

STUDY OF STUDENTS' PERFORMANCE IN LEARNING MANAGEMENT SYSTEM

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Abstract- This paper presents experimental work on online learning environment. Student engagement in learning has become measurement of teaching and learning quality of any educational organization. We have launched learning management system (LMS), MOODLE in our university Local Area Network (LAN) and students' activities have been recorded. LMS could record a large amount of data into its database. It records users login time, students hit on available online course materials, sharing of resources and interaction with other users etc. We have attempted to show the impact of online LMS on student participation in online pedagogy, their motivation towards technology enhanced learning (TEL) and online social networks of students and teachers. We found that the students who have actively engaged in online LMS login more frequently and visit longer time. It can be notice that the Students who actively engaged have higher grade in comparison to other less engaged students.

Keywords: E-learning, Learning Management System (LMS), Technology Enhanced Learning (TEL), MOODLE, Data mining.

1. INTRODUCTION

In this era of technology, E-Learning is an emerging technology in higher classes and universities. Online learning management system is developing new tool for educational management. Now a days, Moodle (Modular Object- Oriented Developmental Learning Environment) is the most commonly used open source learning management system. Student engagement is a vast area to measure academic achievement. Despite the universally accepted definition of what constitutes engagement, it may be link to academic achievement, student attraction, student attrition, student retention, student motivation and institutional success.

Student Engagement in learning is an important factor to measure academic achievement. It has been suggested that student engagement could be used as indicator of institutional teaching quality. Most of research measuring student engagement is simply measure attendance of the student (Douglas & Alemanne, 2007). Although the attendance of the students is measure of participation of student in the course but it is not measurement of the quality of students' achievement.

Learning management systems

Learning management systems (LMS) are the online technologies making a serious impression on patterns of learning and teaching in higher education (Coates, 2006). LMS, also commonly referred to as course management systems (CMS) and virtual learning environments (VLE), are becoming very popular at universities around the world, adding a virtual dimension to even the most traditional campus-based institution (Coates, et al., 2005). In a relatively short time they have become perhaps the most widely used educational technology in higher education, only ranking behind the Internet and common office applications (West, Waddoups, & Graham, 2006). They are being used for presenting online or technology-enhanced classes and it has been said that they influence pedagogy, and therefore engagement, by presenting default formats that are designed to guide instructors toward creating courses in certain ways (Lane, 2009). If LMS are affecting pedagogy, then they are likely to be affecting student study habits, learning and engagement (Coates, et al., 2005).

Academic analytics in E-learning

A fortunate effect of the almost ubiquitous adoption of LMS for online course delivery in universities, is their ability to

track and store vast amounts of data on student and designer behavior (Heathcoate & Dawson, 2005). Typically, LMS record all actions made by users once they are logged into the system and this data is subsequently stored in an associated database. The process of analyzing institutional data captured by an LMS for decision making and reporting purposes is called academic analytics (Campbell, Oblinger, & DeBlois, 2007) and it has been shown that analysis of captured LMS data is directly relevant to student engagement, evaluating learning activities and can usefully answer other important questions (Shane Dawson & McWilliam, 2008).

2. METHODOLOGY

This study has been done on Banaras Hindu University-Local Area Network (LAN). We have launched Learning Management System 'MOODLE' on university LAN. Uploaded study materials and resources on LMS. The students of BHU, connected with LAN can create their account and participate in online learning. We have done our experiment on 40 students. We have enrolled these students in various courses and send instructions online. Students login and see contents on LMS; they can post their information on forum or chat to other online users. Online students are someone who is studying via distance without significant face-to-face instruction. After successful completion of online teaching, we have organized online test. Two online quiz tests on 'General Awareness' and 'Mathematical Sciences' are organized. Test has five multiple choice questions in each test. Students attempt quiz and submit their performance on LMS. Students' performance has been saved into database. MOODLE have activity databases that record the user, course and location of every mouse click that occurs within the system.

3. LMS INDICATORS OF STUDENTS ENGAGEMENT

The core components of active learning in online LMS are student activity and engagement in the learning process (Prince, 2004). It could be expected that students who are actively engaged in their LMS hosted courses would visit the LMS more frequently and for longer periods of time than students who are less engaged. It would seem reasonable to expect that, generally, students who are more actively engaged in LMS courses should receive higher grades than students who are less engaged.

To show indicator of online learning, an example of how LMS data might be indicative of engagement is presented. The following figure shows the statistical representation of participant students based on the final grade they achieved for their course.

3.1 Students' grades report

This report gives a statistical (psychometric) analysis of the students' grade achievement on quiz test. The vertical line of this report shows the number of participants and the horizontal line shows their grade achievement.

3.2 General Awareness test Report

A quiz test has been taken on students of online LMS, the statistical representation of students' score has shown below. The vertical axis represents number of participants and horizontal axis represents participants' scores.

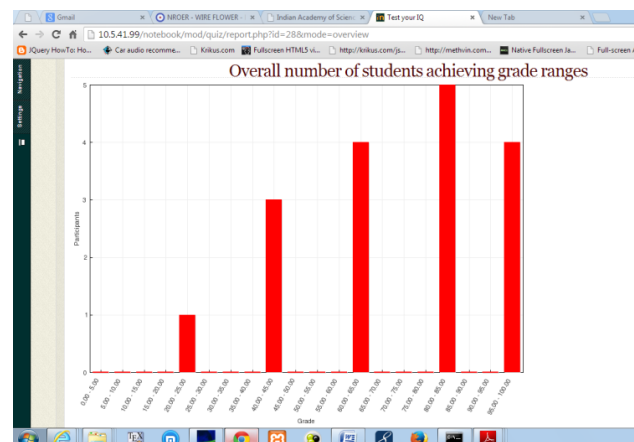


Figure1: Participant score for 'General Awareness' Quiz Test

3.3 Mathematical Sciences Report

The statistical representation of performance of students of mathematical sciences has been shown below.

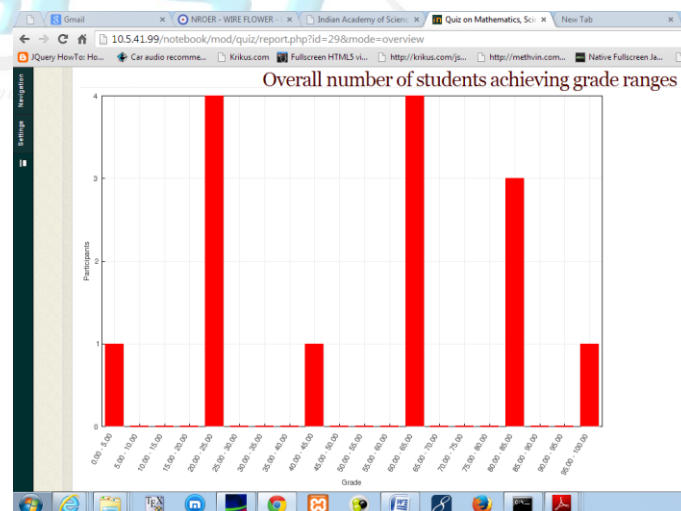


Figure 2: Participants score for 'Mathematical Sciences' Quiz Test

3.4 Quiz Structure Analysis

This section lists all the questions in the quiz with various statistics in a table format.

- Q# - shows the question number (position), question type icon, and preview and edit icons
- Question name - the name is also a link to the detailed analysis of this question (See Quiz Question Statistics below).

- **Attempts** - how many students attempted this question.
- **Facility Index** - the percentage of students that answered the question correctly.
- **Standard Deviation** - how much variation there was in the scores for this question.
- **Random guess score** - the score the student would get by guessing randomly
- **Intended/Effective weight** - Intended weight is simply what you set up when editing the quiz. If question 1 is worth 3 marks out of a total of 10 for the quiz, the the intended weight is 30%. The effective weight is an attempt to estimate, from the results, how much of the actual variation was due to this question. So, ideally the effective weights should be close to the intended weights.
- **Discrimination index** - this is the correlation between the score for this question and the score for the whole quiz. That is, for a good question, you hope that the students who score highly on this question are the same students who score highly on the whole quiz. Higher numbers are better.
- **Discriminative efficiency** - another measure that is similar to Discrimination index.

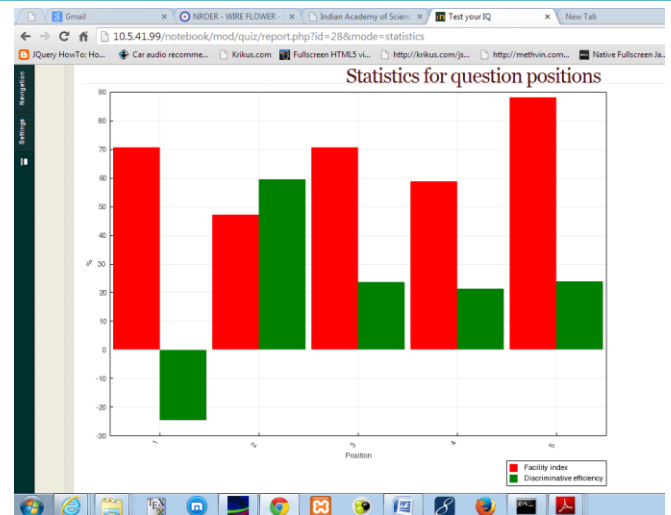


Figure 4: Quiz Statistics chart HTML for 'General Awareness' Quiz Test

3.6 Mathematical Sciences quiz Analysis

The quiz structure analysis of general awareness quiz is given below.

3.5 General Awareness quiz analysis

The quiz structure analysis of general awareness quiz is given below.

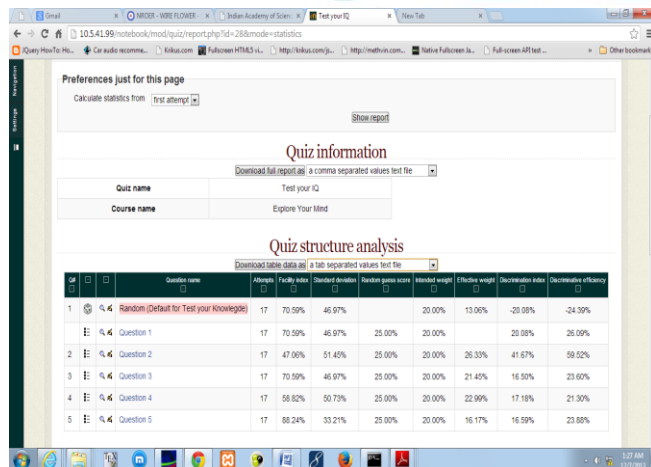


Figure 3: Quiz Structure Analysis for 'General Awareness' Quiz Test

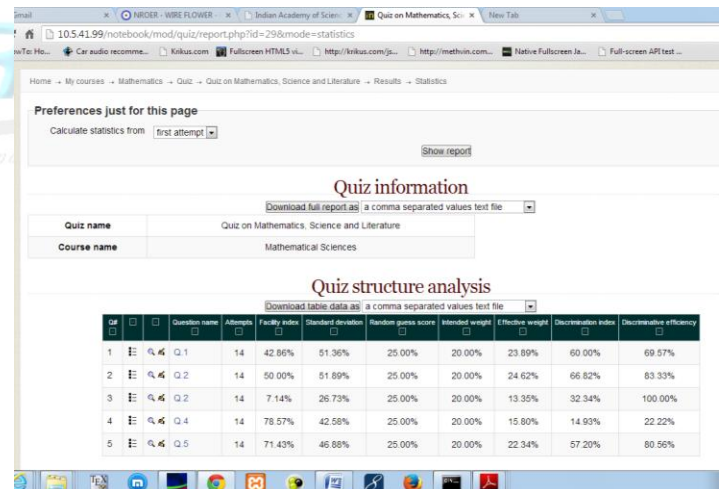


Figure 5: Quiz Structure Analysis for 'Mathematical Sciences' Quiz Test

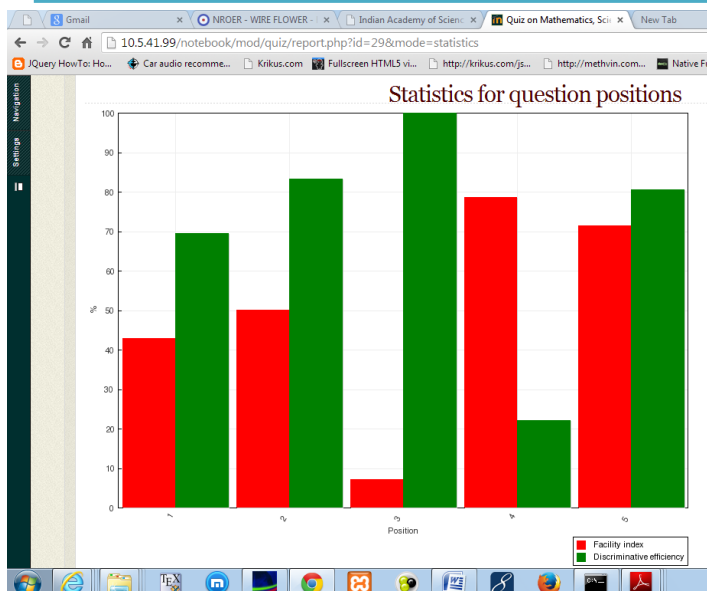


Figure 6: Quiz Statistics chart for 'Mathematical Sciences' Quiz Test

4. IMPACT OF STUDENT ENGAGEMENT ON PERFORMANCE

From there, the average number of clicks within the LMS course is calculated for each of the grade groups for the entire sample of 91284 online, undergraduate students using the LMS and 1515 online undergraduate students using MOODLE. The assumption made here is that click count is an indicator of student participation where student participation has been said to be an important predictor of engagement and student success (Prince, 2004).

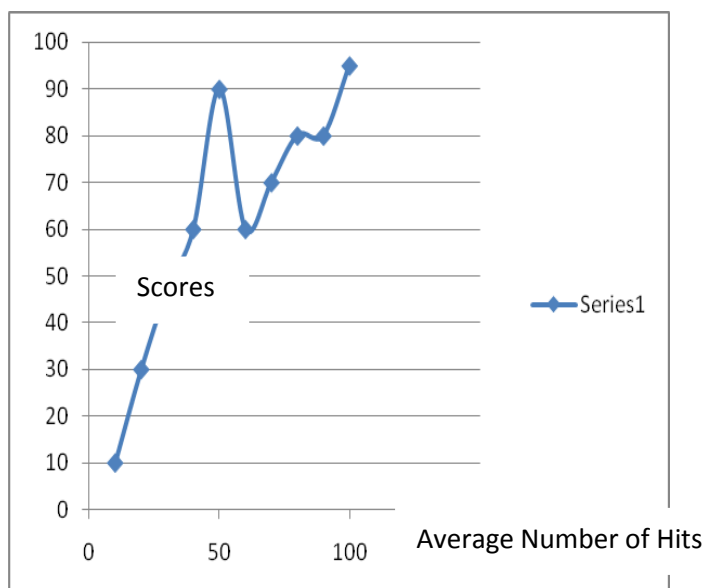


Figure 7: Student Hits per grade comparison on LMS

5. IMPLICATIONS AND FUTURE RESEARCH

It is important to note that the data above represents an initial exploration of the potential of academic analytics to provide information on student engagement. Teacher participation, course design, class size, student gender and student age are just a small subset of a range of factors that can influence online only student engagement. The range of factors that can influence student engagement within an LMS is vast and contains complex interplays between the factors. While these factors prevent academic analytics becoming a solution for all difficulties for informing and improving student engagement in online education, it can be a useful indicator of engagement and uses data that is already being captured by existing systems.

6. CONCLUSION

This study shows the students engagement on LMS, their activities and their interaction with other students. This study shows the impact of LMS on student into their learning process. Based on increasing requirements for institutions to assess their efforts in improving student engagement, and the lack of a clear definition of engagement, this study measure the students engagement that aligns with what can be practically measured within an LMS. It showed that measuring engagement is difficult and that learning environments influence student engagement. Online learning environments are becoming increasingly common with Learning Management Systems at the forefront of educational technologies used for online course delivery.

This study show how data captured by learning management systems can potentially be used by the academy for measuring, informing and improving student engagement, as well as for comparisons between LMS. Variables such as teacher participation, course design, class size, student's gender and student age are identified as factors that influence student engagement and are factors that require further research before their influence on engagement can be fully understood. This study indicates students' participation on online learning can be effective predictors of their success.

ACKNOWLEDGEMENT

The authors gratefully acknowledge to the scholars of Banaras Hindu University, Varanasi and Indian Institute of Technology-Banaras Hindu University (IIT-BHU), Varanasi to participate in online Virtual Learning Environment. Earlier version of this research has presented in the conference organized by National Council of Educational Research and Training (NCERT) at its constituent Regional Institute of Education, at Ajmer, Rajasthan, India.

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