The role of Information and communications technology (ICT) in Academic achievement of elementary students

Mahboubeh Shateri  
M.A in Educational Management  
Shateri_60@yahoo.com

Hamid Shateri Baghiabad  
M.A in Educational Management  
Hamidshateri52@yahoo.com

Abstract

This study aims to investigate "the role of information technology in academic achievement (primary school)," by a descriptive survey that its statistical population included all elementary school girls (n = 300) of Avaj Country's (Qazvin - Iran) academic Year 89 -90, which stratified random sampling survey was conducted. Determining the sample size was determined based on the Cochran formula to calculating the number 181 .This is a study of utilization research tools of standardized achievement test proportional to the degree of primary which its reliability was also calculated 74/0. Data collected with spss software were used to analyze by both descriptive and inferential statistics processes which the main results are: Significantly, the average science lesson of trained students with ICT (First round) is more than the average trained students in the traditional way. Significantly, the average science lesson of trained students with ICT (Second round) is more than the average trained students in the traditional way. Significantly, the average math lesson of trained students with ICT (First round) is more than the average trained students in the traditional way. The average dictation lesson of students who have been trained in the use of information technology significantly (First round) is more than the average students who have been trained in the traditional way. Significantly, the average dictation lesson of trained students with ICT (Second round) is more than the average trained students in the traditional way. Significantly, the average writing Frasi lessons of trained students with ICT (Second round) is more than the average trained students in the traditional way. Significantly, the average writing Farsi lessons of trained students with ICT (First round) is more than the average trained students in the traditional way. Significantly, the average reading Farsi lessons of trained students with ICT (First round) is more than the average trained students in the traditional way. Significantly, the average reading Farsi lessons of trained students with ICT (Second round) is more than the average trained students in the traditional way.

Keywords: Technology, Information and Communication Technologies, Achievement, Academic Achievement, Student.
Introduction

Everything has changed except for education in today's world, the skills which convert the knowledge and information into new and innovative service and products efficiently represent successful knowledge-based economies. Since the knowledge and information has become the common coin to achieve productivity, competitiveness and wealth and prosperity, countries can have higher priority to the development of human capital. Thus, throughout the world, governments have focused on strategies to increasing access to a better quality education. Decision makers and policy makers seek to answer key questions and challenging tasks: What is the definition of quality education in today's global economy based on knowledge and information? Will the education step ahead by a world changing rapidly? Can it be found an appropriate model for reformations to be adoptable?

The problem is that if we compare today's world with the world of a hundred years ago, we will face with breathtaking advances in science, business, medical, communications and other countless fields. But because we visit schools anywhere in the world, astonishingly we won't feel any difference between the classrooms in hundred years ago and today. Students sitting consecutive rows are taking notes rapidly whatever the teacher tells and writes on the blackboard to memorize and to pas it during the exam fastly . While many things have changed because of advances in science and technology but more or less the education and the way students learn and teachers teach has remained intact.

In our country it is also felt the era of knowledge and information requirements and the need to step with the developments and achievements in technology and human sciences which is observing the government's recent decision to extend the accelerated investment in ICT. Also education seeks to develop a charter to guide the reformations of the country's education to find appropriate response to the questions above-mentioned. And the emphasis on the use of ICT is of its components.

The above materials support of critical role in the advancement of information technology and educational reformation. Thus, with regard to the contents the researchers have attempted to examine the role of information technology in their academic achievement.

Wave of information technology in its various forms has been embraced all over the world since the nineties of the 20th century. This wave spreading through mobile phones, satellites, computers, internet has influenced by how humans interact , how it works , how to spend the leisure times , acculturation and many other personal and social aspects of human life . But it seems education institutions have influenced less than other social institutions from this wave apparently .The present era has titled the era of changing an industrial society to a post-industrial society or information society , It is natural that information , knowledge and awareness be reckoned as the most underlying assets for individuals and societies. Growth and expansion of information and communication technology (ICT) in today's society is so fast that they have considered its attention as the most significant indicator of development for developing countries. And they believe that the present era would be a different world which will be responsible for leading the IT, it is an important feature of the phenomenon of information technology. That's it
causes to facilitating and promoting communication between man and man and between man and the environment. Information technology due to its adaptability and changing power of influence in educational development, cultural, economic, national security, universalizing and moderating the problems has traditional informatics is considered to be one of the most dynamic and most controversial fields of science and technology. Of course we shouldn't put out of sight that information technology (IT) due to having the specific characteristics has always been abused. These abuses have caused misinterpretations in the application of this phenomenon. However, it must be confessed that Information technology has enormous potential for knowledge transfer, facilitating communication and interaction and accelerating the process of growing knowledge and information that of course all of this is possible provided proper utilization of this phenomenon. Therefore, on the one hand the understanding of influence and better methods and mechanisms had best influence. This technology in education, particularly the education of children and adolescents is important. So, the research also indicates the importance of achieving the objectives of this research.

Assumptions: The main hypothesis

It appears that the use of new technologies largely will impact on of students (By primary).

Secondary hypothesis:
It seems the country's education system; new technologies have been used less as teaching aids. It seems the student use of new technologies as educational aids is too low. Between the use of new technologies and the mean scores of students (experimental group and control group), there were no significant differences. It seems teachers and education planners have little familiarity with new technologies as educational assistance tools.

Learning:

There are several definitions for learning, each of which focuses on a particular aspect of learning and it ignores other aspects. "Hilgard" and "Marquez" say learning means the formation of relatively stable change on potential behavior of the learner, provided that these changes occur as a result of getting experience. "Gayneh" says the study is the change that occurs in the human ability and it remains some time and cannot simply be attributed to the growth processes. Therefore, organisms gain the ability to perform through learning and sometimes finally this ability remains and its appearance might be delayed for some time like a change in behavior. We refer to individual's performance to acquire the awareness of his learning, observable behavior or a more precise term. Performance is affected by factors such as motivation, environmental conditions and fatigue.

E-learning (Electronic Learning):

E-learning refers to the set of activities that use electronic devices such as audio, video, computer, network, virtual, etc. In other words, all programs via computer networks, particularly the Internet which result in learning are called e-learning.
Methodology

This study aims to investigate "the role of information technology in academic achievement (primary school)."

The method of this research is Descriptive survey. The population included all elementary school girls of Avaj Country (Qazvin, Iran) in 89-90 school years. The sampling method used to determine study sample size was calculated based on the Cochran formula that its volume is equal to 300 people. Choice of research method depends on the objectives, the nature of the subject and its executive features. In the present study given that the purpose of considering the applicability of the extra effort to come to the scientific principles used to solve the problem and in this way, it took a small step in order to enrich the research community police. The present study is in education typically and objectively.

Sampling

Method of calculation is as follows:

\[ T_2 = \text{the percentage probability of 95% confidence level, is equal to } 96/1 \]
\[ P = \text{probability of adjectives} \]
\[ q = \text{probability of loss of property} \]
\[ N = \text{total number of subjects, which is equal to 300 people} \]
\[ D = 5\% \text{ chance of error in the survey is intended.} \]
\[ N = \text{number of sample size is obtained through Cochran formula } = 181 \text{ people.} \]

Tools and methods for collecting data in this research is conducted through the following two processes:

To develop theoretical literature and research, data collection was acting as a library and document review. Thus the study of texts, articles, books and resources on the research required information was collected by taking notes.

To collect the data needed to test the hypothesis of standardized achievement tests is proportional to the degree.

In the above study, researcher uses standardized achievement test to check the validity that its validity has been measured previously in the same study which the reliability of research tools was calculated 74/0. Data obtained from samples collected from the study through testing used both descriptive and inferential statistics analyzed using SPSS statistical software (Frequency distribution of respondents for demographic variables, frequency tables for scores, Cronbach's alpha coefficient for reliability of testing research, T-test for two independent samples (parameters) to examine the relationship between hypotheses.)
Findings

Data obtained using both methods were compared by using analysis was performed using SPSS statistical software which first; we express the results of the descriptive statistical data. **The most important Findings are:**

Half of the subjects were trained in the traditional way and the other half using information technology.

- 55.2% of the subjects are male students and 44.8% are female students.
- 31.5% of student’s father’s business was cultural and 14.4% was employee.
- 7/9% of fathers’ jobs were workers, 8/8% was self-employment and 4/1% were military.

The mothers of more than half of the students (7/54%) were housewives, and 19.1 percent were cultural jobs.

Checking educational status of student's fathers’ shows that 30.7 percent were high school graduates and 28.2 percent of the junior high school level. Also, 17.1 percent had a higher education.

- 31/8% of the student's mothers' education were diploma , 21/5% of students were diploma , 21/5% were high school and 27/6% were elementary and also 9/1% has higher education .

Average science scores of students in the first innings was 4.18 and the variance is 52/1 .The students' scores have slightly negative skewness .

Students in mathematics and first round have a minimum grade average of 18/56 and variance equal to 1/41. The coefficient of skewness of the course is -06/1.

Students ‘scores in math and second round had an average of 18/55, variance of 1/75 and skewness of -0/98.

Checking the status of student ‘scores in dictation lesson and first round shows that the mean and variance in this lesson are equal to 18/45 and 1/82 and the coefficient of skewness is -0/62.

Checking the status of students’ scores in dictation lesson and second round shows that the mean and variance in this lesson are equal to 18/35 and 1/77 and the coefficient of skewness is -0/34.

Checking the status of students ‘scores in writing Farsi lesson and first round shows that the mean and variance in this lesson are equal to 18/74 and 1/17 and the coefficient of skewness is -0/89 .

Checking the status of students’ scores in writing Farsi lesson and second round shows that the mean and variance in this lesson are equal to 18/24 and 2/04 and the coefficient of skewness is -0/52 .

Checking the status of students ‘scores in reading Farsi lesson and first round shows that the mean and variance in this lesson are equal to 18/41 and 1/88 and the coefficient of skewness is -0/79 .

Checking the status of students’ scores in reading Farsi lesson and second round shows that the mean and variance in this lesson are equal to 18/43 and 1/68 and the coefficient of skewness is -0/88 .
Hypothesis testing 1-1: Use of information technology in classrooms for student achievement in science courses (first round) has a positive impact.

Table 18: Results of t-test related to the hypothesis 1-1:

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Degree of freedom</th>
<th>Value of t</th>
<th>SD (Standard Deviation)</th>
<th>Mean</th>
<th>Number</th>
<th>Teaching practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/00</td>
<td>277/21</td>
<td>6/53</td>
<td>1/45</td>
<td>17/64</td>
<td>181</td>
<td>Traditional</td>
</tr>
<tr>
<td>0/79</td>
<td>18/44</td>
<td>181</td>
<td>With information technology</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Leven’s test: F= 104/46 P= 0/00

It is used the t-test for test hypotheses 1-1. The results show that the obtained t = 6/35 and the significance level is P = 0/00. So we can say that the hypothesis 1-1 is confirmed. Significantly, the average science class of students (First round) who have been trained using information technology is more than the average students who have been trained in the traditional way. (44/18 VS 64/17).

Hypothesis testing 2-1: Use of information technology in classrooms for student achievement in science courses (second round) has a positive impact.

Table (19): Results of t-test related to the hypothesis 1-2

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Degree of freedom</th>
<th>Value of t</th>
<th>SD (Standard Deviation)</th>
<th>Mean</th>
<th>Number</th>
<th>Teaching practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/00</td>
<td>281/58</td>
<td>6/32</td>
<td>1/44</td>
<td>18/80</td>
<td>181</td>
<td>Traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/80</td>
<td>18/57</td>
<td>181</td>
<td></td>
<td>With information technology</td>
</tr>
</tbody>
</table>

Leven’s test : F= 93/46 P= 0/00

It is used t-test for hypothesis testing. The results show that the obtained t= 6/32 and its significant level is P= 0/00, so we can say that the hypothesis 1-2 is confirmed. Significantly, the average science class of students (Second round) who have been trained using information technology is more than the average students who have been trained in the traditional way. (57/18 VS 70).

Hypothesis 1-2: Use of information technology in classrooms for student achievement in mathematics (first round) has a positive impact.

Table (20): Results of t-test related to the hypothesis 1-2

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Degree of freedom</th>
<th>Value of t</th>
<th>SD (Standard Deviation)</th>
<th>Mean</th>
<th>Number</th>
<th>Teaching practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/44</td>
<td>18/23</td>
<td>181</td>
<td>Traditional</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Leven’s test : F= 122/87  
P= 0/00

It is used the t-test for the hypothesis testing. The results show that the obtained t=5/39 and its significance level is P= 0/00, so we can say that the hypothesis 1-2 is confirmed. Significantly, the average math (first time) students who have been trained using information technology is more than the average students who have been trained in the traditional way. (18/88 VS . 17/23)

Hypothesis testing 2-2 : Use of information technology in classrooms for student achievement in mathematics (second round) has a positive impact.

Table (18) : Results of t-test related to the hypothesis 2-2

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Degree of freedom</th>
<th>Value of t</th>
<th>SD (Standard Deviation)</th>
<th>Mean</th>
<th>Number</th>
<th>Teaching practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/00</td>
<td>270/76</td>
<td>8/17</td>
<td>1/53</td>
<td>18/03</td>
<td>181</td>
<td>Traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0/80</td>
<td>19/08</td>
<td>181</td>
<td>With Information Technology</td>
</tr>
</tbody>
</table>

Leven’s test : F= 127/28  
P= 0/00

It is used t-test for the hypothesis testing 2-2. The results show that the obtained t=8/17 and its significant level is P= 0/00, so we can say that the hypothesis 2-2 is confirmed. Significantly, the average math (first time) students who have been trained using information technology is more than the average students who have been trained in the traditional way. (19/08 VS. 18/03)

Hypothesis testing 1-3 : Use of information technology in classrooms for student achievement in spelling lessons (second round) has a positive impact.

Table (18) : Results of t-test related to the hypothesis 2-2

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Degree of freedom</th>
<th>Value of t</th>
<th>SD (Standard Deviation)</th>
<th>Mean</th>
<th>Number</th>
<th>Teaching practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/00</td>
<td>338/47</td>
<td>8/76</td>
<td>1/35</td>
<td>17/79</td>
<td>181</td>
<td>Traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/05</td>
<td>18/90</td>
<td>181</td>
<td>With IT</td>
</tr>
</tbody>
</table>

Leven’s test : F= 11/01  
P= 0/00

It is used t-test for hypothesis test 2-3. The results show that the obtained t=8/76 and its significant level is P= 0/00, so we can say that the hypothesis 2-3 is confirmed. Significantly, the average dictation lesson of students (Second round) who have been trained using information technology is more than the average students who have been trained in the traditional way. (18/90 VS. 17/79).
Hypothesis testing 1-4 : Use of information technology in classrooms for academic achievement in Persian writing courses (the first) has a positive impact.

Table (24) : Results of t-test related to the hypothesis 2-2

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Degree of freedom</th>
<th>Value of t</th>
<th>SD (Standard Deviation)</th>
<th>Men</th>
<th>Number</th>
<th>Teaching practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/00</td>
<td>339/05</td>
<td>3/35</td>
<td>1/22</td>
<td>18/55</td>
<td>181</td>
<td>Traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0/89</td>
<td>18/93</td>
<td>181</td>
<td>With information technology</td>
</tr>
<tr>
<td>Leven's test : F=12/13</td>
<td>P= 0/00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is used t-test for the hypothesis testing 1-4. The results show that the obtained t=3/35 and its significant level is P= 0/00, so we can say that the hypothesis 1-4 is confirmed. Significantly, the average writing Farsi lesson of students (Second round) who have been trained using information technology is more than the average of students who have been trained in the traditional way. (18/93 VS . 18/55).

Hypothesis testing 2-4 : Use of information technology in classrooms for academic achievement in Persian writing courses (the second time) has a positive impact.

Table (24) : Results of t-test related to the hypothesis 2-2

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Degree of freedom</th>
<th>Value of t</th>
<th>SD (Standard Deviation)</th>
<th>Mean</th>
<th>Number</th>
<th>Teaching practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/00</td>
<td>284/74</td>
<td>10/35</td>
<td>1/54</td>
<td>17/56</td>
<td>181</td>
<td>Traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0/87</td>
<td>18/92</td>
<td>181</td>
<td>With information technology</td>
</tr>
<tr>
<td>Leven's test : F=12/13</td>
<td>P= 0/00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is used t-test for the hypothesis testing 2-4. The results show that the obtained t=10/35 and its significant level is P= 0/00, so we can say that the hypothesis 2-4 is confirmed. Significantly, the average writing Farsi lesson of students (First round) who have been trained using information technology is more than the average of students who have been trained in the traditional way. (18/92 VS . 17/56).

Hypothesis testing 1-5 : Use of information technology in classrooms for academic achievement in Persian writing courses (the first round) has a positive impact.

Table (24) : Results of t-test related to the hypothesis 2-2

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Degree of freedom</th>
<th>t</th>
<th>SD</th>
<th>Mean</th>
<th>Frequencies</th>
<th>Teaching practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/00</td>
<td>267/25</td>
<td>7/12</td>
<td>1/62</td>
<td>17/93</td>
<td>181</td>
<td>Traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0/82</td>
<td>18/89</td>
<td>181</td>
<td>With information technology</td>
</tr>
<tr>
<td>Leven's test : F= 122/07</td>
<td>P= 0/00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It is used t-test for the hypothesis testing 1-5. The results show that the obtained \( t = 7/12 \) and its significant level is \( P = 0/00 \), so we can say that the hypothesis 1-5 is confirmed. Significantly, the average reading Farsi lesson of students (First round) who have been trained using information technology is more than the average students who have been trained in the traditional way. (18/89 VS. 17/93).

**Hypothesis testing 2-5:** Use of information technology in classrooms for student achievement in reading Persian courses (second round) has a positive impact.

**Table (27) : Results of t-test related to the hypothesis 2-2**

<table>
<thead>
<tr>
<th>Significance</th>
<th>D</th>
<th>T</th>
<th>SD</th>
<th>Mean</th>
<th>Frequencies</th>
<th>Teaching practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/00</td>
<td>339/05</td>
<td>3/35</td>
<td>1/22</td>
<td>18/55</td>
<td>181</td>
<td>Traditional</td>
</tr>
<tr>
<td>0/00</td>
<td>339/05</td>
<td>3/35</td>
<td>0/89</td>
<td>18/93</td>
<td>181</td>
<td>With information technology</td>
</tr>
</tbody>
</table>

Leven's test : \( F = 12/13 \) \( P = 0/00 \)

It is used t-test for the hypothesis testing 2-5. The results show that the obtained \( t = 6/68 \) and its significant level is \( P = 0/00 \), so we can say that the hypothesis 2-5 is confirmed. Significantly, the average reading Farsi lessons of students (Second round) who have been trained using information technology is more than the average students who have been trained in the traditional way. (18/86 VS . 17/99).

**Discussion and conclusions**

The aim of the present study was examining the impact of information technology on the academic achievement of elementary students. The population consisted of all elementary students of nonprofit schools are leading the way in the academic year 90/1389, the number was 5864. Of these patients, 362 patients were selected by multistage sampling method and 5 percentage points in science, math, spelling, Persian – writing and Persian – reading were collected and analyzed in two rounds (first and second round).

Half of the subjects were trained using information technology and the other half were taught in the traditional way.

2/55% of the subjects were male students and 44/8% of them were female students. The jobs of 31/5% of students’ fathers were cultural, 14/4% employees and 9/7% workers. 54/7% of the mothers were housewives, 19/1% Cultural and 5/5% employees. The education level of 52/2% of fathers was lower than diploma, 30/7% diploma and 17/1% higher than diploma. This issue about the mother's education is this: 59% lower than diploma, 31/8% diploma and 9/1% higher than diploma.

To test the hypothesis that the mean scores were compared in two independent groups, the student t-test was used. All research hypotheses were confirmed and it was found that the average use of information technology courses students have been trained is more than the average
students’ lessons which were learning in the traditional way. Results of assumptions are as follows separately:

Significantly, the average science lesson of students (First round) who have been trained using information technology is more than the average students who have been trained in the traditional way. (18/57 VS. 17/64)

Significantly, the average science lesson of students (Second round) who have been trained using information technology is more than the average students who have been trained in the traditional way. (18/57 VS. 17/70)

Significantly, the average math lesson of students (First round) who have been trained using information technology is more than the average students who have been trained in the traditional way. (18/57 VS. 17/80)

Significantly, the average math lesson of students (Second round) who have been trained using information technology is more than the average students who have been trained in the traditional way. (18/03 VS. 19/08)

Significantly, the average dictation lesson of students who have been trained using information technology (First round) is more than the average students who have been trained in the traditional way. (17/81 VS. 19/09)

Significantly, the average dictation lesson of students who have been trained using information technology (Second round) is more than the average students who have been trained in the traditional way. (17/79 VS. 18/90)

Significantly, the average writing Farsi lessons of trained students with ICT (First round) is more than the average trained students in the traditional way. (18/93 VS. 18/56)

Significantly, the average writing Farsi lessons of trained students with ICT (Second round) is more than the average trained students in the traditional way. (18/92 VS. 17/56)

Significantly, the average reading Farsi lessons of trained students with ICT (First round) is more than the average trained students in the traditional way. (18/89 VS. 17/93)

Significantly, the average reading Farsi lessons of trained students with ICT (Second round) is more than the average trained students in the traditional way. (18/86 VS. 17/99)

According to the above assumptions, we can conclude that using information technology has a positive impact on student achievement and it causes increasing the average of students.
References


Dini, Faezeh (1381). The relationship between academic achievement and coping with crisis, emotional intelligence among university students in Tehran, MSc Thesis, School of Psychology, Alzahra University


Henry Masen, Powell et al. (1380). Child development and personality, Translator: Mahshid Yasayi, Publication of Center Book, Median.


Karim zadeh, Mansoureh (1380). Examining your own relationship (academic, non-academic) and academic self-efficacy and academic achievement of female students in Tehran, MSc thesis. School of Psychology, Tehran University.


Sarafizadeh , Asghar " Information technology in organizations - Concepts and Applications" , 1383 , Tehran : Mir Publication

Sharifi , Hassan Pasha , Sharifi , Nastaran (1383) , Research methods in the behavioral sciences , Tehran : Sokhan Publication

Shamradlou , Mehran (1384) . The role of emotional intelligence and cognitive intelligence in predicting academic achievement of high school students, MSc thesis , Shahid Beheshti University