

MOODLE: An Analysis of Its Utilisation, Benefits, Problems and IT Support as Perceived by IT Students

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ABSTRACT

Moodle (Modular Object-Oriented Development Learning Environment) is one of several learning management systems (LMS) in existence, similar to Blackboard and WebCT. Moodle has been trusted by several well-known institutions in New Zealand and the rest of the world because it provides an integrated set of features that can be used by the faculty members and students for academic purposes. In this paper, we gather information on the overall perceptions or experiences of Information Technology students on the utilisation, benefits, problems and IT support of Moodle as an effective learning management system tool. The data, collected from 72 students, was used for statistical analysis and interpretation. The main objective of the paper is to test whether there are significant differences and relationships between and among the test variables as perceived by the participants when grouped according to their attributes.

Keywords: Moodle, learning management system, significant difference, relationship

1. INTRODUCTION

In this era of digital and paperless environments, educational institutions enterprises have to act and think fast, and utilize changes in the digital environment to maximize the efficiency of their operations. Advances in web technologies have played a vital role in designing new, innovative and dynamic systems of learning that help users to become active learners by actively participating in the e-learning process. Currently, many organisations across the globe are using Learning Management Systems to support and improve the learning process. According to the Observatory on Borderless Higher Education, some educational institutes continue to develop their own Learning Management systems and go for an alternate open source systems, but the majority of them are opting to purchase the licenses for proprietary platforms (Garrett, 2009). Another factor that adds to the growing adoption of Learning Management Systems is their ability to provide both synchronous and asynchronous communications. The e-platforms that provide such communication and activities are going to continually grow (Massy, 2005).

Moodle is a learning management system, free with no licensing fees and designed to support both teaching and learning based on the principles of social constructivism. According to Costa et al. (2012), although Moodle is primarily used as a repository of teaching material, users recognised the importance of other features and functionalities of Moodle that can support the learning process. It improves the pedagogical understanding among users, it is highly fluid and can suit a specific individual or task. Several related research studies proved that using Moodle in education as a subject delivery tool enhanced the learning experience beyond the classroom for both students and teachers (De Vega & McAnally-Salas, 2010; Georgouli, Skalkidis, & Guerreiro, 2008; Govender, 2009;

Harman, 2007; Henderson, 2010). Hsu (2011) stated that e-learning blended with traditional face to face learning bridged the gap between teachers and learners. Kaynama & Keesling, (2000) also found that integration of online tools into traditional classes provided high student satisfaction level and improved communication. Azmi (2011) in her research found that the activities that are conducted using e-learning management system are more valuable and useful as compared to the conventional classroom activities. It is expected that using Moodle will increase students' learning responsibility through social interaction (Bruner, 1990). Moodle provides an excellent and powerful instrument of student-centric tools and improves the quality of the relationship between teaching and learning. Moreover, Pearson and Trinidad (2005) have stated that modification of diverse physical location where they are learning to an e-learning style can result in improving students' achievement affective and cognitive learning outcomes.

The research hypothesis of this research is to find out whether there is significant difference on the perceptions of the respondents on the test variables when the respondents are grouped according to their demographic profile.

This paper's main objective is to know whether the different groups have the same experiences with or perceptions of the utilisation, benefits or problems they have encountered and the IT Support given by the IT department on Moodle.

2. RESEARCH METHODOLOGY

2.1 Research Design

The descriptive research method was used in this study to analyse the perception of Information Technology students at the institution of using the system and to predict the overall perception of the student body. The experiences of these students using Moodle were extracted by using a questionnaire. We interpreted the results using the *p*-value of the test variables, which are: Engagement with Moodle; Use of different features in Moodle; Benefits of Moodle; Problems

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encountered using Moodle; and IT support. The survey involves direct responses from the participants through a structured questionnaire. The outcome of this analysis can be used to correlate the demographic profile and the experiences of the students.

2.2 Research Instrument

The questionnaire was developed by the researchers. The questionnaire was made of two parts. The first part is the demographic profile of the respondents and the second part is their perceptions on the utilisation, benefits, problems and IT support while using Moodle.

2.3 Validation of the Questionnaire

The questionnaires were tested using the Cronbach Alpha for the reliability test and presented to the co-researchers for their comments. All the comments and suggestions were considered and the questionnaire went through several iterations before it was released to the participants.

2.4 Population and Sampling Techniques

There were 72 Information Technology students who were used in the study, and they were grouped according to age, average number of weeks attended in a given semester, their prior knowledge of Moodle and the number of years the students had been using Moodle. The survey took place in April 2017.

The sample size was captured using the SLOVIN formula:

$$n = N (1 + Ne^2)^{-1}$$

Where:

N = total number of enrolled in the IT programme

e = desired margin of error

n = approximate number of samples

$$n = N (1 + Ne^2)^{-1}$$

$$n = 100 \{1 + 100 \times 0.05 \times 0.05\}^{-1}$$

$$n = \text{approximately } 80 \text{ samples}$$

2.5 Data Gathering Procedure

The questionnaires were administered by one of the researchers, who made sure that there was no duplication in the survey. The researcher also explained to the participants how to complete the questionnaire and the objectives of the survey.

2.6 Survey Questionnaire Retrieval

The survey forms were retrieved the same day. There were 72 survey questionnaires completed. Most of the respondents were Information Technology students from Information Systems, Computer Networks and Software Development courses.

3.0 STATISTICAL TREATMENT

The raw data from the questionnaires were organised, classified and tabulated for in-depth statistical analysis and interpretation. In the tabulation of the data and computation, the Statistical Packages for Social Sciences (SPSS) was utilised because of its robustness and flexibility in statistical analysis.

The Likert Scale was used and it was treated as ordinal data. It had a 6-point scale. This scaling points out the extent of differences in perception or experience in the appropriate questions in the questionnaires.

3.1 Frequency Distribution

The frequency distribution was utilised to give a detailed account of the data and percentage. This is also to find out the ratio of the actual observation and the total number of respondents. The unit is expressed in percentage (%). Other statistics utilised were the Pearson Chi-square test, the Kruskal-Wallis test and the Mann-Whitney test.

Pearson Chi-square

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Where χ^2 = the test statistic

O = Observed frequencies

E = Expected frequencies

Kruskal-Wallis Test

$$H = (N - 1) \frac{\sum_{i=1}^g n_i (\bar{r}_i - \bar{r})^2}{\sum_{i=1}^g \sum_{j=1}^{n_i} (r_{ij} - \bar{r})^2}$$

Where: n_i = is the number of observation in group i

r_{ij} = is the rank (among all observations) of observation j

N = is the total number of observation across all groups

$$\bar{r}_i = \frac{\sum_{j=1}^{n_i} r_{ij}}{n_i} \quad \text{= is the average rank of all observations}$$

$$\bar{r} = \frac{1}{2}(N + 1) \quad \text{= is the average of all } r_{ij}$$

The Kruskal-Wallis test by ranks, Kruskal-Wallis H test (named after William Kruskal and W. Allen Wallis), or One-way ANOVA on ranks is a non-parametric method for testing whether samples originate from the same distribution. It is used for comparing two or more independent samples of equal or different sample sizes.

Mann-Whitney Test

The Mann-Whitney U test is used to compare differences between two independent groups when the dependent variable is either ordinal or continuous, but not normally distributed.

$$U_1 = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

$$U_2 = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - R_2$$

Where: U_1 = Mann-Whitney 1st sample statistic

R_1 = Sum of the rank of the 1st sample

U_2 = Mann-Whitney 2nd sample statistic

R_2 = Sum of the rank 2nd sample statistic

Table 1 presents the results of the analysis of the data using Cronbach's Alpha statistic. The overall value of Cronbach's Alpha was between 0.823 to 0.928. This is an indication of a good internal consistency of the questionnaire.

Table 1: Reliability Analysis on the Test Variables Using Cronbach's Alpha (Item Analysis)

Test variable	Reliability Test (Cronbach's Alpha)	Acceptable value
Engagement with Moodle	0.872	$a \geq 0.9$ Excellent $0.7 \leq a < 0.9$ Good $0.6 \leq a < 0.7$ Acceptable $0.5 \leq a < 0.6$ Poor $a < 0.5$ Unacceptable
Benefits of Moodle	0.928	
IT support	0.823	

4. RESULTS AND INTERPRETATION

Table 2: Demographic Profile of the Respondents

Independent variable	Mode	Percentage
Age Group	21 - 25	29.2
Average weeks attended in a given semester	13 weeks	50.0
Prior knowledge of Moodle	No	55.6
Number of years of using Moodle	Less than a year	55.6

Table 2 shows the demographic profile of the samples. The frequency distribution was used to show the most frequently-occurring value for each group set. The Mode as one of the measure of central tendency was used since the variables are nominal-scale. For the age group, the highest frequency is the age group between 21 to 25 years old with 29.2%. This is about 21 samples out of the total samples of 72. In the average weeks attended in a given semester attribute there were 36 students or 50% of the students attended 13 weeks in a given semester. The group with no prior knowledge of Moodle comprised 55.6% or 40 samples. The population of the samples also shows that 55.6% have less than a year of using Moodle. This implies that the demographic profile of the respondents is a good indicator of a very responsive segment or groups of samples in the statistical manipulations. The bigger the sample, the better understanding of the behaviour of the data under consideration and have an excellent dimensional view on the population's characteristics. The three test variables under consideration were a) average weeks attended in a semester, b) prior knowledge of Moodle and c) number of years of using Moodle reach the 50% mark.

Table 3: Respondents Perceptions on the Utilisation, Benefits, Problems with Moodle and IT Support.

Test variable	Mode	Subset of the test variable	Percentage
Engagement with Moodle	Agree	The purpose of Moodle is well-defined and clearly explained.	58.2
		Moodle is user-friendly	51.4
		Moodle instructions are clear and easy to follow	47.2
		I can operate Moodle without support	47.2
		Moodle is interactive	43.1
Use of different features on Moodle	Yes	Download course materials	98.6
		Check course assignments	100
		Submit files for assignments, quizzes, midterm test or final examinations	94.4
		Check assessment results	63.9
		Sending and receiving emails	66.7
		No	Discussion Forum
	Chat room		52.8
			Sharing files with classmates

Table 3 continued on next page

Table 3: Continued

Test variable	Mode	Subset of the test variable	Percentage
Benefits of Moodle	Agree	Gives me more freedom in choosing an appropriate time to do my course assessments.	51.4
		Helps me access additional study materials	45.8
		Increases my knowledge in the areas I am studying	41.7
		Develops my interest in the subjects I am studying	37.5
		Motivates my interest in following-up lectures and do more reading	37.5
		Increases my motivation to learn	31.9
Problems encountered using Moodle	No	Was not registered in the system	93.1
		Could not find study materials	88.9
		Moodle sends too many notifications	86.1
		Moodle is installed on my mobile device but I cannot logon	51.4
		Could not submit assignments	65.3
		Could not upload multiple files to Moodle	61.1
		Could not submit large files	58.3
		The content is not user friendly	83.3
IT Support	Satisfactory	Provided training on appropriate and effective use of Moodle	55.6
		IT support in Moodle was always available	54.2

Table 3 shows the respondents' perceptions on the utilisation, benefits, problems with Moodle and IT Support. The frequency distribution and mode were used to get the frequency per category. For the test variable 'engagement with Moodle', the level of agreement is *Agree* with the highest value of 58.2% in the subset of the test variable "the purpose of Moodle is well-defined and clearly explained" and followed by "Moodle is user-friendly". The "download course materials", "check course assignments", and "quizzes, midterm test or final examinations" have the significant percentages, 98.6%, 100% and 94.4% respectively in the use of different features on Moodle test variables and the mode was Yes. However, 45.8% and 52.8% say "No" respectively for discussion forum and chat room. This means that more or less half of the samples were not using these features. In terms of the benefits of Moodle, half of the respondents agreed that they benefited substantially from using Moodle especially for the dependent variable "gives me more freedom in choosing an appropriate time to do my course assessments" with 51.4%. Regarding the problems encountered using Moodle, most of the respondents did not experience any significant problems with the exception of login issues which can be caused by other factors. When using Moodle together with IT support as well with an average of 51.13% that respondents were satisfied. This indicates that Moodle is beneficial to the students and they are satisfied with the support of the IT section.

Table 4: Respondents' Perceptions on the Utilisation, Benefits, Problems with Moodle and IT Support when Grouped according to Age Group

Test variables	Average P-value	General Perception
Engagement with Moodle	0.672	Not significant
Use of different features of Moodle	0.440	Not significant
Benefits of Moodle	0.505	Not significant
Problem Encountered with Moodle	0.365	Not significant
IT Support	0.504	Not significant

Table 4 presents the respondents' perceptions on the utilisation, benefits, problems with Moodle and IT Support when grouped according to age group. The Kruskal-Wallis and Mann-Whitney tests were used to determine if there were significant differences in the perceptions of the respondents on the test variables. It indicates that the computed average *p*-value of the test variables is greater than the researchers' set value of 0.05. This means that the experiences of the respondents are the same on the test variables when grouped according to age group.

Table 5: Respondents' Perceptions on the Utilisation, Benefits, Problem with Moodle and IT Support when Grouped According to Average Weeks Attended in a given semester

Test variables	Average P-value	General Perception
Engagement with Moodle	0.278	Not significant
Use of different features of Moodle	0.482	Not significant
Benefits of Moodle	0.408	Not significant
Problem Encountered with Moodle	0.372	Not significant
IT Support	0.691	Not significant

Table 5 shows the respondents' perceptions on the utilisation, benefits, problem with Moodle and IT Support when grouped according to average weeks attended in a given semester. The Kruskal-Wallis and Mann-Whitney tests were used to analyse the significant perception of the respondents when grouped according to average weeks in a given semester. The results of the computed average p -value for each dependent variable are greater than the desired margin of error which is 0.05. This indicates that there is no significant difference in the perception or experience when they were grouped according to average weeks attended in a given semester. This implies that regardless of the number of weeks attended in a given semester the test variables will be similar.

Table 6. Respondents' Perceptions on the utilisation, Benefits, Problems with Moodle and IT Support when grouped according Prior Knowledge of Using Moodle

Test variables	Average p-value	General Perception
Engagement with Moodle	0.427	Not significant
Use of different features of Moodle	0.576	Not significant
Benefits of Moodle	0.541	Not significant
Problem Encountered with Moodle	0.456	Not significant
IT Support	0.879	Not significant

Table 6 presents the respondents' perceptions on the utilisation, benefits, problems with Moodle and IT Support when grouped according to prior knowledge of using Moodle. The Pearson Chi-square and Mann-Whitney tests were used to determine the relationship between the test variables and the independent variable prior knowledge. The computed average p -values of the dependent variables are greater than the value of the desired margin of error of 0.05. This indicates that the test variables are not dependent, or there is no relationship to prior knowledge of using Moodle.

Table 7: Respondents' Perceptions on the Utilisation, Benefits, Problem with Moodle and IT Support when Grouped According to Number of Years of Using Moodle

Test variables	Average p-value	General Perception
Engagement with Moodle	0.408	Not significant
Use of different features of Moodle	0.578	Not significant
Benefits of Moodle	0.541	Not significant
Problem Encountered with Moodle	0.456	Not significant
IT Support	0.879	Not significant

Table 7 displays the computed average p -values of the test variables on respondents' perceptions on the utilisation, benefits, problems with Moodle and IT Support when grouped according to average weeks attended in a given semester. The Kruskal-Wallis and Pearson Chi-squared were used to determine the existence of relationships and differences of the test variables as perceived by the respondents when they are grouped according to number of years of using Moodle. The computed average p -values of test variables, use of different features of Moodle and problems encountered with Moodle are greater than the desired margin of error of 0.05 while the remaining test variables are also greater than 0.05. These results imply that the test variables are not correlated and not statistically significant with respect to "number of years of using Moodle".

5. CONCLUSION

The results revealed that the perceptions of the different groups on the dependent variables were not statistically significantly different from each other. The participants' experiences were essentially the same even when they were grouped in different categories. Overall, the experience of the different groups of students on Moodle showed that the computed statistical values were largely positive or higher than the researchers' desired margin of error of 0.05. The IT support team had satisfactory ratings in the three test variables. This indicates that the students were satisfied with the utilisation of Moodle and its integration to the academic learning process. Adoption and use of Moodle at the institution should continue.

6. REFERENCES

- Azmi, I. A. G. (2011). Information technology usage and attitudes towards online resources-Students perspective. *African Journal of Business Management*, 5(7), 2582.
- Costa, C., Alvelos, H., & Teixeira, L. (2012). The use of Moodle e-learning platform: a study in a Portuguese University. *Procedia Technology*, 5, 334-343.
- Bruner, J. (1990). *Acts of Meaning*. Cambridge, MA: Harvard University Press.

- De Jesus, T. (2002). *Impact to Non-destructive Testing (NDT) Companies of PNRI/PSNT Personnel*. (Unpublished master's thesis). University of Santo Tomas, Manila, Philippines
- De Vega, C., & McAnally-Salas, L. (2010). Online Support for a Chemistry Course: The Opinion of University Freshmen (pp. 36-46). In *Proceedings of the 5th International Conference on e-Learning, Penang, Malaysia*.
- Garrett, R. (2009). Leading Learning Platforms: International Market Presence. *Observatory on Borderless Higher Education*. Walker, R., Brown, M., Moore, C., & Highes, H. (2011). The move to Moodle: Perspective of academics in a College of Business. *Proceedings ascilite 2011 Hobart: Concise Paper*, 1275-1279.
- Georgouli, K., Skalkidis, I., & Guerreiro, P. (2008). A framework for adopting LMS to introduce e-learning in a traditional course. *Journal of Educational Technology & Society*, 11(2).
- Govender, I. (2009). The learning context: Influence on learning to program. *Computers & Education*, 53(4), 1218-1230.
- Harman, C. (2007). Is This Op-Amp Any Good? Lab-Built Checker Removes All Doubt!. *Tech Directions*, 67(5), 14.
- Henderson, J. G. (2010). Learning through a Disciplined Curriculum Study Approach: Implications for Educational Leadership. *Scholar-Practitioner Quarterly*, 4(4), 312-315.
- Hsu, L. L. (2011). Blended learning in ethics education: A survey of nursing students. *Nursing Ethics*, 18(3), 418-430.
- Kaynama, S. A., & Keesling, G. (2000). Development of a Web-based Internet marketing course. *Journal of Marketing Education*, 22(2), 84-89.
- Massy, J. (2005). The eLearning industry and market in Europe Retrieved 7 August, 2017, from http://www.pedz.uni-mannheim.de/daten/edz-b/gdbk/05/market_annex1a_en.pdf
- Pearson, J., & Trinidad, S. (2005). OLES: An instrument for refining the design of e-learning environments. *Journal of Computer Assisted Learning*, 21(6), 396-404. Retrieved from <http://search.proquest.com/docview/222644792?accountid=27575>
- Thabit, W. (2013). Blended Learning Approach Using Moodle and Student's Achievement at Sultan Qaboos University in Oman. *Journal of Education and Learning*, Vol.2, No.3. doi.org/10.5539/jel.v2n3p96