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The design and development of courseware for MCA students through LMS

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Abstract

The primary objective of this paper is to unveil the specific problems noticed in the quality of the MCA students emerging out of Anna University affiliated colleges and to suggest a research work which may lead to a collective feasible solution for these problems. MCA students enter the professional PG course in computer applications after their UG degree from different arts and science disciplines with just ancillary level mathematics background. So, the course faces heterogeneous entry behaviour. Also due to the advent of more engineering and arts colleges offering MCA, students exhibit a heterogeneous behaviour in their motivation levels, communication skills, logical and reasoning aptitude and computer software skills. But the requirement is to enable them with good academic performance with scope of employability. Employability skills include communication skills, logical aptitude, programming logic, computer-software-based technical skills and so on. Learning management system (LMS) is a software through which students can access the course, enroll, attend and write formative quiz-type exams to assignments and can participate in forums to share their ideas through online. While participating in a forum or quiz or writing to a blog, students with less confidence are able to overcome their inhibition and communicate freely. This is the first step of growth in communication skills which subsequently help them to gain better technical skills. The current research proposes to design, develop and deliver a part of a computer science courseware for 'Object oriented programming with Java' through the Open source LMS Moodle. The design of courseware includes the lecture session of the course, lecture notes, corresponding formative evaluation questions like quiz and other evaluation methods like forum and assignments. Installing an LMS and making the students attend the classes through that media is a matter of hesitation in many of the Indian Universities. Though Open source LMSs like Moodle and Sakai are available and proved good, initial efforts have to be put up not only by the faculty members for content and formative evaluation tool development but also by the administration. Administration has to support the project financially, in gaining the necessary infrastructure and for the internet connectivity throughout the learning period. But, weighing the benefits and limitations of LMS, we understand that for the better future of the students in the national and international level, in the long run LMS-based education will serve the best. A research project to justify the advantages and disadvantages quantifying the various aspects is planned. This paper also suggests that if at least one of the pre-final semester papers is offered through an open-source LMS, the students, institution and the nation will be benefitted.

Keywords: MCA (Master of computer applications), LMS (Learning management systems), UG (Undergraduate).

Introduction

Master of computer applications (MCA) is a course started during 1981-82 by the Department of Electronics (DoE). The purpose of starting this course was to enable the students who could not join BE for their own reasons after XII to gain a professional qualification in computers after they complete UG under any discipline. At the same time they are benefitted, their fundamental knowledge in a basic area say physics, chemistry, mathematics, computer science or commerce/accountancy may be applied in computer applications. We understand that a heterogeneous group of students join in this course to learn a common set of subjects. Till few years ago when the course was started, there were only a few engineering colleges in the country, majority of the students who entered the course were filtered through entrance examination, personal interview and group discussion. Most of them were above average in their subject knowledge, aptitude, mathematical foundation, communication skills and general abilities. As a consequence, they could pick up well mathematical subjects, logical and abstract concepts of computer science, programming logic, accountancy and digital/computer architecture with a little hard work. Their employment opportunities, quality of their work in their career were appreciable. But, when the number of colleges offering the course increased drastically, the entry behaviour went out of control. The number of students who join the course is really encouraging trend if we look at the social point of view. However, only a negligible percentage of them is employable which is an alarming condition. Due to the above mentioned problems and a few other problems, most of the students are not in a position to acquire familiarity with different computer software packages beyond their subject. Even among those who get a job, only those who have good communication skills, self-learning ability and good aptitude can sustain to the frequent changes in technology and fluctuating demands from the industry.

Learning management system (LMS): A learning management system is a software application for the administration, documentation, tracking, and reporting of

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training programs, classroom and online events, e-learning programs and training content.

Characteristics: The virtual learning environment used by universities and colleges allow instructors to manage their courses and exchange information. The other facilities offered include: Manage users, roles, courses, instructors, facilities and generate reports; Course calendar; Learning path; Student messaging and notifications; Assessment and testing handling before and after testing; Display scores and transcripts; Grading of coursework and roster processing, including wait-listing and Web-based or blended course delivery.

Facilities in learning through an Open-source LMS-Moodle: Moodle has several features typical of an e-learning platform, plus some original innovations. Moodle is a learning management system with many more standard features. Moodle can be used in many types of environments such as in education, training and development, and business settings. Developers can extend Moodle's modular construction by creating plugins for specific new functionality (Website http: \Moodle.org).

Moodle's infrastructure: It supports many types of plug-ins such as: Activities (including word & math games), Resource types, Question types (multiple choice, true and false, fill in the blank, etc), Data field types (for the database activity), Graphical themes, Authentication methods (can require username and password accessibility), Enrollment methods and Content filters.

Many freely-available third-party Moodle plug-ins make use of this infrastructure. Latest survey says that Moodle had a user-base of 46,624 registered sites with 3, 24, 64, 992 users in 31, 61,291 courses in 209 countries and in more than 75 languages.

Pedagogical approach: The stated philosophy of Moodle includes a constructivist and social constructionist approach to education, emphasizing that learners (and not only teachers) can contribute to the educational experience. Moodle does not necessitate a constructivist teaching approach. Constructivism is sometimes seen as at odds with accountability-focused ideas about education. Accountability stresses tested outcomes, not teaching techniques, educational value, or pedagogy. Moodle supports an outcomes-oriented learning environment. It helps the Teaching-Learning process through various modules including lesson module, assignment module, quiz module and forum module.

Need for the study

MCA Students have to be considered as a special category for the reasons explained earlier. Offering of at least one subject in the V semester can be a solution. Very few deemed universities have implemented learning through LMS, whereas this exposure must be given to all students. It is necessary that the opportunity be given to the students of all colleges. To increase the percentage of employable graduates at MCA level, the positive impacts have to be highlighted so that it will reach the policy and decision makers of Institutions. From the specifications and capabilities of LMS, it is obvious that students will be benefitted. But there are some limitations faced to implement a course through an LMS as explained later in Section 6. So it is important to quantify the results and substantiate or highlight the positive results of this study to indicate its significance in spite of the limitations. Such a study is required to demonstrate the result in the improvement of learning outcome, employability skills and critical thinking of the learners. Employability skills include communication skills, self-regulated learning, aptitude, proficiency in computer softwares. Even after these post-graduates get an employment, only their self-regulated learning capacity, communication skills and confidence helps them to sustain or endure in their employment in the 'fluctuating', fast-changing software industry. So this kind of training is of national importance, i.e., to enable a higher percentage of Indian students to reach higher level jobs in the International level.

Objectives of the proposal

The proposed study is intended: 1) To deliver a few computer science courses to the MCA students through LMS Moodle, 2) To measure the change in learning outcome as a result of learning through LMS, 3) To measure the change in employability skills as a result of learning through LMS, 4) To assess the convenience and inconvenience of students by learning through the LMS, 5) To get the opinion of Faculty members in implementing a course through LMS, and 6) To get the opinion of administration in implementing a course through LMS.

Methodology

A few content samples will be sent through the LMS Moodle (*http://Moodle.org*) along with the quiz, assignment, etc. to a carefully selected sample of students. Those students will be asked to interact through forum and present their views on given topics in blogs. Participation in these social media with their peer group may be effective in overcoming their inhibitions concerning the language and subject knowledge and understanding which may be difficult in a classroom environment. Their performance in the formative evaluations can be used to judge their learning outcome. Summative evaluation tests show their preparations for examination. Questionnaires (a sample in annexure 1) will be circulated. Personal interviews are planned to be conducted to know about their learning experience. To another group of students, the same content will be taught but in a classroom, the same tests will be given in the class, quiz, forum in the class etc, Questionnaire on learning experience is also given. The results will be analyzed statistically to measure the employability skills,

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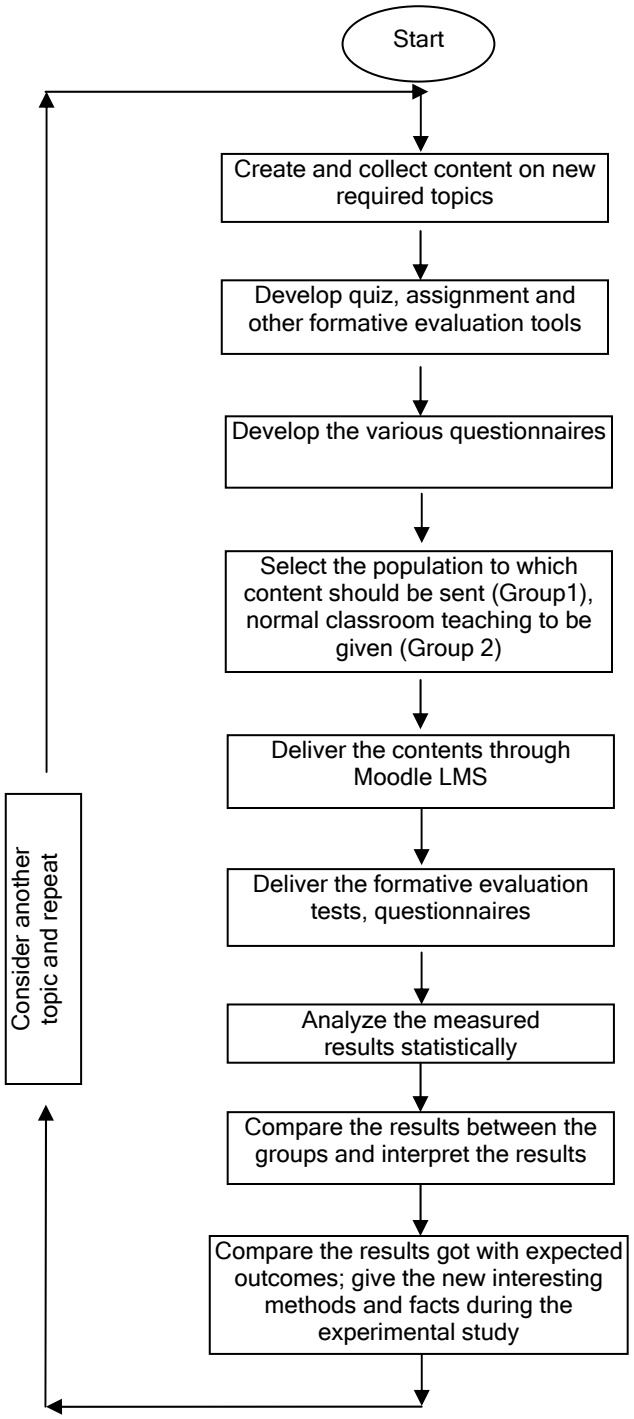
critical thinking and then they are compared and the results are interpreted and summarized (Fig. 1).

Annexure 1

Questionnaire to test the learning experience through moodle

1. I liked the Lecture Session ----------
Excellent b) Very Good c) Good d) Fair e) Bad
2. I could get Internet connection continuously during the lecture session ----------
a) Without break b) With 1 break c) With 2 breaks d) With 3 breaks e) Complete off
3. I could make the forum useful for improving my communication skill ----------
b) Excellent b) Very Good c) Good d) Fair e) Bad
4. My confidence level to communicate increased through the learning session ----------
a) Excellent b) Very Good c) Good d) Fair e) Bad
5. Quiz Session helped to improve my understanding of the lessons while learning ----------
a) Excellent b) Very Good c) Good d) Fair e) Bad
b) By working through Assignment Session, I could express my understanding in a written form
c) Excellent b) Very Good c) Good d) Fair e) Bad
6. The learning experience is good as a supplementary tool ----------
a) Excellent b) Very Good c) Good d) Fair e) Bad
7. Learning through this LMS as primary learning is effective ----------
a) Excellent b) Very Good c) Good d) Fair e) Bad
8. I have developed a confidence to learn by myself through this experience ----------
a) Excellent b) Very Good c) Good d) Fair e) Bad
9. I think my skill in using new computer softwares will increase through this experience to a ---------- extent.
a) Excellent b) Very Good c) Good d) Fair e) Bad
10. General remarks.

Fig. 1. Flowchart & methodology.



Expected outcome

From the previous research experiences in the field, we understood that there has been a definite improvement in several features like examination results, learning outcome, employable skills, critical thinking through this medium of learning. From a survey using the Blackboard LMS in a computer literacy course, based on the positive responses of both the students and instructors, it was found useful both in teaching the course and also in helping the students develop computing skills (Martin, 2008). Combining the use of a learning management system along with the teaching of basic computer applications in the face to face classroom contributed to the enhancement of computer literacy and technology skills.

The survey responses from the students and instructors provide evidence that many learning outcomes can be enhanced by the presence of a learning management system (Ebardo & Valderama, 2009). It served as a vehicle for the students to become more familiar with technology and access the course material from “anywhere, anytime” in a digital format. The presence of features embedded in the LMS such as online interaction, resource materials availability and immediate assessment feedback contributed to the average increase in the assessment scores.

A recent research from CDAC says that the requirement of using technology in education for content

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& knowledge creation and sharing has been emphasized (Govind Raj & Gupta, 2009). The Indian context makes it more important for providing quality education in institutes with varied standards of infrastructure and sources. This study has gone further adding the fact that providing a network of institutions will allow member institutions of collaborating network to choose LMS at their own and still become part of larger learning community.

Research by a group of faculty members from 3 different branches of a college indicates that computer science education is a very heterogeneous course since it implements a few of classical learning methods-lectures, discussion, seminars, lab work and exams (Karlovcec, 2009). They have identified some of the limitations also into consideration and concluded that the expenses should also be considered, not from a student point of view, but from the view of the lecturer, and the administration. Accessibility should be one of the key parts in making the decision to switch to e-learning, because the main argument should be the satisfaction of the student with the course.

Limitations

In spite of several advantages, LMS is still not so popular in Indian Universities because of the financial commitment for acquiring the necessary infrastructure and a great deal of work in developing the content, formative and summative evaluation questions, materials for interactions, training to the new faculty for using LMS, overcoming initial struggles in installing, implementing the system and so on. All these works together require enormous support from the administration, faculty and students in addition to the existing workload.

Conclusion

The need of the hour is to overcome an important fact that the percentage of employable graduates out of total graduates is very less. In this regard, the implementation of at least one of the pre-final or final semester course interactions done via LMS would benefit the students.

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