

Research Article

A Comparative Study of Information and Communication Technology (ICT)-Based and Conventional Methods of Instruction on Learners' Academic Enthusiasm for L2 Learning

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The present study aimed to compare the effects of information and communication technology (ICT)-based and conventional methods of instruction on ninth-grade students' academic enthusiasm for L2 learning (English). The statistical population included all ninth-grade students from lower secondary schools for girls located in the city of Tehran, Iran, in 2019–2020. For this purpose, applied research with a quasiexperimental design was employed to meet the study objectives. To select the statistical sample, the convenience sampling method was used, so one school equipped with the essential facilities was chosen to implement the ICT-based education. Then, two classrooms at the given school were selected as the experimental and control groups, each one consisting of 27 students, based on the random sampling method. The research tool was the 15-item Academic Enthusiasm Questionnaire (AEQ) containing behavioral, emotional, and cognitive subscales, and recruiting a five-point Likert-type scale. All the classrooms initially received a pretest, and then the experimental group was instructed by the ICT-based education. Finally, all the study groups completed a posttest. Moreover, inferential and descriptive statistics were applied for data analysis. The study results demonstrated a significant difference in terms of the baseline academic enthusiasm between the experimental and control groups. In addition, the ICT-based method of instruction showed stronger effects on students' academic enthusiasm than the conventional one.

1. Introduction

It is widely accepted that the information and communication technology (ICT)-based method of instruction is one of the main processes of teaching and learning of L2 learning (English) because it adds vitality to the classroom contexts like those in virtual settings. In fact, researchers have not reflected on ICT as a single technology but rather one of the combinations of software, hardware, delivery systems, as well as multimedia. In current education systems, ICT

involves numerous rapidly emerging technologies, such as notebook, handheld, and desktop computers, the Internet, digital cameras, the World Wide Web (WWW), cloud computing, tutorials, spreadsheets, emails, simulations, Bluetooth, local area network (LAD), digital versatile discs (DVDs), and streaming, together with applications, such as virtual environments, word processors, digital libraries, simulators, emulators, video-conferencing, and computer-mediated conferencing. Furthermore, ICT gives rise to producing digital resources, such as digital libraries, wherein

teachers and students can have easy access to the study and course materials from all situations at all times [1–3].

According to the related literature, advancements in ICT are among the crucial issues to meet the needs of education systems [4–6]. ICT has been also introduced as one of the tools supporting learning processes and holding the promises of new solutions to the challenges facing education systems [7]. Hence, there are positive prospects for ICT in English classrooms, whose success largely depends on several factors, such as teachers' and students' attitudes toward the role of ICT in the teaching and learning process of English as well as their perceptions of ICT skills [8–10].

Multiple publications have thus far verified the benefits of ICT use for educational goals [11–13], as it offers some tools for scalable, student-adopted mobile teaching solutions and online teaching [14]. Additionally, integrating ICT into the teaching process can be generally amplified by incorporating digital resources and respective methodologies [15].

The utilization of ICT by English teachers represents their positive attitudes toward technology as well as the application of compatible teaching methods for their implementation inside and outside classrooms [16–18]. Moreover, in the case of the suitable use of the related technologies, tasks are considerably simplified, collaborative work is promoted [19, 20], and students' learning is motivated [21–23]. The positive effects of ICT can be further observed in students' academic performance [24, 25]. However, some doubts have been raised on the appropriate use of ICT by teachers because of initial indifference and reluctance, as well as the absence of certain teaching methods [26–29]. Thus, conventional methods of instruction no longer meet the growing demands for education, and e-literacy is a way to move through the information society [30–32].

Academic enthusiasm also plays a leading role in academic achievement, promoting students' education and reducing risky behaviors at schools [33], because it increases their commitment to educational goals and involvement in relevant assignments [34–36]. Academic enthusiasm here refers to the amount of energy that students spend doing their academic work as well as the effectiveness and efficiency achieved [37, 38]. Academic enthusiasm can thus lead to effective participation in school and classroom activities, adaptation to school culture, and good relationships with teachers and other students [39–41].

Researchers, including Allah Karami and Manoochehri [42] and Sattari et al. [43], similarly analyzed the effects of ICT on students' success. Interaction, cooperation, discipline, and interest have accordingly increased creative thinking, desire for the classroom, doing homework, and discipline in students. In 2013, Kayha and Hoveyda also examined the impact of ICT on the learning process in lower secondary school students in the city of Zahedan, Iran, and showed the positive effect of ICT in boosting students' perseverance, creativity, and academic success. Moreover, male and female students were in different grades.

Brian et al. [44] in their study aimed at analyzing the relationships between academic achievement, academic self-

efficacy, and academic motivation, and reported that academic self-concept could predict academic motivation toward school. In another study on school status, achievement motivation, and academic motivation, Gunuc and Kuzu [45] concluded a significant positive relationship between students' perceptions of school status and their achievement motivation and academic motivation, which could indirectly predict the school status based on conditions, facilities, and technological equipment related to enthusiasm.

Cadima et al. [39] in their study, reflecting on the effect of self-regulation and teacher-student relationships on students' academic achievement, settled that higher self-regulation and close relationships with teachers could forecast students' academic achievement. Moreover, the relationship between teachers and students could be intensified or reduced due to ICT. Gunuc and Kuzu [45] in a study aimed at modeling the impact of the school environment and its technological facilities on academic enthusiasm (viz., behavioral, cognitive, and emotional). Nurttila et al. [46] investigated the feelings of being competent and optimistic as a source of increasing academic enthusiasm and confirmed that a sense of competence in academic pursuits and optimism could be empowered and ultimately enhance competence.

1.1. History of ICT Use in English Education. English has been acknowledged as one of the basic skills in different dimensions of students' lives. It is also necessary in each community, and English ematical operations are considered as one of the largest parts of the daily routines [47]. For example, Sadovsky [48] focuses on the necessity of re-thinking the learning and teaching process of English, expanding thoughts on the materials to be learned, and illustrating the actual significance of this knowledge in the daily lives of students.

Put differently, the impacts on social life expanded by ICT represent one of the specific opportunities to develop education because such occasions can simplify meaningful learning via technological resources. Hence, the integration of more interactivity and exciting ICT technologies, the exploration of amusing digital resources such as educational games, videos, and images for supporting English learning and teaching, and simulators, as well as other applied sciences in English classrooms to encourage students and teachers, are the feasible ways to facilitate the current situations [49–51].

For this reason, mobile tools, including tablets and smart phones, are among the major options for developing projects to integrate ICT into educational contexts due to their affordability, robust hardware, and main developments [52]. These days, all communities are also experiencing continuous changes with the emergence of technologies and the sciences that result in people's contact at an earlier age with technological resources. Hence, tools such as mobile devices and computers have been part of the recent culture. Consequently, technology can have a major function considering the educational support in education systems. In fact, dynamics in English classrooms may be transformed with the

use of ICT and mobile tools, which can be very promising in this regard.

Some applications of ICT are presented here. For example, calculations may be used by students, graphs can be plotted, and some problems can be solved by ICT. Moreover, a major illustration of the utilization of ICT is associated with the use of a calculator for performing more challenging numbers. Nonetheless, computer algebra systems, graphing calculators, and spreadsheets can be applied for solving problems via retrieval or improvement methods and tests. In addition, students may employ graph plotters or graphing calculators rather than algebra to present the graphical solution of equations [53].

In more advanced steps, students can statistically analyze data and make use of several statistical features of graphing calculators for data collection. Furthermore, producing images in dynamic geometry packages may further enhance students' understanding and problem-solving methods, which then approve geometric problems. The use of ICT as an instrument to help students solve problems, search things out, and understand situations can also expand their skills in the application of English. Therefore, ICT is one of the efficient tools, but students must learn the necessary technical skills in order to seize the effective and constructive opportunities provided to them.

It is possible to employ ICT in numerous aspects of English even though the cases mentioned below are the most useful ones:

- (1) English and problems
- (2) Formulae, identities, and equations
- (3) Order, rounding, and position value
- (4) Geometrical argumentation, including angles, shapes, and lines
- (5) Functions, graphs, and sequences
- (6) Coordinates (*viz.*, coordinate geometry)
- (7) Probabilities
- (8) Transformations
- (9) Statistical uses
- (10) Loci and construction
- (11) Data handling

Moreover, the English Aid software, as one of the browser-based applications that can be accessed by mobile devices, supports students in their self-studies of English in and out of classrooms. In fact, students are capable of using this software as one of the tools for following the curriculum and as a compliment to the common high school English books. The given software deals with a theoretical section introducing the chosen English ematical concepts, the respective learning assignments with solutions, hints concerned with students, as well as concrete examples of the studied phenomenon for guiding them to the solutions of chosen tasks and assignments. This software presents tools to teachers for monitoring students in classrooms and at individual levels. Its learning assignments have also been designed to be interactive and self-instructional, followed by

explanations, calculation steps, and moving graphs, which can visualize English. Finally, the given software can be accessed by desktop computers, smart phones, tablets with both Android and Apple's iOS operating systems and laptops.

In addition, experts have introduced Maxima as one of the algebra solver software that is based on LISP, as a computer language, and deals with each POSIX principle such as Unix, Linux, BSD, and Mac OS X. As well, Gnuplot is utilized for drawing purposes in this software.

According to the experts in the field, GeoGebra has been considered as one of the English software beneficial to students as well as teachers. In fact, this software is a powerful platform, helping preschoolers in effective learning of English and solving its problems, including calculus, vectors, algebra, linear programming, statistics, complex numbers, and so forth.

Furthermore, SymPy has been introduced as one of the Python archives for symbolic English, aiming at turning into a full-featured computer algebra system (CAS) by maintaining the codes in the simplest state for more comprehensibility and easier extension. Thus, the main research question addressed was as follows:

"Is teaching English with ICT-based method of instruction more effective in the academic enthusiasm of ninth-grade students than conventional education or not?"

2. Methodology

The research method was a quasiexperimental approach with a pretest-posttest design and a control group. The statistical population included all ninth-grade students from lower secondary schools for girls located in the city of Tehran, Iran, in 2019–2020. The convenience sampling method was also used since there was a need for appropriate facilities and technical infrastructure in schools as well as basic skills among students. For this purpose, one school equipped with the Internet, computer workshops, and projectors in the city of Tehran was selected. Then, two classrooms at a given school were randomly divided into two experimental (ICT-based education) and control (conventional education) groups. The academic enthusiasm pretest was further taken from both groups before the beginning of the semester.

Ethical considerations were taken into account at all stages of this study. Since a reflective written report as a kind of interview may involve the risk of probing into participants, private lives, the study's participants were notified of any consequences regarding participation in the study. To this aim, a digital written consent was sent to them to be signed and returned to the researchers. Indeed, the participants were informed of the study's objectives and ensured that their names and responses would remain confidential. Besides, the respondents were allowed to withdraw from the study whenever they asked for it. And, at the end of the study, they would be informed about the final results.

The lesson plan was designed for 12 sessions of 45 minutes. The educational content was accordingly prepared in the storyline software in a self-taught manner using texts,

TABLE 1: Mean and standard deviation (SD) of academic enthusiasm in the experimental and control groups.

Scale	Groups	Control group		Experimental group	
		Mean	SD	Mean	SD
Academic enthusiasm	Pretest	93.40	7.49	90.78	13.98
	Posttest	91.37	13.53	95.57	17.78

TABLE 2: Normal distribution.

Variables	<i>d.f.</i>	<i>z</i>	<i>p</i>
Academic enthusiasm	52	0.44	0.000

TABLE 3: Equivalence analysis of variances based on Levene's test results.

Variables	<i>d.f.</i> 1	<i>d.f.</i> 2	<i>F</i>	<i>p</i>
Academic enthusiasm	1	52	0.018	0.894

videos, teacher's voices, examples, exercises, and games. Two days before the classroom, the content was provided to the experimental group through the social network, but the control group received no interventions. At the end of the semester, the posttest was taken from both groups. In this study, gender, age, level of education, and teaching were controlled.

The Academic Enthusiasm Questionnaire (AEQ) developed by Fredricks, Blumenfeld, and Paris, consisting of 15 items and three subscales, viz., behavioral (items no. 1–4), emotional (items no. 5–10), and cognitive (items no. 11–15) using a five-point Likert-type scale (from never to all times) with the minimum and maximum scores of 23 and 115, respectively. In the research by Sadeghi et al. [54], the concurrent validity of the questionnaire had been already approved by experts. The overall reliability of the AEQ using Cronbach's alpha method was 0.87, and it was 0.81, 0.72, and 0.82 for behavioral, emotional, and cognitive dimensions, respectively.

An analysis of covariance (ANCOVA) was also employed to test the research hypothesis, and Levene's test was employed to determine the conditions for establishing the variance between the group scores.

2.1. Findings. According to the descriptive statistics related to academic enthusiasm in the experimental and control groups, as outlined in Table 1, the posttest mean score of the students in the experimental group with regard to the variable of academic enthusiasm was higher in comparison with that in the control group.

Table 2 shows the Kolmogorov–Smirnov test results in terms of examining the distribution of academic enthusiasm mean scores.

Since $p > 0.05$, then the assumption of the normalization of the distribution was established, and the academic enthusiasm outcomes showed a significant level of $p > 0.05$. Moreover, the Kolmogorov–Smirnov test results demonstrated a normal distribution of the mean scores of academic enthusiasm. The comparison of the ICT-based and

conventional methods of instruction on academic enthusiasm is provided in Table 3.

Regarding the research question, “Is teaching English with an ICT-based method of instruction more effective in the academic enthusiasm of ninth-grade students than conventional education or not?”, the mean scores of academic enthusiasm in the experimental and control groups after removing the pretest effect were significantly different, and it was concluded that the ICT-based education was more effective in the students' academic enthusiasm than the conventional one with a 95% confidence interval (Table 4).

3. Discussion and Conclusion

In the present study, the research hypothesis that English education via ICT could be more effective in the academic enthusiasm of ninth-grade students than the conventional method of instruction was confirmed, which was consistent with the findings by Bexton et al. [55], Bashpour et al. [34], Kavetsos and Koutroumpis [56], Naeemi Hosseini et al. [57], and Moradi Mokhles et al. [58], investigating the effects of using ICT in the learning and teaching process of English as well as increasing students' efficiency and consequently stimulating their academic enthusiasm.

The results of this study are in line with those of Azizi Nejad and Allah Karami [59], who compared the effects of traditional education and ICT-based education on students' academic enthusiasm in the eighth grade of middle school in Javanrood. They concluded that there was a significant difference in academic enthusiasm among experimental and control groups. The research results showed that the ICT-based education method has more effectiveness in comparison with traditional education in terms of the student's academic enthusiasm. In fact, the similarity of the research results is based on the fact that each of the studies conducted before refers to the impact of the use of ICT in teaching and learning, and the use of ICT is considered to be effective in promoting happiness, satisfaction, effectiveness, and academic motivation, all of which are associated with academic enthusiasm and make fundamental changes in their interpretation of the world through conversation with the teacher and their classmates.

In an ICT-based learning environment, students gain the ability to analyze and evaluate new knowledge using dynamic information transmitted through online communication, thereby providing learners with dynamic and active participants in building knowledge about their passive past. It will be converted to receive information. In this space, the presence of a participatory atmosphere will involve students in complex projects and help them acquire skills to solve life problems, and this issue will help learners to become

TABLE 4: ANCOVA results for the difference between the mean scores of academic enthusiasm in the experimental and control groups.

Variable	Source of change	Sum of squares	<i>F</i>	Mean squares	d.f.	<i>p</i>
Academic enthusiasm	Interconnection	13466.13	154.49	13466.13	1	0.000
	Group	360.67	4.13	360.67	1	0.047
	Error	4445.34	—	87.16	51	—
	Total	4935.00	—	—	54	—

enthusiastic thinkers, so it can be said in learning environments that are based on information and communication technology. The two basic elements of interaction and a participatory atmosphere will grow. The use of information and communication technology in the classroom and in the learning process as a learning medium changes the basis and structure of learning and changes the roles of teachers and students. If teachers and learners are ready to use and apply these tools, then they will use more of the potential and capabilities of these tools. They can make the possibility of using ICT in the educational process more possible for the student, and most of the students can provide a learning focus, perhaps using the tools involved and other new tools such as multimedia, images, videos, and sounds that are fun to teach, while the text is played, or even the movement of writing for students. It fascinates and amazes them, and they focus on what they need to learn with an attachment away from burnout and boredom, and their enthusiasm increases.

Information and communication technology-based education can provide students with an enjoyable learning environment free from any fear of humiliation or worry, full of psychological security and with inner motivation, and happiness. Here, both the teacher and the student search for information with more interest and motivation. In fact, ICT-based education, in addition to increasing learning and intrinsic motivation, allows learners to make the most of different learning styles. Also, supportive feedback and timely guidance from the teacher will reduce exam anxiety, increase sense of responsibility, increase participation, share information and improve learning, which shows the valuable role in the academic desire for knowledge shows the students' environment. The study has a significant impact on attracting students to the classroom. Unfortunately, in recent years, several factors have caused students to flee from learning environments, especially in low-income areas and due to the employment of students in more fake jobs. Without the traditional doubts, providing facilities in the school and avoiding the methods and speech of the teachers, in addition to making the learning environment attractive and effective, will also improve the students' happiness and vitality, and this factor directly and indirectly. It can affect students' academic performance and motivation. In addition, despite the arrival of information and communication technology in many educational centers, teachers and educational officials are still not aware of the value of using it alongside traditional education and use traditional teaching methods due to the dramatic changes in science and technology. The information obtained and the new theories and approaches to science and its teaching methods suggest that experts and teachers in the field of education should stop

transmitting scientific facts and emphasize the content of the courses exclusively, because while learning the scientific methods, it is not possible to acquire scientific attitudes with traditional methods and they should use new methods instead. On the other hand, because students spend a very high proportion of their time in school and in the future will be responsible as there will be different areas, so it is doubly important to study the variables that affect their behavior and academic performance.

In the ICT-based learning environments, the use of multimedia could thus add to the attractiveness of the learning process and thus students could feel less tired and more eager to be in learning environments. In such environments, wherein learning experiences are enjoyable, students could feel more self-confident and have no depression and burnout. On the other hand, students could be more motivated and satisfied due to the variety of content presented and different learning styles. Benefiting from information resources and receiving instant feedback from teachers could correspondingly augment interaction and optimize learning, and also improve academic performance and enthusiasm. Research shows that ICT-based education provides the necessary conditions to strengthen students' academic self-concept and, accordingly, enhance students' academic enthusiasm.

Based on the study findings, the ICT-based method of instruction for English could elevate students' academic self-concept and their mental health. As a result, students' interaction and comprehensive growth could lead to higher levels of academic enthusiasm. Finally, the production of media by students could result in the further development of a positive academic self-concept and thus increase their enthusiasm for English. No doubt, the requirements to use ICT in curricula are as follows:

- (i) In-service training in the application of ICT-based teaching (especially in classrooms where students are less eager to interact and participate) should be provided to teachers
- (ii) It is better to identify and appreciate teachers using this type of education
- (iii) Schools should be equipped with ICT and then school principals implement it
- (iv) Teachers and students ought to be supported to exploit the unlimited capacity of ICT in classrooms
- (v) It is recommended to utilize podcasts in ICT-based education

Therefore, the following are the research suggestions:

- (i) Investigating ICT-based education in other subjects
- (ii) Studying ICT-based method of instruction at different levels of education systems and universities
- (iii) Examining students' enthusiasm using other new methods
- (iv) Exploring ICT-based education in male students
- (v) Reflecting on the effects of ICT in classrooms on other variables in future research, such as academic burnout, and academic adjustment

Data Availability

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

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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