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Corresponding Author: Sahel Al-Habashneh**Abstract**

In the modern day educational setting, E-learning courseware or the use of computer-based, online teaching and learning techniques is very common. Due to its increasing popularity, the usability, ease of understanding, functionality etc. of the E-learning courseware has been an important topic of research. The effects of gender on the usability and acceptability of the E-learning courseware is a topic that has been researched upon in the past as well. This study explores the impact of gender on the usability of E-learning courseware in segregated teaching environment in UAE colleges. This study can serve as a milestone for the academicians, particularly in the appropriate use of E-learning courseware when teaching the male and female students. Thus this study can also help course instructors and designers in altering the E-learning courseware designs keeping the gender differences in view. The research has been conducted in the colleges of UAE where male and female students study in segregated settings. A sample size of 300 students was asked to perform simple tasks using Moodle. The results revealed no significant effect of gender on the usability of the E-learning courseware. However, the research made a significant recommendations on terms of E-learning courseware elements to be tested as well as considering other elements which may have a direct effect on testing E-learning courseware usability and gender .

Keywords: E-learning courseware , usability , gender , age , educational background and segregated colleges

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1. Introduction

E-learning courseware became a very important tool in education these days (Martin, et. all, 2011). One of the methods to evaluate quality of E-learning courseware is how usable it is (Ardito et. all, 2006). Researchers identify the important of testing E-learning courseware usability with gender (Koochang, 2004) , some researchers point out that information systems industry which is dominated by male does not consider the needs of females, while others found out that actually females perform better using the E-learning courseware (Shneiderman, 2011). That's why the findings of researchers linking gender to E-learning Courseware usability vary. Where some researchers like Kuhlen (2006) found out that there is significant relationship between gender and E-learning courseware usability while others like Efuwape (2013), Sancar (2007) and Verma (2016) found out that there is no significant relationship . Moreover, the core link between gender and technology, some refer it to the fact that gender vary in using the technology (Lee, 2000) while other say it is due to the culture and context of uprising (Moran, Abramson, & Moran, 2014). Similarly, Leow (2016) showed no considerable difference, in spite of the fact that both genders were presenting better usability for the framework. In addition, gender-specific behavior in E-learning (such as taking initiatives in group processes or having preferences for specific domain-specific knowledge and programs is mainly not sex-related, but is permanently constructed in social interaction (Kuhlen, 2006).

The above argument provide the base for this investigation since, it will try to reveal the relationship between E-learning courseware usability and gender, whether the relationship exist same to the findings found by Kuhlen (2006) or does not excises such as the finding of Efuwape (2013) and Sancar (2007) . Moreover, the research case itself will in rich this research since UAE have a unique mix culture with strict emirates like Sharjah and more cosmopolitan emirates like Dubai. The only resent study examining E-learning courseware in the Gulf Cooperation Council (GCC) was conducted by Al-Nefaie (2015), in KSA “ Kingdom of Saudi Arabia “ however it considered participants from a same age groups , same educational background and it revealed no significant in the relations. However, KSA is a much strict country with different cultural elements in many ways (Fearon, 2003).

2. Research question and hypothesis

The objectives of the study is to investigate if there are gender differences related to usability in E-learning courseware (Moodle) at UAE public tertiary segregated schools. The research have the following hypothesis:

H0: there is no significant difference in perceived usability of a VLE according to gender in UAE public tertiary segregated schools.

H1: there is a significant difference in perceived usability of a VLE according to gender in UAE public tertiary segregated schools.

3. Literature Review

Gender is considered one of the important factor. According to various researchers, there is significant relationship between gender and usage of E-learning courseware (Lee (2000). Contrary to some, this difference does not exist at all and both men and women are improving the usage of Moodle regardless of the gender. Furthermore, some researchers like Lee (2000) found that there is relationship between gender and E-learning usability as women are more interactive with internet technologies while according to Chinyamurindi & Louw (2010), gender differences does not exists when ability of the students' to understand the technology is judged. Similarly, some of the researchers indicated that cultural upbringing is important factor while examining the gender and

usability of E-learning courseware (Moran et. all, 2014). So, under the sub-heading of gender, this chapter will try to analyze the two set of variables including Gender and technology as well as differences in gender through cultural upbringing.

3.1 Gender and confidence in use

However, when it comes to the confidence in using computers, females show lower confidence than males in their usability (Beckwith et al. 2006). Research by Margolis, Fisher, & Miller (2002) stated that although a much higher number of females attend college in the United States, a meager 15-20% select computer science as their majors and of only 17% of the females appear in the Advanced Placement Tests for computer science. Only 5% females interviewed showed any confidence in their ability to develop computer software. Beckwith et al. (2006) are of the view that if gender-specific software are not designed, which the females can easily interact with, then there are chances that female efficacy with computers will not increase.

3.2 Gender and perceived use of technology

Studies related to the use of computer-based technologies indicate that gender differences exist in the perceived use of such technology however, not necessarily in their ability to understand the technology (Chinyamurindi & Louw 2010). Such research may offer insight on the impact of gender in introducing technology. This is of particular concern as organizations seek to integrate Information and Communication Technology (ICT) into everyday processes. Attitudes of using technology between genders have been studied, and findings indicate that a gender bias exists such that attitudes toward technology are more positive among men than women (Chinyamurindi & Louw 2010). Further studies indicate that anxiety levels of female college students were higher than those of males, thus suggesting that gender differences may impact the integration and usability of technology.

Gender differences have also been noted in visual-spatial abilities and verbal abilities such that men appear to have better visual-spatial abilities, and women appear to have better verbal abilities (Chinyamurindi and Louw 2010). Analyses of research related to gender differences, however indicate that differences may be negligible along factors such as cognitive, communication, and motor abilities. Also, that context and age may influence the extent of the differences between genders. Technology is a context where data from studies on how the genders interact with technology have revealed that a difference between genders exists.

3.3 Gender through cultural upbringing

Women empowerment has led to an improved success ratio in every field of the society, however, the difference still exists in the way male and female children are brought up in various cultures (Anderson et al, 2008). Considering the focused area of the research, it can be said that, UAE society showed an obvious difference in the way girls and boys are brought up. This might not be the case in the whole UAE because some of the cities are developed like Dubai while cities like Sharjah are still following the conservative mind frame. As a future breadwinner in the family, boys are given preference in better education as well as more focus is given to their personal and social grooming as compared to girls in the same family (Costa, Terracciano & McCrae, 2001). Relatively little multidimensional information is as of now accessible. Moran, Abramson, & Moran, (2014) suggest that these differences in the upbringing of male and female children depend on the cultural values, beliefs and attitudes derived mainly from religion as well as family backgrounds.

From the review, it can be said that cultural upbringing has importance in E-learning activities. In addition, the studies in 30 different countries and cultures depicted that in every country the way

male and females are treated in terms of upbringing was different (Williams and Best, 1990). So, after the analysis of the past studies, it is found that cultural norms, values and belief mainly derived from the religion play an important role in students' learning capabilities especially in case of UAE (Moran et. all, 2001), where society is segregated due to the difference in mind frame of people based on their locality (Torstrick, R. L., & Faier, E. (2009).

3.4 Usability

Usability can be considered the extent to which someone can learn or use a software without difficulty. Thus the safety of the system, its usefulness, as well as how the users perceive it (as easy or difficult to use), all constitute the definition of usability (Preece, 1994). According to Ong et al, (2009) any study regarding usability must also involve an understanding of the relation between the users themselves (cognitive and psychological), understanding of the needs of the work that has to be done, as well as the technology required to do it (Teoh, Ong et al. 2009). Usability has a very major effect on the motivations to use a system in order to learn, as well as on the understanding and retention levels of the learners.

Before discussing the concept of usability further there is a need to agree on its definition. The term usability has a number of definitions. This is due to the fact, that researchers have used the term to describe their specific websites or software. Thus all the characters or attributes used to define usability are limited to the software being tested. A more generalized definition of usability is what is required, that can be implemented on all software and websites without mention of the context of a product in particular (Bevan 2008). Therefore, the definition given by Preece (2000) can be taken as a more generalized definition of the term usability. As this definition also incorporates the VLEs and other computer software, it can be taken as more recent definition of the term. She states that any software has high usability if it usability facilitates quick learning, allows greater retention rates for the students, lesser chances of mistakes and is more effective as a tools for learning. She further states the qualities of high usability system as one that is steady, manageable and foreseeable, making it easy to use (Preece 2000). This definition clearly forms an association among usability and learning experience. Another definition for usability in VLE "the result of actions taken after observing, listening, and learning from real users who are actively engaged in pursuit of a real learning goal."(Barnum 2008)

3.5 Importance of usability

As discussed above, the usability of a software or website can have a big effect on the learning ability and the remembering levels of students, it can also result in greater motivation for the students (Dominic, 2015). Students will feel better and facilitated if the software is user friendly. If a software is not usable with ease, students will be less motivated to use it for learning. On the contrary, when the usability of a software of website is high, learners will be motivated to use it for the enhancement of their knowledge. Furthermore they will not waste time in learning the software itself, rather that time will be spent in learning the course material (Lewis, MacEntee et al. 2005). This statement, by Cole and Lewis (2005) highlights the fact that usability of a VLE or a software is not just related to ease of use or performance, but it can also be responsible for the outcomes of education. According to Barnum (2008) emphasizing the importance of usability testing, suggests that the feedback from actual users should be given the highest weightage when measuring the usability of a software because it is the users for whom the usability should be high, and not the developers.

4 Method

The present study uses the quantitative case study research methodology in order to investigate the usability need according to gender. The case study is a realistic study that examines an existing concept inside its actual setting employing several data sources (Yin, 2004; Orlikowski and Baroudi, 1991).

Case study research is based upon the assumption each educational institute will differ in terms of students and staff as these are selected based on different criteria in each university and college (Yin, 2003). One issue with case studies relates to the fact that researcher may try to seek solution for an issue which is wide-ranging or select a subject which has a number of aims that cannot possibly be achieved from a single study (Yin, 2003). To deal with this issue, many researcher including Yin (2003) and Stake (1995) propose that the researcher determines the limits for a case. These limits may include period and location (Creswell, 2003), period and action (Stake, 1995), meaning (Miles & Huberman, 1994) and setting in which the case is constructed (Miles and Huberman, 1994). Thus, to address these issues, boundaries were placed on the variables. Thus the users are restricted to only the first year of their college; and the setting for the research was selected as Abu Dhabi government colleges.

4.1 Research Design

An online survey been conducted during March 2016.the sample size is 300 students which is a large enough so it can be generalized to the whole population. The online survey is the main tools for this study, which was prepared to list the main questions that will help in finding the answer to the research question.

4.2 Research scope

As discussed above a main issue with case studies involves the propensity of the researcher to aim to seek answers for a subject that is either too wide or they may end up having numerous research objectives which cannot be fulfilled by a single case study (Yin, 2003). To deal with this issue, many researcher including Yin (2003) and Stake (1995) propose that the researcher determines the limits for a case. These limits may include period and location (Creswell, 2003), period and action (Stake, 1995), meaning (Miles & Huberman, 1994) and setting in which the case is constructed (Miles and Huberman, 1994).

In order to avoid the research from being too broad in its scope, the limits were set for this case study. User types were limited to Students. The environment where the research was conducted was higher educational institutions (segregated Colleges) in UAE. The usability tests were conducted on a one open source VLE, Moodle. The other type of variable which needed to be set to limit the scope, as indicated by Miles & Huberman (1994) is the definition of terms used. The terms requiring definition here were 'E-learning courseware' and 'usability'.

4.3 The Survey

data was collected through the questionnaire, included four demographic variables, gender, age, educational background and technology experience and five usability elements; Learnability, Operation ability, Error Satisfaction and attractiveness and to check the scale reliability, reliability test was performed. Cronbach's alpha coefficient is calculated to ensure the reliability of the scale items being adopted to measure the variables (Cronbach, 1951). The value of Cronbach's alpha coefficient ranges from 0.6 to 1; the greater the value of the coefficient, the more reliable the scale

becomes (Nunnally 1978). According to the Table, the Cronbach's Alpha value for usability factor is 0.996 which make it reliable.

	Variables	No. of Items	Cronbach's Alpha
	Usability	22	.996
	Sub-Constructs		
1	Learn-ability	03	.929
2	Operation Ability	10	.995
3	Errors	02	.971
4	Satisfaction	03	.989
5	Attractiveness	04	.988

Table 1 Reliability testing of Usability factors

4.4 Participants Demographics

A total four demographic variables have been included in the current study, including gender of the respondent, age of the respondent, educational qualification and technical experience. All four of them have been used as the predictors of usability of an E-learning courseware.

Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Males	160	53.3	53.3	53.3
Females	140	46.7	46.7	100.0
Total	300	100.0	100.0	

Table 2 Descriptive statistics according to gender

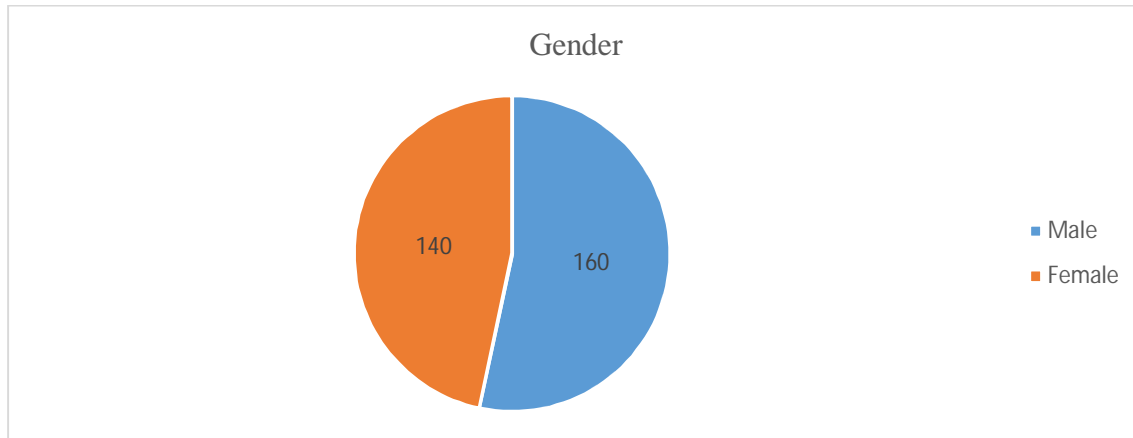


Figure 1 Descriptive statistics according to gender

The research sample consisted 300 participants and among these, 160 respondents were male and 140 were females. This suggested that, the valid percent of male is 53.3 % while 46.7 is for females with cumulative percent of 100.

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	130	43.3	43.3	43.3
	25-34	80	26.7	26.7	70.0
	34-44	90	30.0	30.0	100.0
	Total	300	100.0	100.0	

Table 3 Descriptive statistics according to age

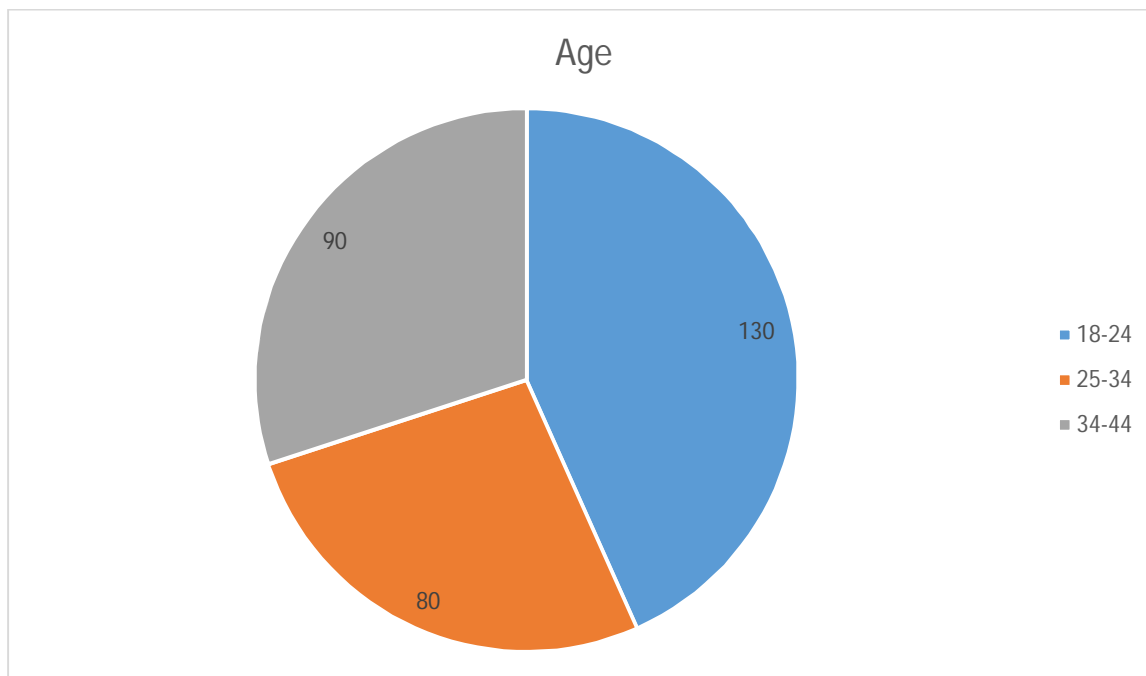


Figure 2 Descriptive statistics according to age

In case of age groups, the highest valid percentage of 43.3% belonged to respondents aged between 18-24 years, followed by the valid percentage of 30% respondents from the age group of 34-44 years. The lowest percentage belonged to the middle group with a value of 26.7%.

Education

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Private secondary schools	30	10.0	10.0	10.0
Public secondary schools	180	60.0	60.0	70.0
College/Diploma	75	25.0	25.0	95.0
University/Bachelor	15	5.0	5.0	100.0
Total	300	100.0	100.0	

Table 4 Descriptive statistics according to Education

The third demographic variable is the educational qualification of the respondents. The highest percentage of 60% belonged to the respondents from Public secondary schools followed by 25% of the respondents belonging to the College certificate or Diploma holders. The lowest percentage of 5% respondents belonged to the University students.

Technology Experience

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Beginner	5	1.7	1.7	1.7
Intermediate	255	85.0	85.0	86.7
Advance	40	13.3	13.3	100.0
Total	300	100.0	100.0	

Table 5 Descriptive statistics according to Technology Experience

The last demographic variable is the technical experience of the respondents. A very high and dominant valid percentage of 85% belonged to the respondents with intermediate level of technical experience. The lowest percentage of 1.7% belonged to the respondents with beginner's level of technical experience. In the pilot study, ANOVA, correlation and regression tests were applied in order to find out the relationship between gender and usability factors as well as correlation between age, education and technological experience with E-learning usability.

5 Results

One-way ANOVA has been conducted to compare the means of the groups with more than two categories, i.e. age group of respondents, educational qualification, technical experience, etc. The first variable to be analyzed is the age group of the respondents and the difference between usability of E-learning courseware among the three different age groups as described above in demographics portion of the analysis. From the ANOVA table, it is clearly evident that the p-value is less than 0.05, which means that the perceived usability significantly differs between the three different age groups of respondents. This proves that our 2nd main hypothesis is not rejected, which stated that there is a significant difference in the perceived usability of E-learning courseware according to age group in UAE public tertiary segregated schools.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	42.006	2	21.003	23.816	.000
Within Groups	261.921	297	.882		
Total	303.927	299			

Table 6 ANOVA usability and Age

Further Tukey's HSD post-hoc test has been conducted to analyze which of the age groups differed from each other in their perceived usability of E-learning courseware. The test statistics to be used here is also the significance or the p-value, which is 0.00 for all other groups except the age group 2 (25-34) and age group 3 (35-44). Here the p-value is 0.986 which is highly insignificant showing that these groups do not differ much from each other. In case of age group 1 (18-24) there exists a strong statistically significant difference between the age group 2 (25-34) and age group 3 (35-44).

(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
18-24	25-34	-.74248*	.13344	.000	-1.0568	-.4282
	34-44	-.76597*	.12877	.000	-1.0693	-.4626
25-34	18-24	.74248*	.13344	.000	.4282	1.0568
	34-44	-.02348	.14430	.986	-.3634	.3164
34-44	18-24	.76597*	.12877	.000	.4626	1.0693
	25-34	.02348	.14430	.986	-.3164	.3634

*. The mean difference is significant at the 0.05 level.

Table 7 Multiple Comparisons Usability and Age

The second demographic variable to be analyzed is the educational qualification of the respondents and the difference between usability of E-learning courseware among the four different educational qualification as described above in demographics portion of the analysis. From the ANOVA table, it is clearly evident that the p-value is less than 0.05, which means that the perceived usability significantly differs between the three different educational qualifications of respondents. This proves that our 3rd main hypothesis is not rejected, which stated that there is a significant difference in the perceived usability of E-learning courseware according to educational qualification in UAE public tertiary segregated schools.

ANOVA

Usability

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	209.232	3	69.744	218.007	.000
Within Groups	94.695	296	.320		
Total	303.927	299			

Table 8 ANOVA usability and educational background

Further Tukey's HSD post-hoc test has been conducted to analyze which of the groups of respondents on the basis of their educational qualification differed from each other in their

perceived usability of E-learning courseware. The test statistics to be used here is also the significance or the p-value, which is 0.00 for all comparisons of private secondary schools with all three other groups. In case of public secondary school qualification holders, they have insignificant comparisons with the college diploma holders and university qualification holders, but the private qualification holders do differ from public qualification holders in their perceived usability.

(I) Education	(J) Education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Private secondary schools	Public secondary schools	-2.80606*	.11154	.000	-3.0942	-2.5179
	College/Diploma	-2.74515*	.12219	.000	-3.0608	-2.4295
	University/Bachelor	-2.65606*	.17886	.000	-3.1182	-2.1939
Public secondary schools	Private secondary schools	2.80606*	.11154	.000	2.5179	3.0942
	College/Diploma	.06091	.07774	.862	-.1399	.2618
	University/Bachelor	.15000	.15200	.757	-.2427	.5427
College/Diploma	Private secondary schools	2.74515*	.12219	.000	2.4295	3.0608
	Public secondary schools	-.06091	.07774	.862	-.2618	.1399
	University/Bachelor	.08909	.15998	.945	-.3242	.5024
University/Bachelor	Private secondary schools	2.65606*	.17886	.000	2.1939	3.1182
	Public secondary schools	-.15000	.15200	.757	-.5427	.2427
	College/Diploma	-.08909	.15998	.945	-.5024	.3242

*. The mean difference is significant at the 0.05 level.

Table 9 Multiple Comparisons usability and educational background

The third demographic variable to be analyzed is the technical experience of the respondents and the difference between usability of E-learning courseware among the three different levels of technical experience as described above in demographics portion of the analysis. From the ANOVA table, it is clearly evident that the p-value is less than 0.05, which means that the perceived usability significantly differs between the three different levels of technical experience of respondents. This proves that our 4th main hypothesis is not rejected, which stated that there is a significant difference in the perceived usability of E-learning courseware according to technical experience in UAE public tertiary segregated schools.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	160.334	2	80.167	165.814	.000
Within Groups	143.592	297	.483		
Total	303.927	299			

Table 10 ANOVA usability and technical experience

Further Tukey's HSD post-hoc test has been conducted to analyze which of the levels of respondents' technical experience differed from each other in their perceived usability of E-learning courseware. The test statistics to be used here is also the significance or the p-value, which is 0.00 for all other groups except the technical experience group 1 (beginner) and technical experience group 2 (intermediate). Here the p-value is 0.975 which is highly insignificant showing that these groups do not differ much from each other. In case of technical experience at the beginner level and the advanced level, there is a significant difference between the perceived usability. It also differs in case of advanced level and beginner level; and also in case of advance level and intermediate level.s

(I) Technology_Experience	(J) Technology_Experience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Beginner	Intermediate	.06791	.31399	.975	-.6717	.8075
	Advance	2.21705*	.32982	.000	1.4401	2.9939
Intermediate	Beginner	-.06791	.31399	.975	-.8075	.6717
	Advance	2.14913*	.11825	.000	1.8706	2.4277
Advance	Beginner	-2.21705*	.32982	.000	-2.9939	-1.4401
	Intermediate	-2.14913*	.11825	.000	-2.4277	-1.8706

*. The mean difference is significant at the 0.05 level.

Table 11 Multiple Comparisons usability and technical experience

6 Findings and Recommendations

Although, the results of the study revealed non-significant relationship between gender and usability factors but some researcher like Kuhlen (2006), there is significant relationship between gender and usability factors while other including Verma (2016) and Sancar (2007), there is no such dependency between usability of Moodle and gender and both males and females perform well in E-learning courses. After the analysis of the data, researcher has found a serious improvement needs to be conducted in order to enhance the reliability of the findings.

Therefore, a solid e-learning courseware model being adopted by Koohang (2004) is followed in order to propose better findings in terms of reliability as well as accuracy. The model which is presented by Koochan (2004) has four components, including fundamental, appearance, communications and information presentation. While following this model, the data collection model which is chosen is Survey questionnaire. This pilot testing has helped in terms of improved participation. Other improvements related to the questionnaire are made which has led to better formulation of questionnaire according to the study requirement. Furthermore, researcher has enhanced his tool and technique thus providing accurate results as of pilot study.

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