Distance Learning – concepts and contributions

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Abstract: The present paper aims to review distance learning in the context of present definitions, technologies, opportunities, challenges, concepts and contributions as it is fast becoming an essential part of educational systems in both developed and developing countries. By virtue of new technologies the ways of teaching and acquiring new knowledge aren't confined by space and time any more. New technologies offer great flexibility in when, where and how to distribute teaching and acquiring knowledge offering flexible learning opportunities to individuals and group learners. Distance learning is one of the most rapidly growing fields of education and its potential impact on all education delivery systems has been greatly accentuated through the development of Internet-based information technologies and in particular the World Wide Web. In order to meet the needs of the changing world future distance learning must be time flexible, lacking geographical barriers, competitive cost/value, and learner centred. The chapter is intended for all educational institutions and their academic personnel.

Keywords: distance learning, education, literacy, flexibility, equity, information technology

1 Introduction

Modern economic and social achievements at the end of the 20^{th} century initiate the transition of global economy from old into a new virtual economy. Virtual economy is highly related to globalization and economy networking. This fact emphasises the importance of knowledge. Today it has become the fundamental economic resource. For this reason knowledge enriched workers are the most wanted input and output. Education is necessary to achieve and supplement new knowledge. Because of geographical distance and level of development, education, in classical sense, is not available to a large number of world's population. Worldwide 796 million of people reported not being able to read and write; 64% of them were women. Adult literacy rates were lowest in Southern Asia - 62%, Saharan Africa - 63%, Oceania - 66% and Northern Africa - 67% (UNESCO, 2010). Education has to be considered in its relation to global, economic, social and cultural development. By increasing the number of educated population global economy can achieve: sustainable GDP growth, decreasing of global unemployment, better quality of living and increase the social cohesion. Also, world's poverty and inequity can be reduced.

Because of the significant changes in demographic structure of developed regions and globalization characteristics it is necessary to make education available to everybody and to motivate people to join this process. Especially, distance learning can be a significant help to education spread out. It is

recommended a significant representation of formal education at every degree level by verified institutions.

As in every other aspect of modern life, the answer to the challenge of education for development will include the use of information and communication technologies, provided the necessary organizational and policy changes that can be implemented to make the technologies effective. Rapid development of information technology contributed to the creation of new methods in education i.e. teaching and learning. Based on this claim, the ways of teaching and acquiring new knowledge aren't confined by space and time any more. There are many technologies that can offer great flexibility in when, where and how to distribute teaching and acquiring knowledge. In particular, technology-mediated distance learning is more and more in use. Roughly the used technologies for this purpose can be divided into four categories including: print, audio (voice), computer (data) and video. Particularly, the expansion of the World Wide Web, coupled with constant fall in the cost of processing, storing and transmitting information contributed significant shifts in how distance learning is perceived by educators and how it is designed, delivered and managed. Distance learning can be summarized as teaching and learning involving implementation of various technological applications. This term also reflects both the fact that all or most of the teaching is conducted by someone removed in time and space from the learner. As a force of contributing to social and economic development distance learning is today one of the most rapidly growing fields of education and training. The mission of distance learning includes greater dimensions of openness and flexibility, whether in terms of access, curriculum or other elements of structure. Therefore this chapter aims to explain the terms and definitions of distance learning making reference also to its advantages and disadvantages, its accompanying technologies, methods and implementation. The chapter will also give recommendation and future research directions, and is intended for all educational institutions delivering distance learning, institutions who will deliver distance learning in the future, and their academic personnel.

2 The concept and historical development of Distance Learning

Distance learning is a field of education that focuses on teaching methods and technology with the aim of delivering teaching, often on an individual basis, to students who are not physically present in a traditional educational setting such as a classroom. It has been described as "a process to create and provide access to learning when the source of information and the learners are separated by time and distance, or both" (Honeyman & Miller, 1993, p. 68).

Modern distance learning initially relied on the development of postal services in the 19th century and has been practiced at least since Isaac Pitman taught shorthand in Great Britain via correspondence in the 1840s (Moore & Kearsley, 2005, p. 235). The University of London claims to be the first university to offer distance learning degrees, establishing its External Program in 1858. This program is now known as the University of London International Programs and includes Postgraduate, Undergraduate and Diploma degrees created by colleges such as the London School of Economics, Royal Holloway and Goldsmiths. In the United States William Rainey Harper, first president of the University of Chicago developed the concept of extended education, whereby the research university had satellite colleges of education in the wider community, and in 1892 he also encouraged the concept of correspondence school courses to further promote education, an idea that was put into practice by Columbia University (Levinson, 2005, p. 69). In Australia, the University of Queensland established its Department of Correspondence Studies in 1911 (White, 1982, p. 262). More recently, Charles Wedemeyer of the University of Wisconsin-Madison is considered significant in promoting methods other than the postal service to deliver distance education in America. From 1964 to 1968, the Carnegie Foundation funded Wedemeyer's Articulated Instructional Media Project (AIM) which brought in a variety of communications technologies aimed at providing learning to an off-campus population. According to Moore's recounting, AIM impressed the UK which imported these ideas when establishing in 1969 The Open University, which initially relied on radio and television broadcasts for much of its delivery. Germany's Fern Universität in Hagen followed in 1974 and there

are now many similar institutions around the world, often with the name Open University (in English or in the local language). All "open universities" use distance education technologies as delivery methodologies and some have grown to become "mega-universities" (Daniel, 1998, p. 15) a term coined to denote institutions with more than 100,000 students.

Distance learning is used for a wide range of purposes. Today, by virtue of new technologies fast development and constant cost fall in processing, storing and transmitting data, many private and public, non-profit and for-profit institutions worldwide offer distance learning from the most basic instruction trough the highest level of degree.

3 Distance Learning and its significance

The term distance learning represents approaches that focus on opening access to education and training, freeing learners from the constraints of time and place. It offers flexible learning opportunities to individual and group learners. This is the most rapidly growing segment of education. The potential impact of distance learning on all education has been emphasised by the development of Internet-based technologies, particularly the World Wide Web. It can be described as learning involving implementation of information, computing and communications technology applications in more than one location (Webster & Hackley, 1997, p. 1284).

The basic definition of distance learning considers that the teacher and the students are separate in the spatial dimension and that this distance is filled by using technological resources (Casarotti, Filliponi, Pieti & Sartori, 2002, p. 37).

Distance learning is a contributing force to social and economic development. It is fast becoming an essential part of the mainstream of educational systems in both developed and developing countries. The globalization of distance learning provides many opportunities for countries for the realization of their education system-wide goals. The growing needs for continual skills upgrading and retraining and the technological advances have led to an explosion of interest in distance learning.

The literatures and studies related to distance learning expanded considerably in the last years. Studies researched different aspects of distance learning from its technologies, methods, and pedagogy to perceptions, opinions and attitudes of students and academicians toward distance learning. Permalla et al. (2011) did a case study on the effectiveness of an online course and integration of web applications in order to improve the distance learning environment. Cinar and Torenli (2010) focused on redesigning the online courses in order to meet the expectations of enrolled students. Isik et al. (2010) examined postgraduate students' attitudes toward web based distance learning and revealed general positive attitude toward distance learning. Also, Karakoyum and Kavak (2009) defined the opinion of academicians regarding distance learning. In 2004 Song et al. published a study on students' perception of useful and challenging characteristics of distance learning. Beyth-Marom et al. (2003) analyzed factors related to students' selection of Internet-assisted versus traditional distance learning. They discussed theoretical, methodological and practical implications.

3.1 Advantages and disadvantages of distance learning

Distance learning offers a myriad of advantages which can be evaluated by technical, social and economic criteria. Also, distance learning methods have their own pedagogical merit, leading to different ways of conceiving knowledge generation and acquisition (UNESCO, 2002, p. 65).

Distance learning increases access to learning and training opportunity, provides increased opportunities for updating, retraining and personal enrichment, improves cost effectiveness of educational resources, supports the quality and variety of existing educational structures, enhances and

consolidates capacity. Another advantage of distance learning is its convenience because many of the technologies are easily accessible from home. Many forms of distance learning provide students the opportunity to participate whenever they wish, on an individual basis, because of distance learning flexibility. This kind of education is quite affordable, as many forms of distance learning involve little or no cost. Distance learning is also multi-sensory. There is a wide variety of materials that can meet everyone's learning preference. In fact some students learn from visual stimuli and others learn best by listening or interacting with a computer program. Also, distance learning can offer increased interactions with students. In particular, introverted students who are too shy to ask questions in class will often "open up" when provided an opportunity to interact via e-mail or other individualized means (Franklin, Yoakam & Warren, 1996, p. 126).

There a some other related benefits of distance learning such as: balancing inequalities between age groups, geographical expansion of education access, delivering education for large audiences, offering the combination of education with work or family life, etc.

While there are countless distance education advantages, there are also various disadvantages of distance learning, that students and institutions should be aware of before starting any distance learning program.

Distance learning requires advance planning. Both the instructors and students involved in distance learning will need to make sacrifices, at times, in order to get things done on time. Distance learning, although affordable, may come with hidden costs (for example extra shipping and handling costs). Distance learning does not offer immediate feedback. In a traditional classroom setting, a student's performance can be immediately assessed through questions and informal testing. With distance learning, a student has to wait for feedback until the instructor has reviewed his or her work and responded to it. Compared with traditional course delivery method, distance learning demands a disproportionate amount of effort on the part of instructors. Namely, teaching distance courses includes not only the time required for actual delivery of course materials, but it must also involve a great deal of time dedicated to student support and preparation. Also, time spent on e-mail correspondence is very significant. Distance learning does not always offer all the required coursework online for every degree program. In fact, physical classroom attendance is mandatory for the completion of some degree programs. Distance learning degrees may not be acknowledged by all employers although most employers do. Students who want to work for a specific employer upon graduation should be sure of that employer's perspective about online education. Distance learning does not give students the opportunity to work on oral communication skills. Students in distance learning courses do not get the experience of practicing verbal interaction with professors and other students. Another disadvantage of distance learning is social isolation. Distance learners may feel isolated or miss the social-physical interaction that comes with attending a traditional classroom. However, many distance learning participants have reported that this sense of isolation has been decreasing with the use of communication technologies such as bulletin boards, threaded discussions, chats, email, and video conferencing.

The most important issue regarding distance learning is instructors' preparedness and students' attitude. If students do not perceive the technology as useful, they will be not receptive to distance education (Christensen, E. W., Anakwe U. P. & Kessler, E. H., 2001, p. 267). Also, the inability of teachers to develop the necessary skills, to adopt a positive attitude, and to develop the needed pedagogy are other important problems affecting the creation of distance learning community. There is connection with pedagogy, personal experience, and distance learning. When a teacher is somewhat reluctant to use technology or views it in a negative way, pedagogy may suffer. Many researches proved that many educational initiatives failed because they had little impact on teacher's beliefs or practices (Niederhauser, D. S. & Stoddart, T., 2001, p. 25). The method of introducing computers to faculty is another factor in the personal development of technology. Faculties may also experience other barriers such as time needed to learn the technology, frustration with malfunctioning

technology, much lead time to prepare the distance learning materials, less time for research, and added monetary costs to work with technology at home and at the office.

3.2 Overview of distance learning technologies

The use of technology to aid in the processing and communication of information is not new; it is at least as old as writing. However, over the last 50 years, the development of a range of technologies has accelerated exponentially, mainly due to the invention of digital electronics.

The available methods of learning used in distance learning are divided into two basic groups: synchronous and asynchronous learning. The term synchronous learning is a mode of delivery where all participants are present at the same time. It resembles traditional classroom teaching methods despite the participants being located remotely. It requires a timetable to be organized. The asynchronous learning mode of delivery is where participants access course materials on their own schedule and so is more flexible. Students are not required to be together at the same time. The two methods can be combined in order to deliver one course.

The use of resources and technologies of the Internet is very important as it increases education accessibility. Taking the huge scale of the Internet into account, the creation of mechanisms designed for effective navigation of the Internet, and the collection, analysis, exchange and distribution of information for the specific use of education acquires great importance (UNESCO, 2002, p. 25). Various Internet technologies are used for the solution of various educational tasks, namely, teaching, learning and management of the educational process. The richness of modern Internet, Web and multimedia technologies allows for unlimited creativity when it comes to electronic courseware development. Such characteristic offers new opportunities to create very interesting course material while representing a substantial challenge for the educator for its requirement to rethink the course content in the light of new technologies.

Ellsworth (1994) proposes the classification of Internet tools in accordance with the types of interaction between the participants in the educational process as follows: interaction between the students and professors in the educational process, interaction between the students and professors while searching for information on the Net, joint activities of professors and the administration, students joint research projects (p. 47).

The various technologies used in distance learning can be roughly divided into four categories: print, audio (voice), computer (data) and video. For example, statistical research on the use of electronic communication in distance learning identified the following types of applied telecommunication media in such programmes: telephone, fax, audio-conference, electronic mail, access to databases (Euler, Von Berg, 1998, p. 68).

Print materials may serve as the primary source of instruction, or they may be supplemental. As a primary source, distance students might use a textbook and read various units on a specific timetable. Other technologies, such as e-mail, could then be used to ask questions and send assignments back to the teacher. As a supplement to instruction, text materials may take the form of worksheets or study guides that are used in conjunction with video or voice technologies. It is important to note that the supplemental print materials may be disseminated via regular mail or over the Internet. In addition, fax machines are often used to transmit the print materials back and forth between the students and the teachers. There are many advantages and disadvantages to incorporating print materials. Some advantages of print materials are: extremely portable (can be used in any location), high comfort level (most students are very comfortable using print materials to learn), cost effective (can be created and duplicated with little expense), readily available (many distance learning courses can take advantage of exiting textbooks, thus saving the time and expense of creating new materials). A disadvantage of print materials is the lack of interaction (print materials do not generally provide built-in interaction; additional technologies, such as e-mail, must be supplemented).

Audio or voice technologies offer cost-effective ways to enhance distance learning courses. The audio component of a distance learning course can be as simple as a telephone with voicemail, or it can be as complex as an audioconference with microphones, telephone bridges and speakers. Voicemail is becoming extremely common. It allows students to leave messages for instructors regardless the time and allows instructors to leave messages for individual groups. Voicemail can be used to administer quizzes (an option which requires programming) and it also serves as an alternative to e-mail for those students who do not have a computer. Audio files and CDs are inexpensive, easily duplicated and very versatile. They can be used to deliver lectures, panel discussions, or instructions for the distant learners. They are especially useful in courses that require nuances in inflection, such as foreign languages, or those that are designed for non-readers. Telephone conversations can be used to monitor individual students or to reach numerous students simultaneously via a conference call (audioconference). Podcast is a method for making digital audio and video files available on the Internet in such a way that others can set their computers to automatically download new episodes in a series as they are posted online.

With the increased popularity of the Internet, computer technologies are receiving more and more attention as a mean of delivering distance learning. The primary computer technologies used for distance learning include e-mail, online collaborations, and Web-based learning. For a long time electronic mail has remained the only Internet application in education. Electronic mail is still the most frequently used computer technology in distance learning. Sending e-mail messages is a common and inexpensive way for students to communicate with instructors. In some cases, an entire distance learning course may be structured using e-mail as the only method of communication. In other cases, e-mail may be used to supplement audio or video technologies. The advantages of e-mail communications include versatility and convenience, but it requires an Internet connection and includes the complexity of learning to use e-mail software and attachments. E-mail communications are asynchronous, meaning that they do not take place simultaneously. Synchronous communications are possible trough online chat (a two-way, interactive exchange on the Internet), shared whiteboards (two or more people connected to the Internet can communicate trough graphic images on a shared whiteboard) and videoconferences. The Web potentially offers a worldwide forum in which to teach courses. Courses material can be dynamically updated. The Web-based learning model is basically free from limitations of space and time while it reaches students around the world very easily. The advantages of computer technologies are: they allow self-paced instruction, can incorporate text, graphics, audio and video, they allow high level of interactivity, provide written record of discussions and instruction, they are inexpensive and worldwide accessible. Its disadvantages are as follows: they require hardware and software, generally rely on written communications, they require substantial planning, can have computer viruses and its performance are notoriously unreliable.

Video techniques used in distance learning are often characterized by the transmission media (videotapes, satellites, television cables, computers and microwave). Videotapes and DVDs offer popular, easy-to-use formats for instructional materials and the hardware is easily accessible. In addition to easy hardware access the tapes and discs are quite inexpensive. Disadvantages of videotapes and DVDs include the fact that they are not interactive, and sending them via mail can be expensive. Satellite transmission is one of the oldest, most established techniques for videoconferencing. Two sets of equipment are needed for satellite systems. The uplink (a large satellite dish) transmits the video and audio signals to the satellite. The downlink (a small dish antenna) receives and displays the signals. When satellite videoconferences are used for distance learning, a studio classroom must be properly wired for the lightning, microphones and cameras needed to produce an acceptable lesson. Satellite videoconferencing may be very expensive.

Microwave transmissions provide a cost-effective method for videoconferencing in more localized areas. Mostly they transmit video signals to areas not more that 20 miles apart. Cable and public broadcast have been used to distribute instruction for years. Almost all public cable television systems allow schools to transmit television courses. This type of connection can be used to transmit one-way

video and one-way audio to the community at large or between specific schools. Desktop videoconferencing uses a computer along with the camera and microphone at one site to transmit video and audio to a computer at another site or sites. It results in a two-way video and a two-way audio communication. Internet videoconferencing requires a video camera and digitizing card / camera to transmit video signals as well as a microphone and speakers / handset. It results in a small image with a few frames per seconds, depending on the speed of the Internet connection.

3.3 Implementation of distance learning

The twentieth century saw the creation and evolution of technologies beyond imagination a century ago. The acceptance of these technologies has led to a new alternative for providing education and training i.e. distance learning.

Despite initial concerns that distance learning might lower the quality of instruction, studies shown that its benefits are clear and demonstrable and many forms of distance learning are quickly gaining acceptance (Belanger & Jordan, 2000, p. 17).

The implementation of distance learning and its supporting technologies requires careful planning. This process includes four basic steps: conduction of needs assessment, outlining instructional goals and producing instructional materials, providing training and practice for instructors and facilitators and implementing the program.

Conducting the needed assessment includes course, audience instructor and technology analysis. The course analysis is to identify content areas that could be enhanced, expanded or initiated trough distance learning techniques. The assessment begins by examining the instructional needs that are not being met and determining if distance learning could contribute. Distance learning techniques are not appropriate for all students. In most cases, a great deal of motivation and the ability to work in a self-paced environment are essential. So it is important to analyse the potential course audience. Distance learning needs facilitators and technical support teams who will ensure that all equipment is functioning. Instructors, facilitators and technical support staff should be trained for such purpose. Distance learning can be delivered trough different technologies. Selecting the most appropriate technology depends on the content area, student's learning styles and existing hardware and software. The technology solutions may be impacted by the geographic locations of the teachers and students.

A well-structured distance learning course must place instructional objectives foremost. In this case the technology is just another tool that teachers can use to effectively transmit the course content and interact with students. After the goals and objectives are outlined, instructional materials can be designed and developed. Materials must be accurate, appropriate and structured to maximize the benefits for students and to minimize the limitations.

Teacher training programs are important to acquaint the teachers with the use of technology as well as to help with the re-design of the instructional strategies. Facilitators and support personnel, as mentioned, are also essential to successful distance learning delivery, they are likely to be the spot contacts for the students.

The program can be implemented after the training has been completed and after a pilot test of supporting technologies has been carried out satisfactory. It is important to include structured activities. Timelines, deadlines and feedbacks motivate students and provide the framework students need to function in a flexible environment. The implementation phase should also emphasise interactions. Trough the development and implementation formative evaluation takes place; also it is important to make revisions often. Also, in selecting distance learning applications factors such as physical location, size and specialization are important for data system creation which supports distance learning. In addition universities have to provide service to students on and off campus, as well as to faculty, research facilities and libraries.

4 Future research directions

Distance learning has become widespread in the past 15 years and it is not simply a contemporary trend that will fade away. It is often seen as an important new approach and strategy which could make a significant contribution towards resolving problems of access, quality and equity. When considering the future of distance learning, it is important to look at many of the trends related to learning that are already influencing current trends and planning. Memorizing facts will have a much lower value, while utilizing information for analysis and decision making will be a critical skill for educational and professional advancement.

Studies shown that introducing new forms of teaching make students spend more time in working on the subject, comparing to other subjects (Dvorak & Burchanan, 2002, p. 74). Also, Diaz and Cartnal (1999) demonstrated that online students display widely differing learning styles profile and other characteristics (p. 132).

Student's characteristics are in constant flux. A model that continuously monitors student's characteristics and which facilitates a favourable outcome should be developed. Future studies should entertain new research questions that focus on student's success rather than distance modalities (Diaz, 2000). This should influence the educational practice by increasing the sensitivity of institutions delivering distance learning to the individual learner and prepare them to facilitate distance learning. At the same time, in increasingly market-oriented educational systems, institutions are to a greater extent using some form of distance learning as a mean of extending their markets. Technological development allows for new access paradigms and delivery systems, linked to new types of demand. New opportunities are presented trough the continuous miniaturization of equipment, decreased costs, greater user flexibility, portability and integration. These changes can support a more open networked society with greater variation and more equitable access to educational resources trough a network infrastructures (UNESCO, 2002, p. 84).

Research direction should be oriented on increasing academic quality among high-grade management and observation, improving information feedbacks of students and external partners, composing quality culture in e-learning and addition of system of distance learning education quality, new developments and academic integration (Marsap, A. & Narin, M., 2009, p.2871).

Future researches should contain studies on student's technology and alleviation of communications problem. This means a standardized delivery system supplemented with a set of well defined tutorials instruction. The goal is to prepare students with a basic set of technical skills which can be used in all courses in order to minimize recurrent impact of technical issues. This standardization should reduce the time and effort of technical staff in supporting the system and hence reducing costs. Future research should also find new way of providing collaborative learning environments, access to database/libraries to all delivering locations. Also new research directions have to be oriented on providing wider security to the Internet as a communication medium, because the messages sent over the Internet run the risk of being intercepted.

There is a need for further researches for effective instructional design for online courses. The design should focus not only on the technological aspects of the course, but also on the goals, objectives, and expectations of the learners. Researches should be oriented on improving the structures, support, technologies, security, methodology, pedagogy, and promotion in order to achieve the appropriate delivery of quality distance learning.

5 Concluding remarks and recommendations

An effective online course is the integration of several different tools and resources for students to learn course material. Online courses provide more flexibility and the freedom of self-directed learning without compromising the students in anyway academically.

Distance learning, implementing information technologies, especially trough mobile learning, is considered as the present and the future of learning and an integral part of any kind of educational process in the future. Two most promising areas should be involved more and more in developing distance learning: mobile computing and e-learning. It can be carried out in a mobile environment using different devices such as cellular phones, Personal Digital Assistant (PDA), smart phones, tablets, PCs etc.

Institutions delivering distance learning should introduce self-made, personalized, customized educational policies, development guidelines and educational management systems that should lead to a radical change of the whole information system of such institution. In such way institutions delivering distance learning could enormously amplify theirs possibility to interact with different actors including students, teachers, tutors, staff, etc.

Introductory lecture should inform students from the beginning that the course goes beyond memorisation and requires application of knowledge and their understanding of course material. For this purpose an increased lecturer participation in supporting students vial email discussion is strongly encouraged.

Student's success can be improved by the voluntary discussion board and virtual tutorial. Frequent peer collaboration can be provided by the incorporation of a discussion board in the online course. This way students can peer discuss difficult concepts and confirm course information. With consistent monitoring by virtual tutors and lecturers, participants don't have to worry about the integrity of information posted on the discussion board. Lecturers should clarify any incorrect information posted. More topics unrelated to the course material can be also introduced on the discussion board. Also an introduction of more tutorial hours may help students who have noted the tutorial hours being incompatible with their schedule.

Flash video lectures as a learning tool allow students to take better notes, revisit certain lecture concept and increase course material retention. Though, the lecture videos should be offered only for a restricted time period (ex. three videos per week). This way the same level of discipline as in the inclass format is promoted.

Moreover, simple strategies like incorporating frequent online quizzes (which can be difficult to do in in-class courses) can be extremely effective in enhancing the learning experience.

It is recommended that students enrolled take separate anonymous surveys were they can express their opinion about the course and rate the lecturers. Also, faculty resources for the distance learning programs must be systematically monitored, and faculty recruitment, reward, and development must reflect the duties and responsibilities that faculty members perform in these programs.

Distance learning is not simply a contemporary trend that will fade away. In order to meet the needs of the changing world future distance learning must be: time flexible, lacking geographical barriers, competitive cost/value, learner-centred with less emphasis on lecture-style classes, high-technology, incorporating new media and computer applications as part of instructor presentations and course work, culturally diverse, adaptable to the needs of the global marketplace, growth oriented from the perspective of the individual and organization, using contemporary material that is relevant to the times.

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