

JOURNAL OF
Educational &
Psychological
S C I E N C E S

**Effects of Moodle as an E-Learning Tool
on Enhancing Study Skills of
Bahraini Student Teachers**

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Abstract

In this paper, we investigated the effects of teaching physical sciences according to Moodle LMS on students' study skills. The sample consists of two groups of students who were enrolled in a physical sciences course offered at the foundation year of Bahrain Teachers College at the University of Bahrain. One of two sections of this course was randomly assigned as an experimental group (N=20); while the other was considered as a control group (N=27). The control group was taught traditionally using in-class instruction with focus on the textbook and screen/LCD projector from time to time. Quizzes and paper assignments were frequently used. The same content in the textbook has been used for the experimental group but in an electronic format utilizing the researcher's e-learning platform and the interactive website in a blended environment. Strong emphasis was given to online learning. Moodle as an LMS, which was released in the second semester of 2012, was utilized for the delivery of the course requirements. A validated scale consisting of 60 items covering nine dimensions of study skills were administered to the two groups before and after the treatment. These dimensions were the following: organization and planning, motivation for learning, using people & resources, essay writing, preparation for exams, effective listening, note taking, reading for learning, and handling worries. Statistically significant differences between the two groups were found on the pretest. Consequently, the Multivariate Analysis of Covariance were used for data analysis of the post test controlling the differences on the pretest. The differences between the experimental and the control groups in their performance on the post test appears statistically significant on all dimensions. All of these differences were in favor of the experimental group. Moreover, the experimental group has gained in post test performance compared with pretest on six of the nine study skills dimensions. These were: organization and planning, motivation, using people and resources, preparation for exams, note taking, and handling worries. No differences were found on reading for learning, and a decline appeared on two dimensions, which were: essay writing and effective listening.

Key words: learning management systems, moodle, study skills, student teachers, physical sciences.

*This research paper is the product of a research grant project (50/2012) that was approved and supported by the Deanship of Scientific Research at the University of Bahrain.

أثر استخدام الموودل كأداة للتعليم الإلكتروني في تطوير مهارات الدراسة لدى الطلبة المعلمين في البحرين

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الملخص

اهتمت هذه الدراسة باستقصاء أثر تدريس مقرر العلوم الطبيعية للطلبة المعلمين باستخدام برنامج موودل في مهاراتهم الدراسية. وقد أتبع المنحى التجريبي وفق التصميم شبه التجريبي من نوع قبلي بعدي للمجموعة الضابطة غير المكافئة. تكونت عينة الدراسة من مجموعتين من طلبة كلية البحرين للمعلمين في جامعة البحرين تدرسان مقرر العلوم الطبيعية الخاص ببرنامج إعداد معلم المرحلة الابتدائية. تم تعيين إحدى المجموعتين عشوائياً لتكون المجموعة التجريبية (ن=٢٠). وتعيين الأخرى كمجموعة ضابطة (ن=٢٧). دُرست المجموعة الضابطة المادة العلمية الخاصة بمقرر العلوم الطبيعية بالطريقة التقليدية من خلال أسلوب المحاضرة والمناقشة الصفية المعتمدة على الكتاب المقرر وبشرائح العرض الحاسوبي. واستخدمت الاختبارات القصيرة والتعيينات كوسائل للتقويم والمتابعة. أما المجموعة التجريبية، فقد تم تدريسها محتوى المقرر نفسه باستخدام برنامج موودل الإلكتروني المعتمد على التفاعل مع الموقع في بيئة تعلم مندمجة بتركيز عالٍ على التعلم الإلكتروني عبر هذا البرنامج الذي اعتمد في كلية البحرين للمعلمين في الفصل الثاني من عام ٢٠١٢.

استخدمت أداة لقياس تسعة أبعاد من مهارات الدراسة مكونة من ٦٠ فقرة بعد التحقق من صدقها وثباتها. وهذه الأبعاد هي: التنظيم والتخطيط، الدافعية للتعلم، الاستعانة بالبشر وبمصادر التعلم، كتابة المقالات، الاستعداد للامتحانات، الاستماع الفعال، أخذ الملاحظات، القراءة للتعلم، والتكيف مع المخاوف. وقد طبقت هذه الأداة على مجموعتي البحث قبل تنفيذ التجربة وبعدها.

كشفت نتائج تحليل البيانات عن وجود فروق ذات دلالة إحصائية بين مجموعتي الدراسة قبل تنفيذ التجربة على بعض أبعاد مهارات الدراسة بعضها لصالح المجموعة الضابطة وبعضها الآخر لصالح المجموعة التجريبية. ولذلك تم مقارنة مجموعتي الدراسة في أدائهما البعدي باستخدام تحليل التباين المتعدد المصاحب لضبط أثر الفروق بينهما في الأداء القبلي على الأبعاد التي كانت فيها هذه الفروق ذات دلالة إحصائية. وقد كشفت نتائج هذا التحليل عن تفوق المجموعة التجريبية على المجموعة الضابطة في جميع أبعاد المقياس. وعند مقارنة أداء المجموعة التجريبية البعدي بأدائها القبلي، ظهر تحسن بدلالة إحصائية في ستة أبعاد من مهارات الدراسة، وهذه الأبعاد هي: التنظيم والتخطيط، الدافعية للتعلم، الاستعانة بالبشر وبمصادر التعلم، الاستعداد للامتحانات، أخذ الملاحظات، والتكيف مع المخاوف.

الكلمات المفتاحية: أنظمة إدارة التعلم، موودل، مهارات الدراسة، الطلبة المعلمين، العلوم الطبيعية.

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Introduction:

The world is witnessing a strong move towards using technology in teaching and learning at all educational levels from kindergarten to university. Numerous platforms for designing, managing and delivering online learning sequences have been produced (Bower & Wittmann, no date). E-learning systems provide services that enable students to shift from passive to active learners where they can actively participate in the online learning process. E-learning environments that provide access to synchronous and asynchronous learning resources and activities are going to continue growing (Sunmak, Hericko, Pusnik, & Polancic, 2011; Bouhnik & Marcus, 2006; Liaw, Huang, & Chen, 2007; Raab, Ellis, & Abdon, 2002; Shotsberger, 2000).

Bouhnik and Marcus (2006) have discussed the benefits of e-learning and stated that e-learning has four advantages:

- Freedom to decide when each online lesson will be learned.
- Lack of dependence on the time constraints of the lecturer.
- Freedom to express thoughts, and ask questions without limitations.
- Accessibility to the course online materials at students' own election.

Kandies and Stern (1999) have explained that the web offers numerous pedagogical benefits for learner students. In web-enabled learning, environments become more active and self directed learners are exposed to enhanced learning materials. Course websites have proved to be an effective means of delivering learning materials, with students responding positively to the quality resources they make available. Wernet, Olliges, and Delicath (2000), surveyed students who used WebCT in a social work course and found that all of the respondents considered the online course

materials beneficial to their overall learning experience.

Modular Object Oriented Dynamic Learning Environment (Moodle) is a web based course management system that allows the classroom to extend onto the web (Abdel Aziz & Elbadrany, 2001). It is currently used by well over 1.241.072 registered users in 218 country around the world (Moodle Community, 2012). There are thousands of Moodle systems worldwide ranging from a single teacher site to a 40.000 student university site (Alnsour, et al., 2011). Numerous research studies have been carried out on the effectiveness of adopting Moodle in instruction. Results showed promising opportunities to support and improve upon this platform (Alnsour et al., 2011; Ahmad & Al-Khanjari, 2011, Bower & Wittmann, no date, Abdel Aziz & Elbadrawy, 2001; Cuadrado-Garcia & Ruiz-Molina, no date). One study (Sumac, et al., 2011) revealed that the actual use of Moodle depends on two main factors: Behavioral intentions and attitudes toward using Moodle. Perceived usefulness was found as the strongest and the most important predictor of attitudes toward using Moodle.

Bahrain Teachers College (BTC) introduced Moodle as a new technology for the improvement of instruction in all courses offered at the beginning of first semester of 2011. It is of crucial importance to join research with development. However, no studies have been carried out on the implication of this adopted learning media on any aspect of outcomes. Since Moodle is mainly self-learning media, it might be logical to think about its effect on aspects of study skills.

Problem of the Study:

It is rarely that research is connected with development at our institutes of education (Alkhalili, 2012). Moodle being introduced as a new way of instruction at BTC was not assisted by objective field research. One of the most important latent outcomes of instruction that affects other important variables is study skills. How these study skills are affected by using Moodle was the problem of this study.

Purpose of the Study:

This study aimed at finding out whether using Moodle in teaching

physical science to students of BTC in the foundation year has any impact on their study skills.

Hypotheses of the Study:

The study is designed for testing the following hypotheses:

- There would be non-statistically significant difference between the performance of the experimental and the control group on study skills that could be due to using Moodle in preparation for teaching science.
- There would be non-statistically significant differences on the performance of the experimental group on study skills that could be due to using Moodle in preparation for teaching science.

Methodology:

Research Design:

The study followed the experimental approach according to the quasi experimental procedure of type pretest Post test nonequivalent control group design.

Sample of the Study:

The available non-probability type of sampling was chosen for carrying out this study. Two groups of students who were taking physical science course in the foundation year with one of the researchers comprise the sample of this study. One of them was randomly selected to be the experimental group (N=20), and the other one was considered as the control group (N=27).

Procedure:

This study was conducted at Bahrain Teacher College on students enrolled in physical science course which is an introductory course for students in the foundation year. Two sections enrolled in this course in the second semester of 2012, were chosen to be participants in this study being taught by the first researcher. One of the sections was randomly assigned to be the control group, and the other as the experimental group. The control group was taught traditionally using in-class instruction with focus on the

textbook and screen/LCD projector from time to time. Quizzes and paper assignments were frequently used. The experimental group was taught the same content in the textbook but in an electronic format utilizing the researcher's e-learning platform and the interactive website in a blended environment. Strong emphasis was given to online learning. Moodle as an LMS, was released in the second semester of 2012, was utilized for the delivery of the following experiences:

The online submission of materials in the form of powerpoint slides, MS Word, Acrobat PDF documents, and video files has been presented through Moodle to allow for anytime, anywhere access for students. Documents, and video files can be presented through Blackboard to allow for anytime, anywhere access for students. The Discussion Board which is a very useful tool for both instructors and students was also used. Instructions on how to prepare for an upcoming lecture has been posted on which students used to post any queries they have regarding the subject, assignments, and technical problems with the website. Responses from their peers also could work off-campus. The discussion board and chat-room offered an ideal opportunity to maintain up-to-date and regular communication with instructors and peers from remote sites. Short quizzes in the form of multiple choice questions were made available online for students who were keen to self-test their knowledge or learning. The program also allowed students to upload their assignment files before the deadline. An online grade book shared by student and instructor was used; including a detailed calendar section with hyperlinks; including digital rubric usage for assessment of students projects and assignments; weekly announcements; personal mailboxes.

Instrument Used:

The instrument used in this study was a study skills scale originally developed by Fazal (2005), Fnsari (1983) and Kanchana (1986). Slight modifications were made on phrasing of some sentences for making them clearly understood by students. The scale comprised of 60 items covering nine dimensions of study skills. These were the following: organization and planning, motivation for learning, using people & resources, essay writing, preparation for exams, effective listening, note taking, reading for learning,

and handling worries. The responses given to each item of this instrument were rated on a 3-point rating scale ranging from almost never (1) to almost always (3). Following is an example of the items in the Motivation for learning dimension of this instrument: “Do you reward yourself when you work?”

The construct validity of this instrument was determined by those who originally developed it. Moreover, its face validity was assured by us through asking a panel of judges consisting of four experts in psychology or instruction at the University of Bahrain about their opinion of whether each item measures the specific skill for which it is assigned to measure. The group of judges completely agreed on what they were asked about.

Cronbach alpha as a reliability index of the instrument was assured through applying it on a pilot sample consisting of twenty students and found to be 0.97 to the instrument as a whole. Table 1 shows that the reliability of the eight of the nine dimensions of this instrument ranged from 0.75 to 0.91 with only one of reliability of 0.69. Such values are good enough to trust the values given by this instrument.

Table 1
Chronbach Alpha Values as Measures of Reliability
of the Instrument and its Dimensions

Dimension name	Number of items	Chronbach Alpha
Organization and planning	9	0.85
Motivation for learning	7	0.83
Using People & resources	5	0.69
Essay writing	9	0.91
Preparation for exams	8	0.90
Effective listening	4	0.75
Note taking	5	0.86
Reading for learning	5	0.83
Handling worries	8	0.80
The instrument as a whole	60	0.97

Data Analysis:

The Statistical Package for the Social Sciences SPSS was used for

data analysis. Descriptive as well as analytical statistics were obtained. Multivariate as well as univariate tests were performed. Following is a brief presentation of the results:

Findings:

The findings of the study are organized and presented in three sections as follows:

Findings pertaining to pretest:

The t-test was used for comparing the performance of the two groups on the pretest for assuring equivalency of the two groups. Table 2 shows that there is a statistically significant difference between the experimental and the control group on the total pretest score in favor of the experimental group ($t=8.132$, $df=45$ significant at $\alpha=0.001$). This difference was high as revealed also by the high value of effect size (2.39) which is very high according to Cohen criteria (cited in Ary, Jacobs, & Razavich, 2012, P 151). Which means that the experimental group started much better than the control group.

Table 2
T-test Results for Comparing the Experimental with the Control Group on the Total Pretest Scores

Group	N	Mean	Std. deviation	t-test	Effect size
Experimental group	20	130.2000	10.45089	8.132*	2.39
Control group	27	105.0370	10.51549		

*Significant at $\alpha=0.001$ $df=45$

Based on the above results, we have to control these differences in statistical analysis of the performance of these two groups on the post test. Analysis of covariance is the convenient test for such a case. But since the instrument is a multi-dimensional, we have to look deeply on the differences in the means achieved by these two groups and focus on each dimension on the pretest as shown in Table 2. It is evident, in this table, that the performance of the experimental group is better than that of the control group on eight of the nine dimensions. However, only those dimensions on which the differences are statistically significant should be controlled in their performance on the post test. The multivariate analysis of variance

was carried out on the performance of the two groups on the dimensions of the pretest scores in order to identify the dimensions that we have to control. Table 3 shows the mean and standard deviations of the performance of the two groups on each of the dimensions of the instrument in the pretest. Mean differences between the two on some dimensions are evident.

Table 4 presents Hotelling' Trace, which shows overall statistically significant differences between the experimental and control group on the dimensions of the pretest scores taken together.

Table 3
Descriptive Statistics of the Performance of Both Groups
on Each of the Dimensions of Pretest

Dimension	Group	Mean	Std. deviation	N
Organization and planning	Experimental group	20.4000	1.95744	20
	Control group	15.5556	2.17208	27
	Total	17.6170	3.17978	47
Motivation	Experimental group	12.4500	1.57196	20
	Control group	11.1852	1.59415	27
	Total	11.7234	1.69015	47
Using people & resources	Experimental group	9.6500	1.75544	20
	Control group	10.0000	1.64083	27
	Total	9.8511	1.68082	47
Essay writing	Experimental group	21.5500	2.64525	20
	Control group	14.1481	2.82440	27
	Total	17.2979	4.59165	47
Preparation for exams	Experimental group	16.1000	2.67346	20
	Control group	14.5926	3.11645	27
	Total	15.2340	3.00154	47
Effective listening	Experimental group	11.3000	2.10513	20
	Control group	8.2222	1.76141	27
	Total	9.5319	2.43927	47
Note taking	Experimental group	10.9500	2.18789	20
	Control group	8.2593	2.10480	27
	Total	9.4043	2.50790	47
Reading for learning	Experimental group	10.5500	1.76143	20
	Control group	9.2222	1.88788	27
	Total	9.7872	1.93297	47

Table 3 Countied

Dimension	Group	Mean	Std. deviation	N
Handling worries	Experimental group	17.2500	2.40340	20
	Control group	13.8519	1.48593	27
	Total	15.2979	2.55305	47

Table 4
Results of Multivariate Analysis of Variance for Comparing the Performance of the Experimental and the Control Group on Dimensions of Pretest Taken Together

Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Hotelling's Trace	3.713	15.264	9.000	37.000	.000	0.788

Through the univariate analysis of variance on the scores obtained by each of the two groups on the nine dimensions of pretest scores we could identify those dimensions we have to control in the performance on the post test. Table 5 shows the results of this analysis. It is evident in this table that there are statistically significant differences between the experimental and control groups on seven of the nine dimensions, which were: organization and planning, motivation for learning, essay writing, effective listening, note taking, reading for learning, handling worries. These results were in favor of the experimental group on all of these dimensions as it is evident in Table 3 which shows that the mean score of the experimental group was higher than that of the control group on each of these dimensions. Thus all of these factors were controlled in the final analysis of the performance of the two groups on the post test.

Table 5
Tests of between-Subjects Effects on Each of the Nine Dimensions of the Pretest Taken Separate

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Group	Organization and planning	269.640	1	269.640	62.076	.000	0.580
	Motivation	18.380	1	18.380	7.318	.010	0.140
	Using people & resources	1.407	1	1.407	.493	.486	0.011
	Essay writing	629.472	1	629.472	83.225	.000	0.649

Table 5 Countied

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Group	Preparation for exams	26.107	1	26.107	3.025	.089	0.063
	Effective listening	108.835	1	108.835	29.706	.000	0.398
	Note taking	83.184	1	83.184	18.159	.000	0.288
	Reading for learning	20.256	1	20.256	6.012	.018	0.118
	Handling worries	132.672	1	132.672	35.716	.000	0.442
Error	Organization and planning	195.467	45	4.344			
	Motivation	113.024	45	2.512			
	Using people & resources	128.550	45	2.857			
	Essay writing	340.357	45	7.563			
	Preparation for exams	388.319	45	8.629			
	Effective listening	164.867	45	3.664			
	Note taking	206.135	45	4.581			
	Reading for learning	151.617	45	3.369			
Total	Handling worries	167.157	45	3.715			
	Organization and planning	15052.000	47				
	Motivation	6591.000	47				
	Using people & resources	4691.000	47				
	Essay writing	15033.000	47				
	Preparation for exams	11322.000	47				
	Effective listening	4544.000	47				
	Note taking	4446.000	47				
Reading for learning	4674.000	47					
Handling worries	11299.000	47					

Results pertaining to first null hypothesis:

Table 6 shows descriptive statistics of the performance of the experimental and control group on each of the nine dimensions in the post test. It could be seen that again the experimental group outperformed the control group on all of the nine dimensions. Table 7 shows the results of the Univariate Analysis of Covariance for comparing the experimental group with the control group in their performance on the post test after controlling the

differences in their performance on each of these seven dimensions as well as on the overall scale.

It is evident in Table 6 that by controlling the differences between the experimental and the control group in their performance on the motivation dimension in the pretest, statistically significant differences between them appear in their performance on only motivation dimension of the post test in favor of the experimental group. However, if we control differences on essays writing dimension in pretest, statistically significant differences appear in their performance on people & resources dimensions. But if we control differences between the two groups on effective listening dimension in pretest, statistically significant differences appear in their performance on note taking dimensions. If we control differences between the two groups on note taking dimension in pretest, statistically significant differences appear in their performance on handling worries dimension. While if we control differences between the two groups on handling worries dimension in pretest, statistically significant differences appear in their performance on three dimensions of the post test, which are: people and resources, reading for learning, and handling worries. Likewise, if we control for differences between the two groups on reading for learning dimension in pretest, statistically significant differences appear in their performance on another three dimensions of post test, which are: people and resources, effective listening, and reading for learning. On the other hand, the differences between the experimental and the control group in their performance on the post test appear statistically significant on all dimensions except two (note taking and reading for learning) if we control their overall performance on the pretest. All of these differences were in favor of the experimental group.

To sum up, the results of this study showed that the experimental group outperformed the control group with statistically significant differences on all of the nine dimensions of the study skills if we control the difference in their performance on the pretest for one dimension or another; which are: organization and planning, motivation for learning, using people & resources, essay writing, preparation for exams, effective listening, note taking, reading for learning, and handling worries. This means that the first

null hypothesis is rejected at all of these nine dimensions of study skills.

Table 6
Descriptive Statistics of the Performance of the Experimental and Control Group on Each of the Dimensions in the Post test

	group	Mean	Std. Deviation	N
Post test motivation for learning	Experimental group	15.8500	1.49649	20
	Control group	12.1481	1.68029	27
	Total	13.7234	2.43794	47
Post test people & resources	Experimental group	10.9500	1.84890	20
	Control group	9.5926	1.80297	27
	Total	10.1702	1.92601	47
Post test organization	Experimental group	21.3500	1.30888	20
	Control group	15.1481	1.95534	27
	Total	17.7872	3.53207	47
Post test essay writing	Experimental group	19.7500	2.19749	20
	Control group	12.9630	2.57923	27
	Total	15.8511	4.15451	47
Post test preparation for exams	Experimental group	17.7500	2.29129	20
	Control group	13.8519	2.42905	27
	Total	15.5106	3.04939	47
Post test effective listening	Experimental group	9.4000	1.63514	20
	Control group	5.9259	1.54237	27
	Total	7.4043	2.33740	47
Post test note taking	Experimental group	11.4000	1.84676	20
	Control group	8.0741	1.70803	27
	Total	9.4894	2.41258	47
Post test reading for learning	Experimental group	11.0500	1.57196	20
	Control group	8.7778	1.47631	27
	Total	9.7447	1.88204	47
Post test handling worries	Experimental group	17.7000	3.06251	20
	Control group	14.0370	2.10277	27
	Total	15.5957	3.11839	47

Table 7
Results of Multivariate Analysis of Covariance on Post Test Scores
for Controlling Differences in Pretest on the Seven Dimensions
that Account for Statistical Differences

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Motivation	Post test motivation for learning	29.382	1	29.382	14.703	.000	.279
	Post test people & resources	6.334	1	6.334	3.083	.087	.075
	Post test organization	.032	1	.032	.011	.918	.000
	Post test essay writing	.551	1	.551	.088	.768	.002
	Post test preparation for exams	20.834	1	20.834	3.663	.063	.088
	Post test effective listening	1.812	1	1.812	.954	.335	.024
	Post test note taking	.007	1	.007	.004	.952	.000
	Post test reading for learning	.725	1	.725	.493	.487	.013
	Post test handling worries	2.235	1	2.235	.771	.386	.020
Writing	Post test motivation for learning	5.709	1	5.709	2.857	.099	.070
	Post test people & resources	9.044	1	9.044	4.402	.043	.104
	Post test organization	2.382	1	2.382	.797	.378	.021
	Post test essay writing	11.142	1	11.142	1.785	.190	.045
	Post test preparation for exams	3.410	1	3.410	.600	.444	.016
	Post test effective listening	2.362	1	2.362	1.243	.272	.032
	Post test note taking	1.712	1	1.712	.889	.352	.023
	Post test reading for learning	.105	1	.105	.072	.790	.002
	Post test handling worries	.373	1	.373	.129	.722	.003
Listening	Post test motivation for learning	1.239	1	1.239	.620	.436	.016
	Post test people & resources	1.586	1	1.586	.772	.385	.020
	Post test organization	1.078	1	1.078	.361	.552	.009
	Post test essay writing	1.297	1	1.297	.208	.651	.005
	Post test preparation for exams	1.157	1	1.157	.203	.655	.005
	Post test effective listening	7.035	1	7.035	3.703	.062	.089
	Post test note taking	10.955	1	10.955	5.687	.022	.130
	Post test reading for learning	1.100	1	1.100	.748	.393	.019
	Post test handling worries	10.340	1	10.340	3.565	.067	.086
Note taking	Post test motivation for learning	.863	1	.863	.432	.515	.011
	Post test people & resources	1.753	1	1.753	.853	.361	.022
	Post test organization	3.677	1	3.677	1.231	.274	.031
	Post test essay writing	.556	1	.556	.089	.767	.002
	Post test preparation for exams	6.604	1	6.604	1.161	.288	.030

Table (7) Countied

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Note Taking	Post test effective listening	.483	1	.483	.254	.617	.007
	Post test note taking	.247	1	.247	.128	.722	.003
	Post test reading for learning	2.405	1	2.405	1.636	.209	.041
	Post test handling worries	21.588	1	21.588	7.443	.010	.164
Handling	Post test motivation for learning	2.876	1	2.876	1.439	.238	.036
	Post test people & resources	14.818	1	14.818	7.212	.011	.160
	Post test organization	1.858	1	1.858	.622	.435	.016
	Post test essay writing	.186	1	.186	.030	.864	.001
	Post test preparation for exams	.001	1	.001	.000	.990	.000
	Post test effective listening	3.432	1	3.432	1.806	.187	.045
	Post test note taking	4.186	1	4.186	2.173	.149	.054
	Post test reading for learning	6.117	1	6.117	4.159	.048	.099
Reading	Post test handling worries	144.365	1	144.365	49.775	.000	.567
	Post test motivation for learning	.219	1	.219	.109	.743	.003
	Post test people & resources	20.068	1	20.068	9.767	.003	.204
	Post test organization	1.935	1	1.935	.648	.426	.017
	Post test essay writing	8.808	1	8.808	1.411	.242	.036
	Post test preparation for exams	3.205	1	3.205	.563	.457	.015
	Post test effective listening	8.382	1	8.382	4.412	.042	.104
	Post test note taking	7.619	1	7.619	3.955	.054	.094
Overall	Post test reading for learning	20.959	1	20.959	14.251	.001	.273
	Post test handling worries	2.411	1	2.411	.831	.368	.021
	Post test motivation for learning	60.175	1	60.175	30.112	.000	.442
	Post test people & resources	34.331	1	34.331	16.709	.000	.305
	Post test organization	81.221	1	81.221	27.189	.000	.417
	Post test essay writing	69.058	1	69.058	11.061	.002	.225
	Post test preparation for exams	47.027	1	47.027	8.268	.007	.179
	Post test effective listening	36.640	1	36.640	19.285	.000	.337
Overall	Post test note taking	5.111	1	5.111	2.653	.112	.065
	Post test reading for learning	3.319	1	3.319	2.257	.141	.056
	Post test handling worries	13.074	1	13.074	4.508	.040	.106

Results Pertaining to the second null hypothesis:

If we compare the performance of the experimental group on each of the nine dimensions of the post test with its performance on the pretest

(see Table 8) we could see that this group has gained seven of the nine dimensions. These were: motivation for learning, using people and resources, organization and planning, preparation for exams, note taking, reading for learning and handling worries. Again, this also appeared on the overall test. However, a decline in the performance of the experimental group appeared on two dimensions, which are: essay writing and effective listening.

Table 8
Paired Samples Statistics of the Performance of the Experimental Group on Each Dimension of the Scale of Pretest and Post test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post test motivation for learning	15.8500	20	1.49649	.33462
	Pretest motivation for learning	12.4500	20	1.57196	.35150
Pair 2	Post test using people & resources	10.9500	20	1.84890	.41343
	Pretest using people &resources	9.6500	20	1.75544	.39253
Pair 3	Post test organization & planning	21.3500	20	1.30888	.29267
	Pretest organization & planning	20.4000	20	1.95744	.43770
Pair 4	Post test essay writing	19.7500	20	2.19749	.49137
	Pretest essay writing	21.5500	20	2.64525	.59150
Pair 5	Post test preparation for exams	17.7500	20	2.29129	.51235
	Pretest preparation for exams	16.1000	20	2.67346	.59780
Pair 6	Post test effective listening	9.4000	20	1.63514	.36563
	Pretest effective listening	11.3000	20	2.10513	.47072
Pair 7	Post test note taking	11.4000	20	1.84676	.41295
	Pretest note taking	10.9500	20	2.18789	.48923
Pair 8	Post test reading for learning	11.0500	20	1.57196	.35150
	Pretest reading for learning	10.5500	20	1.76143	.39387
Pair 9	Post test handling worries	17.7000	20	3.06251	.68480
	Pretest handling worries	17.2500	20	2.40340	.53742
Pair 10	overall post test	134.7000	20	5.69487	1.27341
	overall pretest	130.2000	20	10.45089	2.33689

The results of the paired samples correlations test (see Table 9) for the relationship between the performance of the experimental group on the conjugate dimensions of the pretest and Post test show that these correlations were statistically significant in case of seven dimensions of learning

skills. These dimensions are the following: using people and resources, organization and planning, preparation for exams, effective listening, note taking, reading for learning and handling worries. Non statistically significant correlations were found on the other two dimensions, motivation for learning and essay writing. In addition, a negative but non statistically significant correlation was found between the overall pretest and Post test results.

Table 9
Paired Samples Correlations between Pretest and Post test
Performance of the Experimental Group

		N	Correlation	Sig.
Pair 1	Post test motivation for learning & pretest motivation for learning	20	.254	.280
Pair 2	Post test using people and resources & pretest using people &resources	20	.465	.039
Pair 3	Post test organization and planning & pretest organization and planning	20	.497	.026
Pair 4	Post test essay writing & pretest essay writing	20	.369	.109
Pair 5	Post test preparation for exams & pretest preparation for exams	20	.451	.046
Pair 6	Post test effective listening & pretest effective listening	20	.621	.003
Pair 7	Post test note taking & pretest note taking	20	.748	.000
Pair 8	Post test reading for learning & pretest reading for learning	20	.579	.007
Pair 9	Post test handling worries & pretest handling worries	20	.812	.000
Pair 10	Overall post test & overall pretest	20	-.116	.627

Table 10 shows the t-test results for comparing the performance of the experimental group on the conjugate dimensions of the pretest and post test. It is evident in this table that the post test performance of experimental group on the dimensions of the study skills scale were statistically better than their performance on the pretest in only four dimensions. These are the following: motivation for learning, using people and resources, organization and planning preparation for exams. Whereas, their performance declined with statistically significant difference on two dimensions, which are: essay

writing and effective listening. Non statistically significant differences were found on the other three dimensions which were: note taking, reading for learning and handling worries. In addition, a negative but non statistically significant differences were found between the overall pretest and Post test performance. Thus, the second null hypothesis is rejected in case of the six dimensions and failed to be rejected in terms of the other three dimensions as well as of the overall performance on study skills.

Table 10
Paired Samples t- Test for Comparing the Performance of the
Experimental Group on Each Dimension of
the Scale of Pretest and Post test

		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	Post test motivation for learning - pretest motivation for learning	3.40000	1.87504	.41927	8.109	19	.000
Pair 2	Post test using people & resources - pretest using people &resources	1.30000	1.86660	.41739	3.115	19	.006
Pair 3	Post test organization - pretest organization & planning	.95000	1.73129	.38713	2.454	19	.024
Pair 4	Post test essay writing - pretest essay writing	-1.80000	2.74533	.61387	-2.932	19	.009
Pair 5	Post test preparation for exams - pretest preparation for exams	1.65000	2.62127	.58613	2.815	19	.011
Pair 6	Post test effective listening - pretest effective listening	-1.90000	1.68273	.37627	-5.050	19	.000
Pair 7	Post test note taking - pretest note taking	.45000	1.46808	.32827	1.371	19	.186
Pair 8	Post test reading for learning - pretest reading for learning	.50000	1.53897	.34412	1.453	19	.163
Pair 9	Post test handling worries - pretest handling worries	.45000	1.79106	.40049	1.124	19	.275
Pair 10	overall post test - overall pretest	4.50000	12.46680	2.78766	1.614	19	.123

Discussion and Implications:

The study revealed that using Moodle in instruction seems to be influential in terms of enhancing study skills since the experimental group outperformed the control group with statistically significant differences on all of the nine dimensions of the study skills if we control the difference in their performance on the pretest of one dimension or another. These dimensions are: organization and planning, motivation for learning, using people & resources, essay writing, preparation for exams, effective listening, note taking, reading for learning, and handling worries. All of these differences were in favor of the experimental group. This result supports previous researchers (Alnsour et al., 2011; Ahmad & Al-Khanjari, 2011; Bower & Wittmann, no date; Abdel Aziz & Elbadrawy, 2001; Cuadrado-Garcia & Ruiz-Molina, no date; Sumac, et al., 2011).

It's worth noting that although the experimental group outperformed the control group on all dimensions of study skills, a decline in its performance with statistically significant difference was noticed on two dimensions, which are: essay writing and effective listening. The decline in essay writing might be due to the nature of the course being selected to be taught according to Moodle. This course was a natural science course where less effort is given to report writing and more effort is given to practical activities. In terms of the decline of the experimental group on effective listening, it might be explained based on the fact that teaching according to Moodle gives little emphasis to listening which is a crucial factor in traditional lecture method. Thus it is logical to get such result if we follow Moodle in instruction.

One more important result in this study has to be pointed out and discussed. This was that although the study showed that Moodle was influential on enhancing most (6 out of 9) dimensions of study skills, the overall improvement of the experimental group was not statistically significant. The implication of this finding is that researchers should always check the effect of any new instructional method on sub factors and dimensions of the target variable or aspect. The overall effect might be masked by one dimension over the others.

Finally, although the results of this study supports using Moodle in

instruction at the university level, further research is needed on various courses before giving any conservative generalization.

Acknowledgments:

We would like to acknowledge the support from Deanship for Scientific Research, University of Bahrain, project 50/2012.

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