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Distance Education and the Dissemination of Science

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Abstract

Taking advantage of distance education in the development and dissemination of science necessitates a true understanding of the different aspects of the subject with regard to its importance and priority in the present circumstances of the modern society. Accordingly, the purpose of this article is to examine the role, importance, necessity, benefits, and barriers of distance education as a modern method of training and an alternative to traditional methods of teaching in the dissemination of science. The data collection method includes identifying, studying, and summarizing the scientific resources available in the literature such as books, research reports, and published scientific papers. The data gathered were analyzed based on the research categories including the goals and research questions. The results show that methods of distance education are viable alternatives to those of the traditional education in the dissemination and promotion of science and have various advantages such as taking communities to the heart of scientific developments more than before by decreasing or removing the limitations of the traditional methods.

Keywords: Distance Education; Science; Dissemination of Science; Higher Education

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Introduction

In today's modern societies, science plays a vital role, and the dissemination of science, in the framework of distance education, is quite related to the rate of growth and development. Dissemination of science is an attempt to reduce the gap between science experts and the public. It is the interpretation of the obtained scientific information to the general public rather than professionals or students. It refers to the activities designed to teach science to the general public, to strengthen public faith in science, and to popularize it. In other words, it is the effort taken to present scientific activities in a way that everyone can understand the fundamental bases of the scientific concepts and grasp its essence (Newsletter for the Iranian Association of the Popularization of Science, 2009). Popularization of science refers to the ways in which critical thoughts and values and the history and sociology of the scientific and technological knowledge are so simplified that they can be understood by the general public while preserving their content and scientific value. The concept of popularization of science and technology is conceived as a system for determining the specified amount of dissemination, type, and value of the scientific and technological products (Abreu, 2004).

In general, dissemination of science and technology plays a vital role in the social economy, culture, and the environmental development of countries. From the socio-economic standview, it is considered as an endeavor to involve talents in scientific research and the development of technology, and generally, to make wise efforts possible. This helps to create trained workforce, develop social opportunities, and strengthen the educational systems. In terms of environmental culture, the promotion of science enhances the vital feelings of the community members by participating more in decision-making and helping to improve democracy and sustainable development. Finally, the promotion of science helps to improve personal satisfaction and self-esteem (report from the Workshop on the Popularization of Science and Technology, 2004).

Statement of the Issue

It is believed that the reason for relating science to the public involves a range of cultural, educational, governmental, and political considerations (Vilanilam, 1993). Organizational and economic dimensions are of similar importance in this regard. At the present time, when science and technology have gained increasing significance in all spheres of the social life, dissemination of science has become a very important strategic issue (Vasali & Ojagh, 2010). It is necessary to increase people's understanding of the process and progress of science, "critical thinking, citizenship, and social commitment". Giving importance to "scientific vocation among young people by giving them opportunity to experience scientific environment through the hands of well prepared master in a humanistic atmosphere" is another reason to emphasize the popularization of science and the growth of scientific understanding among individuals (Schall, 2000). Another reason is its contributions to the formation of an innovative culture in the world today (Dagnino, Lima & Neves, 2016). Popularization of science creates a new social conscience used by the community both at the local and international levels by linking the two elements of communication content and communication technology.

A look at the works published in this field makes it clear that at least seven different arguments have been raised concerning the positive process of promoting scientific knowledge in the society. These arguments can be listed briefly as follows: (a) the benefits that science gains, (b) benefits for the national economy, (c) benefits for the national power and influence, (d) the benefits that accrue to individuals, (e) benefits

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for democratic governments, (f) benefits for the society as a whole, and (g) intellectual benefits (Paya, 2009).

Information and communication facilities together with the evolution of media such as the Internet, have transformed people's way of thinking, work, communication, teaching and learning, and, in a word, their social life (Romao, 2008). This situation and the new social and communication order have created a cyberculture where mutual relations of information, communication, computer technology, communication poverty, and physical presence have been merged together (Roesler, 2008).

In the field of education, cyberspace makes it possible for the development of virtual learning environments.Taking advantage of interactive software and the Internet as an educational interface can potentially reduce the geographical distance and increase interaction between trainees and training providers (Palloff & Pratt, 2007). Moreover, cyberspace connects users and institutions and makes a wide range of opportunities and services possible. One of these areas, opportunities, and services is distance education, which, as an applied branch, has appealed to education professionals (Perraton, 2005).

Therefore, it can be said that since we are in the era of knowledge-based advanced technology, and that the development of a culture of research and technology and the dissemination of science and scientific awareness in societies are the conditions to enter the stage of advanced scientific and technical development, their applications for the local and regional needs should be thought about while taking advantage of the most recent results of the world's scientific studies. The new educational paradigm requires a new way of thinking about educational models and new intervention processes in order to enable the people to respond to them. From this perspective, distance education can be an effective system for training and promotion of science.

The exponential growth of people's awareness of information and communication technologies has encouraged universities and educational institutions to examine alternatives to traditional methods of teaching. Currently, information and communication technologies are the media of learning and important elements of education and systems of teaching and learning (Djoudi, 2009). The participation of information and communication technologies in the field of education underlies advanced and general experimental approaches to design the educational environment. The growth of information and communication technologies in the past few decades has introduced new tools and methods to information and knowledge professionals and has made them more powerful in terms of the management of information and intellectual resources. One of these methods is distance education. The dissemination of science through distance education has been significantly welcomed and accepted by the public.

There are few studies on the role of distance education in promoting knowledge. The literature is also largely descriptive and the introduced views are based on few experimental works. Ebrahimzadeh (2007), in a research entitled "Transition from Traditional Distance Learning to Online Learning at PNU: Innovation and Challenge of Change, (A Case Study)", has come to the conclusion that this program has many advantages and provides suitable opportunities for applicants to reach the goal of the university and to operationalize the slogan of higher education for all, all the time and everywhere. Its potential capacity to deliver official BA, MA and PhD courses as well as free training courses is very high. In a study, Kim, Curtis, and Zeng (2005) have examined the future of e-learning. In this study, training professionals, ie, senior education staff, training managers, trainers, and authors of e-learning have been investigated about the current situation and future trends of e-learning in shaping learning at workplaces. The results show that e-learning is a very important way of providing education and may become the dominant form of

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training in the near future. More than 50% of responders believed that, in 2010, e-learning will be the dominant form of education in their organizations.

Kumar (2010) stated that because of its comprehensive features, the system of distance education can play a proper role in education by creating social changes in underdeveloped groups. Negi (1999) suggested that "the participation of disadvantaged groups can be increased by stablishing more study centers in the rural and tribal areas, programs designed for each of the local needs, and creating awareness about open distance learning programmes" through the media.

Therefore, what is considered as the main issue of research is (a) the role that the system of distance education, as a reflection of the use of technology in the educational process, can have in the popularization of science in the community, and

(b) that granting such a role is based on what benefits and is associated with what risks.

Methodology

The main objective of this study is to investigate the role and place of distance education as a modern mode of training and an alternative to traditional methods of teaching in the dissemination and promotion of science. With regard to the purpose of the study, the research questions are as follows: (a) What is the status of the implementation of distance education in general and in comparison with traditional systems in the dissemination of knowledge? (b) What are the benefits of the system of distance education that have succeded the traditional systems in disseminating science? The data collection method includes identifying, studying, and summarizing the scientific resources available in the literature such as books, research reports, and published scientific papers.

Distance education and the dissemination of science

The first decade of the twenty-first century has been called the decade of awareness. The purpose of this designation has been known to be the full-scale development of human knowledge and awareness (Bowles, 2000). Publication of scientific journals, Internet sites with scientific content, books, films, video publications, programs such as science and technology awards, organizing olympiads, scientific communities and festivals, and setting days or weeks of science and technology in some countries exemplify important programs and resources that have been performed in this regard. Science and technology have affected food production, health care, industrial development, rural development, and even family plans for minor affairs. It is evident that formal education has been an important tool in the formation of this and certainly has had an important role to play. However, what is clear in this regard is that with all ongoing efforts in formulating strategies in the formal and traditional system of education to further promote science, rapid changes in science and technology have caused a lot of these changes to remain outside this system. Besides, traditional formal education systems in their best condition are not in a position to meet the immediate needs of the people who are in industry and encounter the new scientific and technological requirements.

In such circumstances, it seems natural that traditional methods of teaching and learning lose their effectiveness for those aming to move on to the information superhighway. Consequently, new methods and procedures should be sought to transfer and promote science and knowledge that lack the limitations of traditional methods and have features that meet the existing conditions. Therefore, while it seems inappropriate to deny the key role of the traditional formal education in disseminating and promoting

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science, it is necessary to search for other educational models that can play major roles in this respect. Among these, the electronic learning system, by virtue of its features and its actual and potential capacities, can play an essential role in promoting science.

The demand for learning is on the rise due to population growth and multiple changes in different aspects of human life as well as educational policies. No doubt, this will bring about issues such as shortage of teachers, space, and educational facilities, especially in universities and institutions of higher education, and will make a group of people stay outside the educational system.

There is sufficient evidence for the role of education in the development and progress of all societies. Of course, in the turbulent and changing condition of the modern society, no remarkable progress can be achieved without a modern and quality system of education. Within the educational system, the system of higher education has a certain effect on organizing various stages of education, including undergraduate levels, graduate studies, research, and everything else related to professional practice, development of values, and manufacturing activities of science and technology. As a result, without a doubt, it is understood that the reduction of the above mentioned gap mainly depends on the appropriate structure of the educational system. This situation can be tested by comparing the decent research and educational systems of developed countries to those of the less developed countries, which lack such systems.

The study of related literature on distance learning broadly reflects that the views and opinions are based on few empirical works. On the other hand, detailed information on the status of services, courses offered through distance education systems, and the number of people receiving these services at national and international levels are nonexistent. What is available in this respect, is more at local and college scales. Therefore, researchers have had to confine themselves to these views and statistics in their explanation of the status of distance education.

On the world stage, open and distance learning have achieved a tremendous level of development in the last two decades. Because this type of training provides the knowledge required of a person during study, work, and in the family simultaneously, it allows him to maintain the process of skill development in his economic life by means of continuous learning.

Distance education has had a growth spurt over the past decades. Requests of different social groups to take advantage of distance learning programs provide the groundwork for understanding to what extent distance education has met the needs of different groups (Rao, 2008). This issue is quite observable from the increase in enrollment in distance education institutions (Cavanaugh, 2005; Fozdar & Kumar, 2006).

Literature review shows that the number of institutions of distance education, the number and variety of courses, qualifications, participants and users of distance education, and the geographical regions and countries providing this type of education are rapidly increasing. The transfer of knowledge through technology platforms has outgrown and quickly emerges itself as a successful method of learning science in the twenty-first century.

The scope of using distance education in the dissemination of science

Historically and upto the 1980s, distance education was used in different forms and with different objectives (Moore & Kearsley, 2011). More recently, it has been used to educate adults for professional or career choices, to meet commitments in order to keep their businesses, and to progress at higher levels or to complete their qualifications.

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Over the past ten years, new models of distance education have been unprecedentedly accepted to provide educational services in higher education, especially as a way to reduce costs, which is expected as the number of students to each professor increases (Tinker, 2001). Today, it is possible to get a BA, MA, and even PhD degrees without any physical presence at universities (Anijar, 2004).

It seems that the future role of distance education in the dissemination of science will be more meaningful. Distance education is a major trend in education, a strategic plan for development, and a new source to develop course resources for educators at universities and other educational institutions. In industry, distance education is both a way to change the traditional methods of teaching used in training skills and a new resource for literacy.

Distance education institutions not only transmit training as an alternative to formal systems of education, that is, conventional courses and programs, but are also active in areas as career and vocational training, continuing education, teacher training and even high-level technology-based learning (UNESCO, 2002; Bourne, Harris, & Mayadas, 2005) . Distance education has even contributed to technical education (Mehrotra & Sacheti, 2005).

Because universities can be counted as archetypes of knowledge organizations, academic societies are expected to utilize the methods that are based on management of knowledge more seriously to produce, share, organize, and make more effective use of information resources, knowledge, and intellectual capital.These valuable assets should be discovered, saved, and updated irrespective of their being internal or external, overt or covert, and adequately offered to enthusiasts by employing the latest technologies (Hazeri & Safarzadeh, 2006).

In industry, rapid changes in the field of knowledge and skills provide for competition and rapid business changes, especially in the field of small and medium-sized businesses, causing demand to provide learning opportunities and continuing education by private and public institutions. There is the need for a paradigm shift in the educational approaches in both official and unofficial sectors to develop the skills known to society, and this can not be achieved by the formal system of education alone.

In countries where the bulk of affairs and activities are state-run, and a high percentage of employees are employed in the public sector, the system of formal education can not meet the needs of employees to develop the skills and knowledge they need due to their working conditions and characteristics of this system. Here, distance education can play an important role in providing flexible conditions and effective training.

Distance education provides for the promotion of science in the following groups and social strata.

(1) People living in remote areas: In many remote areas people do not have access to conventional in-person education for various reasons.

(2) Women and girls: Gender differences in access to education is a very big challenge in developing countries. In these communities, inequality between men and women is growing; they constitute 78% of the world's illiterates. Taking these cases into account, the necessity to pay due attention to the education of girls and women and gender equality in access to education has been included in the development goals of the millennium and the international document of education for all.

(3) People with physical disabilities: Distance education provides the opportunity to help people overcome their learning obstacles by providing various kinds of printed, video and audio learning materials whose users require the abilities to see and/or to hear.

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(4) People outside the school: A significant number of people around the world do not have access to education. The implementation of distance education provides the context and capacity to promote and transfer science to this large group of people.
(5) Clerks and workers: In a rapidly changing world, lifelong learning is the only requirement for survival. In fact, lifelong learning is a necessity for living in the world today. Hence, the issues related to the management of knowledge and the organization of learners receive more attention each day. Consequently, to comply with the new demands of workplace and new technologies, the workforce need to learn, and distance education is the best source to develop knowledge and skills among the trainees.

Advantages of distance education in the dissemination of science

Distance education has spread via the Internet and computers from the last two decades of the twentieth century and has had good results in different countries. It has changed the category of education from the process of teaching (instruction) to the process of learning (acquisition) (Berg & Collins, 1995). Distance education has undoubtedly been able to remove many of the issues and problems, and in the current era, which is the era of information technology, population expansion and the growing need for more education, it enables more people to participate in the learning-teaching positions by unsettling the traditional equations and methods of teaching. In this way, it is more conducive than the traditional education in the popularization of education, thereby weakening the social gaps. This leads to the growth of societies, which is followed by social, cultural, and economic development.
Science is the path to economic growth and prosperity, and distance education is a way of providing job training for persons who have been denied access to it and allowing them to develop their learning opportunities and training (Mishra, 2004). He remarks that distance education, because of its flexibility, friendly approach to learning, high cost-effectiveness, usability for full-time workers, especially for those who do not have access to the system of formal education, is increasingly being popularized.
Distance education, by providing educational opportunities for lifelong learning of a wide range of learners, is considered as a successful model of education. More importantly, because of providing training programs for employees who wish to update their knowledge and skills, it plays a vital role in higher education (Rao, 2008)
In addition, the costs of education and training can be significantly reduced by this mode of education. Distance education has a crucial role not only in the development of education among a large number of people but also in the reconstruction of the old educational systems, stimulation of in-service training systems, immediate response to new demands, and practical application of new technologies. Therefore, open and distance education, form an important aspect and tool that, by considering strategic tasks, will rapidly and extensively direct developing countries to the modern situation; hence approaching the living standards in developed countries.
According to Boyaci (2000), in today's global and post-modern community, distance education is essential to direct the educational environment and to feel the necessity for change in the society. In a sense, it leads all aspects of life to the extent that it provides the conditions for our survival. All educational institutions have important roles in the implementation of this, i.e. creating and directing the processes of change.

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Platforms facilitating the use of distance education in the dissemination of science

The advantages of distance education in the promotion of science emerge and are realized in the context of capacities and potentialities of varying dimensions. Creating facilities such as email, blogs, discussion groups, and mailing lists using the technological tools and know-how has effectively contributed to the transfer of knowledge and information; an innovation that can herald more share of knowledge and better utilization of resources in the future to enhance efficiency, competence and innovation at universiteis.

The factors contributing to the growth of this of mode of education are economic benefits, flexibility, and eliminating the distance. In distance education, there is no need for physical buildings to offer educational services. Here, compared to traditional methods, teachers and educators have more opportunities to train a greater number of people (Dodds, Perraton, & Young,1972).

Summarizing the literature, it can be noted that the following substrates are effective in the proper use of distance education in disseminating science.

(1) Technological infrastructure
(2) Human infrastructure
(3) Pedagogical infrastructure
(4) Economic infrastructure
(5) Socio-cultural infrastructure
(6) leadership and management infrastructure
(7) Support systems and administrative infrastructure

Barriers and problems of distance education in the dissemination of science

Participation in any area, including specialized knowledge, forms the basis of relative identities and the perception of social distance and position of the audience and participants. In this context, various benefits may be subjected to risk (Paya, 2009).

Although distance education has led to lower education costs, increased productivity, saving time, elimination of commuting to educational sites, and dozens of other benefits, its necessity, advantages, and a culture of acceptance of this type of education are still not so clear for many people and managers in charge of organizations.

A modern educational system, is qualitative, research based, unlimited, and varied. The task of learners at such a system entails information management and knowledge production. As a result, the use of modern methods is more practical and more effective in organizational entities due to the kind of conducts, the type of relations, the age of participants, technological development, and the move toward knowledge-based organizations . However, organizations are faced with various problems in the implementation of this method. These problems include: (a) lack of a suitable position for distance learning in organizations and institutions, (b) technical problems (hardware, software, network requirements, etc.), (c) problems related to the design and preparation of course content, (d) problems related to the support of the new method, (e) problems related to the low level of information literacy, and (f) problems related to teaching and learning management systems.

In addition to the above, to play a role in the development and dissemination of knowledge, distance education confronts obstacles that have been dealt with to a lesser extent. The literature on these obstacles can be summed as follows:

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(1) Using a team approach: There is the need for a team of technical and training experts for the development of the content and the training courses.
(2) High volume of faculty members' duties: The need to teach using new methods in order to offer the same content, typing of the content, evaluating, and correcting assignments leave no opportunity for their talents to emerge. It should be noted that in the system of distance education, lreaners need more support compared to traditional courses.
(3) Cultural differences: The large population of students with different cultural backgrounds makes it difficult to provide relevant course curricula for the learners of different areas.
(4) New technologies: In distance education, instructors have to develop their knowledge of computers, network, email, and other new technologies.
(5) Separation and alienation: In distance education, communication is highly structured and formal rather than being verbal; as a result of which, separation and alienation constitute a trend in this system.
(6) Coordination problems: Population growth (compilation teams and the learners' population) requires more coordination.
(7) Heavy reliance on technology: Any damage to the employed technologies such as network outages, failure of computers and players, etc., would disrupt the educational situation.
(8) The high cost of technology: It is a significant issue both at the individual level and at the level of the institutions that provide training
(9) The need for high motivation: The dropout rate is very high in this system. Studying at higher levels of education and its completion require motivation and self-centeredness (Perraton, 2005).
The challenge for Daniel (1996) in distance education was to arrive at a right mix between the learners' independence (students' interaction with the content) and interaction (mainly the interaction between faculty and students); in the 21st century there is still the challenge to determine the right combination. Now, the challenge is manifold because we have to arrive at a combination of six types of interaction, while at the time of Daniel mostly two types were present (Ebrahimzadeh, 2007).

Conclusion

Literature review suggests an increase in educational institutions providing distance education as well as the number of registrants and participants in distance education training courses. Although there are no accurate statistics on national and international levels in this regard, local and academic statistics testify this. This is consistent with the results of a previous study (Kim, Curtis, & Zeng, 2005) that demonstrated the predominance of e-learning in education and the belief that e-learning will become the dominant educational mode in the US organizations.
The results also indicate that distance education is a suitable source for any action to facilitate and accelerate the dissemination of knowledge and helping people and organizations to minimize the related costs and difficulties. Distance education is useful for teaching a wide range of topics and subjects including general and job-related tasks and skills to cover the shortcomings of other techniques and skills in training up-to-date skilled workforce, which serves a large number of people. The results of this study is also consistent with the findings of the study carried out by Ebrahimzadeh (2007) indicating that this educational system has many advantages and that provides a good opportunity for volunteers to achieve the main goal of the university and operationalizing the motto of higher education for all, all the time and everywhere.

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The system of distance education, by providing educational opportunities for lifelong learning of a wide range of students as well as providing training programs for employees who wish to update their knowledge and skills, plays a vital role in higher education and is considered as a successful model. This conclusion is compatible with the results obtained by Kumar (2010), Munshi (2009), and Negi (1999) indicating that, the dissemination of knowledge can best be achieved by developing appropriate programs meeting the real needs of people through the media.

However, in order for distance education to succeed as a symbol of the application and effectiveness of changes and scientific developments in the field of education and learning that plays a great impact on the promotion and dissemination of knowledge among the various strata of society, especially the groups that lack the privilege of formal education, it is required to provide the necessary infrastructures and standards prior to its implementation and to sustain them thereafter. Experience shows that because of disregarding the infrastructures and standards, distance education has remained far from achieving its goals in less developed countries. Therefore, it is recommended to identify the challenges facing the development of distance education and employ the experiences of the prominent countries in this area in the selection and implementation of the most appropriate method.

References

Abreu, A. (2004). *The workshop on the popularization of science and technology.* Rio de Janeiro, Brazil.

Anijar, K., Noble, D. F., Trend, D., & Raschke, C. A. (2004). Proletarian Professors, Digitized Classrooms.

Berge, Z. L., & Collins, M. P. (Eds.). (1995). *Computer mediated communication and the online classroom: distance learning*. Cresskill: Hampton press.

Bourne, J., Harris, D., & Mayadas, F. (2005). Online engineering education: Learning anywhere, anytime. *Journal of Engineering Education*, *94*(1), 131.

Bowles, J. (2000). The E-learning potential. *Available at: www. Kdgonline. com/ webpages/ whitepaperconten t2. htm, o*.

Boyaci, A. (2000). Distance education as a challenging concept in sociology. *Turkish Online Journal of Distance Education*, *1*(2).

Cavanaugh, J. K. (2005). Are online courses cannibalizing students from existing courses. *Journal of Asynchronous Learning Networks*, *9*(3), 3-8.

Dagnino, R., Lima, M. T., & das Neves, E. F. (2016). Popularization of Science in Brazil: getting onto the public agenda, but how?. *Democracy*, *28*, 07.

Daniel, J. S. (1996). *Mega-universities and knowledge media: Technology strategies for higher education.* Psychology Press.

Djoudi, M. (2009). Expériences de Elearning dans les Universités Algériennes. In *CIIA*.

Dodds, T., Perraton, H. D., & Young, M. D. (1972). *One Year's Work: The International Extension College, 1971-1972*. International Extension College.

Ebrahimzadeh, I. (2007). Transition from Traditional Distance Learning to Online Learning at PNU: Innovation and Challenge of Change,(A Case Study). *Quarterly Journal of Research and Planning in Higher Education*, *13*(1), 113-134.

Received:14 June 2018/Accepted:10 September 2018/Published:24 December 2018

Fozdar, B. I., & Kumar, L. S. (2006). Teaching Chemistry at Indira Gandhi National Open University. *Online Submission*, *7*(2).

Hazeri, A., & Sarafzadeh, M. (2006). Knowledge management and the role of academic libraries. *Nama*, *5*(4).

Kim, K. J., Bonk, C. J., & Zeng, T. (2005). Surveying the future of workplace e-learning: The rise of blending, interactivity, and authentic learning. *eLearn*, *2005*(6), 2.

Kumar, V. P. (2010). Education for Social Change: Role of Distance Education in Wibal Upliftment. *Indian Journal of Open Learning (ISSN: 0971-2690)*, *3*(2), 36-39.

Mehrotra, V. S., & Sacheti, A. K. (2005, November). Integrating vocational education and training with open learning system: Taking skills training to door step. In *ICDE Internaional Conference*.

Merisotis, J. P., & Phipps, R. A. (1999). What's the difference?: Outcomes of distance vs.traditional classroom-based learning. *Change: The Magazine of Higher*

Learning, *31*(3), 12-17.

Mishra, A. (2004). Economic development and skills development. In: Arun K. Mishra and John Bartram (Eds.), *Perspectives on Distance Education Skills Development through Distance Education*.Vancouver: The Commonwealth of Learning.

Moore, M. G., & Kearsley, G. (2011). *Distance education: A systems view of online learning*. Cengage Learning.

Munshi, D. P., & BHATTI, T. (2009). Quality assurance in teacher education programmes offered through distance mode in Pakistan. *The Sindh University Journal of Education-SUJE*, *38*.

Negi, D. B. (1999). Impact of IGNOU on Disadvantaged Groups: A Critical Assessment. *Proceedings of AAOU Conference. Beijing.*

Palloff, R. M., & Pratt, K. (2007). *Building online learning communities: Effective strategies for the virtual classroom*. John Wiley & Sons.

Paya, R. (2009). The promotion of science in society: A philosophical evaluation. *Journal of Science & Technology Policy*, 1(1).

Perraton, H. (1993). National developments and international cooperation in distance education in Commonwealth Africa. *Distance education: New perspectives*, 250.

Perraton, H. (2005). *Open and distance learning in the developing world*. Routledge.

Rao, S. R. (2008). The social basis of distance education: Strategies for inclusive growth. *Asian Journal of Distance Education*.

Roesler, J. (2008). Comunicação, Socialidade e Educação on-line. Retrieved on July 2008 from http://www.abed.org.br/congresso2007/tc/552007104412PM.pdf

Romao, E. S. (2008). Educar, ensinar e aprender a distância na era digital: Princípios básicos. In *X Simposio Internacional de Informática Educativa SIIE 2008* (pp. 145-150). Ediciones Universidad de Salamanca.

Schall, V. (2000). Science education and popularization of science in the biomedical area: its role for the future of science and of society. *Memórias do Instituto Oswaldo Cruz*, *95*, 71-77.

Tinker, R. (2001). E-learning quality: The Concord model for learning from a distance. *nassp Bulletin*, *85*(628), 36-46.

Received:14 June 2018/Accepted:10 September 2018/Published:24 December 2018

UNESCO. (2002). Open and Distance Learning: Trends, Policy and Strategy Considerations (Eds M.M. Moore and A. Tait). UNESCO, Paris. [Online] http://unesdoc.unesco.org/ images/0012/001284/128463e.pdf [Accessed 16 Nov 2004]

Vasali, M., & Ojagh, Z. (2010). The promotion of science: Conceptual issues, methods and its importance. *Rahyaft*, 44(1).

Vilanilam, J. V. (1993). *Science communication and development*. Sage Publications Pvt. Ltd.

Received:14 June 2018/Accepted:10 September 2018/Published:24 December 2018