Considering the Effects of Open Courseware Education Website Technology on Improving Educational Productivity

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ABSTRACT

Information technology is one of the largest and most important human achievements in the present era whose influence on most human activities is undeniable. The traditional education system is being affected by the information technology and it is now turning into an electronic education system. One of the newest issues in the field of electronic education is the effects of web page achievements on it which have resulted in the creation of the necessary capabilities to improve education, in addition to removing any time and place limitation; therefore, educational productivity has also been affected. The aim of this study is to consider and determine critical success factors and parameters in the open courseware education system in order to investigate the productivity of this system through studying the selected parameters in a sample population. It means that all the above mentioned factors lead to the improvement of the open courseware education system in the society; as a result, the necessary attempts to determine the level of productivity of these parameters in a new environment were done through field and library researches. The results of this research showed the effects of virtual universities on productivity improvement in the population under the study (Mazandaran University), in addition to investigating and determining the features of virtual universities with an open courseware orientation.

Keywords

Information Technology - Electronic Banking - Risk - Risk Control

INTRODUCTION

Virtual education system is a system through which researchers and experts can perform teaching without being present in the learning environment. Such a system, in fact, means that they can attend the learning environment and use educational equipment without being limited to a specific time or place. Each learner can register through Internet and attend the environment; they can take their exams in virtual institutes and become aware of their results. They can become in touch with their professors at any time or they can use the archives of the exam papers and the held classes.

The open courseware website which is one of the most important and significant virtual educational products in the world, has some major characteristics which have contributed in its more and fast extension. Of its characteristics, the following can be named:

- Creating the possibility of access to the learners' educational needs at each level and different courses (Abasi Esfajir, Rezaee Qal'e, 2011: 3);
- Facilitating access to the information;
- Increasing learning the unknowns;
- Creating the capability of pre-learning before the beginning of educational courses and investigating the knowledge;
- Creating easy search capability for scientific issues and educational pamphlets; and
- Creating the capability of easily using scientific resources cited in the open courseware education website (Saeedi Nejat and Vafaee Najar, 2011: 3).

The conceptual model of the effective factors on the open courseware website which is the summary of studying different resources has been demonstrated based on the types of primary and secondary factors
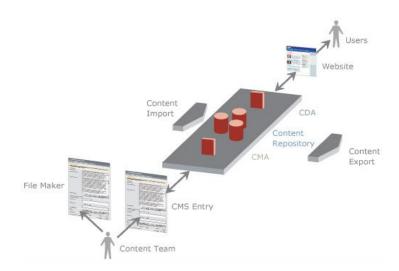
Figure 1. The Conceptual Model of the Open Courseware Education System

Research Questions

- What are the effects of launching a free education website on the improvement of users' satisfaction?
- What are the effects of launching an open courseware education website on the satisfaction of the requirements of users' virtual education?
- What are the effects of launching an open courseware education website on the satisfaction of the requirements of educational institutes' virtual education?
- What are the effects of launching an open courseware education website on the improvement of knowledge management in organizations?

Research Goals

The research goals can be stated as below:

- Considering and identifying virtual education;
- Considering and identifying the open courseware education website;
- Determining the significant features and characteristics of the open courseware education website; and
- Considering and identifying the effects of the open courseware education website on the improvement and development of knowledge in Mazandaran University.

Research Significance

The increasing needs of people and organizations' employees to education, their lack of access to educational institutes, lack of equipments, lack of professional instructors, and too much costs have contributed to the creation of new methods in education using information technology support. These methods must be both economical and of high quality and at the same time, they must satisfy the needs of a large number of people (Ebadi et al., 2010: 2).

Spending too much money and time, changing geographical locations, problems related to timing and providing appropriate schedules, and covering educational steps to acquire knowledge have all resulted in the creation of such an idea; in this idea, educational materials are moved towards the learners and it has been attempted to create learning with the least probable problems with respect to all human resources in the world. All the mentioned requirements have caused the necessity of creating a new capability known as open courseware education website through which all people of the society are provided with an equal opportunity to acquire knowledge.

LITERATURE REVIEW
The History of Virtual Education

Distance Learning was first created in the 19th century as the correspondence study. Experts have stated that the best place to be educated is a university which helps one reach their goal, even if it is far from them. Electronic education in its modern form and with such an application was created at the early 1990s due to the emergence of the Internet; electronic education grew fast considering too many functions of the web and it has now registered its place in the educational structures of many countries (Nasiri, 2011: 3).

The idea of electronic education was first stated by a university in England as the Open University plan; in 1988, a software program was first used in the United States named as "digital master" which proposed one of the primary usages of computer in the issue of education. Since then, electronic education has changed a lot; in 1995, applying some changes to their system and optimizing them, scientific-educational centers of the United States could promote the electronic education method every where in the world (Ataee, 2010: 3).

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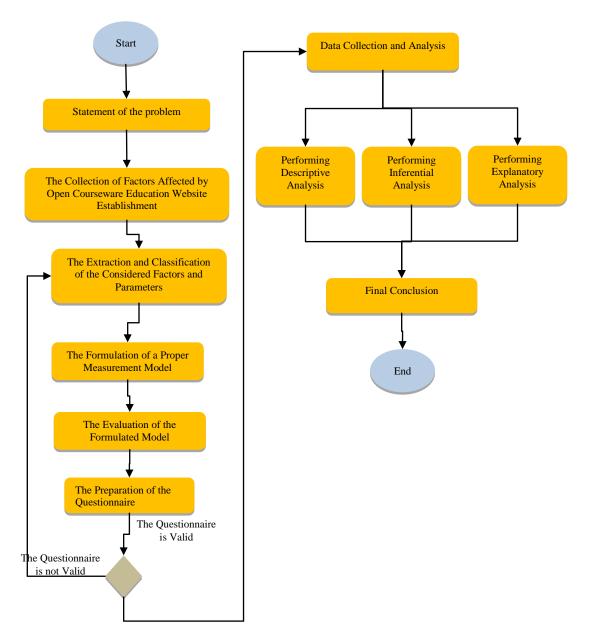
Diagram 1. The Algorithm of the Operation of Investigating the Open Courseware Education Effects on Productivity Improvement

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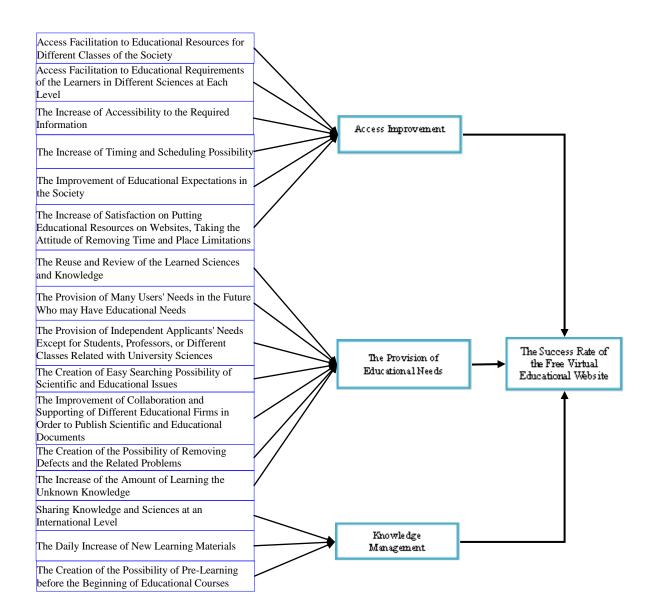
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Access Facilitation to Educational Resources for Different Classes of the Society

Access Facilitation to Educational Requirements of the Learners in Different Sciences at Each Level

The Increase of Accessibility to the Required Information

The Increase of Timing and Scheduling Possibility

The Improvement of Educational Expectations in the Society

The Increase of Satisfaction on Putting Educational Resources on Websites, Taking the Attitude of Removing Time and Place Limitations

The Reuse and Review of the Learned Sciences and Knowledge

The Provision of Many Users' Needs in the Future Who may Have Educational Needs

The Provision of Independent Applicants' Needs Except for Students, Professors, or Different Classes Related with University Sciences

The Creation of Easy Searching Possibility of Scientific and Educational Issues

The Improvement of Collaboration and Supporting of Different Educational Firms in Order to Publish Scientific and Educational Documents

The Creation of the Possibility of Removing Defects and the Related Problems

The Increase of the Amount of Learning the Unknown Knowledge

Sharing Knowledge and Sciences at an International Level

The Daily Increase of New Learning Materials

The Creation of the Possibility of Pre-Learning before the Beginning of Educational Courses

Access Improvement

The Provision of Educational Needs

Knowledge Management

The Success Rate of the Free Virtual Educational Website

RESEARCH METHODOLOGY

The type of this case study is a library research and the data has been collected in a survey through questionnaires. Using questionnaires, the necessary attempts to investigate the effect of the open courseware education system on the productivity improvement is done.

Information is collected in two major parts. The first part includes collecting information on the literature of the research topic. Besides, some studies have been conducted on the characteristics and parameters related to the electronic education to be able to determine the expectations of the electronic system and compare it with the traditional system.

The second part includes studies on different methods of data analysis, questionnaire validation, descriptive, inferential, and explanatory analytical-statistical methods, and how to use these resources in the project in question.

It has been firstly attempted to provide the experts in this field with parameters to conduct a field research to determine and finalize the amount of the considered variables' compatibility with those of the mentioned study, having analyzed their opinions. This is the same as the questionnaires' validation which has been done through Cronbach's alpha coefficient. Then, the necessary attempts to identify the different methods of statistical analysis, register information in an extended page, use statistical software, and other required attempts have been performed.

Table 1. The Characteristics of Questionnaire Validation Using Cronbach's Alpha Method

Cronbach's Alpha Coefficient	The Number of Items
0.852	9

Descriptive Statistics

The considered parameters in the field of descriptive analysis of the questionnaires are characteristics of sexuality, age, education, major, and the job of the repliers. In the following lines, the statistical results related to each of the considered parameters are presented. The sexuality of the population being investigated in answering the questions is both male and female. As can be seen in Diagram 3, out of the 54 people of the population under the study, 25.9% are male and 74.1% are female. The obtained results regarding the descriptive statistics of the population under the study have been demonstrated in a diagram which can be seen below.
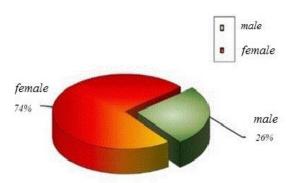

Diagram 3. The Frequency of the Repliers Answering the Questionnaires Based on Sexual Separation

In order to prepare the descriptive statistics of the questionnaire indices, the necessary attempts to count the answers have been separately performed for each question. In the table of the questionnaire's descriptive statistics, the number of the repliers' answers to each of the parameters has been presented on a symmetric basis.

Table 2 shows the secondary parameters of the sub category of access enhancement. The questionnaires' answers are scored from 0-100. The obtained results regarding this main parameter show that 36% of the repliers have known the electronic open courseware education effective and 30% have regarded it as very effective. The results of calculating the mean of the presented answers to the secondary parameters have also been obtained. The results of the descriptive analysis of the main and primary parameters of the questionnaire showed the positive effects of the open courseware education on improving each of the mentioned factors.

Table2. The Descriptive Statistics

Percentage	Number	Very Important 80-100		Important and Effective 60-80		Average 40-60		Ineffective 20-40		Very Ineffective 0-20		The Effects of Access Improvement on Educational Proficiency Improvement
100%	54	22%	12	37%	20	33%	18	7%	4	0	0	Access Facilitation to Educational Resources for Different Classes of the Society
100%	54	35%	19	37%	20	19%	10	9%	5	0	0	Access Facilitation to Educational Requirements of the Learners in
100%	54	39%	21	22%	12	26%	14	13%	7	0	0	The Increase of Accessibility to the Required Information
100%	54	19%	10	44%	24	31%	17	6%	3	0	0	The Increase of Timing and Scheduling Possibility
100%	54	26%	14	33%	18	28%	15	13%	7	0	0	The Improvement of Educational Expectations in the Society
100%	54	37%	20	41%	22	15%	8	6%	3	2%	1	The Increase of Satisfaction on Putting Educational Resources on Websites, Taking the Attitude of Removing Time and Place Limitations
100%	396	30%	96	36%	116	25%	82	9%	22	0%	1	**Access Improvement**

The Inferential Statistics of the Questionnaire One-Way Analysis of Variance

Based on the information mentioned in the questionnaire, one-way analysis of variance was done regarding the main indices under the study, i.e. the main groups of access enhancement, educational requirements' satisfaction, and knowledge management. Considering the mentioned issues, the hypotheses related to the main variables of the model can be stated as below: based on the presented null hypothesis, as repliers believe, all the considered parameters have the same value; therefore, there is no significant difference between these variables. On the contrary, based on hypothesis 1, it is realized that there is a significant difference at least between two of the main variables. In the following lines, the necessary attempts have been done in order to investigate the significant difference between the mentioned variables to perform the one-way analysis of variance. Considering the information mentioned in Table 3, it is seen that the characteristics of the sample number, mean, the sum, and the standard deviation of the data have been presented for each group. In this table, the average answering level is between 62.59- 65.74; it shows the relatively high importance of the categorized features in the repliers' idea.

Table 3. The Statistical Characteristics of the Main Indices in order to Investigate the effects of the Open Courseware Education System on Improving Educational Productivity

Group Name	Number	The Least	The Most	The Average	The Total
Access Enhancement	54	26.7	96.7	63.37	3422
The Satisfaction of Educational Needs	54	25.7	91.4	62.59	3380
Knowledge Management	54	20.0	97.5	65.74	3550
Total	162	20	97.5	63.9	10352

Below, in addition to studying Table 4, since the significance level of the Fisher statistic is less than 0.50 (equal to 0.003) and also regarding the fact that the F statistic with the value of 5.11 is greater than the F statistic with 2 and 161 level of freedom related to 0.05, which is equal to 3.50, there are strong proofs to reject the null hypothesis; as a result, the null hypothesis is rejected at the significance level of 95%. This shows that as repliers believe, the main parameters and variables under the study are not of the same value and importance regarding the efficiency on educational improvement. Consequently, it can be concluded that the entrance of the open courseware education website to the organization will result in the creation of different effects of this technology on the considered variables.

The same evaluations were performed on all the secondary parameters and each set of the secondary parameters was measured in the field of a primary parameter through one-way analysis of variance. The total results also showed a significant difference between repliers' attitudes towards the questionnaires per the secondary parameters.

Table 4. The Results of One-Way Analysis of Variance on the Main Indices

ANOVA	Squares' Total	Level of Freedom	Squares' Mean	F Statistic	Level of Significance
Between Groups	289.89	2	144.94	5.11	0.003
In Groups	45055	159	283.36		
Total	45354	161			

T-Student Test

In order to reach to the goals of this article, the next question will be: Is information technology effective on the variables under the study regarding the research population's viewpoints? In other words, the researcher intends to know at what field the obtained results stand in terms of each variable. To this end, one sample t-student test has been used for the items related to the variables. The studied means can be per secondary index or as a combination of the means related to the primary indices which have been used for each variable; the related descriptions have been attached.

In order to measure the existence or non-existence of the open courseware education effect on the educational productivity, t-student test is used. It must be noted that since the number of samples exceeds 30, the distribution of the test statistics will be approximately normal based on the central limit theorem. Therefore, the test statistic is 1.645 based on normal distribution with alpha of 5% with which the obtained value is compared.

$$\begin{cases} H_0 : \mu < 50 \\ H_1 : \mu \geq 50 \end{cases}$$

Table 5. The Results of One Sample T-Student Test for the Secondary Indices of Access Enhancement

Variable	T-Test Statistic	Level of Freedom	Fisher Statistic Value
Access Enhancement of Different Classes of the Society to Educational Resources	4.67	53	0
Access Enhancement to Learners' Educational Requirements at Each Level and Courses	5.598	53	0/0
The Increase of On time Access Capability to the Required Data	4.398	53	0
The Increase of Timing and Scheduling Possibility	5.042	53	0
The Improvement of Educational Expectations in the Society	3.958	53	0
The Removal of Time and Place Limitations and the Increase of Satisfaction	6.382	53	0

Based on the information in Table 5, it is seen that two-way Fisher test statistic for each 6 secondary index is less than 0.025. Furthermore, all the obtained values of T-Student test are greater than 1.645, i.e. t-test is done with 53 degree of freedom which is moving towards a normal distribution. The results proved that the t value is placed at the critical zone; therefore, the null hypothesis is rejected and its opposite is supported. It means that each secondary parameter has been effective on improving educational productivity, as the

repliers' believed. The obtained results from the 6 secondary parameters prove this issue that the main parameter, i.e. access enhancement has been known as one of the effective factors on improving educational productivity.

T-student test was performed on other secondary parameters; the results showed the effects of each secondary parameter and eventually, the main parameters on the improvement of educational productivity in the society.

Indices' Rating

In this part, the necessary attempts to rate the primary and secondary variables of the research are done based on Kruskal–Wallis nonparametric test; rating variables is performed based on the conducted field studies. In order to do rating based on Kruskal–Wallis evaluation, the null hypothesis states that the mean of all the main indices is similar and its opposite states that there are at least two main indices with different means. Therefore, the null hypothesis and its opposite can be regarded as below:

The obtained values of Kruskal–Wallis test have been presented in Table 6. It is observed that chi-square value is 8.166 and Fisher significance value is 0.038. According to standard tables, the value of chi-square distribution with alpha of 0.05 and 2 degrees of freedom is 5.99. The obtained results show that chi-square statistic is greater than its standard value; besides, the significance level is less than 0.05; therefore, the null hypothesis is rejected and its opposite is supported. Consequently, it can be concluded that based on Kruskal–Wallis rating evaluation, there is a significant difference between the means of the main indices of the open courseware education system.

H=8.166   P-Value = Asymp.sig = 0.038

H_0 : $\mu1=\mu2=\mu3$
H_1 : $\mu1\neq\mu2\neq\mu3$

$$\chi^2_{(ak-1)}= \chi^2_{(0.052)=5.99}$$

$$H=8.166 > \chi^2_{(0.05.2)} = \circ/99$$

and $\alpha = 0.05$ >P-Value= Asymp.sig = 0.038

Rating the main parameters effective on improving the productivity of the open courseware website has been presented in Table 8 based on their priority. Based on the collected opinions of the repliers, the first priority in improving education productivity in Mazandaran University is knowledge management; the second priority is access enhancement; and the third priority is the satisfaction of

educational requirements. Therefore, the emergence of an open courseware education website is an important factor in improving educational productivity in Mazandaran University.

Table 6. The Characteristics of Kruskal–Wallis Rating Evaluation for the Main Indices of the Open Courseware Education System

Indices		Crascal Rate	Sample Number	Access Rate
Access Enhancement		78.79	54	2
The Satisfaction of Educational Requirements		77.29	54	3
Knowledge Management		88.43	54	1
Level of Freedom	2	Chi-Square Statistic 8.166	Level of Significance	0.038

CONCLUSION

Based on the collected parameters, the unique characteristics of the virtual university and open courseware education system have attracted much attention as a new product of the electronic education system. It must be noted that in all the conducted studies in this field, issues such as the best framework, appropriate computer tools, powerful network and Internet infrastructures with high speed in data transfer, and a simple function have been mentioned as the primary and required characteristics of the electronic education issue. Consequently, in this study, the main characteristics, especially related to outputs and the presentable products of the open courseware education system, have been considered as basic and it has been attempted to regard the advantages of this new technology as the parameters being questioned in the population.

The results of the field and library researches on the open courseware education website show that each main or secondary parameter of this technology affects the improvement of educational productivity in the population under the study which is Mazandaran University. Therefore, it is concluded that the entrance of this technology raises hopes to improve educational productivity and increase satisfaction among the students in the mentioned field.

Rating the primary and secondary parameters related to this study has been presented in Table 7. Rating the parameters has been done based on the primary and secondary factors.

Table 7. The Characteristics of Different Types of Primary and Secondary Indices of the Open Courseware Education System

Row	Group Name	Factor Description
1	Access Enhancement	Access Enhancement of Different Classes of the Society to Educational Resources
2	Access Enhancement	Access Enhancement to Learners' Educational Requirements at Each Level and Courses
3	Access Enhancement	The Increase of On time Access Capability to the Required Data
4	Access Enhancement	The Increase of Timing and Scheduling Possibility
5	Access Enhancement	The Improvement of Educational Expectations in the Society
6	Access Enhancement	The Increase of Satisfaction from Putting Educational Resources in Websites and Removing Time and Place Limitations

Row	Group Name	Factor Description
7	The Provision of Educational Requirements	The Re-Use and Review of the Learned Knowledge and Sciences
8	The Satisfaction of Educational Requirements	The Provision of the Needs of a Major Percentage of Users who may Have Educational Needs in the Future
9	The Provision of Educational Requirements	The satisfaction of Applicants' needs
10	The Provision of Educational Requirements	The Creation of Educational Needs
11	The Provision of Educational Requirements	The Creation of Easy Search Capability for Scientific Materials and Educational Pamphlets
12	The Provision of Educational Requirements	The Improvement of Collaboration and Supporting Different Educational Institutes to Publish Scientific and Educational Documents
13	The Provision of Educational Requirements	The Creation of Correction Capability and Removing the Related Problems
14	Knowledge Management	The Increase of Learning the Unknowns
15	Knowledge Management	Sharing Sciences and Knowledge at an International Level
16	Knowledge Management	The Daily Increase of New Courses and Materials
17	Knowledge Management	The Creation of Pre-Learning Capability Before the Beginning of Educational Courses

Of the accomplishments of the performed research, two main groups can be mentioned which are scientific accomplishments and the applied accomplishments of the research and are explained below:

The research scientific accomplishments are:

A total knowledge about the characteristics of the open courseware education, its history, and its building blocks;

Considering and identifying the primary and secondary factors effective on the improvement of educational productivity;

Familiarity and studying other conducted researches on the open courseware education system;

Categorizing and modeling effective parameters on educational productivity in the field of open courseware education system and preparing questionnaires;

Considering and indentifying the steps of statistical testing and analysis of the model;

And the applied accomplishments of the research are:

Identifying primary and secondary indices emphasized by Mazandaran University in the field of open courseware education system; and

Identifying and prioritizing effective parameters and factors on educational productivity in Mazandaran University taking the open courseware education approach.

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