, the result of the analysis as shown in Table 4.15 revealed a statistical significant relationship between social presence, cognitive presence, teaching

presence and E-learning Usage. The equation of the multiple regression analysis (F (3, 76) = 10.675, P < 0.05), which indicates that the model is statistically significant as suggested by Hair et al., (2010).

Table 4.15: *Anova*

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.145	3	3.382	10.675	.000[b]
	Residual	24.076	76	.317		
	Total	34.222	79			

a. Dependent Variable: E-Learning Usage

b. Predictors: (Constant), Social presence ,Cognitive presence, Teaching presence

H_1 : Social presence has positive impact on the usage of e- learning among female students.

From the coefficients part of Table 4.16, it is revealed that , the social presence has insignificant impact on the usage E-learning among female students , this is because the significance value of p = 0.628. However, the Beta value (b = 0.059) indicates that the direction of this impact is positive. Such result means that for each unit increase in the social, there is an expected increase of 0.059 in the E-learning usage (t =0 .487). Thus, this hypothesis is not supported.

H_2: Cognitive presence has positive impact on the usage of e- learning among female students.

In the coefficients part of Table 4.16, the Beta value (b = 0.286) and significance value of p = 0.044, it is revealed that ,the cognitive presence has a significantly positive impact on the E-learning usage among female students. This means that for each unit increase in the cognitive presence , there is an expected increase of 0.286 in E-learning usage (t = 2.050). Accordingly, this hypothesis is supported.

H_3: Teaching presence has positive impact on the usage of e- learning among female students.

In the coefficients part of Table 4.16, the Beta value (b = 0. 277) and significance value of p = 0.030 , it is revealed that ,the teaching presence has a significantly positive impact on the E-learning usage among female students. This means that for each unit increase in the teaching presence , there is an expected increase of 0.277 in E-learning usage (t = 2.211). Accordingly, this hypothesis is supported.

In addition , as shown in Table 4.16, the independent variables (social presence , cognitive presence and teaching presence) contribute significantly to explain the dependent variable (E-learning usage). The highest contribution is from cognitive presence variable where (b = 0. 286, t = 2.050, Sig = 0. 044), explaining 29%, and has significant influence, followed by that of teaching presence (b = 0.277, t = 2.211, Sig = 0.030), explaining 28%, and has significant influence . On the other hand, independent variable (social presence) do not have significant influence on E-learning usage and they have positive direction. Social presence values is found to be

(b = 0.059, t = 0.487, Sig = 0.628) and explains 6% of the total variance of E-learning usage .

Table 4.16*:Coefficient of the regression*

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.830	.472		1.760	.082
	Social Presence	.065	.133	.059	.487	.628
	Cognitive Presence	.391	.191	.286	2.050	.044
	Teaching Presence	.316	.143	.277	2.211	.030

a. Dependent Variable: E-learning Usage

Table 4.17 :*Summary of Findings*

	Hypotheses	**Decision**
H_1	Social presence in online social games has positive impact on the usage of e- learning among female students.	Not Supported
H_2	Cognitive presence in online social games has positive impact on the usage of e- learning among female students.	Supported
H_3	Teaching presence in online social games has	Supported

	positive impact on the usage of e- learning among female students	

4.8 Summary

This chapter presents the summarization of demographic background of respondents. After that, several assumptions were examined using normality and multicolinearity test before doing regression. The result reported that there was no multicolinearity problem and that the distribution can be assumed normal in this study. All research hypotheses have been tested to evaluate the research objectives. The next chapter will discuss the research findings followed by possible direction for future research, discussion and recommendation.

CHAPTER FIVE

Discussion and Conclusions

5.1 Introduction

This chapter of the study discusses the findings of the statistical analysis of this study. Also, the limitation, contribution and the recommendation for future study, and the conclusion inferred from the research are presented.

5.2 Overview of the Study

This study focus on examining the impact of social presence, cognitive presence and teaching presence in online social games on E-learning usage among female university students. This study is borne out of the fact that female students are reportedly motivated to playing online social games than they use e-learning application. The study then, adopts the community of enquiry model to factorize the attributes of online social games, hence the social, cognitive and teaching presence. The community of enquiry model guided the hypothesized relationships in this study. An experimental research design was employed in this study. 80 female students from the Universiti Utara Malaysia were selected to play FarmVille2 after which they were asked to answer the self-administered questionnaire. The collected data was analyzed using the Pearson product-moment correlation and multiple regression analysis. The findings of revealed in this study are discussed with regards to the research objectives in the following sections.

5.3 Discussions

The aim of this present study is to examine the impact of the attributes of online social games, such as the social presence, cognitive presence and teaching presence on the usage of E-learning. As such, three hypotheses were proposed and tested in this study. The three hypotheses were proposed with regards with the three research objectives. Hence, testing the research hypotheses is invariably answering the research questions. The following sections present discussions on the findings on the hypotheses testing in relation with the research questions.

5.3.1 The Impact of Social Presence on E-learning Usage

With regards to the first research question(What is the impact of social presence in online social games on the usage of e-learning among female students?), the first hypothesis posited no impact of social presence on E-learning usage of female students. The findings presented in this research revealed that Social presence attribute in online social games have an insignificant impact on E-learning usage among female students . According to the findings presented, the level of the impact of social presence is found to be minimal and insignificant. Impliedly, the findings of this study revealed that the social presence attributes of online social games have no influential impact on the usage of E-learning usage among female students. As such, the findings of this study exposed the insignificance of social presence as a motivating factor to the usage of E-learning. This finding of this study is contrary to previous studies such as; Lee and Faulkner(2010), Picciano (2002), Richardson &Swan (2003) , Iahad et al.,(2004); Oliver and Omari (2001);Rovai (2002),

Rodrigues et al., (2011) ,Hernandez et al., (2011), Dominguez et al., (2013) and Li and Liu, (2009) . These studies unanimously posited that, social presence is an important factor in motivating student participation, engagement and usage of E-learning application.

The implication of the insignificant relationship between social presence and e-learning usage among students basically explains that, the social presence attribute of online social games does not motivate female students towards the use of e-learning applications. The finding of this study is discerning, in the sense that it affirms that the social presence in online social games is not a motivating factor to learning. Even though studies such as; Essam and Al-Ammary, (2013) continue to reiterate the essence of social interaction as a motivating factor to use e-learning applications among students. The findings of this study reveal that the social presence in online social games is not a significant motivating factor to use e-learning applications.

The findings of this study on the impact of social presence of online social games on the usage of e-learning conforms to reality. Obviously, e-learning is an application developed for the purpose of learning and teaching. Meanwhile online social games are social and entertainment applications. Hence, this study findings revealed that, users of e-learning are aware of the difference between the two applications. As users can separate between the two, the former does not motive the usage of the later. Even though theorists in this realm of study have proposed the connection between online social games and e-learning usage, it is apparent that, social presence in online social games is not a motivating factor to using e-learning. This is because

the social attribute of online social game is not the kind of attribute users look after or sort after in using e-learning applications. In other words, social games are for playing, enjoyment and entertainment while in other hand, e-learning are for learning and teaching. This explains why users are not motivated with the social presence of online social games to use e-learning applications. In essence, the insignificance of social presence of online social games is because students are keenly interested with learning and not entertainment. Therefore, students have limited time to engage in gamification or social interactions in the course of using e-learning for learning purposes. The inconsistency in the invitation and acceptance of friendship and interaction in online social games. For example, there instances whereby, gamers could not make effective interactions with other friends on social game platforms. This again, impend the motivation and influence online social games could have on e-learning usage.

5.3.2 The Impact of Cognitive Presence on E-learning Usage

In the quest of answering the second research question (What is the impact of cognitive presence in online social games on the usage of e-learning among female students?) the second hypothesis seek to examine the impact of cognitive presence on E-learning usage among female students. The findings presented in this research revealed that the cognitive presence attributes on online social games have positive and significant impact on E-learning usage among female students . The implication of this finding is that cognitive presence is an important motivating factor to the usage of E-learning among female students. Garrison et al.(2000), Oriogon (2003), Lee and Faulkner(2010), Kanuka and Garrison (2004) , Rodrigues et al., (2011)and

Silva(2010) consistently induced that cognitive features are impactful to usage of E-learning.

The implication of this study is that the cognitive presence or perhaps the cognitive attributes of online social games significantly motivate students to use e-learning. In other words, this imply that, cognitive functionalities, or activities that can be cognitively challenging should be incorporated into e-learning environments. In the case of online social games, cognitive attributes entails solving problems, facing challenges and overcoming obstacles. These sort of cognitively inclined activities should be incorporated in e-learning environments, as it has be proven to be among the significant factors that motivate, attract and influence the use of e-learning among female students. The significance of cognitive presence of online social games on e-learning usage can be justified with the fact that the cognitive activities of online social games is academically inclined. Playing games has to do with challenges and solving problems, these kind of activities are similar to that of cognitive activates of doing tests, examinations and online task. Hence, if more of the activities are incorporated into e-learning applications, female students will be more motivated to use and adopt e-learning.

5.3.3 The Impact of Teaching Presence on E-learning Usage

With regards to the third research question (What is the impact of teaching presence in online social games on the usage of e-learning among female students?), the study hypothesized that, teaching presence in online social game impacts on the usage of E-learning. The findings presented in this study provide enough evidence to justify

the impact of teaching presence on E-learning usage. It is revealed that, teaching presence has a significantly positive impact of the usage of E-learning among female students. The result presented in this study is consistent with the findings reported in Bangert(2008) , Shea et al.(2003) , Garrison et al.(2000), Rodrigues et al., (2011) ; Kanuka and Garrison,(2004); Lee and Faulkner,(2010) and Li and Liu(2009) Their studies also asserted the importance of teaching presence with a ripple effect on the usage of E-learning.

The significance of teaching presence on the usage of e-learning among female students has logical implications. It is fair to say that, the basic function of e-learning application and system is to be an electronic hub of learning, a digital classroom or rather an electronic system that anchors teaching and learning in a more interactive, engaging and timely manner. Hence, the usage of e-learning capitally depends on teaching functionality. Justifiably, the findings of this study affirms that female students are motivated, attracted and influenced to use e-learning because of teaching presence similar to that of online social games. Even though teaching presence in social game is more or less inclined towards entertainment, online social game environment are educating and the teaching presence in the online social game environment significantly encourages usage of e-learning among female student.

The significance of teaching presence of online social game as one of the motivating factor to the usage of e-learning affirms the fact that female students learning from online social games. Teaching attributes of online social games is evident by learning time management, decision making skills, direct instructions, sharing personal experience and risk management. The findings of this study can be

interpreted as thus, if the teaching attributes akin to that online social games are present in e-learning female students will be motivated and influenced to use e-learning more often. In another perspective, the interpretation of this findings also affirms that, female students are aware of the utilitarian of e-learning, as a primarily a teaching and learning application. This is a reason why teaching presence is a significant factor to usage of e-learning among female students.

5.4 Research Implications

5.4.1 Theoretical Implications

The theoretical implication of this study is that, the findings presented in this research validates the theoretical perspectives of community of enquiry model. The community of enquiry model which was propounded by Garrison, Anderson and Archer (2000) theorized the importance of experience and interactions on learning process. The model emphasized that learners interact in a community and should not be denied the responsibility to learn on their own. In a manner to provide a philosophical view of fundamental elements that can impact the usage of any online educational tool, Garrison, Anderson and Archer (2000) identified three basic elements namely; social presence, cognitive presence and teaching presence. Even though this study found that, social presence has no significant impact on e-learning usage among female students, the other factors such as; cognitive and teaching presence are found to be significantly impactful. Accordingly, the findings presented in this study asserted the importance and the significance of these elements on the usage of E-learning among female students.

Another important significant implication of this study is that, this research empirically explore the association between online social games and e-learning. By examining the relationship and the impact of online social game attributes (social, cognitive and teaching presence), the study stands to discern the nexus that connect the two systems. Invariably, the findings of this study imply that both cognitive presence and teaching presence connects both online social game and e-learning. The result of this study aim at provoking future theoretical exploration in conceptualizing the relationship between online social games and e-learning application. In other words, this exploration tends to buttress the possibility of how to use online social games to improve usage of e-learning among female students. The result of this study is constructive in this regard by affirming that cognitive and teaching presence in online social game significantly impact on female student usage of e-learning.

5.4.2 Practical Implications

The findings presented in this study revealed that, cognitive presence and teaching presence are significant factors that impact on the usage of E-learning through playing online social games. As such, this imply that, these two factors must be taken into considerations in the adoption of E-learning application for pedagogical purposes. Educators, instructors and other educational stakeholders are provided with empirical evidence in this study on the importance of cognitive presence and teaching presence on the usage of E-learning particularly among female students. As such, the practical implication of this is that, system developers in the realm of e-learning should consider the incorporation of both cognitive functionalities and teaching presence such as; academic games .

Academic games can be incorporated to the e-learning platforms as method of gamification. For instance, theorists such as; Charles, et al., (2009) have argued that, the concept of gamifying learning does not only increase the dynamism and active engagement of students with learning, it also increases students motivation to use e-learning platform. In addition, academic games can be induced into e-learning as method of drawing similarity between online social games and e-learning platforms.

Incorporating the gaming into learning will increase experimental learning and enhance student engagement. For example, academic games can be induced into e-learning through two distinct method including; Firstly, problem solving in the form of game scenario/question to the students to solve and receive reward in form of marks or continuous assessment scores. Secondly, academic game can be incorporated by using avatar to represent learning illustrations and role playing in the course(such as; case study and information technology manager). By doing this, students will learn enjoyably and will be motivated to use e-learning as well as become more actively engaged with learning. This, according to the findings of this study would go a long way in increasing the current downturn in the level of e-learning usage among female students and by extension, among all students in general.

5.5 Limitation of the Research

Firstly, this research is conducted in a cross-sectional view as the data used in this study were gathered at one period of time. Secondly, using an experimental research approach, this study is constrained to use minimum sample size of 80 female

students. Invariably, time and resources are the two major constraints of this study. Due to the fact that, this study is an experimental study, and data collection in an experimental research is often considered as one of the most expensive and time costly research design. Finally, the researcher could not explore a probabilistic sampling technique for selecting larger sampling size from different sampling locations. The researcher delimit the place of data collection on UUM and also only on female postgraduate students in UUM.

5.6 Recommendations for Future Studies

Base on the limitations discussed in the above section, firstly, researchers are implored to use a longitudinal data of time horizon at which data from this similar study will be collected over a long period of time, in order to discern the long-term impact of online social game attributes on the usage of E-learning. Secondly, future researchers are recommended to adopt a research design that will accommodate a bigger sample size. Thirdly, future researchers are recommended to consider expanding the scope of this study by selecting bigger and generalizable sample size. Future researchers should also consider social presence of online social games as moderating or mediating variable in other to determine the indirect or direct impact of social presence of online social games on e-learning usage among female students. Finally, researchers should also consider using other e-learning theories such collaborative learning theory to understanding the students' motivation of e-learning usage.

5.7 Conclusion

This research investigated the impact of social presence, cognitive presence and teaching presence of online social games on E-learning usage among female students of higher institutions . The findings in this study can be concluded as thus, cognitive presence and teaching presence have impact on E-learning usage among female students. As such, two hypotheses were supported and the other one is not supported. Precisely, the first hypotheses which examines the impact of social presence on e-learning among female students is not supported. It can be concluded that, social presence of online social games does not significantly impact on e-learning usage among female student.

Overall, it can be concluded that, the social presence attributes of online social games does not influence female students to use E-learning. Conclusively, the first research objective (To determine the impact of social presence in online social games on the usage of e-learning among female students) is no achieved with this finding. The result of this question is answered with the above conclusion.

Also, the result of the second hypothesis presented in this study can be summarize as thus, cognitive presence have positive and significant impact on E-learning usage among female students. The interpretation of this findings can be summarized as follow;

- Through exploration of the online social games, female students feel free flow to exchange information.

- Through online social games female students comment on other people's idea,
- Female students gain new ideas from playing online social games
- Online social games enhances female students' thinking process
- The brainstorming activity in playing online social game helps female students in problem solving
- Female students like to play online social games because it challenges their brains
- It is not difficult for female students to use e-learning applications.

Conclusively, this findings affirm the attributes of cognitive presence in online social games and that cognitive presence influence the usage of E-learning among female students. With this, this study achieved its second research objective (To examine the impact of cognitive presence in online social games on the usage of e-learning among female students).

Regarding the third hypothesis tested in this research, the findings revealed that there is a positive impact of teaching presence as one of the attributes of online social games on E-learning application. The interpretation of teaching presence is this research is as follows;

- Learning new things by playing online social games
- Receiving information through playing online social games that are helpful in using e-learning
- Learning how to focus in learning from playing online social games

- Receiving direct instructions in online social games
- Sharing personal experiences from online social games with friends.

In conclusion, the interpretation of this findings is that, teaching presence is an important attribute of online social games that influence female students to use E-learning. With this finding, this study achieved the third research objective (To determine the impact of teaching presence in online social games on the usage of e-learning among female students).

REFERENCES

Acuna, E., & Rodriguez, C. (2004). The Treatment of Missing Values and Its Effect in the Classifier Accuracy. Classification, clustering and data mining applications. Springer, Berlin, pp 639–648

Ahmad, M.A., Keegan, B., Sullivan, S., Williams, D., Srivastava, J. & Contractor, N. (2011). Illicit Bits: Detecting and Analyzing Contraband Networks in Massively Multiplayer Online Games. *SocialCom'11*.

Akyildiz, M., & Argan, M. (2012). Using online social networking: Students' purposes of Facebook usage at the University of Turkey. *Journal of Technology Research*, *3*, 1.

Akyol, Z., & Garrison, D. R. (2014). The development of a community of inquiry over time in an online course: Understanding the progression and integration of social, cognitive and teaching presence. *Journal of Asynchronous Learning Networks, 12: Issue 3-4*

Alahakoon, T., Tripathi, R., Kourtellis, N., Simha, R. & Iamnitchi, A. (2011). K-path Centrality: A new Centrality Measure in Social Networks. In *SNS 11*.

Albarrak, A. I. (2010). Designing E-Learning Systems in Medical Education: A Case Study. *International Journal of Excellence in Healthcare Management*, *3*(1), 1-8.

Aldrich, C. (2005). *Learning by doing: A comprehensive guide to simulations, computer games, and pedagogy in e-learning and other educational experiences*. San Francisco, CA: Pfeiffer, A Wiley Imprint.

Alexander, B. (2006). Web 2.0: A new wave of innovation for teaching and learning? EDUCASE Review, 41(2), 32-44. Retrieved from http://net.educause.edu/ir/library/pdf/ERM0621.pdf

Allen, I. E., & Seaman, J. (2007). *Making the grade: Online education in the United States, 2006*: ERIC.

Almarabeh, T.,& Mohammad, H. (2013). E-learning in the Jordanian Higher Education System: Strengths, Weakness, Opportunities, and Threats .Journal of American Science 2013;9(3) :281-287]. (ISSN: 1545-1003) . http:/ / www . jofamericanscience.org. 52

Amaral, L.,& Leal, D. (2006): 'From classroom teaching to e-learning: the way for a strong definition'. Proc. World Multi-Conf. on Systemics, Cybernetics and Informatics (WMSCI 2006), Orlando, Florida, SA.

Anderson , T. (2008) . The theory and practice of online learning . Athabasca University Press.

Andrew, C. (2010). Militants of Truth , Communities of Equality : Badiou and the ignorant schoolmaster.

Arunachalam, A.R. (2014). Bringing out the Effective Learning Process by Analyzing of E-Learning Methodologies . *Indian Journal of Science and Technology, Vol 7, No.S5, pp 41-43.*

Babbie, E. (2010).The practice of social research, *(12th ed.).*USA: Wadsworth.

Bader, L. & Zotter, V. (2012). Interdisciplinarity: Wishful Thinking? Experiences at the University of Graz. *Multicultural Education & Technology Journal, Vol. 6, No. 3, pp. 118-136.*

Baid, H., & Lambert, N. (2010). Enjoyable learning: The role of humour, games, and fun activities in nursing and midwifery education. Nurse Education Today, 30(6), 548-552.

Balakrishnan, V., & Loo, H. S. (2013). Social Media in E-Learning: An Empirical Analysis among Students and Academicians. *GSTF Journal on Computing (JoC)*, *2*(4), 145.

Bangert, A. (2008). The influence of social presence and teaching presence on the quality of online critical inquiry. Journal of Computing in Higher Education, 20(1), 34-61.

Barab, S., Thomas, M., Dodge, T., Carteaux, R., & Tuzun, H. (2005). Making learning fun: Quest Atlantis, a game without guns. Educational Technology Research & Development, 53(1), 86-107.

Bauerova, D., & Sein-Echaluce, M.L. (2007): 'Open dialog as a tool for university education'.29th Int. Conf. on Information Technology Interfaces (ITI 2007), Cavtat/Dubrovnik, Croatia, pp. 33–38.

Behera, S. K. (2013) . E-and M-Learning : A comparative study . *International Journal on New Trends in Education and Their Implications, 4*(3), 65-78.

Ben, K., Shaun, L., Conor, L., Francesco, M., Luciano G. & Andrea ,G. (2010). Improving Social Game Engagement on Facebook through Enhanced Socio-Contextual Information. *ACM, pp. 1754-1756.*

Bisson, C., & Lunckner, J. (1996). Fun in learning: The pedagogical role of fun in adventure education. *Journal of Experiential Education*, 9(2), 109-110.

Bonn, S. E., Lagerros, Y. T., Christensen, S. E., Möller, E., Wright, A., Sjölander, A., & Bälter, K. (2012). Active-Q: validation of the web-based physical activity questionnaire using doubly labeled water. Journal of medical Internet research, 14(1).

Bort, J.(2013). 8 million people play Zynga's Farmville 2 every day. *Retrieved on May, 8*.

Bridges, S. ,Chan, L. K. &Hmelo-Silver , C.E.(2015). *Educational Technologies in Medical and Health . Sciences Education* (Vol. 5). Springer.

Buchanan, D., & Bryman, A. (2007). Contextualizing Methods Choice in Organizational Research. Organizational Research Methods, 10(3), 483–501.

Chang, C.-C. (2013). Examining users′ intention to continue using social network games: A flow experience perspective. *Telematics and Informatics, 30*(4), 311-321.

Charles, M, Bustard, D., & Black, M. (2009) ."Game Inspired Tool Support for e-Learning Processes" Electronic Journal of e-Learning Volume 7 Issue 2, (pp101 - 110), available online at www.ejel.org.

Chatterjee, S., & Yilmaz, M. (1992). A review of regression diagnostics for behavioral research. *Applied Psychological Measurement, 16*(3), 209-227.

Chau, P. Y., & Hu, P. J. H. (2001). Information technology acceptance by individual professionals: A model comparison approach*. *Decision sciences,32*(4), 699-719.

Chaudhary, A. G. (2008). Digital game-based learning – future of education? Pranjana: The Journal of Management Awareness, 11(2), 1-15.

Checkland, P. (1999). Systems Thinking, Systems Practice (with 30-year retrospective), John Wiley & Sons.

Cobb, S. C. (2009). Social presence and online learning: a current view from a research perspective. *Journal of Interactive Online Learning*, *8*(3), 241-254.

Cohen J.(1988). Statistical Power Analysis for the Behavioral Sciences(2nd edn) , Hillsdale, NJ: Lawrence Erlbaum Associates.

Cole, H., & Griffiths, M. D. (2007). Social interactions in massively multiplayer online role-playing gamers. *CyberPsychology & Behavior*, *10*(4), 575-583.

Cordova, D.I. & Lepper, M.R. (1996) Intrinsic Motivation and the Process of Learning: Beneficial Effects of Contextualization, Personalization, and Choice, *Journal of Educational Psychology*, 88 (4), 715- 730.

Creswell, J. W. (2010). Mapping the developing landscape of mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), Sage handbook of mixed methods in social and behavioral research (2nd ed., pp. 45-68). Thousand Oaks, CA: Sage Publications, Inc.

Cunha, M., Raposo, A.,& Fuks, H. (2008): 'Educational technology for collaborative virtual environments'. 12th Int. Conf. on Computer Supported Cooperative Work in Design (CSCWD 2008), Xian, China, pp. 716–720.

Dalsgaard, C. (2006). Social software: E-learning beyond learning management systems. *European Journal of Open, Distance and E-Learning*,*9*(2).

Daniel, M. (2012). *Design Characteristics of Virtual Learning Environments: A Theoretical Integration and Empirical Test of Technology Acceptance and IS Success Research*. Springer Gabler, Germany.

David, C., & Robert, W.C. (2007). Designing and Constructing Instruments for Social Research and Evaluation. John Wiley & Sons, Inc.

Davis, D., & Cosenza, R. M. (2000). Business research for decision making. California: Duxbury Press Belmont.

Dawes, L., & Dumbleton, T. (2001). Computer games in education project. Retrieved December 18, 2003, from http:// www.becta.org.uk/ research/ research.cfm?section=1&id=2835 (Archived at http://web.archive.org/web/ 20031218001848/http://www.becta.org.uk/research/research.cfm?section = 1 & id=2835)

DeKanter, N. (2005). Gaming redefines interactivity for learning. TechTrends, 49(3), 26-32.

Denscombe, M. (2010). The good research guide : for small-scale social research

projects: for small-scale social research projects. New York: McGraw-Hill/Irwin

Desai, S. (2010).Role of Information Communication Technologies In Education Proceedings of the 4th National Conference; Computing For Nation Development, February 25 – 26, 2010BharatiVidyapeeth's Institute of Computer Applications and Management, New Delhi

Dickey, M. D. (2005). Three-dimensional virtual worlds and distance learning: two case studies of Active Worlds as a medium for distance education.*British journal of educational technology*, *36*(3), 439-451.

Dominguez, A., Saenz-de-Navarrete, J., De-Marcos, L., Fernández-Sanz, L., Pagés, C., & Martínez-Herráiz, J. J. (2013). Gamifying learning experiences: Practical implications and outcomes. *Computers & Education*, *63*, 380-392.

Dron, J.,& Bhattacharya, M. (2009): 'Lost in the Web2.0 jungle'. Seventh IEEE Int. Conf. on Advanced Learning Technologies (ICALT 2007), Niigata, Japan, pp. 895–896.

Dumitrica, D.D. (2011). An Exploration of Cheating in a Virtual Gaming World. *Journal of Gaming & VirtualWorlds, pp 234.*

Edwin,R.V.,&Vanora ,H. (2001) . The importance of pilot studies . *Social Research Update, 35,* 49-59.

Essam, S., & Al-Ammary, J. (2013) . The Impact of Motivation and Social Interaction on the E-Learning at Arab Open University , Kingdom of Bahrain.*Creative Education*, *4*(10), 21.

Ferdig, R. E. (2006). Assessing technologies for teaching and learning: Understanding the importance of technological pedagogical content knowledge. British Journal of Educational Technology, 37(5), 749-760.

Figl , K., Kabicher , S.,& Toifl , K. (2008) . ' Promoting social networks among computer science students'. 38th Ann. Frontiers in Education Conf. (FIE 2008), Saratoga Springs, New York, pp. S1C-15–S1C-20.

Friborg, O., & Rosenvinge, J. H. (2013). A comparison of open-ended and closed questions in the prediction of mental health. Quality & Quantity, 47(3), 1397-1411.

Friesen, N. (2009). Re-thinking e-learning research: Foundations, methods and practices. New York: Peter Lang.

Gachter, S., Daniel, N. & Martin S. (2012). Peer Effects in Pro-social Behavior: Social Norms or Social Preferences. *Journal of the European Economic Association, Vol. 11, pp 548-573.*

Galamoyo, M. & Colin, P. (2011). Enhancing the Quality of E-learning Through Mobile Technology. *Campus-Wide Information Systems, Vol. 28, Issue 5, pp. 331-344.*

Garrison, D. R., M. Cleveland-Innes, M. Koole & Kappelman, J. (2006). Revisiting methodological issues in the analysis of transcripts: Negotiated coding and reliability. The Internet and Higher Education 9(1): 1–8.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The internet and higher education*, *2*(2-3), 87-105.

Garrison, D.R., & Anderson, T. (2003). E-learning in the 21st century. A framework for research and practice. London: RoutledgeFalmer.

Garrison, D. R. (2007). Online Community of Inquiry Review: Social, Cognitive, and Teaching Presence Issues. *Journal of Asynchronous Learning Networks, 11*(1), 61-72.

Garrison, D. R. (2011). *E-learning in the 21st century: A framework for research and practice*: Taylor & Francis.

Gåsland, M. M. (2011). Game mechanic based e-learning: A case study.

Gee, J. P. (2003).What video games have to teach us about learning and literacy.New York, NY: Palgrave Macmillan.

Gee, J. P. (2005). Learning by design: Good video games as learning machines, E-Learning , 2(1), 5-16.

Governors State University, Center for Online Learning and Teaching. (2008). E-learning glossary. Retrieved from www.govst.edu/elearning/default.aspx.

Green, M., & McNeese, M. N. (2007). Using edutainment software to enhance online learning. International Journal on E-Learning, 6(1), 5-16.

Griffiths, M. (2002). The educational benefits of videogames. *Education and Health,* 20(3), 47-51.

Gros, B. (2007). Digital games in education: The design of games-based learning environments. *Journal of Research on Technology in Education,* 40(1), 23-38.

Guri-Rosenblit, S. (2005). 'Distance education 'and 'e-learning': Not the same thing. *Higher Education,* 49(4), 467-493.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis (7th ed.). Englewood Cliffs: Prentice Hall.

Hair, J. F., Ringle, C. M., &Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. Journal of Marketing Theory and Practice, 19, 139 - 151.

Hair, J. F., Hult, G. T. M., Ringle, C. M. & Marko, S. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM).* United State of America: Sage Publication, Inc.

Henderson, L. (2002). Playing video games and cognitive effects: Teenagers' thinking skills and strategies. In P. Barker & S. Rebelsky (Eds.), Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications (pp. 759-760). Chesapeake, VA: Association for the Advancement of Computing in Education.

Hernandez, B., Montaner, T., Sese, F. J., & Urquizu, P. (2011). The role of social motivations in e-learning: How do they affect usage and success of ICT interactive tools? *Computers in Human Behavior, 27*(6), 2224-2232.

Hicks, A. (2011). Towards Social Gaming Methods for Improving Game-based Computer Science Education. *ACM, pp. 1-3.*

Hoic-Bozic, N., Mornar, V., Boticki, I. (2009): 'A blended learning approach to course design and implementation', IEEE Trans. Education, 52, (1), pp. 19–30.

Ilias , K., & Nor, M. M. (2012) . Influence of teacher-student interaction in the classroom behavior on academic and student motivation in teachers' training institute in Malaysia . *Academic Research International, 2*(1), 580.

Iahad, N., Dafoulas, G. A., Kalaitzakis, E., & Macaulay, L. A. (2004). Evaluation of online assessment: The role of feedback in learner-centered e-learning. Paper presented at the Proceedings of the 37th Hawaii International Conference on System Sciences, Hawaii, US.

Iowa State University (2013), "eLearner – computer-based learning", available at: www.dso.iastate.edu/asc/academic/elearner/index.html .

Jarmo, K., & Jonna, H. (2010). Shared-screen social gaming with portable devices. In *Proceedings of the 12th international conference on Human computer interaction with mobile devices and services . ACM , pp. 317-326.*

Jeremy, B., Ramanuja, S., Nicolas, K.,Xiang, Z., Matei,R., John, S.&Adriana, I. (2012). Branded with a scarlet C: cheaters in a gaming social network. In *Proceedings of the 21st international conference on World Wide Web. ACM, pp. 81-90.*

John, R. (2011). Emiratizing the Education Sector in the UAE: Contextualization and Challenges Education. *Business and Society: Contemporary Middle Eastern Issues, Vol. 4, Issue 2, pp. 134-14.*

Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.), Instructional design theories and models: A new paradigm of instructional theory (Vol. 2, pp. 215- 239). Mahwah, NJ: Erlbaum.

Jonassen, D. & Land, S. (2000). Theoretical foundations of learning environments, Lawrence Erlbaum, Mahwah, NJ.

Jong, M. S. Y., Shang, J., Lee, F.-L., & Lee, J. H. M. (2008). Harnessing computer games in education. *International Journal of Distance Education Technologies,* 6(1), 1-9.

Josephine C. & Jennifer E. (2013). Strategies for Impact: Enabling E-learning Project Initiatives. *Campus-Wide Information Systems, Vol. 30, Issue 3, pp. 165-173.*

Jovanovic, M. (2013). Localization in E-learning Semantics (DSi Model Approach). *ACM, pp1-7.*

Junco, R., Heiberger, G., & Loken, E., (2010). The effect of Twitter on college student engagement and grades. Journal of Computer Assisted Learning, 27(2), 119-132. doi:10.1111/j.1365-2729.2010.00387.x

Kakasevski, G., Mihajlov, M., Arsenovski, S. & Chungurski, S. (2008):'Evaluating usability in learning management system moodle'. 30th Int. Conf. on Information Technology Interfaces (ITI 2008), Cavtat/ Dubrovnik, Croatia, pp. 613–618.

Kanuka, H., & Garrison, D. R. (2004). Cognitive Presence in Online Learning. *Journal of Computing in Higher Education*, 15(2), 30-49.

Kaplan, A.M. & Haenlein, M. (2010). Users of the World, Unite! The Challenges and Opportunities of Social Media. *Business Horizons, Vol. 53, pp. 59-68.*

Kerlinger, F. N. (1986). Foundation of behavior research. San Francisco: Holt, Rinehart and Winston.

Klopfer, E., Osterweil, S., Groff, J., & Haas, J. (2009). The instructional power of digital games, social networking, simulations, and how teachers can leverage them. Cambridge,MA: The Education Arcade, Massachusetts Institute of Technology.http://education.mit.edu/papers/GamesSimsSocNets_EdArcade . pdf

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Englewood Cliffs, NJ: Prentice Hall.

Kritz, W. C., & Hense, J. U. (2006). Theory-oriented evaluation for the design of and research in gaming and simulation. Simulation & Gaming, 37(2), 268-283.

Krosnick, J. A.,& Fabrigar,L.R.(1997). Designing rating scales for effective measurement in surveys . *survey measurement and process quality, 141-164*.

Kuhlthau, C. C. (2010). Guided Inquiry: School Libraries in the 21st Century, *School Libraries Worldwide*, Volume 16, Number 1, pages 17-28.

Lambert, J. L., & Fisher, J. L. (2013). Community of inquiry framework: Establishing community in an online course. *Journal of Interactive Online Learning*, *12*(1), 1-16.

Lattin, J. M., Carroll, J. D., & Green, P. E. (2003). Analyzing multivariate data. Wageningen: Thomson Brooks/Cole Pacific Grove.

Lazim, A.,Hafriz, N. A.,Yazid , S., Noor, M. M. N.&Wan ,A. W. A. (2013). The use of Web 2.0 in e-learning: evidence From a public university in Malaysia. *3rd International Conference For e-learning & Distance Education.*

Lee, R. & Faulkner, M. (2010). The roles of extrinsic factors in a community of inquiry model of e-learning.*2010 Occasional Papers on Learning and Teaching at UniSA*, 1-13.

Leiyu, S. (2008). *Health Services Research Methods*. 2nd Edition, Delmar learning, USA.

Lena, B. & Marlene K. (2013). E-learning from a student's view with focus on Global Studies. *Multicultural Education & Technology Journal, Vol. 7, Issue 2/3, pp. 176 – 19.*

Lewis, P. J. (1992). Rich picture building in the soft systems methodology, *European Journal of Information Systems*, 1(5), 351-360.

Li, M.,& Liu, Z. (2009): 'The role of online social networks in students' e-learning experiences'. Int. Conf. on Computational Intelligence and Software Engineering (CiSE 2009), Wuhan, China, pp. 1–4.

Lepper , M. R., & Cordova , D. L. (1992) . A desire to be taught : Instructional consequences of intrinsic motivation. Motivation and Emotion, 16(3), 187-208. doi:10.1007/BF00991651

Mahama, E.S. (2012). Disability and Development: The Role of Language and E-Learning. *Multicultural Education & Technology Journal, Vol. 6, Issue 3, pp.162-176.*

Mahmood, J., Dahlan, H. M., & Hussin, A. R. C. (2013a, December). Enhancement of e-learning system by using social network features. In *e-Learning, e-Management and e-Services (IC3e), 2013 IEEE Conference on*(pp. 24-29). IEEE.

Mahmood, J. B., Dahlan, H. M., & Hussin, A. R. C. (2013b). Enhancing Knowledge Sharing in e-learning by Incorporating Social Network Features.*Journal of Information Systems Research and Innovation*.

Mawaddah, M. (2013). Factors Affecting the Success of Nanotechnology Product Commercialisation in Malaysia. Universiti Utara Malaysia.

McFarlane, A., Sparrowhawk, A., & Heald, Y. (2002). On the Educational Use of Games. Cambridge: Teachers Evaluating Educational Media.

Mihaela, B., Vlad. P., Alexandru, V. & Alexandru, L. (2011). An Analysis of Social Gaming Networks in online and Face to Face Bridge Communities. *ACM, pp 35-42*.

Muntean, C. I. (2011). *Raising engagement in e-learning through gamification.* Paper presented at the Proc. 6th International Conference on Virtual Learning ICVL.

Murray, M. C., Pérez, J., Geist, D. B., & Hedrick, A. (2012). *Student interaction with online course content: Build it and they might come*. DigitalCommons@ Kennesaw State University.

Murugesan, S. (2007): 'Understanding Web 2.0', IT Professional, 9, (4), pp. 34–41.

Nasser, R., Cherif, M., & Romanowski, M. (2011). Factors that impact student usage of the learning management system in Qatari schools. *The International Review of Research in Open and Distributed Learning*, *12*(6), 39-62.

Namisiko , P. , Mindila , R. , Chepkoech , E., & Nyeris , R. (2014) . A Review of Application of Web 2.0 and Open Source Softwares in E-learning: A Baseline Survey in a Private University, Kenya . *International Journal of Computer Science Issues (IJCSI), 11*(2), 190.

Nee , A. Y. H. , & Gim, Y. G. (2015) . Use of Social Media to Enhance Personal Learning Environment in Learning of Statistics.

Neo , M ., & Neo, T. K. (2009). Engaging Students in Multimedia-mediated Constructivist Learning-Students' Perceptions. *Educational Technology & Society* , *12*(2), 254-266.

Neuman , W. L. (2007) . *Basics of Social Research Qualitative and Quantitative Approaches*,(2nd Ed.). Pearson Education, Inc.; Boston.

Norusis , M .J. (2011) . IBM SPSS Statistics 19 guide to data analysis : Pearson Education.

Oblinger, D. (2006). Games and learning digital games have the potential to bring play back to the learning expereince. *Educause Quarterly,* 5-7.

Ofori-Dwumfuo, G. O. & Paatey, E. (2011). The design of an electronic voting system. *Research Journal of Information Technology, Vol.3,No.2, pp.91-98.*

Oliver, R., & Omari, A. (2001). Student responses to collaborating and learning in a web-based environment. *Journal of Computer Assisted Learning*, 17(1), 34-47.

Olson, J., Codde, J., deMaagd, K., Tarkleson, E., Sinclair, J., Yook, S.& Egidio, R. (2011). An Analysis of e-Learning Impacts & Best Practices in Developing Countries *With Reference to Secondary School Education in Tanzania.*

Oriogun, P. K. (2003). Towards understanding online learning levels of engagement using the SQUAD approach to CMC discourse. *Australian Journal of Educational Technology,* 19(3), 371-387.

Paechter, M., Maier, B. & Macher, D. (2010). Students' Expectations and Experiences in E-learning: their Relation to Learning Achievements and Course Satisfaction. *Computers & Education, Vol. 54, pp. 222-229.*

Pallant, J. (2013). SPSS survival manual: A step by step guide to data analysis using SPSS. New York: McGraw-Hill International.

Pallant, J. (2011). SPSS Survival Manual (4th ed., p. 359). British library. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle: SPSS +Survival+Manual#7.

Pallant, J. (2001). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS for Windows (Versions 10 and 11): SPSS Student Version 11.0 for Windows*. Milton Keynes, UK, USA: Open University Press.

Parise, S., & Crosina, E. (2012). How a mobile media game can enhance the educational expereince. *MERLOT Journal of Online Learning and Teaching,* 8(3), 209-222.

Park , H.M.(2008). Univariate analysis and normality test using SAS, Stata , and SPSS . *The University Information Technology Services (UITS) Center for Statistical and Mathematical Computing , Indiana University* .

Phan, M. H., Jardina, J. R., Hoyle, S.& Chaparro, B. S.(2012). "Examining the Role of Gender in Video Game Usage, Preference, and Behavior". Proceedings of the Human Factors and Ergonomics Society Annual Meeting. 56 (1): 1496-1500

Picciano, A. G. (2002). Beyond student perceptions: issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks,,* 6(1), 21-40.

Posea, V., Balint, M., Dimitriu, A. & Iosup, A. (2010). An Analysis of the BBO Fans Online Social Gaming Community. *In RoEduNet, IEEE, p 1-6.*

Powell, E. M., Finkelstein, S., Hicks, A., Phifer, T., Charugulla, S., Thornton, C., Barnes, T., & Dahlberg, T. (2010). SNAG: Social Networking Games to Facilitate Interaction. In *Proceedings of the 28th of the internationalConference Extended Abstracts on Human Factors inComputing Systems,pp* 4249-4254.

Premagowrie, S., Kalai, V. R. & Ho, R. C. (2014). Online forum: a platform that affects students' learning?'. *American International Journal of Social Science, 3*(7), 107-116.

Prensky, M. (2006). Don't bother me Mom - I'm learning. Paragon House

Prensky, M. (2001). Digital game-based learning, New York, NY: McGraw-Hill.

Ricci, K. E., Salas, E. & Cannon-Bowers J. A. (1996). Do computer games facilitate knowledge acquisition and retention. *Military Psychology*, 8(4), 295-307.

Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, 7(1), 68-88.

Rodrigo de Oliveira., Mauro, C. & Nuria, O. (2010). MoviPill: Improving Medication Compliance for Elders Using a Mobile Persuasive Social Game. *ACM, pp. 251-260.*

Rodrigues, J. J., Sabino, F. M., & Zhou, L. (2011). Enhancing e-learning experience with online social networks. *IET communications, 5*(8), 1147-1154.

Roither, M. (2012). Beim e-learning sind viele Stu ¨hle leer, *Salzburger Nachrichten, p. 46.*

Rovai, A. P. (2002). Building sense of community at a distance [Electronic Version]. *International review of research in open and distance learning,* 3, 1-16.

Roy, K. (2006). The impact of learning styles on interactivity in asynchronous e-learning. *Performance Improvement,* 45(10).

Royle, K. (2008). Game-based learning: A different perspective. Innovate: Journal of Online Education, 4(4). Retrieved from http://www .innovateonline. info/ pdf /vol4_issue4/Game-Based_Learning- __A_Different_Perspective.pdf

Sabino, F. M. R. (2010). Contributions of online social networks for e-learning. *Dissertation Abstracts International* ,1-54.

Safran, C., Gütl, C. & Helic, D. (2007). The Impact of Web 2.0 on Learning at a Technical University - A usage survey. In T. Bastiaens & S. Carliner (Eds.), *Proceedings of E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 436-443)

Salkind, N. J. (2009). *Exploring Research,* (7th Ed.). Pearson Education, Inc.:USA.

Salomon, G. (2002). Technology and pedagogy: Why don't we see the promised revolution ? Educational Technology, 42(2), 71-75.

Sangra, A. Vlachopoulos, D. & Cabera, N. (2012). Building an Inclusive Definition of E-Learning: An Approach to the Conceptual Framework. *The International Review of Research Open and Distance Learning*, 13(2), 145-159.

Schmidt, M. E., & Vandewater, E. A. (2008). Media and attention, cognition, and school achievement. The Future of Children, 18(1), 63-85.

Sekaran, U. (2000). Research methods for business: A Skill Building Approach. Third Ed. New York :John Wiley&Sons,Inc.,p.288.

Sekaran, U. (2003). Research methods for business . Hoboken: NJ: John Wiley & Sons.

Sekaran, U., & Bougie, R. (2010). Research methods for business: A Skill Building Approach (5th. ed.). John Wiley & Sons Ltd., United Kingdom.

Sekaran, U., & Bougie, R. (2013). Research Methods for Business: A Skills-Building Approach.(6th Ed). John Wiley & Sons, Inc.

Sejzi, A. A., & Arisa, B. (2013). Learning Management System (LMS) and Learning Content Management System (LCMS) at Virtual University. In *2nd International Seminar on Quality and Affordable Education (ISQAE), Johor, Malaysia. http://www. isqae. com.*

Shea, P. J., Fredericksen, E. E., Pickett, A. M., & Pelz, W. E. (2003). A preliminary investigation of "teaching presence" in the SUNY learning network. *Elements of quality online education: Practice and direction*, *4*, 279-312.

Sher, A. (2009). Assessing the relationship of student-instructor and student-student interaction to student learning and satisfaction in web-based online learning environment. *Journal of Interactive Online Learning*, *8*(2), 102-120.

Silva, E. (2010). Gamifying learning with social gaming mechanics. *The Masie learning center perspectives*, 61-62.

Soer, R., Reneman, M. F., Vroomen, P. C., Stegeman, P., & Coppes, M. H. (2012). Responsiveness and minimal clinically important change of the pain disability index in patients with chronic back pain. Spine, 37(8), 711.

Sophie, E.P., Elizabeth, B. & Mohammad, D. (2010). Adaptable Personalised E-Learning Incorporating Learning Styles. *Campus-Wide Information Systems, Vol. 27 Issue 2, pp. 91-100.*

Spears, L. R. (2012). Social Presence, Social Interaction, Collaborative Learning, and Satisfaction in Online and Face-to-Face Courses.

Squire, K. & Jenkins, H. (2004). Harnessing the power of games in education, *Insight*, (3)1, 5-33.

Smith, J. D. (2012). Single-case experimental designs: a systematic review of published research and current standards. Psychol Methods, 17(4), 10.

Steckbauer, S. E. (2005). An Analysis of Social Presence in Online Learning. *Month*.

Sukanlaya, S., Cameron, N.& Kieren , J. (2013). Increasing Learners' Satisfaction Intention to Adopt more E-learning. *Education and Training, Vol. 55, Issue 1, pp. 83-105.*

Susan, R.M. & Bradley J.C. (2010). Transformative learning: UAE, Women and Higher Education. *Journal of Global Responsibility, Vol. 1, Issue 1, pp. 127-148.*

Swan, K., Shea, P., Richardson, J., Ice, P., Garrison, D. R., Cleveland-Innes, M., & Arbaugh, J. B. (2008). Validating a measurement tool of presence in online communities of inquiry. *E-mentor*, *2*(24), 1-12.

Swan, K., & Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous learning networks*, *9*(3), 115-136.

Szell, M. & Thurner, S. (2010). Measuring Social Dynamics in a Massive Multiplayer Online Game. *Social Networks, Vol.32, pp 313-329.*

Tabachnick, B. G., &Fidell, L. S. (2007). Using multivariate statistics (5th ed.). Boston, MA: Allyn & Bacon.

Thomas, D., & Brown, J. S. (2011). A new culture of learning: Cultivating the imagination for a world of constant change. North Charleston, SC: CreateSpace.

Trepte, S., Reinecke, L., & Juechems, K. (2012). The social side of gaming: How playing online computer games creates online and offline social support. *Computers in Human Behavior, 28*(3), 832-839.

Van den Broeck ,J.,&Fadnes, L.,T.(2013).Data Cleaning Epidemiology:Principles and Practical Guidelines (pp.389-399):Springer.

Vassileva, J. (2008). Toward social learning environments. *Learning Technologies, IEEE Transactions on, 1*(4), 199-214.

Water.org ,About Farmville2 and safe water , Accessed http://water.org/post/farmville-2-and-safe-water/ ,on 26 January ,2016.

Wei, X., Yang, J. ,Adamic, L. , Ara´ujo, R. &Rekhi , M. (2010). Diffusion Dynamics of Games on Online Social Networks. In *WOSN 10*.

Weintraub, D., Mamikonyan, E., Papay, K., Shea, J. A., Xie, S. X., & Siderowf, A. (2012) . Questionnaire for impulsive-compulsive disorders in Parkinson's Disease–Rating Scale. Movement Disorders, 27(2), 242-247.

Wikia, About FarmVille, Accessed http://farmville.wikia.com/wiki/FarmVille, on 30th January, 2016

Wikipedia, About FarmVille, Accessed https://en.wikipedia.org/wiki/FarmVille,on 5 February, 2016.

Xiao, E. & Daniel, H. (2011). Classification of Natural Language Messages Using a Coordination Game. *Experimental Economics, Vol.14, No. 1, pp 1–14.*

Xu, Y., Cao, X., Sellen, A., Herbrich, R. & Graepel, T. (2011). Sociable Killers: Understanding Social Relationships in an Online First-person Shooter Game. *In CSCW 11, pp.197-206.*

Zikmund, W. G. (2003). Business research methods (7th ed.). Ohio: Southwestern Educational Publishing.

UNIVERSITI UTARA MALAYSIA
ILMU BUDI BAKTI
UUM
Universiti Utara Malaysia

A. Background Information

Part A

Kindly tick (√) to answer the following questions

1.What is your approximate age?

A. 19 – 24	
B. 25 – 29	
C. 30 – 39	
D. 40 and above	

2.What is your highest academic qualification?

A. Bachelor Degree	
B. Master Degree	
C. Phd	

3. What is your academic field?

A. information and Communication Technology	
B. Computer Science	
C. Information Technology	
D. Other , state…….	

4. Do you play online social games?

A. Yes, I always do	
B. Yes, I seldom do	
C. No, I never do	

5. Do you use any e-learning applications?

D .Yes, I always do	
E .Yes, I seldom do	
F . No, I never do	

6. How many hours you play online social game daily?

A. Below 1 hour	
B. 1 – 4 hours	
C. Above 4 hours	
D. Never	

7. How many hours you use e-learning application daily?

A. Below 1 hour	
B. 1 – 4 hours	
E. Above 4 hours	
F. Never	

B. Social Presence

Please **circle** to indicate the extent to which you **agree** with the statements about social presence:

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

1	Playing online social games can enhance interactions with other gamers	1	2	3	4	5
2	Playing online social games makes interpersonal relationship to be of fun	1	2	3	4	5
3	Playing online social games increases the closeness among players	1	2	3	4	5
4	I will use e-learning websites if they have similar fun with online social games.	1	2	3	4	5
5	Playing online social games makes interpersonal relationship to be stronger	1	2	3	4	5
6	Playing online social games allows players to freely communicate with one another	1	2	3	4	5
7	Online social games into encourage collaborations with other players	1	2	3	4	5
8	I enjoy playing online social games with other gamers	1	2	3	4	5

C. Cognitive Presence

Please **circle** to indicate the extent to which you **agree** with the statements about the impact of social motivation:

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

1	Through exploration of the online social games, I feel there is a free flow of information exchange	1	2	3	4	5
2	I can comment on other people's idea, through online social games	1	2	3	4	5
3	I gain new ideas from playing online social games	1	2	3	4	5

4	Online social games enhances my thinking process	1	2	3	4	5
5	The brainstorming activity in playing online social game helps me in problem solving	1	2	3	4	5
6	I like to play online social games because it challenge my brain	1	2	3	4	5
7	Because I play online social games, it is not difficult for me to use e-learning applications	1	2	3	4	5

D. Teaching Presence

Please **circle** to indicate the extent to which you **agree** with the statements about the impact of social motivation:

	1	**2**	**3**	**4**	**5**					
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**					
1	I learn new things by playing online social games					1	2	3	4	5
2	The instructions I receive in online social games are helpful in using e-learning					1	2	3	4	5
3	I learn how to focus in learning from playing online social games					1	2	3	4	5
4	I receive direct instructions in online social games					1	2	3	4	5
5	I can share my personal experience from online social games with friends					1	2	3	4	5

E. E-Learning Usage

Please **circle** to indicate the extent to which you **agree** with the statements about the usage of e-learning:

1	2	3	4	5
Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**

1	I like to use the e-learning applications	1	2	3	4	5
2	I am motivated to use the e-learning applications because it is similar to online social games.	1	2	3	4	5

Thank You

-Ends-

Appendix B

Descriptive Result for Z score

	N	Minimum	Maximum
Zscore(B1)	80	-2.64181-	1.76120
Zscore(B2)	80	-3.10843-	1.74375
Zscore(B3)	80	-2.48993-	1.88797
Zscore(B4)	80	-2.27395-	1.79121
Zscore(B5)	80	-2.36456-	1.88633
Zscore(B6)	80	-2.75693-	2.06393
Zscore(B7)	80	-2.51434-	1.81141
Zscore(B8)	80	-2.37841-	1.82652
Zscore(C1)	80	-2.71248-	2.00488
Zscore(C2)	80	-1.74968-	2.36721
Zscore(C3)	80	-2.92012-	2.21416
Zscore(C4)	80	-3.00905-	1.82963
Zscore(C5)	80	-2.93468-	1.93111
Zscore(C6)	80	-2.26767-	1.69766
Zscore(C7)	80	-2.58145-	1.61177
Zscore(D1)	80	-2.56906-	1.94797
Zscore(D2)	80	-1.98746-	2.27138
Zscore(D3)	80	-1.48518-	1.78495
Zscore(D4)	80	-2.60220-	1.73480
Zscore(D5)	80	-2.83715-	1.99204
Zscore(E1)	80	-2.05722-	2.05722
Zscore(E2)	80	-1.62913-	1.83096
Valid N (listwise)	80		

Appendix C

Chi-Square Probabilities

	P										
DF	0.995	0.975	0.20	0.10	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	0.0000393	0.000982	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.550	10.828
2	0.0100	0.0506	3.219	4.605	5.991	7.378	7.824	9.210	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.860	16.924	18.467
5	0.412	0.831	7.289	9.236	11.070	12.833	13.388	15.086	16.750	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.690	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.180	11.030	13.362	15.507	17.535	18.168	20.090	21.955	24.352	26.124
9	1.735	2.700	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.275	19.675	21.920	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.300	30.957	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32.000	34.267	37.146	39.252
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	38.648	40.790
18	6.265	8.231	22.760	25.989	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.900	27.204	30.144	32.852	33.687	36.191	38.582	41.610	43.820
20	7.434	9.591	25.038	28.412	31.410	34.170	35.020	37.566	39.997	43.072	45.315
21	8.034	10.283	26.171	29.615	32.671	35.479	36.343	38.932	41.401	44.522	46.797
22	8.643	10.982	27.301	30.813	33.924	36.781	37.659	40.289	42.796	45.962	**48.268**
23	9.260	11.689	28.429	32.007	35.172	38.076	38.968	41.638	44.181	47.391	49.728
24	9.886	12.401	29.553	33.196	36.415	39.364	40.270	42.980	45.559	48.812	51.179
25	10.520	13.120	30.675	34.382	37.652	40.646	41.566	44.314	46.928	50.223	52.620
26	11.160	13.844	31.795	35.563	38.885	41.923	42.856	45.642	48.290	51.627	54.052
27	11.808	14.573	32.912	36.741	40.113	43.195	44.140	46.963	49.645	53.023	55.476

28	12.461	15.308	34.027	37.916	41.337	44.461	45.419	48.278	50.993	54.411	56.892
29	13.121	16.047	35.139	39.087	42.557	45.722	46.693	49.588	52.336	55.792	58.301
30	13.787	16.791	36.250	40.256	43.773	46.979	47.962	50.892	53.672	57.167	59.703
31	14.458	17.539	37.359	41.422	44.985	48.232	49.226	52.191	55.003	58.536	61.098
32	15.134	18.291	38.466	42.585	46.194	49.480	50.487	53.486	56.328	59.899	62.487
33	15.815	19.047	39.572	43.745	47.400	50.725	51.743	54.776	57.648	61.256	63.870
34	16.501	19.806	40.676	44.903	48.602	51.966	52.995	56.061	58.964	62.608	65.247
35	17.192	20.569	41.778	46.059	49.802	53.203	54.244	57.342	60.275	63.955	66.619
36	17.887	21.336	42.879	47.212	50.998	54.437	55.489	58.619	61.581	65.296	67.985
37	18.586	22.106	43.978	48.363	52.192	55.668	56.730	59.893	62.883	66.633	69.346
38	19.289	22.878	45.076	49.513	53.384	56.896	57.969	61.162	64.181	67.966	70.703
39	19.996	23.654	46.173	50.660	54.572	58.120	59.204	62.428	65.476	69.294	72.055
40	20.707	24.433	47.269	51.805	55.758	59.342	60.436	63.691	66.766	70.618	73.402
41	21.421	25.215	48.363	52.949	56.942	60.561	61.665	64.950	68.053	71.938	74.745
42	22.138	25.999	49.456	54.090	58.124	61.777	62.892	66.206	69.336	73.254	76.084
43	22.859	26.785	50.548	55.230	59.304	62.990	64.116	67.459	70.616	74.566	77.419
44	23.584	27.575	51.639	56.369	60.481	64.201	65.337	68.710	71.893	75.874	78.750
45	24.311	28.366	52.729	57.505	61.656	65.410	66.555	69.957	73.166	77.179	80.077
46	25.041	29.160	53.818	58.641	62.830	66.617	67.771	71.201	74.437	78.481	81.400
47	25.775	29.956	54.906	59.774	64.001	67.821	68.985	72.443	75.704	79.780	82.720
48	26.511	30.755	55.993	60.907	65.171	69.023	70.197	73.683	76.969	81.075	84.037
49	27.249	31.555	57.079	62.038	66.339	70.222	71.406	74.919	78.231	82.367	85.351
50	27.991	32.357	58.164	63.167	67.505	71.420	72.613	76.154	79.490	83.657	86.661
51	28.735	33.162	59.248	64.295	68.669	72.616	73.818	77.386	80.747	84.943	87.968
52	29.481	33.968	60.332	65.422	69.832	73.810	75.021	78.616	82.001	86.227	89.272
53	30.230	34.776	61.414	66.548	70.993	75.002	76.223	79.843	83.253	87.507	90.573
54	30.981	35.586	62.496	67.673	72.153	76.192	77.422	81.069	84.502	88.786	91.872
55	31.735	36.398	63.577	68.796	73.311	77.380	78.619	82.292	85.749	90.061	93.168
56	32.490	37.212	64.658	69.919	74.468	78.567	79.815	83.513	86.994	91.335	94.461

Appendix D

Normality

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
B1	80	1	5	3.40	.908	-.370-	.269	.482	.532
B2	80	1	5	3.56	.824	-.552-	.269	.393	.532
B3	80	1	5	3.28	.914	-.274-	.269	-.309-	.532
B4	80	1	5	3.24	.984	.074	.269	-.470-	.532
B5	80	1	5	3.23	.941	-.002-	.269	-.737-	.532
B6	80	1	5	3.29	.830	.095	.269	.129	.532
B7	80	1	5	3.33	.925	-.306-	.269	-.269-	.532
B8	80	1	5	3.26	.951	-.554-	.269	.312	.532
C1	80	1	5	3.30	.848	.271	.269	.196	.532
C2	80	2	5	3.28	.729	.125	.269	-.192-	.532
C3	80	1	5	3.28	.779	-.363-	.269	-.065-	.532
C4	80	1	5	3.49	.827	-.580-	.269	.880	.532
C5	80	1	5	3.41	.822	-.483-	.269	.002	.532
C6	80	1	5	3.29	1.009	-.382-	.269	-.303-	.532
C7	80	1	5	3.46	.954	-.070-	.269	-.121-	.532
D1	80	1	5	3.28	.886	-.127-	.269	.589	.532
D2	80	2	5	3.40	.704	-.080-	.269	-.245-	.532
D3	80	2	5	3.36	.917	.015	.269	-.844-	.532
D4	80	1	5	3.40	.922	.004	.269	-.380-	.532
D5	80	1	5	3.35	.828	-.053-	.269	.778	.532
E1	80	2	5	3.50	.729	.502	.269	-.218-	.532
E2	80	2	5	3.41	.867	.157	.269	-.579-	.532
Valid N (listwise)	80								

Appendix E

Correlations

Correlations

		SIV	CIV	TIV	EDV
SIV	Pearson Correlation	1	.597**	.451**	.354**
	Sig. (2-tailed)		.000	.000	.000
	N	80	80	80	80
CIV	Pearson Correlation	.597**	1	.633**	.496**
	Sig. (2-tailed)	.000		.000	.000
	N	80	80	80	80
TIV	Pearson Correlation	.451**	.633**	1	.484**
	Sig. (2-tailed)	.000	.000		.000
	N	80	80	80	80
EDV	Pearson Correlation	.354**	.496**	.484**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	80	80	80	80

**. Correlation is significant at the 0.01 level (2-tailed).