EXPLORING LEARNING IN NEW LEARNING ENVIRONMENTS OF THE 21ST CENTURY

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Abstract: As the pace of change in the 21st century continues to increase, the world is becoming more interconnected and complex, and the knowledge economy is craving more innovation. The growing importance and new dimensions of face-to-face learning are opened by the rapid development of educational ICT technology. The effective integration of ICTs into the educational system is a complex multifaceted process that involves not just technology but also curriculum and pedagogy, institutional readiness, teacher competencies, long-term financing etc. Learning Management Systems (LMS) is changing the way students are getting educated nowadays. This paper discusses the effectiveness of MOODLE (Modular Object Oriented Dynamic Learning Environment) as an LMS on student engagement, motivation and academic performance, with the help of tools and scales prepared by the researcher to assess the same. The two sample 'post-test only' experimental research design was used for this study. The study found a significant difference in the engagement, motivation and performance of students, with students using LMS-MOODLE performing better. The study further explored the type of learning taking place inside the LMS-MOODLE of the experimental group. The findings are useful to conclude that LMS-MOODLE does contribute positively towards improving the outcomes in a classroom-like situation it could likewise be an efficient as well as cost-effective tool in higher education.

Keywords: Academic Performance Engagement ICT, MOODLE-LMS, Motivation,

Introduction: A Learning Management System (LMS) is a software package that enables the management and delivery of online content to learners [3]. One of the most direct and pressing applications, however, is in terms of understanding how online LMSs might be used to enhance overall student engagement. Motivation has been considered an important factor in students' decisions to devote quantitative time-on-task. Student engagement is generally understood to be the primary mechanism that enables motivational processes to contribute to learning and development [6]. This paper explores the effectiveness of MOODLE (Modular Object Oriented Dynamic Learning Environment) as an LMS on student engagement, motivation and academic performance, with the help of tools and scales prepared by the researcher to assess the same.

Review of Literature: LMS-MOODLE provides collaborative tools like email, chat and discussion forums that assist students as they construct knowledge. The aim is to create learning environments centered on students as learners and to offer new learning opportunities all at one place. LMS-MOODLE was designed based on the constructivist pedagogy wherein knowledge is actively constructed by the learner, not passively received from the environment [4]. It has three main functions: authoring, administrative and a means of communication.

Student engagement results provide educators across a variety of campus programs and departments, information to consider in their efforts to understand the student experience and to collaborate in the design of educationally productive activities and programs [9]. MOODLE-LMS provides an environment that enables learning, as learners work individually on assigned materials and decide when they would engage. Learners can assess the outcomes of their engagement by how successful they were progressing through the materials with the help of assessment features like Quiz, Assignment, etc. all built into the LMS . Several studies [2],[7] have highlighted the significant role that such factors can play in the learning process, laying particular emphasis on those associated with student engagement levels.

The plethora of features offered in LMS-MOODLE along with the embedded cognitive strategies like a feedback feature makes it an LMS that provides students with a learning advantage.

Objectives of The Study: The objectives of the study are:

1. To study the effect that the nature/type of interaction that the students in the experimental group have with the LMS-MOODLE on their engagement, motivation and academic performance.
2. To study the type of learning taking place through the LMS-MOODLE.

Research Design and Methodology: The Research Design used for this study was the 'Experimental method' with 'post-test only' design. The students in the two groups were enrolled in a compulsory course titled Software Engineering during the last (sixth) semester (B.Sc. Computer Science degree programme offered by Goa University, India) for the academic

year 2012–2013. Both groups were taught the course in the conventional environment, with the only difference being that only students from the experimental group had access to MOODLE-LMS. Engagement implies the use of three interrelated criteria namely, Cognitive, Affective and Behavioral to assess student engagement levels [2]. Keeping the above studies in mind, the researcher developed an Engagement Scale using a four-point rating scale with 21 items, with an objective to study the cognitive, affective and behavioral aspects of engagement.

A Motivation Scale was developed by the researcher by suitably modifying and adapting Keller ARCS motivation scale to this study. The scale was developed using a five-point rating scale with 24 items, with an objective to study the attention, relevance, confidence and satisfaction aspects of motivation. The Performance Test was an achievement test with a maximum score of 25 marks. All the above tools were constructed by the researcher and validated by experts before administering them as post-tests to both the groups.

Besides these tools an Evaluation Rubric (ER) was also constructed to help determine the extent to which MOODLE-LMS features namely Chat, Discussion Forum, Glossary, Assignment and Quiz actively promote student engagement and participation. The scores obtained from the rubric helped determine whether such activities appeal to the learners, thereby increasing their engagement, motivation and interaction. The criteria in the ER were designed keeping in mind the objectives of the study with an additional focus being to understand the quality of interactions that was taking place through the various activities and resources that the MOODLE-LMS offers. An attempt was made to know a student's willingness, need, desire and compulsion to participate in, and be successful in the learning process by offering the student various LMS features which in turn are expected to affect their engagement, motivation and performance. The faculty for the treatment group made available resources like lecture slides and website links to the students. Activities related to their coursework like Assignments, Forums, Quiz, Chat sessions, etc were all made available through MOODLE-LMS. The students were expected to access and participate in all the activities that the faculty made available to them via the MOODLE-LMS from time-to-time.

Findings and Discussions: A Comparison of the means of post-tests of the Experimental and Control group post-tests on Engagement, Motivation and Academic Performance shows that the students from the experimental group reported a higher mean score on all parameters of the study as compared to students from the control group [5], thus, indicating that the LMS-MOODLE plays a significant role in engagement, motivation and academic performance of students in the experimental group.

In an attempt to study the nature/type of interaction that the students in the experimental group have with the LMS-MOODLE w.r.t their engagement, motivation and academic performances, the students in the experimental group were classified based on the basis of extent of LMS-features used in LMS-MOODLE. The ER scores of all the students in the experimental group on various LMS features like Chat, Forum, Glossary, etc. were computed. Table I shows that there is a correlation between overall LMS features and student engagement, motivation and academic performance.

Table I: Results of the correlation between LMS features like Chat, Forum, Glossary, etc. used vis-à-vis Engagement, Motivation and Academic Performance in the Experimental Group.

Features--> Parameters	ER^	Chat^	Forum^	Glossary^	Assignment^	Quiz^
Engagement	0.578*	0.279	0.596*	0.083	0.566*	0.425
Motivation	0.668*	0.514	0.582*	0.034	0.760**	0.845**
Academic Performance	0.913**	0.608*	0.918**	0.317	0.728**	0.563*

^figures mentioned in these columns are r values

* Significant at 0.05 level

** Significant at 0.01 level

From Table I it was found that the type of interaction taking place through the LMS plays a very significant role on Engagement, Motivation and Academic performance of students in the experimental group. Hence the experimental group students have been grouped as 'high ER scorers' and 'low ER scorers'; based on the average scores obtained in the ER.

However, the Table I also show a positive correlation between academic performance and ER of students in the experimental group. This significant co-relation can be attributed to the use of activities and resources available in LMS-Moodle by the experimental group. Hence, they were grouped as 'high AP scorers' i.e B+ and 'low AP scorers' B-; based

on the average scores obtained at the post-test on academic performance.

When this grouping was completed, however, it was found that those students who had been grouped as 'high AP scorers' in this group were the same students who obtained 'high ER scores' and the 'low AP scorers' in this group were the same students who obtained 'low ER scores'. This result is acceptable because from Table I we have seen that ER and AP have very significant relationship with r= 0.913 (significant at 0.01 level). Hence, in view of this (ER score and post-test score in academic performance) the experimental group has been grouped as 'high achievers' (B+) and 'low achievers' (B-); based on average of scores obtained in the ER and academic performance post-test.

To analyze the learning taking place through LMS-MOODLE (objective 2), the t-ratio was computed for each pair of achievers separately for High and Low achievers. The Table II presents the relevant statistics.

Table II: Analysis of the learning taking place through scores obtained by B+ and B- users on the LMS features that they use and also the time spent by the B group users.

LMS features	B+ high achievers	B- low achievers	t-value	Significance (df=11)
Chat	8.87	6	3.01*	0.012
Discussion Forum	28.25	14.8	4.83**	0.001
Glossary	6.25	5.4	0.957	0.369
Assignment	9.87	7	3.01*	0.012
Quiz	6.37	5.2	2.646*	0.023
Time	6.46	7.98	0.875	0.400

* Significant at 0.05 level

** Significant at 0.01 level

Table II shows that Discussion Forum is an important activity in the LMS-MOODLE that does contribute significantly to higher academic performance of B+ users. The other features like Chat, Assignment and Quiz also help significantly towards better academic performance in the B+ group.

Conclusion: Previous research shows that LMS influence engagement and research into their effect on engagement is still in its infancy [3], [1]. The current study has established that there is a significant difference between the Engagement, Motivation and Academic Performance levels between students of the experimental group and control group. Learning in an environment like LMS-MOODLE that provides collaborative tools like email, chat, discussion forums, virtual classrooms and blog features, all available free will definitely help educators and researchers to create effective online learning communities. These results are encouraging signs that Internet and Web-based learning technologies continue to have a positive impact on student learning in higher education.

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References:

1. Beer, C., Clark, K. and Jones, D., 2010. Indicators of engagement. Curriculum, technology & transformation for an unknown future. Proceedings ASCILITE Sydney, pp.75-86.
2. Chapman, E., 2003. Assessing Student Engagement Rates. ERIC Digest.
3. Arpan Das Gupta, Dr. Madhumita Roy, Probable Variables Of Transition Of Built Forms.; Engineering Sciences international Research Journal : ISSN 2320-4338 Volume 3 Issue 2 (2015), Pg 26-32
4. Coates, H., James, R. and Baldwin, G., 2005. A critical examination of the effects of learning management systems on university teaching and learning. Tertiary education and management, 11, pp.19-36.
5. Dougiamas, M. & Taylor, P. (2003).MOODLE: Using learning communities to create an open source course management system. Proceedings of the EDMEDIA 2003 Conference, Honolulu, Hawaii. Retrieved December, 2015, from: http://dougiamas.com/writing/ edmedia2003
6. C.Umadevi, K.R.Mohan, A.K.Sharma, A Comparative Study Of The Discharge Characteristics Of (Pvp/Pva) Polymer Blend Electrolyte Films Doped With Different Potassium Salts.; Engineering Sciences international Research Journal : ISSN 2320-4338 Volume 3 Issue 2 (2015), Pg 38-44

7. Falleiro, S. (2015). Assessing Quality of Interaction Vis-à-vis Time Spent inside the LMS-MOODLE. Proceedings of the Exploring Teacher Education in the 21st Century,Nirmala Institute,Goa. (ISBN No: 978-93-84298-23-4; PgNos: 102-110).
8. Teesha Majumder, Enabling And Creating Supportive Design Model For Elderly And Orphans – A Sustainable Approach.; Engineering Sciences international Research Journal : ISSN 2320-4338 Volume 3 Issue 2 (2015), Pg 33-37
9. Furrer, C. & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. Journal of Educational Psychology. Vol. 95, No. 1.
10. Kuh, G.D. (2007). What student engagement data tell us about college readiness. Peer Review, Association of American Colleges and Universities, 9(1), pp 4-8.
11. K. Amrutha Varshini, K. Padma Vasavi, An Area Efficient Vlsi Architecture For Da-Based Reconfigurable Fir Filter.; Engineering Sciences international Research Journal : ISSN 2320-4338 Volume 3 Issue 2 (2015), Pg 45-49
12. MOODLE Online. (2015). Retrieved December 26, 2015, from http://www.moodle.org.
13. National Survey of Student Engagement. (2011). Fostering student engagement campus wide—annual results 2011. Bloomington, IN: Indiana University Center for Postsecondary Research.
14. Uma Maheswari, On A Class Of Quasi Hyperbolic Kac Moody Algebras Of Rank 11.; Engineering Sciences international Research Journal : ISSN 2320-4338 Volume 3 Issue 2 (2015), Pg 50-56

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