Research Paper Education

LMS a Tool for Green Computing

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ABSTRACT

Elearning is the trend today as all tend to use e-learning for their day-to-day bits of information. LMS is a popular e-learning implementation mode used by corporate for their training. Though LMS is used for education in colleges and even schools abroad, in Indian scenario, only a few Universities and autonomous colleges have just implemented it.

Sustainability is the burning issue of today's world which experiences enormous usage of natural resources. As everyone uses computer in some form, green computing concepts are very important for sustainability. Green computing involves the methods and procedures in using computer-based systems with fewer disturbances to environmental factors. Green computing methods mainly concentrate on

i. Electrical conservation ii. Paper conservation iii. Purchase of equipment – E-wastage

Elearning is said to support 'Green computing' mainly because it results in paper conservation. LMS being an implementation method of Elearning can also be considered to support 'Green computing.

The primary objective of this paper is to state how an LMS implementation when delivered to college students as an elearning mode can support 'Green Computing' concepts. With the experiences and expectations of the researcher in developing a Moodle-based website being developed as the basis, this paper highlights 2 ways in which an LMS implementation can support Green computing as follows.

i. Green computing can be facilitated by 'learning through LMS'

ii. LMS can be used as a tool to propagate awareness among students about 'green computing concepts' and about 'sustainability facts'

Keywords : LMS- Learning Management System

Introduction

[Reference 1] E-learning is essentially the computer and network-enabled transfer of skills and knowledge. Elearning applications and processes include Web-based learning, computer-based learning, virtual classroom opportunities and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio. Today it is a part of everybody's life. Whether a student or a house-wife, all tend to use e-learning for their day-to-day bits of information. Technology and e-learning have replaced the conventional mode of training, knowledge sharing and communicating.

Learning Management System

[Reference2] A Learning Management System is an online, digital environment that allows information to be shared between students and faculty and provides access to content and administrative features for specific courses. The benefits of the LMS are twofold.

i. First, by distributing materials electronically and nearly instantaneously, LMS facilitates the creation and dissemination of course materials that otherwise would need to be dispensed during class time.
ii. Features – An LMS also allows for the creation of unique learning environments that can supplement in-class activities, empowering both students and instructors to reinforce the course material and to engage with the material in a variety of ways. Most of the individual LMS implementations aspire to facilitate one of the three priorities that can engage instructors and learners: transmission, evaluation and interaction.

In addition to allowing the delivery of syllabi and course materials, an LMS framework can allow instructors to introduce additional experiments that they might not have had time to cover during the normal period of instruction.

LMS provides its users with a built-in opportunity to reflect critically on the utility of the LMS to their teaching or learning. Most LMSs support different evaluation methods including 'student-interactions'. Thus they effect in the purpose – to seek out differences in students' learning styles in order to isolate optimally effective pedagogies. Indeed, these evaluation methods make the LMSs render so adaptable.

LMS for education and training

In the international scenario, apart from corporate trainings and Certificate-based courses, several Universities and Schools implement education through LMS. But in India, many corporate are using LMS for training purposes. As far as collegiate education is concerned, only a few deemed Universities and premium institutions have implemented 'learning through LMS' for the benefit of their students.

[Reference2] Studies note that LMSs are tend to be used overwhelmingly for that utility as online repositories for syllabi and lecture slides, neglecting most of the required fea-

tures which support interaction and evaluation. Regardless of whether it is presently achieved, interaction provides the most novel end-user experiences, and it marks the fullest potential for LMSs to introduce teaching and learning strategies that are otherwise inconceivable in the real world.

Significance of Sustainability [Reference3]
The terms Sustainable and Sustainability are used to describe many different approaches toward improving our way of life. Sustainability does not have a rigid definition. Here are some views of what Sustainability can encompass. Fig 1 shows the role of different sectors in managing sustainability.

- Sustainability is an attempt to merge ecology and economy into one system.
- Sustainability means living a life of dignity in harmony with nature.
- Sustainability means renewing resources at a rate equal to or greater than the rate at which they are consumed.
- Sustainability means living within the resources of the planet without damaging the environment now or in the future.
- Sustainability means creating an economic system that provides for quality of life while renewing the environment and its resources.
- A sustainable community is one that resembles a living system where all of the resources (human, natural and economic) are renewed and in balance for perpetuity.
- Sustainability is creating a world where everyone can have fulfilling lives and enjoy a rich level of well-being within the limits of what nature can provide.
- Sustainability means taking the long-term view of how our actions effect future generations and making sure we don't deplete resources or cause pollution at rates faster than the earth is able to renew them.
- Some of the many uses of the word sustainable include: Sustainable Business / Sustainable Development / Sustainable Agriculture / Sustainable Living / Sustainable Community.

As computing is part of everyone's life today say in the form of a laptop or PDA or a mobile phone, green computing is a very important title to be discussed under 'sustainability'.

Green Computing [Reference3]
Green computing is the environmentally responsible use of computers and related resources. Such practices include the implementation of energy-efficient Central Processing Units (CPUs), servers and peripherals as well as reduced resource consumption and proper disposal of electronic waste (e-waste).

Waste Minimization can be done through various methods adapted in

- Electrical Conservation
- Paper Conservation
- Purchasing and Use of Equipment

Elearning can promote Green computing
[Reference 5]

- E-mail can take the place of more costly practices, such as when users distribute print documents as e-mail file attachments rather than as paper copies.
- Online learning using learning management systems and web/videoconferencing can reduce the need for traditional classrooms and other infrastructure while decreasing travel costs and CO2 emissions.
- These energy and cost-saving measures can dramatically diminish carbon footprints and corresponding costs for institutions of higher education.

LMS for Green Computing
This paper highlights how the work being done by the researcher can be used to promote Green Computing.

[Reference 5] A website is being designed to deliver a few Computer Science courses to students particularly to Computer Science students through the LMS Moodle. Designing the course content for the LMS Moodle includes modules as shown in Fig 2.

Designing courseware includes content design and a few more attributes like periodicity of the evaluation method, scores, validity period of the questions etc. to be decided for the LMS to be implemented.

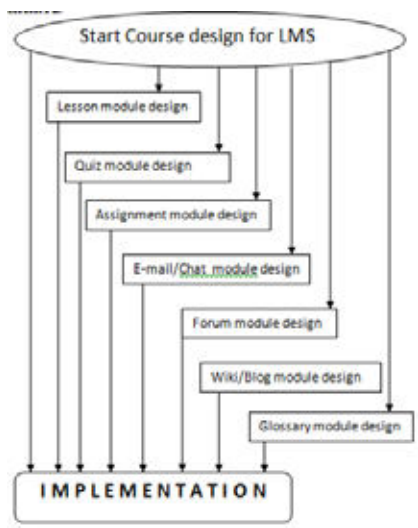

Fig 2: Steps in design of moodle-based courseware

Learning through LMS facilitates Green Computing
[Reference 6] From these references, we understand that learning though LMS

i. reduces paper wastage in the form of study materials, textbooks, question and answer papers for the formative and summative evaluation papers.
ii. 'Anytime / Anywhere learning' reduces – expenses pertaining to 'travel' by the individuals – though it may appear less, when counted, it is a huge expense of 'combustion oils' etc.
iii. This internet-based learning can be implemented through Cloud Computing, a method which supports Green computing concepts or sustainability

LMS as a medium to propagate Green computing concepts
An important step in Green Computing initiative more than all conservations is the 'awareness of sustainability and environmental issues' to the next generation.

LMS supports Social media such as Wikis, Blogs, Chats and Forums. These features make an LMS, a trendy way of learning. Hence students of today find it very attractive. A worthnoting point is that 'Social media' motivates the students to

'interact well'. This peer group interaction and interaction with experts through 'forum' module results in them get involved in the subject rather than just study for examination purposes. When implemented by the educational boards as a mandatory system, LMS can be a very effective media for spreading the awareness about sustainability and environmental issues. Implementation must be done with a proper design as follows.

i. The Lesson module introduces the concept to the students in an interesting manner to captivate the attention of students in a deeper sense.
ii. Proper 'initiation' of the forum topics by the teacher to involve students into the discussion. Proper direction and follow-up by the teacher is also important by involving experts 'who can involve and contribute' then and there to give more clarity to the students.

Conclusion

As learning options begin to include broader definitions than formal courses, and as collaborative learning takes a firmer hold in the higher education, the likelihood that LMSs will evolve in future remains high. As an Elearning method, it facilitates green learning; helping to reduce energy use and the carbon footprint by providing an eco-friendly alternative to traditional classroom-based training. Green eLearning, with its interaction and evaluation methods can help the students to develop confidence and communication skills while increasing their Employability by increasing their Self Efficacy also and hence in a brighter future.

Appropriately applied LMS implementations can yield significant benefits in collegiate and corporate training. Simple Green Learning technology can produce powerful results. LMS Technology when applied to teach Green computing topics like sustainability in collegiate training can help the future to become greener by making the youth of today to develop a much more clear understanding of 'Green concepts' than from the normal pedagogical methods. This may enable the generations to develop these concepts through learning which is very important for a 'Green future'.

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