

Original Article: Investigating the Use of Educational Software in Chemical Engineering and Teaching Systems

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Citation M. Zbuzant, **Investigating the Use of Educational Software in Chemical Engineering and Teaching Systems**, *EJCMPR*. 2023; 2(4): 364-371



<https://doi.org/10.5281/EJCMPR.20210102>

Article info:

Received: 01 November 2023

Accepted: 29 December 2023

Available Online:

ID: EJCMPR-2401-1138

Checked for Plagiarism: Yes

Peer Reviewers Approved by:

Dr. Frank Rebut

Editor who Approved Publication:

Dr. Frank Rebut

Keywords:

Chemical Engineering, Smart Schools, Students, Social Environment, New Technologies.

ABSTRACT

The purpose of this research is to investigate the impact of educational technology and Chemical Engineering and the use of educational tools and software in teaching. Many teachers and professors believe that in the matter of education and teaching, many subjects and topics cannot be conveyed well to the learners in the traditional way and the lecture method. Therefore, nowadays, in order to make education easier, using tools and equipment in the teaching process and clarifying the lesson content, the use of educational tools and software by teachers is inevitable. A smart school, as a learning organization, has evolved over time and continuously develops its professional staff, educational resources, and executive capabilities. In the world of technology, where every day we are faced with new developments and achievements in the field of communication technology products, the only way to develop societies is to keep pace with this progress. The use of these technologies is inevitable in the discussion of education, which is the basic foundation of improving the scientific, cultural, social and political level of society. If the developing countries want to step in parallel with the advanced countries and increase their scientific and research capacity, they need to learn new and efficient methods that can bring the country to the desired scientific level in a shorter period of time. In countries like Iran, where new technologies are introduced quickly and are generally used in practice, the lack of alignment of education in schools with the facilities available in social and family environments will cause boredom and sometimes fatigue and reluctance of students. Smart schools are created with the aim of preparing students for the future. In smart schools that have been made smart by school software, the computer affects the way of teaching and evaluation and changes the curriculum to some extent.

Introduction

However, the purpose of intelligentization is not only the use of multimedia. This method refers to the use of new educational technologies in

schools. Things like multimedia, smart networks, smart boards and in short any new facilities that are electronic and improve the speed of education and the quality of learning [1]. Bell believes that the use of visual media facilitates the process of learning and

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remembering, and interactions can be recorded and stored. For example, PDF files, PowerPoint, or the entire speech can be recorded as a video file.

You can also use the capture system, document camera and electronic microscopes. The results of theoretical research by Saadatpour (2017) also showed that the learning process deepens with the use of multimedia content. In other words, in addition to increasing the efficiency of the class, the use of various software helps students learn. By providing a dynamic and attractive environment, the smart school provides the flourishing of students' talents and increases their motivation to do better academic activities. Educational technology is the use of physical hardware and educational theory. Educational technology includes several areas such as learning theory, computer-based education, online education and m-learning or mobile learning, where mobile technologies are used:

- Educational technology as theory and application of educational methods for learning [2].
- Educational technology as technological and media tools, for example Massive Open Online Courses or Moocs, which help in the communication, development and exchange of knowledge. This is what people mean when they use the term "EDTECH".
- Educational technology for learning management systems (LMS), such as student and curriculum management tools, and education information management systems (EMIS).
- Educational technology as behind-the-scenes management, such as learning management systems for procurement and budget management and learning record stores (LRS) for storing learning data and analyzing them.

- Educational technology itself as an educational subject; Such courses are sometimes called "Computer Studies" or "Information and Communication Technology (ICT)".

Definition of educational technology

The Association for Educational Communication and Technology (AECT) has defined educational technology as "The study of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources." It should be noted that educational technology includes "the theory and works of designing, developing, operating, managing and evaluating processes and resources for learning". Likewise, educational technology refers to all valid and reliable applied sciences from equipment to processes and procedures that result from scientific research, and in a specific context it can also refer to theoretical, algorithmic, or heuristic processes: Necessarily not refer to physical technology. Educational technology is the process of matching technology with education in a positive direction, which makes the E-learning environment more diverse and is also a way to teach students how to use education technology.

Advantages of technology in education

In retrospect, the introduction of technology into the classroom has been a boon for younger students and teachers. In other words, with the sudden introduction of a wide variety of devices and the Internet, students got the opportunity to make the learning process much easier and more interesting. It provides a better interactive experience during the learning and teaching process. With the introduction of cell phones, tablets, and computers, students can now do what they should have been able to do long ago—active and productive learning. For the first time, students can access a subject/subject with enthusiasm thanks to apps, videos,

simulations and digital books that make the learning process much more engaging. Additionally, having the opportunity to delve deeper into an area that interests them allows them to potentially explore their interests and talents, and perhaps even their future career [3].

Terms related to educational technology

Educational technology is an inclusive term that includes material tools and theoretical foundations to support learning and teaching. Educational technology is not limited to high-level, but anything that enhances learning and teaching in online, face-to-face, or blended learning. An educational technician is someone who is trained in educational technology. Educational technologists attempt to analyze, design, develop, implement, and evaluate processes and tools to enhance learning.

Modern electronic educational technology is an important part of our society today. Educational technology terms e-learning, educational technology, application of information and communication technology (ICT) in education, EDTECH, learning technology, multimedia learning, technology-based learning improvement (TEL), computer-based instruction (CBI), computer education, Internet-based training (CBT), computer-based training or computer-based training (CAI), Internet-based training (IBT), flexible learning, web-based training (WBT), online training, digital training collaboration, distributed communication training computer-related, cyber-learning and multipurpose learning, virtual learning, personalized learning environment, networked learning, virtual learning environment (VLE) (also known as learning operating system), m-learning or mobile learning, includes inclusive learning and digital education. Each of these many terms has its proponents, who emphasize the potentially distinctive features each has. However, many

educational technology terms and concepts are vaguely defined in educational technology.

Online educational platforms

Online learning platforms such as Moodle and Edmodo are useful for classroom management, uploading resources and exercises, conducting tests, and communicating with students and parents. Online learning platforms are tools that teachers can use to manage their classrooms and communicate with students and parents. These platforms include online learning environments, learning management systems (LMS), and other virtual tools. Using these platforms, teachers can upload educational resources, exercises and tests in the form of audio, video and text files, and students can easily access them. Also, these platforms allow teachers to update the syllabus, class schedule and assignments for students. Online education platforms also allow teachers to connect with students and parents. For example, these platforms allow teachers to communicate with parents and students via E-mail, SMS, chat or audio and video files and provide them with the necessary information. Also, these platforms allow teachers to communicate with students in environments such as online discussion groups [4].

The advantages of using online educational platforms for teachers include the following

- **Ease of classroom management:** Using online learning platforms, teachers can easily update the syllabus, class schedule and assignments and keep students informed about the latest changes.
- **Easy communication with students and parents:** Online educational platforms allow teachers to communicate with students and parents through E-mail, SMS, chat or audio and video files and provide them with the necessary information.

- **Ability to use a variety of educational resources:** Using online educational platforms, teachers can easily provide students with a variety of educational resources, including audio and video files, articles, E-books, and other course-related resources.
- **Provide feedback to students:** Using online learning platforms, teachers can easily provide feedback and scores to students. Also, through online learning platforms, teachers can easily determine which students need help in which areas.
- **Ability to deliver lessons online:** Online educational platforms allow teachers to deliver their lessons online and remotely. For example, using video conferencing or other related means. This feature allows teachers to communicate with their students at any time and from any place.
- **The possibility of supporting the learning process:** Online educational platforms support teachers in the learning process of students, so that teachers can help their students to better understand course concepts and learn better in general.
- **Reduce costs:** By using online learning platforms, teachers can reduce costs related to printing, assignments, and textbooks. Also, in some cases, these platforms allow teachers to offer online classes to students in remote locations or to students who do not have access to school education [5].
- **Providing graphic tools:** These days, graphic tools such as digital whiteboards, drawing facilities, and animation charts help teachers to better explain course concepts to students.
- **Ability to record online classes:** Many online education platforms allow teachers to record their classes and make them available to students. This possibility helps students to access course content away from the classroom and helps teachers to review

lessons easily to improve the learning process of students.

Virtual classroom software

Software like Zoom and Google Meet allow teachers to hold their classes online and reach their students anytime, anywhere. Virtual classroom software is used as a solution for holding online classes and communication between teachers and students when physical presence is not possible.

This software's provide various facilities for holding online classes and communicating with students, including

- **The possibility of holding online classes:** This software's allow teachers to easily hold online classes. In these classes, teachers can share content with their students. Submit and review exercises and can chat with students online.
- **Providing educational videos:** Many virtual classroom software allows teachers to prepare and share educational videos for their students. These videos can include explanations of course material, tips for solving exercises and frequently asked questions, or instructions for doing course projects.
- **Conducting online tests:** This software's allow teachers to conduct online tests and receive the results instantly. Using these software, teachers can prepare questions for their students and use them in online tests. Also, this software's allow teachers to check students' answers more easily and more accurately than paper tests and get grades instantly.
- **Ability to communicate with parents:** Many virtual classroom software allows teachers to communicate with students' parents and send reports about their students' progress. These reports can include grades, classroom interactions, as

well as any other information that teachers want to share with parents.

- **Providing interactive tools:** Many virtual classroom software provides a variety of interactive tools for teachers and students. These tools can include interactive exercises, group discussions, interactive shows, or even educational games that help students learn the subject matter in an attractive and motivating way [6].

In general, virtual classroom software allows teachers and students to easily communicate with each other at any time and place and hold their classes online.

Classroom and educational software

Classroom and educational software are a set of computer programs designed and developed by schools, universities, organizations and even private individuals with the aim of helping students learn. This software is usually used for classroom, private training, online training, distance learning or personal use. They include various applications such as classroom management software, learning management systems (LMS), teaching software for various subjects including mathematics, science, languages, soft skills, history, geography, etc. Among the advantages of using classroom and educational software, we can mention improving the learning experience of students and students, improving the quality of education, providing interactive and multimedia exercises, easy evaluation, and increasing educational productivity. Also, these software's help students prepare for their future and improve the skills needed in the job market.

Some of the most popular classroom and educational software include Moodle, Blackboard, Edmodo, Kahoot, Quizlet, Google Classroom, Rosetta Stone, Duolingo, Coursera, and edX. Classroom and educational software may be available for free or at different costs. Some are free for personal use or as classroom

aids, while others, such as online courses, come at a cost.

Classroom management software or LMSs are among the most famous educational tools used by schools and universities to manage courses and classes as well as provide educational resources to students. These software's help universities to provide students with various educational resources such as educational videos, slides, exercises and tests online and available. Some popular examples of these types of tools include Moodle, Blackboard, Canvas, and Schoology. Educational software is generally designed to facilitate learning and the education process. This software's include various programs such as language teaching software's, math teaching software's, science teaching software's and history and geography teaching software's [7].

Discuss

Information and communication technology is the most important capital tool and method that is used to empower societies in the new century and is considered the cause of fundamental change in life, education, industry, economy and culture, as well as an exceptional opportunity to compensate for the backwardness of developing countries. What is emphasized in the information society, especially in the education sector, is not only the investment and application of hardware and tools of communication technologies and their use for storing information. Rather, the important and fundamental issue of empowering students in selecting and choosing the required information is the main and important task of a teacher who prepares students to face new technologies. Therefore, today the teacher, as the most important resource in the education organization, is not aware of the complexity of developments, they will never be able to do their serious duty properly. Based on Dwyer's (1998) research, it shows that the professional ability of

teachers increases through the use of information and communication technology, and this is only possible when teachers are trained to use information and communication technology.

Undoubtedly, the future of any society depends on the quality and efficiency of education in that country, therefore, the more effective and useful the educational programs are, the healthier and prosperous society will be. Useful and effective efficiency and productivity does not only mean that the goals and content of education are expressed in the form of beautiful sentences and slogans, but it means the coordination efforts that are made in order to create a common context between the goals and appropriate methods of education to achieve the objectives and anticipated needs are realized in practice.

Educational systems and the activities governing them, according to the progress of societies, are always in the hands of change and transformation. Educational transformation is the result of social, science and technology transformations. In a simple society, the needs and methods of satisfying them are simple. But in complex and developed societies, the speed of evolution of its educational systems is so fast that every few years' little change is made in the structure of the educational system. With the advancement of science and technology, societies are becoming more complex, individual and social needs are also becoming more complex. Satisfying these needs also requires complex sciences and techniques, and acquiring complex sciences and techniques is possible in the shadow of complex educational methods. It is no longer possible to lead people and society to a complex and huge transformation with traditional methods, and in this complex world, no one is without education. Nowadays, school activities and learning are a huge part of people's lives, and it is no longer possible to look at students and their education with the past way of thinking.

International research, especially in the field of computer use in education, shows that information technology has been used in regular education, and various reports published by organizations such as UNESCO indicate that information technology has brought changes. It has become fundamental in the learning process. Today, due to the diversity of societies, people, their creativity, and their interests, there is a need for a variety of learning methods, and this requires a new form of education that has sufficient flexibility in this field. Information technology in the medical industry, business, services, employment, education, etc. are used quickly and widely. So that its importance is obvious in all the mentioned fields. Each of these departments use information technology with specific and predetermined goals. In other words, information technology pursues specific goals in each of these sectors [8].

Standards of learning elements

Many efforts have been made in the field of reusing E-learning materials and especially creating or reusing learning elements. These are self-contained units properly tagged with keywords or other metadata, often stored in an XML file format. Creating a course requires gathering a set of learning elements. The SCORM Reference Model (SCORM) is a set of standards and specifications used for some web-based e-learning. Other specifications, such as the Schools Framework, allow the transfer of learning elements or the Classification of Metadata (LOM).

Application of artificial intelligence in education

Artificial intelligence has become so important in this phase of big data; it is also widely accepted in middle school classrooms. A prominent class of AI-enhanced educational technology is Intelligent Instructional Systems (ITSs), which are designed to provide rapid and

personalized feedback to students. The motivation for the development of ITS is from research that shows that personalized training is much more effective than training that is written for a group. Over the past years, a combination of scientific cognitive theories and data-driven techniques has significantly enhanced the capabilities of ITS. There is ample evidence that ITSs are very effective in helping students. Recent work has also focused on the development of artificial intelligence-based learning tools that assist human teachers in coordinating classroom activities. The teacher can support students in a way that artificial intelligence cannot; But it is not capable of processing the large amount of real-time data analysis that computer systems can do. On the other hand, artificial intelligence can share the workload and recommend best practices, but they can only operate within a predetermined range of tasks and are unable to perform tasks such as emotional support. Understanding how artificial intelligence should support teachers in a real, differentiated, self-paced classroom remains an open question [9].

Conclusion

The electronic learning method of this type of learning, which refers to the use of educational technology, emphasizes that in the closed space of the classroom, teachers use heavy educational media such as public computers, personal computers, CDs, diskettes, internet sites, E-mail and even nano technology should be used in the teaching process in order to facilitate learning and increase the scientific level of students. This learning method is efficient and effective for students because it improves their academic efficiency and educational activity and teachers' performance and teaching and classroom behavior, because based on the research, this result was obtained: That "75% of learning through devices will be done visually and visually. In the event that only 13% of learning is

done through the sense of hearing and audio devices, and the other senses, respectively, 6%, smell and taste each have an effect on memory and learning, and it affects the entire learning process and is effective. It is for this reason that information and communication technology plays a vital role in the design of tomorrow's better schools, because in the communication process of the new technology of education, the power of wide and comprehensive utilization increases; For example, with the use of technology and satellite video in Japan, students of one class ask for help with the teacher and students of the same grade in another point of the same country, even to prepare a report in a social science course through electronic mail with students of the same age. They communicate in European countries or write letters to their peers in Canada, Malaysia and Sri Lanka and discuss global issues. With this teaching style in the new classroom approach, the use of new technology in the classroom, whether through group learning or through video conference or using virtual education, puts students in the center of the education process. This is the way in which, according to John Dacey, we can build a bridge over what in the past has been a big bottleneck for separating students from opportunities. Teaching in this way provides the possibility for teachers and students who are separated from each other in terms of time and place, or both, to communicate with each other through course management software, multimedia resources and the like, and the content of the course receive and exchange information and transfer information with each other.

The solutions of using electronic learning in order to be able to help learners to reach high cognitive levels, that is, to climb from the stage of knowledge and understanding and application to the stage of analysis, synthesis and evaluation, and to adopt a critical aspect and instead of acquiring materials and to maintain it,

create content and create knowledge, electronic education in schools is done with the help of computers through networks such as the Internet, intranet and in multimedia form. In other words, curriculum content is presented using sound, image, text, video, etc. LMS makes it possible to take advantage of two-way and multi-way interaction and communication between the teacher and the student as well as between the students, and the quality of the teaching and learning process reaches its highest level. It is not that electronic education can turn the world of education upside down. If you are currently managing or working in a traditional educational institution, this may worry you a little, but it really shouldn't. The role of e-learning does not replace traditional education in the classroom, but complements it. E-learning provides learning opportunities for those people who, for reasons such as time and place limitations or due to cost, do not have the possibility of traditional and usual learning. In fact, not only are traditional educational institutions thriving with E-learning services, but most of them are embracing virtual learning by themselves and running virtual learning courses.

References

- [1]. Faghihi AH, Aghaz A, Human resource management in transition countries: An ecological approach, *Public Management Research*, **2011**, 4(22):4-5. [[Google Scholar](#)], [[Publisher](#)]
- [2]. Godarzi M, Soltani I, Presenting the competency indicators model of managers in educational organizations (case study: Payam Noor University), *Journal of Sociology of Education*, **2018**, 7(2): 109-131. [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [3]. Innocenzo L, Mathieu JE, Kukenberger MR. A meta-analysis of different forms of shared leadership–team performance relations. *Journal of Management*, **2016**, 42(7):1964-1991. [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [4]. Rasekh Eslami, Z, Zohoor S., Second Language (L2) Pragmatics and Computer Assisted Language Learning (CALL); Technology Assisted Language Education (TALE), **2023**, 1(2), 1-7 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [5]. Zohoor S, Eslami ZR, Tabatabaei O, Impact of Dynamic Assessment Principles on Learning and Retention of Conditional Sentences among Iranian Intermediate EFL Learners, *Language Related Research*, **2021**, 12(5), 551-577 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [6]. S Zarinabadi, A Samimi, International Congress of Chemical and Process Engineering, CHISA, **2012** [[Google Scholar](#)], [[Publisher](#)]
- [7]. A Samimi, *American Journal of Research Communication (AJRC)*, **2013** [[Google Scholar](#)], [[Publisher](#)]
- [8]. M Zbuzant, *Eurasian Journal of Chemical, Medicinal and Petroleum Research*, **2022**, 1, 40-48 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]
- [9]. M. Zbuzant, *Eurasian Journal of Chemical, Medicinal and Petroleum Research*, **2022**, 1, 10-19 [[Google Scholar](#)], [[Publisher](#)], [[Crossref](#)]

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