Analysis of Distance Learning in Smart Schools in Iran: A Case Study of Tehran's Smart Schools

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ABSTRACT

In the paradigm of information society the structure and facts have become flexible and subjective. In the recent social - economic order, IT and communication have taken over the leading role. Distance learning in smart schools is one of the flexible realities in the education field that has crossed the format of the hard and inflexible traditional schools such as boundaries of time and place and has provided educational content by using multimedia and networking software and computers. This study analyzed distance learning in smart schools within the regions of education of Tehran. The subjects for study were teachers and administrative staff of Tehran's four smart schools. Survey research method was used. Then using a questionnaire, smart school teachers' comments were collected and analyzed. Using a Likert 5 spectral pattern in the form of questionnaire, indicators were identified. The population of this research was the smart schools in Tehran. Given the widespread pattern of Tehran, four top smart schools in Tehran were identified as sample. Our sampling method involved two-stage cluster sampling and census. At first among smart schools in Tehran, four clusters were selected with indicators such as history, area of education, student population, and gender. Data collection was conducted in two phases and with two methods. Then an attempted was made to test the hypothesis using Pearson's correlation and regression testing. Results indicated that there should be an emphasis on systematic approach in distance training and also that one-dimensional view lead to failure to achieve distance learning objectives. There was a significant relationship between elements of software and hardware infrastructure and distance learning in smart schools and also between the ability of teachers and the establishment of distance education.

Keywords: *distance learning, smart schools, infrastructure, software and hardware, Iran*

INTRODUCTION

Society is in transition to a new model of economic – social order based on knowledge and information processing. In other words, knowledge and information are the raw material for a new society. The new structures and factors are associated with structures that do not completely conform to the requirement of the industrial paradigm. While in previous diverse range of industries often faced with hard facts, and structures, uncompromising physical and material needs, in the paradigm of information society, these facts and structures are flexible and subjective. In the recent economic- social order IT and communication have taken over the leading role so even workers become a knowledge-based workforce. This technology is actually a set of tools and methods that collect, store, retrieve process and distribute information in a variety of forms and provide means to overcome the problem of unresolved historical detachment and lack of access to information and knowledge which are the main obstacles to the development of education.

ICT created a new educational landscape due to changes in content and methods of learning and the

function of educational institutions (Salimi & Ghonoodi, 2011). Use of these technologies has changed the educational system (Liaw, Huang, Chen, 2007; Liu, Liao, & Pratt, 2009; Özpolat & Akar, 2009) and strengthens the processes of learning and teaching (Paechter & Maier, 2010). Learning is fundamentally changing; it is no longer limited to attending classes (Wang, Wang, & Shee, 2007). Distance learning is described "as instructional delivery that takes place when learners and teachers are separated throughout the learning process by time and physical distance" (Motamedi, 2001, p. 386). The distance learning phenomenon has been established due to the learners' tendency to seek non-personal access to course material, limitations of time, place, and problems of mandatory attendance and on time attendance in academic classes. Computer networks, especially the Internet and the World Wide Web in this way have created a special facility.

In distance education, students can take courses without reference to their own school buildings to register and they can participate in virtual classes unlimited by time and place. Therefore, the role of information technologies, the Internet, software for distance learning, virtual libraries, web and its interactive capabilities specially link technology, hypertext, and meta-data models is undeniable. These provide a robust and secure infrastructure to support the distance education process via the Internet. As a result of the interactions between the system and the students, the classroom environment and human communication are simulated and even by providing answers to possible questions students may complete the training process. In the field of distance education, in addition to the various technologies used, items such as the ability of teachers and students, available library facilities, network support, software facilities, elementary training, study skills, improving procurement procedures, transmission, delivery and evaluation of training materials, types of IT-based training, and training management also arise; all these play an effective role in improving the quality of learning and solving problems of absence in traditional classroom and promote scientific relations.

Iran is still in the early stages of planning and implementing the smart schools plan. According to the Supreme Council of Information and Communication Technology of the Ministry of Education, pilot implementation of the model began in 2008 in four schools in Tehran. In the 2011-12 school years, the majority of nationwide education institutions have decided to implement the smart schools project. The research questions for this study are:

- What facilities and equipment are required for classes via the Internet?

- What skills are smart schools teachers and staff required to execute distance learning courses and what skills do they have.

- What is the current status of the smart schools facilities?

Given that distance education has become prevalent in the last two decades, it seems to have had a good result in different disciplines and countries and has changed the focus of education from teaching to learning (Berge & Colllins, 1995). In addition, smart schools in the world have had good growth even in Asia (Norman, 2001). However, in Iran we are facing the changed nature of the smart school pattern. Up to now what has been done in smart schools was at the level of installing projectors and smart boards. Looking at the various components of this model implies that both the hardware infrastructure such as computer accessories, Internet networking and LAN systems, designing classrooms to suit smart school needs and software infrastructure such as backup rules and regulations and smart schools teaching and learning, digital libraries, and skilled and trained manpower should be seriously considered. Therefore, further study is necessary to assess the facilities of smart schools.

Literature Review

Smart schools are schools that are flexible with respect to the features and student capabilities (Salimi & Ghonoodi, 2011). Computers also have affected teaching and evaluation and led to curriculum transformation. As the Internet and accessing web sites are of major infrastructure planning in smart schools, students gain the ability of processing information so they can increase their amount of learning (Rahimah, 2003). The Malaysian Smart School Roadmap (2005) states that these kind of schools are learning institutions in which all the learning, teaching and management processes are reinvented in the information age to help students to be effective and able.

Collaborative efforts can provide students with positive and meaningful learning experiences as Jeffs and Banister (2006) noted. Smart school is not limited to the use of ICT in teaching and learning but national curriculum and pedagogy, teachers, school administrative staff, parents and the community that enhance the education of Malaysian students have important role. In the definition of smart schools in Iran, it is also stated: Smart schools in Iran are schools that are developed schools that for the transmission of traditional concepts, information and communication technology tools will be used. These tools include computer programs, specially the use of applications, such as slides (PowerPoint), lexicography and spreadsheets and Internet facilities (Education and Training Organization of Tehran, 2005). In the smart schools, using the Internet, students have access to vast reservoirs of information. For getting answers to their questions, students interact not only with teacher but also with other students. Content is presented electronically and teacher acts as a guide (Nozari & Nozari, 2013).

The use of distance learning in smart schools of America has begun in the United States and has found its way into other countries (Norman, 2001). In a study conducted in India, the author has tried to change the world of computers and communications and explained their role in providing the resources required for Internet-based training course in smart schools and discussed distance education in smart schools in India as case study (Sign, 2007). Dringus and Scigliano (2000) reviewed the history of academic courses via the Internet at Nova University in the United States from1980 to 2000 and explained the inherent problems and obstacles and discussed their solution. In this study the systems and technologies for distance education programs, facilities and capabilities of the system and the relationship between students and teachers, and software used in teaching courses and presentations of conferences and remote resources were discussed and analyzed. In another study learning using information technology is classified and explained; in the first stages, available scenarios have discussed this kind of training and methods of preparing materials for them and then the communication services required for each scenario are described. According to this analysis components and features required for each scenario are included in the three protocols – components used in communications, data management and special functionality for learning. The author has tried to analyze all sorts of aspects of distance education with special situations of communication between teacher and student, student and student, and the students with the system (Knierriem-Jasnoch, 2001).

In IT-based self-learning, educational environment including computer and education software is used. The plan includes the following elements: a) transmission of multi-media resources; b) consultation and interaction between teaching and learning; and c) a series of tests and results. To fulfill the self-learning course, training software can be done offline or online or by combination of both (Knierriem-Jasnoch, 2001). For distance guidelines, the self-learning environment is developed by telecommunications. This IT-based education initiative consists of the following elements: a) connect via telecommunications to guide or instructor; b) remote monitoring of one or more students; c) in response to student requests concurrently; d) provide access to training materials via student workstation; and e) a set of performance results. By considering transformation of the training materials, interaction with training materials and results, all the features of self-learning schemes are also available in the plan. The only difference is that in this design a human head is involved in a system. There can be a point to point relationship with the framework of video conference system based on an ISDN or TCP/IP. In this case there are clear examples such as systems in a business-visual conference or Microsoft network visualization such as ELSA vision or Picture Tel (Tapscott, 1998).

METHODOLOGY

The present study was a descriptive –analytical research. As it assesses the feasibility and implementation of distance learning of smart schools in Iran, there is a need to review, identify and compare the available facts. Survey research method was used. This means that at first a set of cases were identified as facts of possibility of holding distance learning via the Internet for smart schools using materials, policies have been determined. Then using a questionnaire, smart school teachers' comments were collected and analyzed. Using a Likert 5 spectral pattern (totally agrees 5, and completely disagree 1) in the form of questionnaire, indicators were identified.

The population of this research is the smart schools in Tehran. Given the widespread pattern of Tehran,

four top smart schools in Tehran have been identified as sample. These four schools were selected because the model of smart schools in Iran was started in 2008 by these schools on an experimental basis.

Our sampling method is two-stage cluster sampling and census. At first among smart schools in Tehran, four clusters were selected with indicators such as history, area of education, student population, and gender.

Data collection was conducted in two phases and with two methods. Firstly, through interviews with some of the teachers in smart schools, information obtained about the facilities, equipment and conditions required for distance courses and online classes especially in the smart schools then specified conditions assessed in the form of questionnaire.

FINDINGS

Data Analysis

Computer Technician. The teachers and administrators were asked whether it is necessary to have computer technician to administrate distance education.

Table 1 Likert for items related to computer technician

1	Completely disagree	Disagree	No idea	Agree	Completely agree
2	4%	3%	7%	56%	30%

Having laboratory specialized to smart schools. The teachers and administrators were asked: for holding distance education courses whether smart school groups should have labs? Their answers according to the Likert scale are shown in Table 2.

Table 2 Likert scales for items related to having LAB.

1	Completely disagree	Disagree	No idea	Agree	Completely agree
2	8%	12%	5%	48%	27%

The necessity of having a digital library in school. In this school administrators and the teachers were asked about the necessity of having a digital library on the Internet for distance education in smart schools, and their responses are summarized in Table 3.

Table 3 Likert scales for items related to having a digital library

1	Completely disagree	Disagree	No idea	Agree	Completely agree
2	8%	12%	5%	48%	27%

The necessity of having a smart board. The teachers and administrative staff were asked whether it is necessary to have a smart board for distance education courses in smart schools. Their answers are shown in Table 4.

Table 4 Likert scales for items related to having electronic and smartboard

1	Completely disagree	Disagree	No idea	Agree	Completely agree
2	12%	12%	7%	40%	29%

Internet Networking. Administrative staff and the teachers were asked whether it is necessary to have online networking with other schools and the necessary resources and databases. Their responses are shown in Table 5.

Table 5 Likert scales for items related to having internet networking

1	Completely disagree	Disagree	No idea	Agree	Completely agree
2	12%	12%	7%	40%	29%

Familiarity with software related to distance education. In this case, the respondents were asked whether it necessary to be familiar with software related to distance education. Their responses are shown in Table 6.

Table 6 Likert scales for items related to being familiar with related software

1	Completely disagree	Disagree	No idea	Agree	Completely agree
2	13%	8%	3%	53%	23%

The history of holding classes via the Internet. The teachers and administrators were asked whether the history of distance education courses via the Internet is essential. Their responses are shown in Table 7.

Table 7 Likert scales for items related to history of holding Internet classes.

1	Completely disagree	Disagree	No idea	Agree	Completely agree
2	195%	20%	9%	33%	29%

Using online resources as subsidiary. The teachers were asked whether using online resources by teachers is essential. Their responses are shown in Table 8.

Table 8 Likert for items related to using online resources.

1	Completely disagree	Disagree	No idea	Agree	Completely agree
2	10%	5%	9%	54%	25%

Having specialized LAN system in smart school. The teachers were asked whether designing LAN system is essential to create proper communication with environment and students parents. Their responses are shown in Table 9.

Table 9 Likert scales for items related to having specialized LAN system

1	Completely disagree	Disagree	No idea	Agree	Completely agree
2	15%	9%	8%	21%	27%

Testing Hypotheses

Hypothesis 1

Hypothesis H1: There is a significant relationship between the hardware and software infrastructure in smart schools and distance education courses.

Hypothesis H0: There is no significant relationship between the hardware and software infrastructure

in smart schools and distance education courses.

A - Pearson correlation test

Table 10 Pearson Correlation Test of Hypothesis 1

Correlation coefficient	The number of responder	Significance level
R= .785	N=120	α=/43

This test (Table 10) revealed a weak positive correlation between the independent variable of the hardware and software infrastructure and distance education variable in smart schools. The results show that for a unit change in the independent variable, the value .785 unit changes in the dependent variable can be expected. This prediction is bilaterally significant at the level of 95% based on the above test.

• Regression testing

Table 11 Regression Testing of Hypothesis 1

R	R^2	Adjusted R^2	F	Sig. *F*	β
0.245	0.565	0.061	22.886	0.047	0.785

Table 11 shows the regression output. According to this Table, F test which is the test for approving or rejecting a hypothesis is significant at the level of 95% and confirms the relationship between two variables. β is the kind of statistic indicates that 0.785 changes are predictable. R^2 represents the identified amount of variable "Y" in relation to the variable "X". R^2 indicates 0.565 which implies 56% of variations of variable "Y" -- inserted "X" and the rest is related to other "Xs".

The results of *F* test, Pearson correlation, and regression analysis show that there is significant relationship between hardware and software infrastructure in smart schools and the possibility of establishing distance education. Then hypothesis H1 is conformed and null hypothesis H0 is rejected.

Hypothesis 2

H1: There is a significant relationship between capabilities of teachers and school administrative staff and the possibility of establishing distance education.

H0: There is no significant relationship between capabilities of teachers and school administrative staff and the possibility of establishing distance education.

A - Pearson correlation test

Table 12 Pearson Correlation Test of Hypothesis 2

Correlation coefficient	The number of responder	Significance level
R= .654	N=120	α= .000

This test (Table 12) revealed a positive and high correlation between the independent variable of the needed capabilities of teachers and school administrative staff and the dependent variable of distance education. The results show that for a unit change in the independent variable, .654 unit changes in the dependent variable can be expected. This prediction is bilaterally significant at the level of 99% based on the above test.

B - Regression testing

Table 13 Regression Testing of Hypothesis 1

R	R²	Adjusted R²	F	Sig. F	β
0.284	0.533	0.077	26.054	0.047	0.654

Table 13 shows the regression output. According to this Table, *F* test which is the test for approving or rejecting a hypothesis is significant at the level of 99% and confirms the relationship between two variables. β is the statistic indicating that 0.284 changes are predictable. R^2 represents the identified amount of variable" Y" in relation to the variable "X". R^2 indicates 0.533 which is 53% of variations of variable "Y" can be accounted for by the inserted "X" and the rest is related to other "Xs".

The results of *F* test, Pearson correlation, and regression analysis show that there is significant relationship between capability of teachers and school administrative staff and distance education. Then hypothesis H1 is conformed and null hypothesis H0 is rejected.

DISCUSSION AND CONCLUSION

Technological innovations have had a strong and far-reaching effect on our lives. They have changed societies. As Vita-More (2014) explains, the experience of modern technology is an experience of change, and in this experience, the familiar may be lost or altered forever. But it is not lost forever; it evolves. As it is obvious from analysis of structures of research variables, both the teachers and the administrative staff of smart schools insist on a system approach in administering distance education and reject the one-dimensional approach. In this systemic approach all elements of software and hardware infrastructure for distance education in smart schools should be present. As the conceptual model reveals, these infrastructure have mutually dependent relationship with each other. Hence, it is necessary that the country's education system administrators take into consideration the integrity of elements of distance education. By considering the requirements of the information society and the increasing demand for distance education by different social classes, planning and formulation of related laws and regulations should be the most important challenging infrastructure. Then the following cases should be examined: a) rules on how to evaluate a distance education degree; b) rules on how to establish distance education (focused on by different institutions); c) rules concerning the definition of authority of institutions in holding distance education; d) rules relating to the requirements for participation in distance education; e) rules on how to reform and state the opinion of teacher; and f) rules regarding online network security system.

It should be noted that many of the social issues of educational affairs after administering training programs and through observations and surveys and feedback can be studied.

Through this study three overall results were obtained:

- Smart Schools do not have the potential functionality and capability for distance education courses.

- It is necessary that the teachers and administrative staff could investigate further the distance education following up its implementation at different levels and in different classes.

- With regard to the first case and having the potential performance of such work and along with the progress made in this area, it is essential that schools have a systematic plan for the distance education and with the systematic and purposeful stances pave the way to achieve it. On the other hand, observing the Pearson correlation between the independent variables, including the capability of teachers and administrative staff to establish, it is essential that the country's education system authorities act toward holding classes to be able better act in continuing to apply the new teaching model.

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