An overview of e-Learning and its place in distance education in health

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Abstract

The impact of information and communication technologies (ICT) on educational practices and methods of knowledge-transfer in recent times has been noticeable. These changes have resulted a significant shift from traditional instructor-centred method of teaching and learning towards learner-centred methods. A new term, e-learning has been coined to encompass this paradigm. The aim of this paper is to provide an overview of the current tendencies related to e-learning. The paper provides a brief historical overview of knowledge-transfer leading up to the changes taken place due to current technological advancements. The discussion also includes the typologies of educational media and technologies, the place of e-learning in distance education and e-leaning in health fields. In conclusion, the paper examines the current state of e-learning and future prospects.

Introduction

Throughout history, the teacher has performed an important role in the dissemination of information to the learner. This remained the primary form of educational communication until 14th century when the invention of the printing machine allowed for the first time a large scale dissemination of knowledge through books. Printed books, however did not replace the role of the teacher. They only sped up the circulation and access of knowledge.

The Industrial Revolution demanded rapid growth of educated and skilled people to fulfil the need of the society. As a result, school and university education saw a rapid expansion. At the same time educational curriculum also widened significantly to meet the demands of the changing world. However, it is hard to say that the Industrial Revolution made noticeable changes in the nature of the knowledge-delivery. The ways of delivering knowledge more or less remained the same i.e. the education was mainly teacher-centred.

If any, it was the introduction of postal services that first made some changes in the delivery of traditional means of education. With rapidly expanding postal services, the distance education through correspondence began to make a notice[1]. Later, to some extent telephone was used in distance education. However, in this period it was the invention of radio that made a significant impact on the way education was delivered. Since its invention, radio was used extensively as an educational medium in various parts of the world[2)3)]. For example, in 1926 British Broadcasting Cooperation (BBC) started a schools' radio program which aimed to provide learning material in combination with the school curriculum. Educational radio has been employed within a wide variety of instructional design context. In some cases it has supplemented the printed material, supported the local study groups, regional study centres and helped providing public education.

The next important invention that made significant impact on knowledge-communication was films. From the 1930s onwards 16 mm films

were used extensively in schools, universities and professional development studies. Subsequent technological advancements such as television in the 1950s can be noted as other important landmarks in this transformation of education modalities[4)5)].

However it is the more recent technological developments in the so called 'digital era' that have managed to make unprecedented changes in the way education is delivered. The Internet and videoconferencing technology have revolutionized the way education is now being delivered. With the developments of digital technologies, knowledge can be delivered faster, further and possibly more cost-effectively. These are the main features of the era of e-learning.

Typologies of education-communication, media and technology

Communication in teaching and learning process can primarily be:
1. between learner and teacher
2. learner and learner
3. learner and learning material

The success of knowledge-transfer depends upon the success of this communication. Traditionally such communication took place in a face-to-face context. The role of technology over the years has been attempting to seek alternative means to make this communication effective.

There are number of forms which facilitate knowledge-transfer. Bates calls these forms as media that is associated with particular ways representing knowledge[6)]. Each of these media has its own way of presenting knowledge, and facilitating educational communication.

Education media primarily include:
1. direct human contact (face to face communication)
2. text
3. audio
4. video
5. digital multi-media (combination of above)

Distance education relies on technology to transfer knowledge overcoming geographic barriers. Technology used in distance education can vary from simple telephone to sophisticated videoconferencing facility or a satellite aided communication system. Some technology may have better capacity to facilitate wide range of media while other may have restricted capacity. For example, educational material recorded on compact disks (CDs) can be used to deliver text, pictures, and images while digital versatile disks (DVDs) can facilitate moving images and audio. The use of technology is dependent on the required needs.

Technology also can be classified depending on the level of capacity to accommodate communication. The capacity of technology to accommodate either one-way or two-way communication would have important implications on knowledge-transfer. An example for one-way communication in education can be the use of television or printed material. This system facilitates only one-way flow of information. Therefore the knowledge acquisition takes place in isolation. The advantage of this system is the ability to standardise and set levels for knowledge and material delivered. However the lack of interaction of the participants in the process of knowledge-acquisition can be a serious disadvantage.

Traditional class-room based teaching and learning is a good example for two-way education-communication. As far as technology is concerned, telephone or videoconferencing system can provide an opportunity to establish two-way communication. A distinct feature of this system is the ability of participants to interact with each other (Fig. 1). Thanks to two-way communication system, knowledge is acquired while interacting. If interaction is to be one of the most effective ways of knowledge-acquisition, the advantages of two-way communication system in education cannot be under-rated.
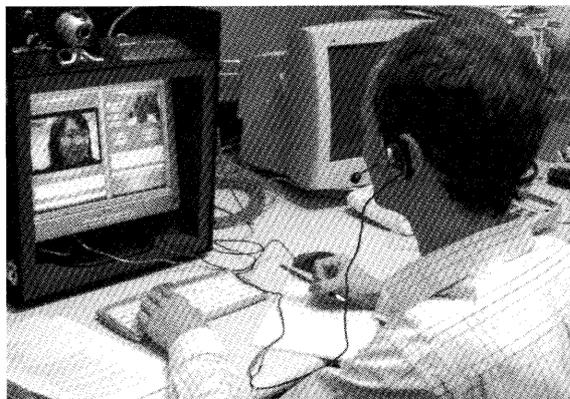
Fig. 1: Internet based videoconferencing: an example for two-way communication

Knowledge delivery can also be classified as synchronous and asynchronous. Synchronous knowledge-communication (also known as real-time) provides an opportunity for parties to involve in simultaneous and spontaneous education process. Again, traditional classroom based education can be a good example for this system. Such technology as telephone or videoconferencing can facilitate a synchronous knowledge-transfer (Fig. 2).

Fig. 2: Equipment to facilitate Internet based videoconferencing

Asynchronous knowledge communication enables participants a flexible access to education material, as the communication is not real-time.

The use of books, audio and videocassettes, CD, CD-ROMs and DVD can be examples for this system. Indeed a synchronous study material can be transferred into asynchronous by recording it to access later. The use of email and online discussion forums are also asynchronous educational communication systems. The system gives participants flexibility and control. The ability to do studies on learner's own time can be an advantage of this system. However a lack of live interaction and the delay of feedback can be disadvantages.

What is E-learning

E-learning is the teaching and learning process that is taken place over distance with the aid of new technology, particularly the Internet. The term e-learning is relatively new. Many comparable terms are in use such as technology-enhanced learning, Web-based learning and distributed learning to note a few. A popular definition of e-learning is - learning (and thus the creation of learning and arrangements) where the Internet plays an important role in the delivery, support, administration and assessment of learning[7]. Being an extension of the concepts of open and distance education, e-learning presupposes to overcome barriers to education and enhance equality, flexibility and accessibility to knowledge.

E-learning is characterised by its independence of place and time, its integrated presentation and communication facilities and its opportunities for reuse of instructional materials in the form of leaning objects[8]. One strong argument supporting e-learning is that with the use of Internet for education, teaching and learning process have shifted towards the constructivist paradigm[9)10)]. What this means is that today with the expansion of e-learning, learners have a better choice of what to learn, how to learn, when to learn and where to learn.

E-learning and distance education

E-learning is a contemporary method (or technique) of distance education. Some analysts have categorised three generations of distance education[6]. Main characteristic of the first generation distance education was the use of a single technology, and a lack of direct student interaction with the institution providing the teaching. Main form of first generation distance education was the use of printed material with postal correspondence. Second generation distance education is characterised by the availability of print material plus broadcasting. As far as technology was concerned, one-way transmission of information was the main technology. The third generation distant education is characterised by the use of two-way communications technology such as the Internet and/or videoconferencing.

It is assumed that the main reason for the rapid growth of third generation distance education is the expansion of the Internet and in particular World Wide Web. The WWW is a particular component of the Internet that allows digital materials to be created, stored, accessed and interacted over the Internet (Fig. 3).
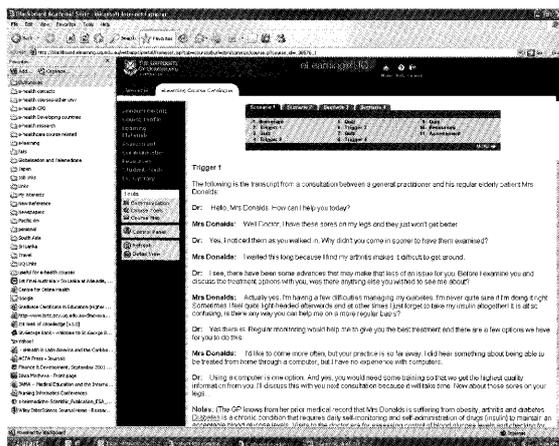

Fig. 3: The use of web-based material in distance education

Another significant element of the third generation distance education technologies is the ability to combine all education media (such as text, graphics, audio and video) and all four structural characteristics of technology (such as one-way and two-way communication as well as synchronous and asynchronous modes) (Fig. 4). Undoubtedly these features have significantly expanded the capability of distance education making it more attractive modality of knowledge-transfer. It can also be assumed that the ongoing developments in technology will further expand the capacity of e-learning.
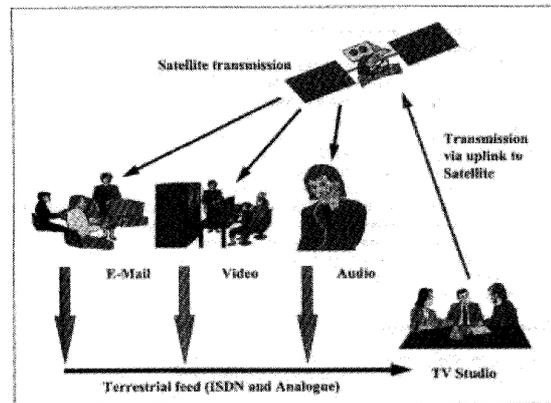

Fig. 4: The use of satellite communication system in education

Why e-learning?

There are number of arguments to support e-learning as an effective means for education. Advocates of e-learning suggest that new technologies have potential to democratize the education process. Enabling flexible and life-long education which is affordable, accessible and comfortable, education will no longer be restricted to only a certain sectors of the society. The desire to make education less dependent on time and place is mainly related to the increasing number of people who combine study with work in order to stay prepared for changes in job requirements, to improve career perspectives, and

to realise personal growth.

E-learning is also a means to address social inequality. Traditional education system restricts certain sectors of the society to enter higher education. Regardless of their desire to enhance education, existing education systems do not allow them to acquire necessary skills and qualifications. E-learning has emerged as an alternative. Particularly previously deprived sectors of the society such as elderly, women and communities in rural and remote areas can be potential beneficiaries of e-learning.

In a rapidly changing workplace environment, there is a need for new methods of professional development. In the last few years, e-learning has made significant headway in vocational training. Provision of professional development at workplace has become effective, and even cheaper compared to institution-based training. E-learning has been identified as an effective method to provide training to modern, highly mobile workforce[11].

Another argument supporting e-learning is that technology assisted learning can improve the quality of education. Capturing large population, e-learning can facilitate diverse opinions and viewpoints making the learning process more interesting and rewarding. The principle learning methods being problem-based learning, self-regulation and self-assessment, e-learning has a better capacity to develop critical thinking and meta-cognitive skills.

Cost effectiveness is an important element in e-learning. It is argued that e-learning can bypass massive costs (example for land, building, and infrastructure) that the traditional education incurs. Advocates of e-learning suggest that with constant reduction of price for technology, e-learning has a potential to provide education at a cheaper cost.

Another argument is related to the economic competitiveness. With rapidly shrinking populations especially economically advanced countries put particular emphasis on knowledge-based economies. In this context e-learning has been identified as a cost-effective way to deliver education while providing skills relevant to current needs.

High commercial expectations of business communities have attracted large investments into e-learning in the past few years. Similarly the public sector also sees e-learning to play a major role in addressing issues in education. This renewed interest of both public and private sector has become an important driving force in the expansion of e-learning.

Current state and future

E-learning is currently practiced in a number of sectors of education including career, technical, vocational, as well as college and university level programs.

One of the most referred success stores in distance education has been the British Open University founded in 1969. The motive of establishing BOU was to promote distance education with the use of variety of media such as printed material, broadcast, face-to-face etc. The BOU has been in the forefront of integrating new technologies in education since mid 1990s. Since its foundation BOU has served over 2 million students. In 2002-2003 academic-year the BOU had over 180,000 undergraduates and postgraduate students[12]. An important feature of the student population at the BOU is that the majority of them are full time workers. It is also significant that according to quality of teaching and research, BOU ranks in top 10 universities in the UK.

Today there are over 25 similar open universities around the world. These universities provide quality education to large number of students and they are proven to be cost-effective ventures[13]. In addition, traditional universities and a large number of technical institutions in the United States, Canada, UK and other European

countries have introduced online learning. There is an increasing demand for continuing professional education programs and workplace training delivered by distance methods. These trends have been quite consistent since the advent of Web-based online learning in mid 1990s.

Universities have been instrumental in introducing online professional development courses to address these needs. Web-based training is believed to be central to the design and delivery of workplace learning in the 21st century. For example, Training magazine's annual Industry Report stated that today 13 percent of all courses are delivered via computers. According to International Data Corp (IDC) the online training market is estimated $11.6 billion in 2003[11].

The Teaching and Learning Enhancement Plan (2003-2007) of the University of Queensland places a strong emphasis on e-learning as a means of providing high quality education. Responding to the diverse circumstances and needs of students and giving opportunities for new forms of interaction and learning mediated by the information and communication technologies, e-learning is becoming a significant element of teaching and learning process. There has been a noticeable growth in e-learning within UQ for the last few years.

There is a noticeable growth in online learning in rapidly developing countries like Malaysia, Mexico, India, Thailand, Singapore, China, South Korea, Taiwan, Brazil and the Eastern European countries. Rapid expansion of rich middle class and the inability for governments to meet educational requirements by conventional means are main reasons for this tendency. As a result there is a visible increase of private education providers that tend to use new technologies for knowledge delivery.

Understandably the developing world is lagging behind in the e-learning process. Existing socio-economic pressures and the lack of infrastructure are the primary reasons. So

called 'digital divide' is a serious issue still to be addressed. Nonetheless, it is undeniable that there is an increasing interest in e-learning in developing countries too. In addition, world organisations such as the UN, the UNESCO, and the World Bank have envisioned that e-learning is a potential way to address problems in education in developing countries[14)15)16]. Evidence shows that there are attempts to incorporate e-learning in addressing education issues in number of developing countries[17)18)19)20].

E-learning in health

There are many reasons why e-learning must be adopted into health education. In recent times, health has seen dramatic changes with the introduction of new information and communication technologies. These changes enforce health professionals to acquire knowledge and skill to use technology in their daily activities. For example, to introduce and maintain electronic medical records (EMR) system in health care facilities, health professional need not only technical knowledge to use the system, but also an understanding to maximize the outcomes. The new concept of electronic health records (EHR) system is even boarder than EMR. In this rapidly changing health environment, shortage of human resources with adequate knowledge and skills to utilize new technology can be a serious barrier.

Providing education to health professionals currently in the workforce as well future generation is an urgent task. What is important is to understand that the conventional education methods may not be adequate to address this urgent need. The importance of e-learning in health education is increasingly acknowledged. Evidence shows that e-learning can be an effective tool in professional development of health workers[21]. Meanwhile more and more health education institutions begin to integrate e-learning modalities for medical and health

education. Research shows that the absence of appropriate courses to update their knowledge and skills is one of the most serous barriers[22]. E-learning systems offer opportunities for health professionals to acquire latest knowledge and skill in information technology paving path to the use of such technology in workplace settings.

The growth of information technology and its adoption in healthcare has been rapid and widespread. Logic dictates that traditional teaching methods may be adequate to match the speed and scale of these developments. Therefore, e-learning has must be accepted as a historical inevitability to address emerging needs of education in the health field.

Conclusions

E-learning is an important development in the evolution of education practice. With the introduction of the Internet, there have been noticeable changes in the way knowledge is shared and delivered. It is expected that e-learning will play an important role in facilitating learning in the future. However it is vital to note that this may happen only under certain conditions that enable the technology to enhance the capacity of knowledge-transfer. It would be erroneous to assume that e-learning will replace traditional teaching and learning methods. At best, e-leaning will complement education process to improve the quality of learning. Therefore, taking an integrated approach is imperative. To reap the maximum result of e-learning, prime consideration must be given to pedagogy. Technical and organisational aspects must facilitate the teaching and learning process.

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