

## Encroachment of E-Tools in Computer Science Education Moodle - A Case Study

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**Abstract:** This article deals with the nature and scope of computer science education. We insist that the focus should not be on technological issues but on educational design issues. Our intention is three fold. First of all the nature of computer science education, secondly the impact of E-tools in computer science education and finally case study on moodle (An E-tool) within the context of computer science education. In future, as the technical infrastructure of Moodle stabilizes, further improvements in pedagogical support will be a major direction for Moodle development.

**Keywords:** Computer science education, web based learning, E-tools.

### 1. Introduction

Computer education provides a unique opportunity for boosting natural ways of learning. Since 1997 web based E-tools for computer science education has been appearing, this term represents application of systematic, disciplined and qualified attitude to development, performance and maintenance of web based learning application. Many simple E-tools for educational purpose are available. Some examples are;

- E-mails
- Forums (discussion groups)
- Wiki
- Real time audio and video conference.

Many computer science learners have no formal training in education. As a result, computer science education tends to be grounded in the technology rather than in the pedagogy or didactics of computer science.

There is a huge discrepancy in the quality; quantity and accessibility of the materials that can help lecturers to improve face-to-face courses which is available for lecturers of on-line courses.

In (Rotbottom 2011) it is stated that ‘The technology provides the educator with a very powerful toolkit, but this is not to substitute for learning design. Technology is rarely the problem - and equally rarely the solution.

Four learning orientations which includes whole-person needs and is based on learners inclinations to learn or perform. These are: transforming, performing, conforming and resistant. These learning orientations help to identify learner difference profiles which “guide analysis and design of instruction and environments and tailor solutions that improves learning ability” [6]

### 2. Nature of Computer Science Education

Computer science is a rapidly changing and increasingly diverse academic discipline .A possible and open minded definition of computer science is that it is the collection of scientific disciplines oriented toward the electronic or digital storing and processing of information. One way to do this is to say that computer science or indeed informatics, is concerned with the technical aspects of designing computers and computer

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systems, whereas the more social scientific issues of computers in organization and society of psychological issues of human computer interaction constitute scientific disciplines of their own. [5]

Implementation of technology as pedagogy means in the teaching and learning of other subjects. A rough division can be made between the teaching and learning of computer science as vocational training on the one hand and as a theoretical academic study on the other. CSE is an autonomous academic discipline with the aim to provide the knowledge needed to help our computer science teachers and lecturers to attain pedagogical content knowledge.

Examples of enabling computer science education are tools that facilitate the management and manipulation of data. It also provides access to information by assisting students with disabilities such as vision and hearing-impaired students as well as students who have difficulty in writing and speaking. Too often training and maintenance are neglected in budget estimates for technology purchases. Another motivation to use computer science education is its adaptability. [6]

### 3. Design guidelines for computer science education

The following guidelines include technology in the classroom is complex. The principles stated below can serve as the guide for determining how, why and when to use computer science education and E-tools

- **Principle 1:** Build up user confidence with the technology based computer science education.
- **Principle 2:** Use technology to improve communication between people.
- **Principle 3:** Build in the instructor's presence and personality.
- **Principle 4:** Plan the support the technology without affecting the pedagogical issues.
- **Principle 5:** Make computer science education easily accessible and allow all types of students to integrate its use into their education.
- **Principle 6:** Instruct students to critically evaluate the information which in turn increases their analytical thinking.
- **Principle 7:** Provide a clear set of learning activities.
- **Principle 8:** Create on personal and professional experience of participants.
- **Principle 9:** Build in collaboration and facilitated team projects.
- **Principle 10:** Relate content to real situation using case studies and simulation.
- **Principle 11:** Use technology judiciously.
- **Principle 12:** Focus on new trends and new tools for E-learning which were not available in past with traditional tools. As designers of computer-based learning environments heed to these guidelines, as they are able to create effective computer based learning experience for students of all category. [7]

### 4. E-tools - Computer Aided learning

Since the introduction of computer technology in schools in the late seventies, the prophecies have been running strong about how it will revolutionize schools intelligent tutoring systems where the computer "learns" about the student's way of thinking and working and gives feedback and instruction based on this. The rationale for this research has been the provision of dynamic individualization of instruction and a sophisticated level.

There are many sophisticated educational software for teaching and learning (especially those alleged to have human-like intelligence). Many Open Source Course Management System (CMS), Learning Management System (LMS) E-tools have a great impact on Computer science education. E-tools provide a Virtual Learning Environment (VLE) and makes web based learning more effective.

### 5. Moodle – A Case Study

The word Moodle was originally an acronym for Modular Object-Oriented Dynamic Learning Environment (MOODLE). It is a simple, lightweight, efficient, compatible, low tech browser interface. Moodle has spread and the community has grown, more input is being drawn from a wider variety of people

in different teaching situations. Moodle is now used not only in Universities , but in high schools, primary schools, non –profit organizations, private companies ,Military organization , Airlines , Healthcare organizations, by independent teachers and even homeschooling parents. The design and development of Moodle is guided by “social constructionist pedagogy”. People actively construct new knowledge as the interact with their environments. Constructionism asserts that learning is particularly effective when constructing something for others to experience. Moodle provides motivation of individuals within a discussion (Separate, Connected and constructed).

The Moodle web is managed by an administrator user. Currently there are language packs for over 70 + languages. User authentication mechanisms such as Standard email method, LDAP method, IMAP, POP3, NNTP. SSL/TLS certificates are supported. Every user can choose the language used for Moodle interface (English, French, Tamil, Spanish, Arabic, Portuguese etc).

Each person requires only one account for the Moodle site-each account can have access to different courses or resources and activities. Roles combine specific permissions for specific types of participants. The administrator user account controls the course and creates other roles as teachers, course creator, non editing teacher, Guest. New roles can be assigned.

Flexible array of course activities – Forums (teacher only, open-to-all, one-thread-per-user), Quizzes, Glossaries, Resources, Choices, Surveys (COLLES, ATTLS), Assignments, Chat (URL, smilies, embedded HTML), Workshops, lesson, Quiz (automatically and education. The impact and possibilities offered by educational software, the Internet and interactive multimedia have also been advocated for computer science education. The research done on artificial intelligence has given rise to the idea of developing graded).

For authentication, Moodle supports authenticating against LDAP. For enrollment, Moodle supports the use of an LDAP server. For content Moodle supports the import of reusable learning objects packaged according to the SCORM/AICC/IMS.

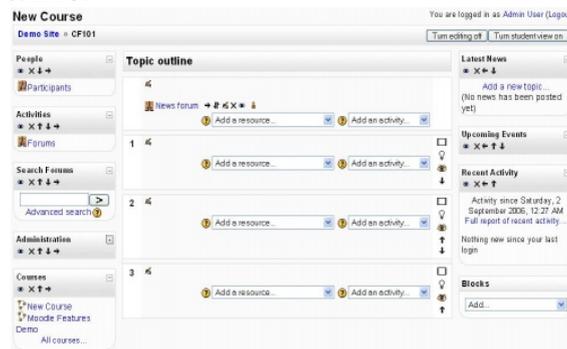


Fig: 1 Teacher’s view of a home page of new course, editing turn on

## 6. Moodle Statistics

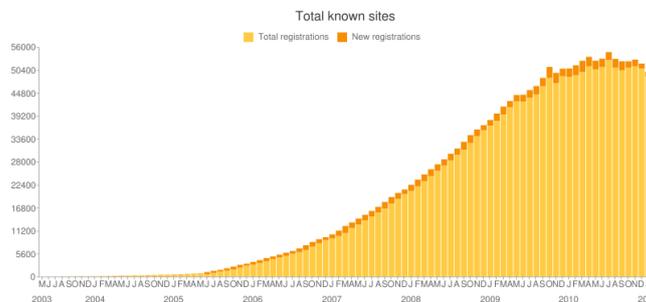


Fig: 2 Total known sites

We perform regular bulk checking of sites to make sure they still exist, so occasionally you may see reductions in the count

Registered sites	50,125
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Countries	212
Courses	4,229,086
Users	40,014,200
Teachers	1,126,307
Enrolments	18,478,339
Forum posts	68,525,605
Resources	36,736,422
Quiz questions	66,031,620

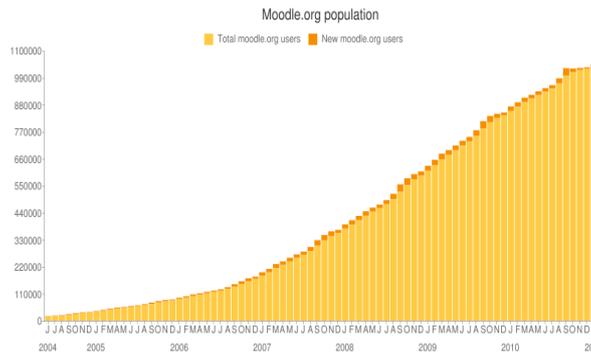


Fig: 3 Moodle Registrations

Registered users total:	1,038,636
New users in the past 24 hours:	549
Registered users accessed in past 24 hours:	1,305
Registered users accessed in past month:	17,373

## 7. Conclusion and future work

To date there has been a productive climate of educators sharing ideas, techniques and tools in order to improve computer science education throughout the world. A higher proportion of the E-tool sort of work would also strengthen the case of Computer Science Education. There are a lot of reports with findings and ideas of educational scientists and practitioners, in all kinds of disciplines, which can be considered as a starting point to get ideas about educational designs for using such E-tools. Moodle an E-tool for web based Computer Science Education doesn't FORCE this style of behavior, but this is what the designers believe that it is best at supporting. In future, as the technical infrastructure of Moodle stabilizes, further improvements in pedagogical support will be a major direction for Moodle development

Teaching is a hard work. Learning is a hard work. Technology is not a silver bullet. The paper describes a first, investigation, case study, for supporting web based learning E-tool for computer science Education. The need of E-tool with reference to computer Science Education has to be taken seriously as an academic discipline and counter the criticism often leveled at it that it is merely a way for "teachers to write papers".

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