Student Engagement in a Blended Learning Environment

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Abstract: To keep connections and engage the students for learning educators are adapting to different learning strategies. Use of powerful technology resources like electronic Learning Management Systems (LMS) is one of them. This paper gives an overview of student engagement in a LMS based environment.

Index Terms—Student engagement, Blended Learning, LMS, Moodle

I. INTRODUCTION

Student engagement research works from the perspective that education is fundamentally about students creating their own knowledge. While students are seen to be responsible for constructing their knowledge, learning is also seen to depend on institutions and staff generating conditions that stimulate and encourage student involvement [Davis and Murrell, 1993].

For the last two decades or so, the penetration of sophisticated technology tools like on line learning management systems into many educational institutions have provided a blended learning environment for the current student generation.

Learning Management Systems (LMS) are at the forefront of this technological development. LMS have been designed to have a diverse influence on the ways in which campus based students engage with their university studies [Hamish Coates 2006]. LMS have the capacity to change how students collaborate with others, communicate with staff and access the materials which they use to learn. It enriches student learning experiences by opening wide range of resources. This paper covers an overview of LMS based learning environment and its influence on student engagement.

Section II of this paper describes the Student engagement models and Section III covers the learning environment. Different studies conducted so far to measure the influence of online student engagement is described in Section IV. Section V presents some conclusions.

II. STUDENT ENGAGEMENT

Student engagement is used to, "depict students" willingness to participate in routine academic activities, such as attending class, submitting required work, and following teachers' directions in class [Chapman E, 2003]. It has even been suggested that student engagement could be used as an indicator of institutional teaching quality [Kuh, 2001].

Coates believes engagement comprises of active and collaborative learning, participation in challenging academic activities, formative communication with academic staff, involvement in enriching educational experiences and feeling legitimated and supported by university learning communities [Coates, 2007]. Stovall [2003] suggests that engagement is defined by a combination of students' time on task and their willingness to participate in activities.

Krause and Coates [2008] say that engagement is the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes. Additionally, Chen, Gonyea and Kuh [2008] say that engagement is the degree to which learners are engaged with their educational activities and that engagement is positively linked to a host of desired outcomes, including high grades, student satisfaction and perseverance.

However, the term is also increasingly used to describe meaningful student involvement throughout the learning environment, including students participating in curriculum

design, class room management and school building climate [Fletcher A, 2005]. It is also often used to refer as much to student involvement in extra-curricular activities in the campus life of a school/college/university which are thought to have educational benefits as it is to student focus on their curricular studies [Donald M, 2007].

As Heidi Jacobs [2010] quotes in her book Curriculum 21 "Educators in the 21st century realize that students entering the classroom today are much different from those who have come before. Today's students are demanding a change in the classroom because of their ability to gather information faster than any other generation."

An observation and peep into the UG classroom of today, the scenario might not be very different as Paul [2011] writes about a current classroom environment, "in the 21st century is quite a different story. Students seem to know that once a teacher stands up in front of the room and starts "teaching," not only is their life going to get very boring very quickly, the end result will be that there will be more quizzes and tests to fail and more opportunities to end up feeling dumber and dumber. So, how do they cope? They text their friends or get some sleep, or interrupt the teacher with a myriad of cleverly constructed distractions. Therefore for the teacher who intends to stand in front of such a class and "teach" is in a constant battle".

One of the reasons for such a scenario is as Green and Gilbert[1995] write that "growing numbers of college bound students come to campus with computer skills and technology expectations". Frand [2000] adds further " contemporary students have an information-age mindset and these skills are tacit and profound". Engaging these students in a traditional classroom environment is therefore not only difficult but also challenging.

At a fundamental level, student engagement depends on a range of interactions such as interactions between teachers, students and content. It could be said that the computing and information technology based online learning environment facilitates the interactions required for learning and therefore have an influence on student performance. According to a study conducted by Kuh and Hu [2001], students appeared to benefit from computing and information technology when they used it frequently and in a variety of ways for learning.

III. LEARNING ENVIRONMENT

Learning environments cover the systems and dynamics that facilitate and enable student engagement [Coates, 2006]. It is reasonable to assume that the learning environment will have an influence on how students engage with their learning. Technology is altering virtually every aspect of campus life. For the techno-savvy students, email, instant messaging are essential communication models. In order to map to the need, contemporary on line learning systems are playing a major role

in distributing learning beyond the conventional contexts of instruction. Therefore over the past 10 or more years, on line learning management has been rapidly adopted by many campus-based institutions and is becoming almost ubiquitous in many parts of the world. Recent estimates suggest that in many countries, about three quarters of institutions have an LMS. [Coates 2005]

These systems have profound yet uncertain implications for university education. They have the capacity to influence the management of academic programs, teaching practices, and the way students engage with key aspects of their university experience.

A number of LMS have assumed prominence in international markets. Examples of commercial systems include: Topclass/Firstclass [WBT Systems , 2003], NextEd [NextEd 2003], WebCT Vista [WebCT 2003], Blackboard [Blackboard 2003] and Learning Space from Lotus [IBM Lotus 2003]. Most LMS were commercialized after originally being university development projects, rather than as direct results of business development activities. In recent years, several major USA universities have chosen to release their LMS under free and open source rather than commercial licenses. The most prominent open source systems have been gathered together in the Sakai Project [Sakai Project, 2004], and include CHEF [University of Michigan 2003], Stellar [MIT 2003], Coursework [Stanford University 2003]. Also another popular free and open source LMS is Moodle (Modular Object-Oriented Dynamic Learning Environment), originally developed by Martin Dougiamas in 2002.

If online learning systems are changing teaching and campus environments, it seems reasonable to assume that they are influencing the way campus-based undergraduate students engage with their study. While recent advances in student engagement research represent an important development for higher education, very little is known about the influence of contemporary online learning management systems on students' involvement with their study [coates 2007]. According to Hall [2003], several factors should be considered when assessing the value of an LMS: availability, scalability, usability, interoperability, stability, and security.

These systems have profound yet uncertain implications for university education. They have the capacity to influence the management of academic programs, teaching practices, and the way students engage with key aspects of their university experience. The benefits of LMS usage are numerous. LMS platform provides, centralized learning, consistency in delivery, tracking and reporting performance and immediate learning evaluation. [Ann Brown and Jordy Johnson 2007]

While LMS have the potential to influence student engagement, research into how they do this is largely in its infancy and is often based on assumptions about campus learning environments [Coates, 2006]. It has been argued that the rapid adoption of LMS has occurred in a vacuum of research into their teaching and learning effectiveness [Lopes, 2008].

Most, if not all, of the interactions enabled by the LMS are asymmetric, which is where the student is responsible for logging in and engaging with course material without prompting or instruction. This means that students who require substantial instructor direction may have problems with an environment that demands a certain level of self discipline [Douglas & Alemanne, 2007] and this could conceivably influence their confidence and motivation, both of which can influence their level of engagement. Others have questioned how the LMS is influencing student's confidence and motivation for learning, their understanding of the significance of what they have learned and how LMS are encouraging increasingly independent and isolated forms of study [Coates, et al., 2005]. This seemingly supports research that suggests that rates of attrition for online students range between 20-50% higher than on-campus students [Shane Dawson, Macfadyen, & Lockyer, 2009] . This is possibly because LMS can affect the way students explore and contextualize learning resources as well as the way they receive summative and formative feedback.

While engagement depends on individual students, teachers also play a very critical role. Teachers must integrate active learning environments with authentic learning tasks, foster personal connection and facilitate the process of learning [Jean Mandernach 2009]. They must facilitate to set up an active and collaborative learning environment for students. Students can learn to work in teams in both the traditional classroom approach and through learning technologies. Teachers must create an environment where students are encouraged to share and contribute to a collective knowledge base [kesdee foundation 2013].

IV. INFLUENCE OF LMS ON STUDENT ENGAGEMENT

While there has been lot of research work which is available on student engagement over the past few years, the most well defined framework has been developed by USA National Survey of Student Engagement [NSSE, 2000, 2012, Kuh 2003].
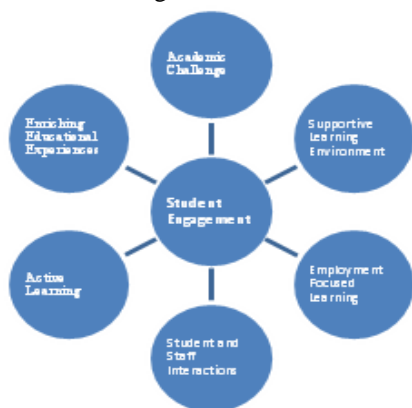The frame work divides student engagement into six benchmarks as shown in Figure 1.

Figure:1 Student Engagement Construct

This frame work has been evolved out of substantial amount of research into good or effective practices in university education.
Academic Challenge benchmark relates to students striving perpetually to operate at and push forward the frontiers of their knowledge. It tries to measure students' behavioral efforts and intentions to move their learning forward. For example how often they 'worked harder than they thought', how many hours they spent on preparing for class, how many papers they wrote of specified lengths etc. Such items suggested students spending some hours in converting information into knowledge.

In the active and collaborative learning NSSE focuses on two combined aspects of learning, i.e., active learning and collaborative learning. Active learning is about student's participation in constructing new knowledge and understanding and collaborative learning is through appropriate situated conversational interactions about knowledge with their peers. Operationalization items for this benchmark in questionnaire are how often students ask questions in the class, make presentations, discuss with peers inside and outside the classroom, participate in course related community projects etc. The student-faculty benchmark focuses on students contact with academic teaching within and beyond formal instructional environments. The enriching educational experiences benchmark encompasses many of the broader experiences that students may have around the university, particularly those which occur outside of class. These experiences indicate experiences related to diversity, differences, energy and stimulation, culture, ethics etc. Broadly these are the conditions that are used to characterize university education. The supportive campus environment focuses on the degree to which institutions provide conditions that are likely to make student engagement possible. The institution and its staff are the object form measurement of this construct. NSSE thus appears as the most advance existing conceptualization of the student engagement. [Coates, 2007]. The Australian survey of Student Engagement [AUSSE 2009] has measured six aspects. The sixth one being work integrated learning, which is employment focused learning of student engagement.

Research in the area of LMS based learning is in its evolving stage. A large number of studies available in this area focus on technology transformations, pedagogy, faculty work and academic development. Learning and student experiences have been addressed in highly compartmentalized and particular issues.

Student engagement research needs to focus more on Online learning technologies. Looking into the changes the technology (LMS driven) has brought to the campus; it is possible it may even be changing some very basic qualities of student engagement.

Kuh and Hu [2001] examines the relationship between student characteristics, student use of Computers and other Information Technologies(C&IT), amount of effort they devote

to other college activities, and self-reported gains in a range of desirable college outcomes. The College Student Experiences Questionnaire (CSEQ) used nine C &IT variables as,

1. Used computers for or word processor for paper
2. Used E-mail to communicate with class
3. Used computer tutorial to learn material
4. Joined in electronic class discussions
5. Searched Internet for course material
6. Retrieved off-campus library materials
7. Made visual displays with computer
8. Used a computer to analyze data
9. Developed Web page, multimedia presentation.

Based on an analysis of responses to the CSEQ from 18,344 undergraduates at 71 four-year colleges and universities of USA, students appeared to benefit more from C&IT when they used it frequently and in a variety of ways. Using C&IT was positively related to educational effort with the effects of C&IT on outcomes of college being largely mediated through the educational efforts students put forth.

Knowing how campus-based students engage in online and general learning practices, Hamish Coates [2007] responds in his paper the need to develop student engagement research in the widespread adoption of online learning systems, by documenting the development and application of a typological model of online and general campus-based student engagement.

The population for this study was defined as full-time, campus-based, early-year undergraduate students at Australian universities using online learning management systems.

The Student Engagement Questionnaire (SEQ) [Coates, 2006] was used to survey students. The SEQ was designed to measure the online and general engagement of campus-based university students.

The seven SEQ indicative items are,

1. Online Engagement
2. Online Active Learning
3. Online Academic Relevance
4. Online Teaching
5. Online Collaboration
6. Online Social Interaction
7. Online Contact with Staff

Apart from these, the SEQ also measured more general forms of campus based student engagement based on the framework shown in Figure 1.

It reports the statistical analyses used to develop the model, and analyses the model's structure and substance. The model is exemplified by considering what it says about how increasingly powerful and pervasive online technologies might be leveraged to enhance campus based student engagement. Results of the empirical analysis were used to characterize student engagement as intense, collaborative, independent or passive as shown in Figure 2.

Those with intense online engagement use university learning management systems more than others to enhance and contextualise their study, to communicate and collaborate with other students, to manage and conduct their learning and to contact staff. Students reporting intense general forms of engagement see themselves as active, motivated and imaginative learners who collaborate with others in and beyond class, participate in broadening activities around campus, and initiate communication with staff.

An independent style of engagement is characterized by a more academically and less socially oriented approach to study. Such students tend to see online systems as a significant part of their campus-based education, as playing a formative role in their knowledge construction activities. They are less likely, however, to collaborate or interact with other students using university learning management systems, or to use the systems to initiate contact with staff. With an independent style of general engagement, students tend to seek out challenging learning experiences, to use feedback formatively to help their learning, and to initiate pedagogical conversations with academic staff.
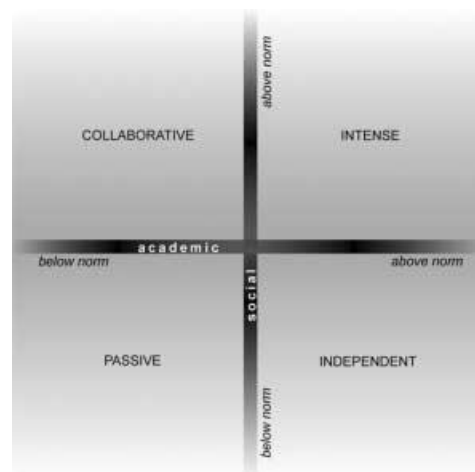

Figure 2 H Coate's Typological Model for Student Engagement

In many ways, the collaborative and passive engagement styles are the converse of the independent and intense styles. Either online or in general, students reporting a collaborative style of engagement tend to favor the social aspects of university work and life, as opposed to the more purely cognitive or individualistic forms of interaction.

Collaborative online engagement tends to focus on students using the systems to work and communicate with others at university. Passive styles of engagement rarely participate in the online or general activities and conditions linked with productive learning.

H M Selim [2007] focuses on categorizing the existing Critical Success Factors (CSF) for e-learning acceptance and further identifying the critical success factors in each category. The e-learning CSF in an academic environment was grouped into four categories based on existing literature: instructor, student, information technology and university support. Both, traditional, as well as online methods of teaching were used to teach the course. The traditional method included class-room

sessions, manual attendance and the use of textbook, whereas the online method encouraged interaction between students and the instructor, and among the students themselves using "Blackboard" e-learning management system.

A survey instrument was constructed in order to identify the e-learning acceptance CSF among students. The instrument consisted of five sections: one for each CSF category (instructor, student, information technology and university support) and one for the demographic characteristics of the participant. Each CSF category was measured with a set of indicators. The indicators associated with the instructor section assessed the characteristics of the instructor such as the attitude of the instructor towards using the e-learning technology, attitude towards the students, teaching methodology etc.

The indicators associated with the student section assessed the student's experience in using the e-learning tool, his/her ability to use a computer and various software, attitude towards e-learning, activities performed using the e-learning tool etc.

The information technology section was assessed using indicators that measured the quality of the IT infrastructure, network reliability, user interface of the e-learning website, ease of communication etc.

The indicators that were used to assess university support measured the ease of access to the library website, technical support provided by the university, availability of computers and printers to use for e-learning and to print the required material, respectively.

The survey was distributed amongst 900 students, from which 538 responses were used. Out of the 538 students, 334 were females and 204 were males. All students were aged between 17 to 28 years, with an average GPA of 2.6, and came from 18 Middle Eastern countries with varying cultural backgrounds. Table 1 indicates the participants' exposure to e-learning technologies in the research period.

Percentage of participant students	Exposure to e-learning technologies (in years)
38.7	1
36.6	2
24.7	3

Table 1: Participants Exposure to learning Technologies

A confirmatory factor analysis was done on the model using LISREL statistical tool (version 8.52), which would generate measures indicating whether the model is a good fit or a bad fit.

The results revealed 8 categories of e-learning CSFs; each included several critical e-learning acceptance and success measures. The level of criticality of each measure was represented by its validity coefficient. The factors are,
1. Instructor's attitude towards and control of the e-learning tool
2. Instructor's teaching style
3. Motivation of the student to use the tool and his/her experience with computers and software
4. Student's ability to collaborate actively
5. Structure of the course content in the e-learning website
6. Ease of computer and internet access in the campus

7. Satisfaction with the IT infrastructure
8. University support to adopt e-learning initiatives

Beer and Clark [ASCITE , 2010] conducted an exploratory study that aims to show how data from learning management systems can be used as an indicator of student engagement and how patterns in the data have changed with university's adoption of Moodle as its single learning management system.

Data from CQUniversity's, Australia, LMS databases, the student administration system's grade database and the student administration system's demographic database has been summarized and aggregated into a homogenized database that facilitates querying, as shown in Figure 3 is used for reporting.
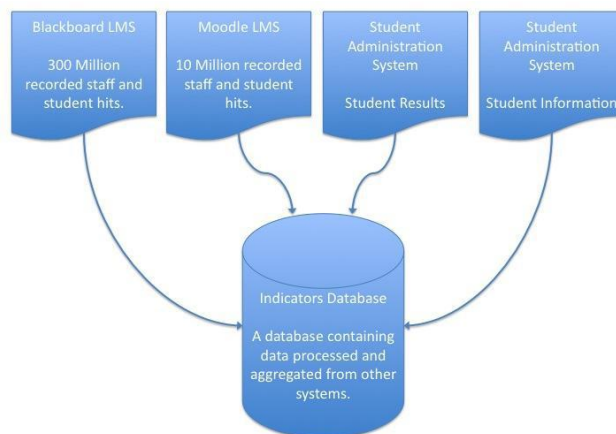

Figure 3 Data Source Aggregation[Beer and Clarke]

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 and would get better grades. The assumption made was that click count is an indicator of student participation where student participation and is said to be an important predictor of engagement and student success [Prince, 2004].

In another paper, S Arulchelvan [2012] writes about his findings on use of LMS and e learning in rural India that "the absenteeism ratio has declined. This in turn reflected in the academic performance of the students since they have no other option than sustaining with the learning activities".

CONCLUSIONS

To attract and engage current generation techno-savvy student universities and educators are adapting to different teaching learning strategies', e -LMS being one of them. A student can therefore log in to his/her university's online learning portal, view the updates and enrolled course contents, submit assignments, take lessons and quizzes, discuss with mentors and peers and together can convert information into knowledge. This depends on how voluntarily and how often a student logs in to the system. Sometimes learning may not

occur by way of passive absorption. Which shows technology can support learning but may not stimulate process of learning. Many students mention that they work and understand when they discuss it in person with teachers and peers. Such a discussion may lead to more questions, more analysis and lead to inquiry based knowledge creation. In such cases a guiding support in the form of balanced learning environment may have to be considered by educators. A sort of symmetry can be brought to the learning environment by ways of adapting to both traditional and technology based.

Teachers as facilitators may have to take huge responsibilities to mould our future generation. Universities will have to plan on faculty to operate in a world where blended courses and online teaching constitute an integral part of academic teaching responsibilities. [Mohammad, 2012]. The pedagogy designed for course delivery will definitely have an influence on student engagement in such a blended learning environment.

Student engagement research for such a blended learning environment is still in its infancy. More evidence based study is required to propose student engagement for a blended learning environment.

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