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Original Article

Comparing the Impacts of E-learning and Conventional Education on Students' Academic Motivation and Performance: A Descriptive Study

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ABSTRACT

Background: Today, e-learning has become an integral part of educational practice around the world and plays a relatively significant role in student learning. E-learning is an educational approach in which educators and learners make use of electronic tools and technologies to communicate with each other in spite of distance and lack of close communication. The purpose of this study was to compare the effects of e-learning and conventional methods on the academic motivation and performance of fifth-grade elementary school students in Shiraz, Iran.

Methods: A descriptive study was conducted in 2019-2020 academic year. A convenience sampling method was applied and the research sample consisted of 268 students (134 in e-learning group; 134 in conventional education group). Data collection tools included the EPT questionnaire (Based on Pham and Taylor) and the academic motivation questionnaire (Vallerand et al.). Independent t-test was used for data analysis.

Results: the results showed that the mean of the academic motivation among the e-learning students is higher than the conventional learning students ($P<0.001$). Furthermore, in terms of academic performance, the mean score of the motivation component in the e-learning group was higher than the conventional education group ($P=0.03$). There was no significant difference between the two groups in other components of the academic performance.

Conclusion: The results showed that e-learning had a greater impact on student motivation. More research with larger samples is required to better understand the possible advantages of this method.

Keywords: E-learning, Conventional education, Academic motivation, Academic performance

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Introduction

In 1980s and early 1990s, many scientists noted that computers and other super-media could be used as cognitive tools to improve learning. In fact, e-learning is an educational system in which the educator and learner use electronic tools and technologies to communicate with each other despite the distance and lack of close communication. E-learning is a process that is conducted through computers, the Internet, and the Intranet. In other words, e-learning is the use of information and communication technology in learning. Since the advances in educational technology bring about a rise in educational needs, one has to develop new ways of addressing individuals' educational needs regardless of time or place. In addition, adopting e-learning enables and encourages the learners to actively participate and learn (1).

Motivation and learning progress are profoundly interconnected. Motivation is like a driving force for human ideals and achievements. It is a force that encourages individuals to confront difficult and challenging situations (2, 3).

It is also an important predictor of academic achievement (4), and is known as a significant theoretical factor in learners' success (5, 6). Students' academic motivation is one of the important areas of interest to teachers and educational psychologists, and can be assessed as a means of predicting the quality of their school work and determining whether assignments should be given or not (7, 8).

There are several theories about academic motivation, but the motivation in this study is based on the self-determination theory presented by Deci and Ryan (1985) (9). According to this theory, people can be classified based on three types of motivational orientation: intrinsic, extrinsic, and amotivation (7).

Individuals with intrinsic motivation have a strong perception of self-worth and self-determination. These people do not allow others or external factors to affect their performance, and tend to undertake specific tasks for personal pleasure and satisfaction (9). People with external motivations do not consider themselves worthy or autonomous. That is, external factors and other people play a decisive role in shaping their behaviors and decisions, and activities are performed with the aim of earning a reward or avoiding punishment (11). The third orientation, is amotivation in which there is no connection between a person's conduct and its consequences, and they consider the forces beyond their control as the cause of their behavior (10).

For some time now, the country's educational methods have undergone changes, many of which have played a major role in student learning. Mousavi et al. showed in a study that students of a linear blended learning group have made greater progress in experimental sciences compared to non-linear blended learning groups (12). In a study conducted by Barrow et al. (2009), 1,600 students selected from 17 schools in three major US cities, demonstrated that the performance of experimental group students (trained in a computer lab) was better than the control group (receiving traditional education) (13).

E-learning employs a variety of communication technologies, such as the Internet, Intranets, or mobile phones, to provide information to learners. This method can facilitate access to necessary information related to the lesson and, more importantly, create an interactive educational environment (14). E-learning allows learning to be adaptive and interactive, as well as reducing education costs. It also provides access to education 24 hours a day (15, 16).

Francis et al. (2019) argued that e-learning students can benefit from personal training and real-time feedback (17). Similarly, other researchers have pointed to the increasing potential of e-learning and virtual learning in encouraging enrollment among young students (in the same way as adult, ethnic and racial minority students) due to increased flexibility (18, 19). In contrast, other researchers believe that students who take electronic courses, perform worse than the

ones taking conventional courses (20, 21). Like e-learning, conventional teaching has its drawbacks. For example, this method deprives the learner of the opportunity to think more profoundly. Studies have shown that 80% of what is taught in the traditional way is completely forgotten in 8 weeks. Moreover, the traditional method encourages learners to adopt a passive learning style. It does not take into account individual differences and learners' needs, disregards problem-solving, creative thinking, and other high-level cognitive skills, and is usually not productive (22).

Due to the increasing use of e-learning and the fact that no research has been done in primary schools in Shiraz, the present study seeks to compare the impacts of e-learning and Conventional Education on the academic motivation and performance of fifth-grade students in Shiraz in 2019-2020 academic year.

Methods

This was a descriptive study, and the research population consisted of students studying in the fifth grade of primary schools in Shiraz in 2019-2020 academic year.

MedCalc software was used for sample size calculation. The minimum required sample size was 104 in each group and 208 in total. A larger sample was selected to ensure that the population under study was fully represented. Finally, the statistical sample of this study included 268 students (134 students in e-learning and 134 in conventional education group). The criteria for entering the study included all students studying in the fifth grade of the elementary school in the academic year 2019-2020. Students who did not wish to continue participation and did not complete the questionnaires were excluded from the study.

Research Procedure

After obtaining consent to conduct research from the University Research Council and obtaining an ethical license from the Ethics Committee and the necessary coordination with the Education Department of Shiraz, the researchers began the study.

First, the primary schools in four districts of Shiraz were evaluated, and the schools that met the desired criteria were purposefully selected. The selection criteria included all schools that used e-learning in designing and presenting lessons, and established interactions between teachers, students and their parents. Since the desired e-learning programs were not provided in the elementary schools of the 3rd and 4th districts, schools were inevitably selected from districts 1 and 2.

Finally, one all-male school and one all-female school were randomly selected from District 1 (from 4 all-male schools and 2 all-female schools), and likewise one all-male school and one all-female school were randomly selected from District 2 (from 5 all-male schools and 3 all-female schools). To ensure homogeneity between the e-learning and conventional education groups, the conventional schools that had the highest similarity to the selected e-learning schools (in terms of economic and cultural factors, etc.) were selected. And then, two or three classes were randomly selected from each elementary school in accordance to its inventory of fifth grade classes. We selected our subjects from among the students who agreed to participate in the research.

Prior to data collection, arrangements were made with school officials. The researcher personally visited the schools and all participants in this study were given sufficient information about the objectives of this study. Students and their teachers were fully informed about the study procedure and their questions and concerns were addressed by the researcher. They were also assured that the results of this study will remain confidential and will not affect their academic scores. They also had the choice to opt out at any time if they wished. After providing this information to the candidates, an informed consent form was obtained from them.

Data Collection Tools

Educational Performance Test (Based on Pham and Taylor, 1999): EPT is an

adaptation from the studies conducted by Pham and Taylor (1999) with the purpose of evaluating academic performance in Iranian society. This questionnaire consists of 48 items in 5 areas, namely self-efficiency (15 questions), emotional effects (8 questions), planning (9 questions), lack of consequence control (6 questions) and motivation (10 questions).

Scoring each item was based on a 5-point Likert Scale ranging from 'not at all' (score 1) to 'very much' (score 5). The minimum score was 10 and the maximum was 50.

According to Nour Mohammadian the reliability of each of the factors of the questionnaire in consecutive order are 0.91, 0.92, 0.73, 0.63, and 0.72 (23). Qaltash also used content validity to obtain the validity of the test (24).

Academic Motivation Scale: this scale was developed by Vallerand Blaise, Breier & Pelletier in Canada in 1989. It was designed to evaluate academic motivation with 28 items, and its validity was confirmed. The high school version of this scale is a paper-pencil scale based on the self-determination of Ryan and Deci (25). This measurement evaluates students' success by 7 scales and their related items (amotivation, external motivation, introjected motivation, identified motivation, intrinsic motivation to know, intrinsic motivation to achieve things, and intrinsic motivation to experience stimuli) using 7-points Likert scale. The minimum score for each item is 1 and the maximum score is 7. Therefore, the maximum score of the questionnaire is 196 and the minimum is 28.

Vallerand et al. (1992) reported that the reliability of the sub-scales using Cronbach's alpha was 0.84, 0.85, 0.86, 0.62, 0.84, 0.85, and 0.85 respectively, and the total reliability of the questionnaire was measured at 0.71(26). Bahrani's study (2005) indicated that the calculated alpha coefficient in Iran for the questionnaire stood at 0.88 (27).

Data Analysis Method

The research questions were tested using inferential statistics. Inferential statistical methods and independent t-test (SPSS v.22) were used to analyze data according to the title, objectives and research questions.

Results

The e-learning group was comprised of 134 students, of whom 54 were girls (40.3%) and 80 were boys (59.7%). In the conventional learning group, there were 56 girls (41.8%) and 78 boys (58.2%). In the e-learning group, there were 82 participants with housewife mothers (61.2%) and 52 with employed mothers (38.8%). In the conventional learning group, 87 (64.9%) had housewife mothers and 57 (35.1%) had employed mothers.

Independent t-test was used to address the first research question, which investigates whether e-learning and conventional teaching have different effects on students' academic motivation.

As seen in Table 1, the difference is significant in the academic motivation and its components, and according to the obtained mean values, the students receiving e-learning education had higher mean scores than the students in the conventional education group.

Independent t-test was used to study the second research question, which investigates whether "e-learning and conventional teaching have different effects on students' academic performance".

As seen in Table 2, there is a significant difference in the motivation component in the two groups and according to the mean scores, e-learning students have a higher score than the conventional learning group. In terms of other components, there was no significant difference between the two groups.

Discussion

The current study draws a comparison between the impacts of e-learning and conventional education on the academic performance and motivation of the fifth-grade students at elementary schools in Shiraz, Iran. The results showed that academic motivation is higher in e-learning students than in the students undergoing

Table 1. Using t-test to determine the difference between academic motivation in e-learning and conventional education groups

Variable	Group	Mean	Standard Deviation	t	DF	P
Intrinsic motivation	E-learning	64.76	14.49	3.05	266	0.002
	Conventional	59.42	14.16			
External motivation	E-learning	70.41	14.27	2.42	266	0.02
	Conventional	66.28	13.63			
Amotivation	E-learning	19.48	3.86	2.21	266	0.03
	Conventional	18.35	4.50			
Academic motivation	E-learning	154.66	25.92	3.41	266	0.001
	Conventional	144.04	25.06			

Table 2. Using t-test to determine the difference between academic performance in e-learning and conventional education groups

Variable	Group	Mean	Standard Deviation	t	DF	P
Self-efficacy	E-learning	30.36	3.94	1.51	266	0.13
	Conventional	29.60	4.37			
Emotional effects	E-learning	19.81	7.06	1.45	266	0.15
	Conventional	21.10	7.39			
Planning	E-learning	52.59	6.24	1.11	266	0.27
	Conventional	51.66	7.42			
Lack of consequence control	E-learning	11.90	2.52	0.55	266	0.58
	Conventional	12.09	2.98			
Motivation	E-learning	46.72	5.36	2.23	266	0.03
	Conventional	45.26	5.38			
Academic performance	E-learning	163.57	18.98	0.55	266	0.58
	Conventional	162.43	14.40			

conventional education. This finding is in line with the studies conducted in this area. For instance, Ritzhaupt, Martin & Daniels showed that applying multimedia technology in education is effective on the academic development of students because multimedia-assisted learning leads to faster information processing, quick learning and improved cognitive skills in learners, and provides the grounds for their academic progress (28). Furio et al (2015) believed that using electronic educational content (in the form of multi-media) can improve the style, technique, method, and quality of education as well as the motivation to learn in an active learning environment (29).

In contrast to conventional education, e-learning is based on student self-learning, and in fact, the student is at the center of the learning process. Teaching methods that are based on information and communication technology help teachers and students take a learner-oriented approach. In contrast to traditional content, electronic content does not merely focus on the latent knowledge in a subject, but also it involves the method of presenting a subject and providing an effective and motivational interaction between the learner and the learning management system.

A review of literature reveals a large body of research comparing the effectiveness of e-learning with other teaching methods. Cabero-Almenara et al. (2016) conducted a meta-analysis of research on e-learning in Spain. The first finding of the study indicated that the number of e-learning surveys has been increasing over the years, and this finding proves that e-learning is one of the

topics of interest for Spanish researchers. Other findings of this meta-analysis include the researchers' tendency to study the effects of e-learning on academic performance in order to integrate educational programs in different regions based on related results (30).

Numerous meta-analyses have been conducted on the advantages of e-learning over face-to-face training in different parts of the world, and sometimes contradictory results have been integrated and assessed in a single study. In a meta-analysis, Means et al. (2013) examined the conflicting results of the studies on online, face-to-face and combined learning situations. The results showed that the effectiveness of e-learning and face-to-face learning was not significantly different, but combined courses have a greater impact on learners' performance (31). In a meta-analysis, McCutcheon et al. (2015) compared the impacts of e-learning and face-to-face training on nursing students' clinical skills. They concluded that the effectiveness was similar in these two methods and that neither method was superior to the other (32).

In the schools that utilize multimedia facilities, students use the Internet and other educational media to access vast sources of information, and if they have any further questions, they can remain in contact with other students and teachers. These schools use more information technology than traditional schools. The content is provided electronically and the teacher acts as a guide. In such schools, efforts are made to address new problems and educational obstacles with the help of new technologies. These problems might be related to computer and information literacy, as well as the issues that might arise in the traditional methods of teaching. Electronic content provides an opportunity for learners to make decisions on such matters as how to participate in learning, how to use tools, the time required to learn, the amount and level of learning, the place of learning, and their choice of educator (33).

Today is the age of information technology, and one of its outcomes is the shift in educational practices in the form of e-learning and online education. Studies have shown that 80% of what is taught in the traditional approach is completely forgotten in 8 weeks. On the other hand, the traditional method encourages learners to adopt passive learning attitudes. It does not take into account individual differences and learners' needs, disregards problem-solving, creative thinking, and other high-level cognitive skills, and is usually not productive (22).

Future research may consider strategies such as self-regulated learning (e.g. time management) as the reasons why online and face-to-face learning can have different academic outcomes (34). Students' experiences in previous courses may also be a contributing factor in fostering their motivation. Of course, some studies have found no direct link between previous e-learning experiences and academic performance (35). Future studies should take account of these findings and consider them in their analyses. However, research has shown that there are substantial benefits in measuring the long-term changes in motivation (36) and that the pattern and level of impact of e-courses can be different in the short term and long term.

The use of educational software provides an opportunity for more profound cognition, and therefore measures should be taken to maximize the level of learning in schools. This will not be possible without the cooperation of education officials and relevant organizations in facilitating the development of teaching and learning practices. In e-learning courses, learners can learn at a personal pace, access more resources, and determine the time and place of learning; on this basis, it can be said that the level of learner control in online training courses is more than face-to-face courses and more control can be regarded as a positive development in this type of training; it leads to improved memory performance, higher motivation and, as a result, better learning performance. In addition, the important point before implementing an e-learning system is that organizations need to make the necessary preparations for the implementation of e-learning before

investing in an e-learning program. In this context, the most important factor in successful implementation of an e-learning program is to ensure the preparedness of learners, teachers, and technology. People's attitude especially that of students is also an important determinant of success or failure of e-learning.

The first limitation of the present study is that the findings of the questionnaire and self-report were obtained from individuals' personal accounts, and it is not clear to what extent they reflect the real behaviors in daily life. Another limitation of this research is related to the spatial and temporal scope of the study. This study was performed on fifth-grade elementary school students in Shiraz, Iran, in 2019-20 academic year. Therefore, precautions should be taken, since the findings cannot be generalized to students in other schools and cities in the country. Another limitation of this research is related to the research method. The current study was a descriptive study; however, its findings have not been obtained using educational interventions. Based on these limitations, the results of this study can be applied in reviewing and developing the students' curriculum.

It is recommended that similar studies be conducted in NODET and other schools, and compared with the results of this study.

This research can also be performed at other academic levels as well. Considering that it was conducted using a descriptive method, it is suggested that the relationship between the given variables be investigated experimentally, and educational interventions be introduced in this field. This will help researchers obtain more accurate results. They will be encouraged to plan studies that examine the impact of e-learning and academic performance on different variables including academic vitality, mental well-being, self-efficacy, learning styles and happiness. The results will help them develop a more comprehensive knowledge of the discussed variables, and analyze the relationship between e-learning and other educational approaches that might prove more effective in other circumstances.

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Authors' contributions

NZ and ATG devised the study concept, designed the study, supervised the intervention, data collection and analysis, participated in the coordination of the research, and critically revised the manuscript. ATG participated in the study conception and design, conducted field work, collected data, performed the analyses and revised the manuscript. NZ, ATG and MBN contributed to the design, analysis and interpretation and reporting data, and revising the manuscript critically for important intellectual content, and final approval of the version to be published. All authors have read and approved the content of the manuscript.

Ethical Declarations

At the beginning of the educational program the researchers introduced themselves. They explained the study objectives and procedures to the participants and obtained written informed consent from them. The participants were also assured that all information collected will remain confidential. This study was approved by the Ethics Committee of SUMS (IR.SUMS.REC.1398.894.).

Availability of Data and Materials

The data that support the findings of this study are available from the corresponding author on request.

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Conflict of interests

The author declares that they have no conflict of interests.

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