Effectiveness of Course Management System in Teaching Computer Fundamentals at Far Eastern University

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Abstract—One of the primary challenges of higher education institutions (HEIs) is the call for increasingly flexible and diverse systems to cater to an ever-growing range of learning needs. Flexible approaches aim to provide learners with a greater choice as to when, where and how they learn by adopting various flexible delivery strategies such as online learning, mixed mode delivery, and self-directed learning strategies. This study investigated the effectiveness of the course management system (CMS) in teaching Computer Fundamentals at Far Eastern University for 1st semester, school year 2012-2013. It explored the effectiveness of this innovative learning approach as compared to the conventional method of teaching. In the conventional method of teaching the faculty conducts the lesson in traditional way or face to face mode of delivery of instruction. The course management system is an innovative approach of instruction where the faculty enables to extend the classroom beyond its traditional boundaries of time and space. It allows the faculty to upload lessons, quizzes, and exams to students to download. The faculty can also publish a list of hyperlinks that students can click through to read additional materials online. In this study, it utilized the quasi-experimental design, particularly the pretest-posttest control group design. The findings revealed that there was a mean difference of 5.08 in the recorded mean posttest scores of the students using the course management system and the conventional mode of delivery. This difference, however, was statistically significant as the computed T value of 2.73, went beyond the tabular value of 1.67 at 0.05level of significance. Therefore, there was a significant difference in the achievement of the two groups. The evaluation of this research in the assessment results of the students demonstrated that Computer Fundamentals, through the integration of a Course Management System in the learning process, can increase the level of achievements of students at Far Eastern University as measured in their assessment results.

Index Terms—Course Management System, Higher Education, Conventional Method of Teaching,Learning Outcomes.

INTRODUCTION

Today, higher education institutions (HEIs) are being challenged by rapidly developing information technologies and call for increasingly flexible and diverse systems to cater to an ever-growing range of learning needs. Flexible approaches aim to provide learners with a greater choice as to when, where and how they learn by adopting various flexible delivery strategies such as online leaning, mixed mode delivery, and self-directed learning strategies. Also, institutions are integrating computer-aided instruction into their mission to better serve their students, since traditional methods of supplying information and instruction are no longer adequate. The conventional method of instruction mainly focused on transmitting the teacher's knowledge to students.

Now, new educational model based on constructivist approach can be used to parallel with the traditional mode of instruction using the Course Management System (CMS) or Learning Management System (LMS). The CMS enables instructors to extend the classroom beyond its traditional boundaries of time and space. It allows the instructor to publish files to a section of the CMS for students to download and publish a list of hyperlinks that students can click through to read additional materials online. This approach also use tools like threaded discussions and chat that the students and instructors can continue conversations beyond the walls of the classroom. Teachers frequently ask students to write a number of comments on threaded discussions. The teacher then uses the student responses as part of his or her classroom participation and grades accordingly.

The general trend toward school excellence and educational innovations points to the need for schools and teachers to respond to the differing needs of the learners as a basis with which the effectiveness of instruction can be judged, thus, enabling students to develop intelligently.

Far Eastern University (FEU) through its quest of delivering an online mode of education, started to use the Course Management Systems (CMS) using MOODLE (Modular Object-Oriented Dynamic Learning Environment) since school year 2009.

The computer subject included in this study has been taught in a conventional method. The learning objectives are attained through lecture, discussion, exams, presentation, and hands-on sessions. Using this method, the students are under the impression that their task in class is to passively absorb what the teacher declares during the lecture sessions and apply the concepts through the activities given during the hands-on session.

Research also shows that technology plays a significant role in improving student learning outcomes and devel-

oping among students the intrinsic motivation to learn, provided that its use is contextualized within the faculty's use of learner-centered and constructivist pedagogies and aligned with specific curriculum standards.

Thus, this study seeks to investigate the effectiveness of Course Management System in teaching Computer Fundamentals at Far Eastern University for 1st Semester, school year 2012-2013.

REVIEW OF RELATED LITERATURE AND STUDIES

The increase usage of the course management system in higher education in the past years led to several projects attempting to integrate CMS within the learning environment. These projects brought with them benefits for the academic stakeholders.

Rahman et al. (2011) stated that Learning Management System (LMS) provides an integrated platform for content, delivery and management of learning as well as accessibility by a range of users that may include learners, content creators and administrators. Open University Malaysia, the seventh private university in Malaysia that fully operated as an Open and Distance Learning environment had successfully implemented the LMS to ease the learning process of their students as well as their administrators.

According to Douglas (2004), many colleges and universities world-wide utilize the Internet as a vehicle for E-learning. A course on database management systems (DBMS) is a foundational course that underpins many information systems (IS) degree programs and is pivotal in determining the success of its graduates. Thus, pedagogies that improve the learning for students in a DBMS course are important to not only the faculty and students but to their employers as well.

In the study of Graf, Viola and Leo (2007), the use of learning styles in technology-enhanced learning, such an accurate description is important for relating the learning style model with the features of the online environment. In recent years, technology-enhanced learning has put great attention on learning styles in order to improve adaptability in technology-enhanced educational systems. Moreover, the in-depth investigation of learning style characteristics could improve pedagogical models, supporting a more effective and personalized learning. If an online environment supports a learning style only partially, this has to be considered when analyzing the output of the system and drawing conclusions.

Saint Louis University implemented a project called MySLU. The web portal is seamlessly integrated in the learning process of the university's programs. The primary objectives of this project are: a) provide faster access for students to information and resources, b) promote interaction among the community users; c) provide collaboration between the students and teachers d) equip teachers with innovative tools for instruction e) encourage consistency through a uniform front end interface in the presentation of information resources (Mercado & Genove, 2006). Dokeos is an open source E-Learning platform with a strong community support. Within the systems, tools are available for teachers and students such as course updates notification, CSS support, resource sharing and assessment modules (Rémy,2005).

In the study of Salvador (2007), the MOODLE learning environment has provided the students an environment for learning and is also suited for teachers who wish to manage their courses accordingly. It is a good tool for learning that contains many features that have aided the computer-aided instruction (CAI). The easy navigation and the user-friendly environment complement for the basic needs of a typical CAI.

In the southern part of the Philippines, Mindanao State University opted to use Moodle or Modified Object-Oriented Design Learning Environment. Moodle supplemented face-to-face course instruction through the deployment of online learning activities (Reyes, 2009). An open source technology, Moodle is supported by a strong network of community developers. One of the major benefits of Moodle is its ability to allow access to courses outside the campus. Courses can offer syllabi access, online notices, lecture resources, conferencing, forums and quizzes (Henderson, 2007).

According to DeLaCruz, et al. (2005), the selection of an LMS is critical. That selection needs to be based on both the objectives of the course and the students. The LMS must have components that will allow the instructor to create a course that emphasizes active learning experiences. It must address the needs of the ultimate end user and allow students to be actively involved in their courses. Learning is not a passive activity, it is interactive. Students actively participate in traditional classes by listening and talking to other students and the instructor. Through the use of discussions, students are able to share past experience and apply those experiences. LMS makes usability the number one concern for instructors as well as students. The effectiveness of the course will help the learners achieve the specific goals of the course. LMS also allow students to do coursework anywhere and anytime. The usability of the LMS is the key to the effectiveness. It should have all the necessary E-Learning tools for assessment, communication, collaboration and community building, as well as for the creation and management of learning.

Cavusa and Momania (2009) describe a software system developed by them called EasyWay to Evaluate LMSs (EW-LMS) to aid in the selection of a suitable LMS system. This is web-based software that can easily be used over the internet. The software provides a web based decision support system that may help users to choose the most suitable LMS. The system demands using artificial intelligence methods and decision making procedures to provide a smart process to help

users in making their decision. LMSs evaluation and assessment and describes how the web-based system can help and support a user want to make a decision for choose LMS. The software makes the complex selection process a relatively simple task that can be carried out even by students. It is also possible to compare LMSs based on their features' descriptions, giving the opinion or the viewpoint about any LMS or even discussing any feature of any LMS offered in the system, regardless of the level of users' experience.

CONCEPTUAL FRAMEWORK OF THE STUDY

Figure 1 shows the conceptual framework of the study. The input was the profile of the respondents. The teaching methodology using the course management system and the traditional face-to-face instruction was implemented. The expected output of the research is the effectiveness of the course management system in teaching Computer Fundamentals.

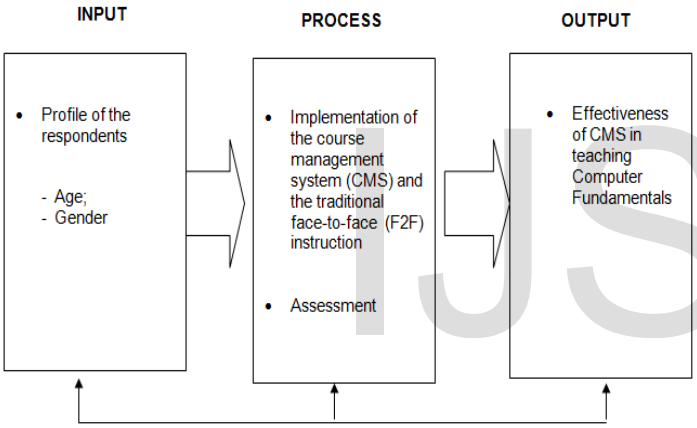

FIGURE 1: THE RESEARCH PARADIGM

STATEMENT OF THE PROBLEM

This study investigated the effectiveness of the course management system in teaching Computer Fundamentals at Far Eastern University for 1st semester, school year 2012-2013. Specifically, the following questions were answered in this research:

1. What are the profile of the respondents in terms of age and gender?
2. What are the mean pretest and posttest scores using the course management system (CMS) as compared to face-to-face (F2F) traditional instruction?
3. Are there significant differences in the mean pretest and posttest scores of the two groups?

On the basis of the foregoing research questions, this study proceeded from the following null hypotheses:

1. The use of course management system and face-to-face (F2F) traditional instruction differ significantly in the mean pretest and posttest.
2. There is a significant difference in the mean pretest and posttest scores of the two groups.
3. The use of course management system is effective in teaching Computer Fundamentals.

RESEARCH METHOD USED

This study utilized the quasi-experimental design, particularly the pretest-posttest control group design. In this design, the researcher used two intact groups of classes that are similar to each other so that the researcher could fairly compare the treated one with the comparison one. The researcher gave pretest, administered the treatment condition to one group, and gave control condition to one group, followed by the giving of the posttest. Then the experimental condition or treatment was administered to the experimental or treatment group, keeping all conditions the same for both groups.

This particular design was deemed appropriate for this study as the researcher determined the effectiveness of course management system in teaching Computer Fundamentals.

Displayed in Table 1 is the paradigm of the aforementioned quasi-experimental design, used in this inquiry. (Best and Khan, 1998)

FIGURE 2
The Pretest-Posttest Control Group Design

Treatment Group	O_1	X	O_2
Control Group	O_3	C	O_4

Where:

O_1 = Pretest of the Treatment Group, (CMS)
O_3 = Pretest of the Control Group, (F2F)
O_2 = Posttest of the Treatment Group, (CMS)
O_4 = Posttest of the Control Group, (F2F)
X = Gain of Treatment Group, (CMS)
C = Gain of the Control Group, (F2F)

SAMPLES OF THE STUDY

Two (2) sections of Computer Fundamental classes were used in this study. The first section was the treatment or CMS group with 43 students or 46% of the respondents. While the second section was the control group or F2F was 50 students or 54% of the respondents. On the whole, a total of 93 student respondents took part in this study.

SUMMARY OF FINDINGS

Sub-Problem No.1 Profile of the Respondents in Terms of Age and Gender

Presented in Table 2 is the profile of the respondents in terms of age.

Table 2
Profile of the Respondents in the CMS and F2F Groups in Terms of Age

Age Group	CMS Group	Percentage	F2F Group	Percentage	Combined	Percentage
15-16	30	70%	29	58%	59	63%
17-18	10	23%	18	36%	28	30%
19-20	3	7%	1	2%	4	4%
21 & Above	0	0%	2	4%	2	2%
Total	43	100%	50	100%	93	100%

Mean Age = 16.68

A perusal of Table 2 shows that majority of the respondents in the CMS group belonged to the 15 to 16 age group, based on the distribution of 30 or 70%. The rest of the respondents in this group had ages ranging from 19 to 20 years old.

Conversely, most of the respondents in the F2F group were classified under the 15 to16 age category. This finding was indicated by the distribution of 29 or 58%. Data further show that 21 or 42% from this group were categorized under the 17 and above age bracket

By combining the data on the ages of the respondents, it can be seen that the ages of the students in both the CMS and F2F groups ranged from 15 to 16 years old or 63%. Close examination of the same tabular data shows that 30% of the respondents belonged to the 17 to18 age group. Nonetheless, the remaining 6% fell under the 19 and above age category.

On the whole, the respondents posted a mean age of 16.68 years old.

Displayed in Table 3 is the profile of the CMS and F2Fgroups in terms of gender.

Table 3
Profile of the Respondents in the CMS and F2F in Terms of Gender

Gender	CMS Group	Percentage	F2F Group	Percentage	Combined	Percentage
Male	27	63%	24	48%	51	55%
Female	16	37%	26	52%	42	45%
Total	43	100%	50	100%	93	100%

Mode = Male

By going over Table 3, it can be noticed that there were 27 or 63% male respondents in the CMS group. On the other hand, 16 or 37% of the total respondents were females. Obviously, the distribution of the students in this group in terms of gender was lopsided toward the male group.

With regard to the gender distribution of the respondents in the F2F group, it can be seen that 24 of the respondents or 48% were comprised by males. Nonetheless, majority of the respondents from this group were females, as gleaned from the frequency distribution of 26 or 52%.

By combining the respondents from the CMS and F2F groups, data revealed that 51 or 55% were males. The rest of the respondents, however, were females based on the frequency distribution of 42 or 45%. Apparently, males outnumbered the females.

Sub-Problem No. 2 The mean pretest and posttest scores using the course management system (CMS) as compared to face-to-face (F2F) traditional instruction.

Exhibited in Table 4 were the pretest and posttest results of the CMS and F2F groups

Table 4
Pretest-Posttest Results of the CMS and F2F Groups

Group	Number	Mean Pretest	SD	Mean Posttest	SD
CMS	43	25.65	9.80	57.16	9.91
F2F	50	27.34	8.63	52.08	7.71

The students in the CMS group posted a mean score of 25.65, with a standard deviation score of 9.80. The foregoing finding indicates that students in the CMS group were average in their level of achievement in Computer Fundamentals. This is understandable considering that the pretest was given at the time that the respondents were not yet subjected to instruction using the CMS approach.

Apparently, students in the F2F group were average in their level of achievement prior to the experiment. This was clearly indicated by their recorded mean score of 27.34, with a standard deviation score of 8.63. Just like the students in the CMS group, students in the F2F group were average in their pretest results. This can be attributed that the both groups have the same level of intelligence.

This finding confirms Patel's (1990) observation that pretest should be administered to students to determine their starting level of knowledge.

A perusal of Table 4 divulges variability in achievement levels of the students in the CMS group, after they were subjected to the use of course management system using MOODLE. Scrutiny of tabular data shows that a mean score of 57.16, with a standard deviation of 9.91. This finding clearly indicates average level of achievement on their part after going through the aforementioned pedagogical approach. The average level of learning and achievement of the students subjected to the aforementioned approach can be explained by the fact that the approach was learner-centered and not teacher-centered.

Students in the F2F group manifested diverse levels of achievement after going through the conventional or traditional classroom instruction in the said subject. As a group, the control or conventional group registered a mean achievement test score of 52.08, with a standard deviation score of 7.71. This goes to show that they were basically high achievers in knowledge learning. The foregoing results can be attributed to the direct or didactic pedagogical approach employed by the professor in teaching the contents of the syllabus in the subject.

Sub-Problem no. 3 Significant differences in the mean pretest and posttest scores of the two groups.

Table 5 displayed the results of the T test of significant difference between the pretest results of the CMS and F2F groups.

Table 5
Results of the T-Test of Difference on the Pretests of the CMS and F2F Groups

Group	Mean	*SD*	Mean Difference	Computed t	DF	Tabular t	Decision
CMS	25.65	9.80	1.69	0.88	84	1.67	Accept H_o
F2F	27.34	8.63					

A cursory look at Table 5 revealed a mean difference of 1.693 between the pretest mean scores of the CMS and F2F groups. This discrepancy, however, was found to be statistically insignificant. Corroborating this finding was the obtained T value of 0.88, which was less than the tabular value of 1.67 at 5% level of significance with the degrees of freedom of 84. Therefore, there was no significant difference on the pretest of the two groups.

The result is indicative of homogeneity in achievement level between the two groups of students before the conduct of the experiment. This point was already stressed earlier. As reported earlier, students in both the treatment and control groups were found to be average in their pretest. This was because of the fact that the pre-assessment was administered prior to traditional instruction in the classroom on the part of the control group and the use of the course management system using MOODLE.

Shown in Table 6 are the results of the T-test of difference between the posttest of the CMS and F2F groups.

TABLE 6
Results of the T-Test of Difference on the Posttests of the CMS and the F2F Groups

Group	Mean	SD	Mean Difference	Computed t	DF	Tabular t	Decision
CMS	57.16	9.91	5.08	2.73	78	1.67	Reject H_o.
F2F	52.08	7.71					

Data show that a mean difference of 5.08 was recorded between the mean posttest scores of the CMS and F2F groups. This difference, however, was statistically significant as the computed T value of 2.73, went beyond the tabular value of 1.67 at 0.05level with the degrees of freedom of 78. Thus, the conjecture of no significant difference between the posttest results of the CMS and F2F groups was not accepted. Therefore, there is a significant difference in the achievement of the two groups.

The above revelation points to the existence of heterogeneity between the CMS and F2Fgroups, as far as their posttest results were concerned. Apparently, marked variations can be noted in the posttest results in the CMS group. It can be deduced from the foregoing disclosure that the CMS group outperformed the F2F group in knowledge learning after being subjected to the use of course management system using MOODLE.

The result was confirmed by DeLa Cruz, et al. (2005), the learning using CMS is not a passive, it is interactive. Students actively participated in traditional classes by listening and talking to other students and the instructor. Through the use of discussions or forums in MOODLE, students are able to share past experience and apply those experiences. CMS makes usability the number one concern for instructors as well as students. The effectiveness of the course helped the learners achieve the specific goals of the Computer Fundamentals. CMS also allowed students to do coursework anywhere and anytime.

CONCLUSION

The evaluation of this research in the assessment results of the students demonstrated that Computer Fundamentals, through the integration of a Course Management System in the learning process, can increase the level of achievements of students at Far Eastern University as measured in their assessment results. The presence of features embedded in the CMS such as online interaction, resource materials availability and immedi-

ate assessment feedback contributed to the improvement of the assessment scores. The shift to the blended learning environment, one that benefits from the integration of the classroom and online approaches, acted as a catalyst for the learners to pursue further knowledge thereby increasing their learning outcomes. The ability of the students to access online notices, lecture resources, forums and quizzes outside the campus allowed students to be present at their classes and further develop knowledge without constraint from the four corners of their classrooms.

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