Research paper

Developing Iranian Technical Students Academic Achievement through Online Instruction

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Abstract

The present study compared the impact of online and face-to-face interaction on Iranian technical students' academic achievement. The participants of the study were selected based on convenience random sampling. A pretest was administered to test their current academic ability. They were then assigned into two equal groups of online (n = 30) and face-to-face (n = 30). The participants of the online group received instruction in an online environment whereas the participants of the control group received instruction through traditional face-to-face methods. Their performances were measured through a post-test. The result of the independent t-test between the pre-tests and post-tests indicated a statistically significant difference between the two groups in their academic achievement. Face-to-face instruction was found to be more effective in improving the students' academic achievement. The current study's findings may be useful for syllabus designers in the sense that they could apply them and develop materials based on the needs and abilities of the learners. The extent to which learning materials cover blended instruction practices is critical in syllabus design.

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Introduction

Over the last 30 years, the conventional teaching methods and approaches have given way to ICT-enhanced education. Stakeholders and school administrations have used these technology advancements as a means of promoting supplementary learning. Learners, on the other hand, contribute to the improvement of their learning and autonomy by bringing internet-accessible gadgets to the classroom, which have become widely available in many learning contexts.

Given the pervasiveness of current technology in L2 classrooms, lessons are designed to accommodate ICT integration, which alters how learners interact with learning activities. According to Golonka, Bowles, Frank, Richardson, and Freynik (2014), when technologies develop, become widely available, and are adapted for FL (foreign language) pedagogy, instructors may change their teaching tactics or restructure their instructional activities to make the most use of existing resources.

It is important to note that the employment of technology in many learning contexts is not intended to be used instead of human (Shank, 2008; Wilson 2008). Rather, it is meant to supplement and enhance normal classroom work, and the usage of these technologies will increase the efficacy of lecturers. Students can utilize technology to boost the material they have learned in class. As a result, students will have several possibilities to broaden their current knowledge by dealing with supplementary tasks that are done and reported online. Students can benefit from exposure to legitimate resources obtained on the Internet in order to tackle real-world challenges (Nelson, 2008). As a result, the usage of technology is getting more prevalent, and it will become a standard feature of classroom instruction in the future years.

For a long time, traditional teaching methods have been employed in the Iranian educational system. Teaching and learning are difficult tasks for both instructors and students. The researcher feels that the current study's difficulty stems from students' poor performance on academic achievement assessments, a lack of enthusiasm, and poor engagement in class. Despite having easy access to current technology, our pupils do not employ them in their study in general. As a result, as a recommended remedy, it is critical to employ online learning programs in strengthening students' skills, where the usage of diverse multimedia might assist students achieve success in their academic courses. The researcher was motivated to undertake this study because of the aforementioned gap. As a result, for all of the concerns described above, a research to address these problems and give some recommendations and implications to fix them is required.

The major objective of this study is to determine whether there is any significant difference between online and face-to-face in their impact on enhancing technical students' academic achievement.

Review of Literature

Teachers must use effective instructional strategies that improve students' capacity to grasp ideas and emotions. According to Bolandifar (2017), advancements in information and communication technology (ICT) in language education have resulted in the invention and implementation of new approaches for teaching and learning. Traditional face-to-face learning and teaching methods cannot satisfy the requirements of the ICT age. Traditional face-to-face sessions are being phased out in favor of computer-assisted instruction, which is becoming more common in EFL/ESL classrooms. The use of technology in language instruction has been backed by research findings.

Mehri Ghahfarokhi and Tavakoli (2020), for example, assessed the effect of using technology-mediated reading comprehension tasks in a reading comprehension class to enhance learner autonomy and metacognitive strategy usage in Iranian intermediate EFL learners. Eighty language learners were randomly allocated to experimental and control groups based on their performance in a placement test. As a pretest, the learner autonomy questionnaire and the metacognitive awareness of reading strategies inventory (MARSI) version1. 0. were utilized. The aforementioned surveys were presented again as a posttest after 20 sessions of reading comprehension teaching in the form of technology-mediated task-based instruction in the experimental group and traditional explicit instruction in the control group. The collected pretest and posttest scores were statistically evaluated using ANCOVA. compared to traditional explicit reading comprehension teaching, the results showed that technology-mediated task-based education was more effective in promoting learner autonomy and metacognitive strategy utilization.

In a similar study, Nushi and Ghasemi (2020) investigated the teaching practices and opinions of 90 Iranian EFL instructors about technology-supported L2 education. A mixed-methods approach was used, which included two surveys and an interview. According to the results, Iranian EFL instructors favor teacher-centered modes of education and have good opinions regarding the use of technology in EFL training. Furthermore, it was demonstrated that there is a significant association between the instructors' teaching methods and their attitudes about the inclusion of technology in EFL training.

Basically, technological advances provide learners with the chance to apply what they are learning in relevant ways in actual scenarios. Another advantage of using the internet and computer technologies is providing the opportunity for peer cooperation and communication. Furthermore, with an ever-increasing amount of instructional materials accessible, new technology allows EFL teachers to provide more effective individual and tailored coaching to their students (Rezaei & Javanbakht, 2015).

New generations lived in the internet and technology era are experiencing a life in school that does not represent their out-of-school life (Lenhart, Purcell, Smith, & Zickuhr, 2010). This new beginning and its activities take place mostly outside of school in more casual learning and social settings (Merchant, 2009; Selwyn, 2009; Spires, Lee, Turner, & Johnson, 2008).

Technology's usage in teaching and learning situations is a key subject that has received a lot of attention in recent years. Blogs, e-learning environments, and even social networking sites are increasingly being used in education. As a result, educational practitioners and instructors are aware of the significance of social networking sites in the acquisition of information. As a result, they aimed to create concepts and frameworks for analyzing, exploiting, and developing learning problems and strategies that leverage Web 2.0 capabilities (Ansari & Khan, 2020).

The Web 2.0 tools have been used in the learning context since their inception. The popularity of Web 2.0 resulted in publication of a special volume titled *The Next Generation: Social Networking and Online Collaboration in education* (Lomicka & Lord, 2009). The technologies examined in this volume range from previously well-known tools such as podcasting, Instant Messaging (IM), and RSS to novel network sites such as Twitter and Facebook.

According to Greenhow and Robelia's (2009) study, high school students' usage of social networks such as MySpace has aided them in developing twenty-first century competences, particularly technical fluency and digital literacy. Because these sites encourage the involvement of web page designs, the authors discovered that students were acquiring communication, creative, and technological abilities while engaging in online social networks. Basically, successful learning requires a set of activities and materials that teachers should try to imbue their classes with. The role of technology in the learners' life is unquestionable; In fact, it was believed that technology is like an earthquake which stimulates the learners to reshape their learning on a new basis (Peng, 2019).

Online learning is known as one type of on-line learning which has received significant attention recently. Blended learning, as defined by Thomas and Trapp (2007), is the mixing of several methods to pedagogy or teaching, such as self-paced, collaborative, tutor-supported learning, or traditional classroom instruction. According to them, blended learning frequently involves the utilization of materials that mix e-learning with other educational resources. Authors also refer to blended learning as hybrid learning, mixed learning, and multi-method learning. All of these notions, however, allude to the incorporation (or blending) of e-learning tools and approaches with traditional methods.

According to Bourke (2010), blended learning encompasses a broad variety of activities ranging from traditional face-to-face contacts to totally online interactions. According to Keshta and Harb (2013), there are three modes of operation that show the extent to which technology is used in learning and teaching:

- Mode 1: Technology is used to aid in course administration and the development of learner support resources. For example, giving information and resources to students (e.g., lecture notes or recordings, assessment criteria) and completing basic administrative chores (e.g., announcements or course emails).
- Mode 2: Using technology to enhance the quality of the learning experience using interactive activities that go beyond what is achievable in a face-to-face classroom environment. For example, using technology to assist communication, cooperation, evaluation, and course management.
- Mode 3: Technology is utilized to facilitate self-directed learning that also includes interactive and collaborative learning activities. Courses are provided entirely online in this way.

Arias, Swinton, and Anderson (2018) compared the effectiveness of online delivery compared to face-to-face delivery using an admission protocol that largely reduces self-selection bias. The research uses the random distribution of Class Principles to Macroeconomics registrants to two alternate locations: online and face-to-face. The same professor taught all sections with the same goals of the course and the same tests. Both the difference in student grades from pre-test to post-test and the student average were determined on the course setting. Students in the face-to-face segment had higher scores. These findings indicate that both the goals of the course and the mechanism used to determine the relative efficacy of the two forms of education will play an important role in assessing the relative effectiveness of alternative implementation methods.

Paul and Jefferson (2019) conducted a study to determine which teaching method (i.e., online vs. face-to-face) was more effective over the 8-year period. The grades of 548 students, 401 conventional students and 147 online students in the environmental science class were used to decide the educational modality yielded better student results. In addition to the overall goal, we also looked at score variability between genders and classifications to assess if the teaching modality has a greater effect on particular categories. There was no significant difference in academic achievement between online and face-to-face learners, gender or class level. These results show the potential to translate environmental science principles for non-STEM majors on both conventional and online channels, regardless of gender or class.

Bourzgui, Alami, and Diouny (2020) examined the students' understanding of mixed learning in the course of growth and development. Another goal was to assess the feasibility of a blended learning approach relative to face-to-face teaching and to demonstrate its effects on the learning environment of second year dental students. A total of 141 second-year students participated in the study. The data needed for this analysis were obtained by means of a questionnaire. Responses were received as soon as they were completed by the students. The research was accepted by the Research Ethics Committee and all students gave informed consent to the study. The attendance rate was 93 percent. 79.4% of students attended lectures on a daily basis. About 77.4 per cent of students felt that the goals of the course had been accomplished and 70 per cent assumed that the objectives of the course had been well established. Just 58.8 per cent of students used the e-learning tool (Moodle), 66.7 per cent had trouble interpreting online research materials; 65.4 per cent felt that immersive assessment was not enough. 41.9 percent of students felt online education was an alternative to face-to-face education. In reality, 53.8% of students assumed that teaching could not be accomplished exclusively online; further clarification could be given by the instructor.

In the paper-based traditional approaches, the instruction is through books so that learners only used verbal processes to decode the meaning. With the advent of multimedia, as According to Narayanan and Hegarty (2000), dynamic and highly representations such as static text, animated text, auditory narratives, static diagrams, photos, photographs, animations, and video have taken the place of mixed-mode representations such as verbal explanations.

In order to pursue the purpose of the present study, the following research question was posed:

- Is there any significant difference between online and face-to-face in their impact on improving technical students' academic achievement?

Methods

Population and Sampling

The participants of the study were 60 adult students who study accounting in technical college. They were both male and female. They were in both male and female forms. Their ages ranged from 22 to 27. Persian was the native language of the participants. They were chosen for this study using convenience sampling. They were assigned to two equal groups of online and face-to-face in order to pursue the goals of the study.

Instrumentations

The instruments employed for data collection consist of a pretest and a posttest. The pretest was a 20-item test measuring the technical knowledge of the students in accounting field. It was taken from 2019 technical university admission exam. Posttest was the same version of the pretest which was administered at the end of the study in order to measure the students' achievement. In multiple-choice questions, each correct answer received +1 point, while each incorrect answer received 0 point. There was no penalty point for incorrect responses in the tests. The test total score was out of 20.

Data Collection and Procedure

In order to accomplish the purpose of the study, the following procedures were taken. First, the participants (n = 60) were then distributed to two equal groups of online and face-to-face. Then, the participants took pretest in order to ensure their homogeneity in terms of technical knowledge at the beginning of the study.

At the beginning, one session was dedicated to explanations about working online. The contents of online instruction was presented by instructor. The instructor posted the course contents online and then asked the students some questions and asked them to express their opinions. It was expected that online group did the tasks online. The students were required to participate in online discussions about important issues or to submit comments on the topics for asynchronous engagement over the internet.

In face-to-face group, the instruction was provided through routine and traditional methods in the classroom. The students were required to attend every session. The contents of the instruction was similar to online group only different was that, the online group was exposed to input materials through internet platform. Finally, the participants of both groups took posttest to measure their academic achievement.

Results

In order to answer the research question of study, the means of the participants on pretest and posttest of study were compared. The descriptive statistics of online and face-to-face groups' performance on pretest is provided in Table 1 below.

Table 1

Descriptive statistics of pretest

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest (online group)	30	9	13.33	11.27	1.291
Pretest (face-to-face group)	30	9.67	14	11.85	1.327

The pretest scores need to be normally distributed. To make sure, two one-sample Kolmogorov-Smirnov tests for the performance of online and face-to-face groups on pretest were conducted. The results are shown in Table 2 below.

Table 2

One-sample Kolmogorov-Smirnov test for pretest

		face-to-face group	online group
N		30	30
Normal Parameters[a,b]	Mean	11.27	11.85
	Std. Deviation	1.291	1.327
Most Extreme Differences	Absolute	.105	.060
	Positive	.101	.038
	Negative	-.105	-.060
Kolmogorov-Smirnov Z		1.085	.614
Asymp. Sig. (2-tailed)		.190	.845

The measured significance levels were 0.19, 0.84 respectively; They were higher than the expected value of significance (i.e., 0.05), implying that there was no significant difference in the observed distribution of scores between the online and face-to-face groups, and the scores were normally distributed.

In order to ensure that there is no significant difference between the online and face-to-face groups regarding their performance on pretest, an independent sample t-test was performed. The results are shown in Table 3.

Table 3

Independent samples t-test between control and experimental group on pretest

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretest	Equal variances assumed	.001	.971	-1.40	58	.167	-.583	.414	-1.421	.255

It was discovered that there is no significant difference in pretest scores of online and face-to-face groups (t = -1.40, p > 0.05). In other words, the academic knowledge of the participants was similar at the beginning of the study. The descriptive statistics for online and face-to-face groups are provided in Table 4.

Table 4

Descriptive statistics of online and face-to-face group scores on posttest

	N	Minimum	Maximum	Mean	Std. Deviation
Posttest (face-to-face group)	30	10.33	18.33	15.183	2.25424
Posttest (online group)	30	9.00	14.33	11.283	1.20076

In order to verify the research question of the study in finding whether there is any significant difference between the online and face-to-face teaching regarding their academic achievement, the following analyses were performed. The mean scores of online and face-to-face groups on posttest were compared by an independent sample t-test. The results are provided in Table 5.

Table 5.

Independent t-test of control and experimental group on posttest

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Posttest	Equal variances assumed	6.03	.019	6.82	38	.000	3.90000	.57111	2.7438	5.0561

The results, as shown in Table 5, showed that there is a significant difference between the posttest scores of both online and face-to-face groups (t = 6.82, p < .05) in such a way that face-to-face group outperformed on posttest. Therefore, the research question of the study was verified.

Discussion

As compared to online learning situations, the results of this study revealed that face-to-face instruction provided more opportunities for students. Students were enthralled and excited by these situations. In face-to-face instruction, they had more opportunities and situations to practice the course. Furthermore, everyone could assess himself/herself and check their understanding and progress. Finally, face-to-face instruction was introduced as an effective teaching tool to assist students in improving their academic performance.

The researcher's explanation for the obtained results was indisputable in the sense that the blended online instruction has significant effect on language achievement. One possible cause for the positive impact of blended online instruction on learners' language achievement is that it coaches EFL learners to have organized and well-structured information. Another reason may refer to the dynamic and highly user-friendly environment that blended instruction was

created through animated text, aural narratives, static diagrams, pictures, photographs, animations, and videos (Narayanan & Hegarty, 2000).

The results of this study support the previous studies such as Arias, Swinton, and Anderson (2018) who found that students in the face-to-face segment had statistically and significantly higher achievement than online segment. These findings support those of Bourzgui, Alami, and Diouny (2020) whose participants believed that teaching could not be accomplished exclusively online; further clarification could be given by the instructor.

However, the findings of this study contrast those of Paul and Jefferson (2019) who found that there was no significant difference in academic achievement between online and face-to-face learners overall, gender or class level.

Conclusion

This study aimed to find the difference between the online and face-to-face groups in their impact on Iranian technical student' academic achievement. The results of study indicated that there is a significant difference between online and face-to-face instruction and the use of face-to-face instruction was more effective in improving the students' academic achievement. Participating in a class that used a face-to-face instruction helped students to improve their academic achievement.

Blended online instruction encourage EFL learners to organize and formulate their own thoughts and speculations and improve their capabilities in learning and accomplishing language learning tasks. They are also effective in motivating students to think more deeply and critically. It can be claimed that the use of blended online instruction should not be limited to language institutes and can be used in all educational settings.

From a pedagogical perspective, the use of online education provided useful insights for EFL teachers, students, and syllabus designers. The utilization of online training cannot ensure academic success. A instructor should be there to arrange materials, inspire, advise, and provide feedback to pupils. The findings of this study aided EFL teachers in designing and adapting learning materials to improve the academic accomplishment of the participants. Furthermore, as Hedge (2000) points out, the existing exercises have been criticized since they consume a significant amount of class time and the teacher's energy. Teachers' time and energy would be saved if face-to-face education was integrated with presenting through an online instruction framework.

According to the findings of this study, blended instruction attracts students more than traditional one in the current circumstances. Learners may easily see the importance of such learning scenarios over tedious online classroom activities and tactics.

The current study's findings may be useful for syllabus designers in the sense that they may put them into practice and develop materials around the requirements and skills of the learners.

In syllabus design, the extent to which learning materials include practice is critical. Meaningful practice occurs when themes and activities are connected to the students' real life, needs, and interests and have the ability to actively involve them in the creation, comprehension, and application of knowledge.

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