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The role of epistemic curiosity in developing EFL learners' grammar and pronunciation skills

EFL Öğrencilerinin Dil Bilgisi ve Telaffuz Becerilerini Geliştirmede Epistemik Merakın Rolü

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Abstract

The study examines the impact of epistemic curiosity on students' grammar and pronunciation skills in an EFL context in Iraq. Conducted over 12 weeks in 2021-2022 Academic Year, the research involved fifty students from TISHK International University, chosen using cluster sampling. The students were divided into control and experimental groups, with the latter encouraged to explore their interests online as part of their learning process. Data collection utilized a mixed-methods approach, including two exams, a questionnaire, and an interview. SPSS 26 and NVivo were used for quantitative and qualitative data analysis, respectively. The results, determined through independent samples t-test, indicated a significant improvement in grammar and pronunciation marks for students in the experimental group. Additionally, they exhibited more positive attitudes towards inquiry-based learning compared to their control group counterparts. These findings contribute to the understanding of the role of epistemic curiosity in enhancing language learning outcomes and offer valuable insights for implementing inquiry-based strategies in EFL classrooms. The study uncovers a crucial gap in the literature, shedding light on the benefits of fostering curiosity-driven learning approaches in English language education in Iraq.

Keywords: Epistemic curiosity, grammar, pronunciation, EFL.

Özet

Çalışma, epistemik merakın öğrencilerin dilbilgisi ve telaffuz becerileri üzerindeki etkisini Irak'ta bir EFL bağlamında incelemektedir. 2021-2022 Akademik Yılı'nda 12 hafta boyunca yürütülen araştırmaya, TISHK Uluslararası Üniversitesi'nden küme örnekleme yöntemiyle seçilen elli öğrenci katılmıştır. Öğrenciler, kontrol ve deney gruplarına ayrıldı ve deney grupları, öğrenme süreçlerinin bir parçası olarak ilgi alanlarını online olarak keşfetmeye teşvik edildi. Veri toplama, iki sınav, bir anket ve bir görüşmeyi içeren karma yöntemli bir yaklaşım ile tamamlandi. Nicel ve nitel veri analizi için sırasıyla SPSS 26 ve NVivo kullanıldı. Bağımsız örneklem t-testi ile belirlenen sonuçlar, deney grubundaki öğrenciler için dilbilgisi ve telaffuz notlarında önemli bir gelişme olduğunu göstermektedir. Ek olarak, kontrol grubundakilere kıyasla sorgulamaya dayalı öğrenmeye karşı daha olumlu tutumlar sergilediler. Bu bulgular, dil öğrenme çıktılarını geliştirmede epistemik merakın rolünün anlaşılmasına katkıda bulunur ve yabancı dil olarak İngilizce sınıflarında sorgulamaya dayalı stratejilerin uygulanması için değerli bilgiler sunar. Çalışma, Irak'ta İngilizce eğitiminde merak odaklı öğrenme yaklaşımlarını geliştirmenin faydalarına ışık tutarak, literatürdeki önemli bir boşluğu ortaya cikariyor.

Anahtar Kelimeler: Epistemik merak, dilbilgisi, telaffuz, EFL.

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Introduction

Grammar has been regarded as a fundamental skill to master English, and gaining academic success can be measured in both the short and long terms, depending on how far along the learning path the student is because it is connected to other macro or micro-skills directly (Yildiz, 2020). For example, learners who command grammar rules precisely can master reading, listening, speaking and writing, pronunciation and vocabulary faster than other learners. In the same vein, learners whose grammar levels are satisfactory enough can increase their chance to get a high score from internationally recognized exams such as TOEFL, IELTS or SAT because the knowledge of grammar can facilitate test-takers' understanding dramatically. Halliday (2014) asserts that learning rules of the grammar may have positive effects to meet people's social, emotional and physical needs because they can express their ideas more confidently. On the other hand, insufficient grammatical competence can hinder learners from learning well, so they may lose their motivation and quit learning process instantly. According to Azar (2007), a language's grammar is essential to understanding the language itself. She elaborates that, without grammar in language, learners would be limited to using single words, sounds, images, and gestures to communicate. She observes that pupils who receive grammar training tend to excel beyond their peers who do not receive such instruction in a planned way. Three well-known grammar teaching methods are inductive, deductive and eclectic ones with their advantages and disadvantages (Ho, 2014). Additionally, teaching grammar with the integration of mobile technologies such as smartboards, computers, mobile phones and tablets has been on the rise thanks to the availability of online quizzes, applications, games and other software applications to teach English in an entertaining way (Bahari & Gholami, 2022; Kara & Yildiz, 2022). The aforementioned perspectives show that teaching grammar has also transformed with the advent of technology in classes in various formats.

Pronunciation is a defining factor to show learners' proficiency in English to a large extent because having mastery in other skills cannot be conveyed appropriately without commanding the regulations of pronunciation. Yucedal, (2023) argues that pronunciation encompasses more dimensions than only verbalizing the words loudly. He reiterates that a good pronunciation should include stress, rhythm, pace, intonation and pitch, so sentences and words can be linked in a comprehensible manner. Otherwise, the problems regarding unintelligible utterances cannot be inevitable which disrupts the communication between the parties. Pronunciation training starts with phonics and continues throughout the life for its undeniable importance in language learning and teaching process. There are three primary approaches to teach pronunciation professionally at educational settings which are intuitive, analytic and integrative (Hashemian & Fadaei, 2011). Intuitive pronunciation teaching method refers to listening and imitating the sounds without having an explicit instruction, whereas analytic one means listening, imitating and producing novel words and sentences. On the other hand, integrative approach requires the learners to be involved in communicative tasks, so they can learn in a practical way rather than doing some drills monotonously. It can be observed that pronunciation training has evolved from drills to meaningful tasks in communicative sessions, so learners' general knowledge and inclination to learn out of curiosity have been receiving increasing attention in such activities.

Being curious and satisfying curiosity have been regarded as fundamental to ensure continuous improvement in people's lives. In order to succeed in the real world, today's students need to be inquisitive, patient, entrepreneurial, competitive, decision-makers, communicators, critical thinkers, and doers (Yildiz, 2016). Correspondingly, it is human nature to seek, discover and expand knowledge in their domains (Casey, 2014). In this regard, being curious has a pivotal role in people`s lives because the degree of earning respect is expected to increase once people are more knowledgeable after learning some novel information. To illustrate, cooks can be promoted to serve as master chefs if they seek novel information throughout their lives. Subsequently, designers can earn more respect if they follow the latest trends and apply them in their works. In addition, librarians can increase reading rate of the neighborhood once they read the books and narrate them to prospective readers by some workshops. Moreover, authors can increase their readers when they use the language more creatively which can be possible by reading regularly. Furthermore, students can be more active in classes if they keep researching in their free time. They can also convert a traditional teaching atmosphere into a stimulating one. Besides other occupations, being curious also plays an essential role in educators' careers. This

prompts us to consider the function of the educator. It is vital to excel as a teacher, as the best teachers will be remembered fondly by their students for the rest of their lives (Sadiq, 2023; Shareef, 2023). Educators ought to be problem-solvers who contribute to their students' achievements. Educators who inquire novel information incessantly for the betterment of the education differ greatly from the educators who are satisfied with the given curriculum. It can be argued that being curious helps people to develop their skills gradually.

Epistemic curiosity (EC hereafter) has many common features with modern teaching methodologies. To illustrate, constructivist learning theory, advocated by Jean Piaget, John Dewey and Lev Vygotsky, highlights that students can take part in the learning process actively, so they can construct their knowledge through interaction, exploration and systematic practice. Exchanging information in a welcoming atmosphere which fosters learning has been regarded as the key component of constructivism. Likewise, inquiry-based learning strategy urges the learners to ask, seek, investigate, conceptualize and synthesize the elements to construct their learning (Tjabaka, 2022). Collaboration, creativity and learning independently are essential components of inquiry-based learning. Similarly, Project Based Learning (PBL) drives the students to learn actively in projects with real life connections (Kavlu, 2015). In the same vein, Task Based Language Teaching (TBLT) approach has been put into practice by assigning some meaningful tasks for students and motivating them to learn and complete the tasks within the given time (Van Den Branden, 2016). In addition, Communicative Language Learning (CLL) approach requires the learners to be involved in meaningful activities through which they can communicate with their peers and teachers, so they are inclined to research more in advance and express their ideas in classes (Foley, 2022). It is evident that EC has direct connections to support modern teaching methodologies.

Purpose of the Study and Research Questions

Discovery, exploration, switching the focus from the teacher to the students via curiosity driven learning are important considerations in modern language learning and teaching process, so this study was carried out the measure the effects of curiosity on linguistic gains in certain domains. In this regard, it was investigated the effects of EC based instruction on students' grammatical and pronunciation competence in this study. In addition, students' motivation and overall attitudes were compared after the treatment period. Research questions were formed in line with these goals:

- To what extent does EC affect learners' grammar and pronunciation skills?
- Does EC-based instruction increase learners' motivation and overall attitudes towards learning English?

Literature Review

The inception of EC concept was emphasized in the 1950s when Berlyne (1954) defined and exemplified it clearly. He defined it as a desire enriched by intrinsic motivation to seek novel information, so individuals' enthusiasm increases as they reduce knowledge gaps gradually. He asserted that observation, asking relevant questions and exploration foster EC. Subsequently, Litman and Silvia (2006) divided EC into two categories which are deprivation (D-type) and interest curiosity (I-type). The former can be triggered once individuals do not have adequate information about some topics, whereas the latter means seeking novel knowledge continuously. In other words, deprivation curiosity can be finalized once knowledge gaps have been reduced, however, interest curiosity lasts as the channels expand while seeking novel information. Since these pioneering initiatives, EC has been emphasized in many fields particularly education on a global scale.

A number of scholars with their pioneering studies asserted that EC affects learning and teaching atmosphere positively in terms of enhanced performance (Eren & Coskun, 2016; Kara, 2023), acquiring knowledge (Rotgans & Schmidt, 2014), retrieving information swiftly (Kang et al., 2009) and increasing self-confidence (Hong et al., 2019). In the same vein, some scholars (Fitzgerald, 1999; Spielberger & Starr, 2012; Silvia, 2017; Abdulrahman & Kara, 2022) argue that being curious is an irreplaceable need for all people like being hungry and getting thirsty. To name a few, a pioneering study was conducted by Bull and Dizney (1973) on university students in the USA which unearthed that EC-based instruction increased the retention rate of students in reading classes, so their comprehension rates improved tremendously. Subsequently, Lowry and Johnson (1981) investigated the effects of EC on secondary school students in the USA which revealed that arousing curiosity ensures higher achievement and positive attitude. Moreover, Eren and Coskun (2016) examined high school students in

a case study which indicated that there was a causal relationship between the level of boredom and type of the instruction. The study unleashed that students' boredom reduced once EC-based instruction was implemented. The study also showed that students' marks were better after EC-based instruction. In addition, Hardy et al. (2017) found that EC stimulated students' problem solving and critical thinking skills, so students participated in debates more actively in a US university. Furthermore, Ruiz Alfonso and Leon (2019) conducted a study about the effects of EC on high school students in Spain. The study showed that the passion of students increased as lecturers integrated more EC-based activities into the curriculum. Additionally, it was observed that students and lecturers were more harmonious compared to previous years. Similarly, Huck et al. (2020) carried out a study in the USA on undergraduate students which indicated that arousing curiosity with various activities yielded better marks once combined with game-based activities. In addition, students' adaptation problems to the course were reduced substantially. Subsequently, Al-Nabi and Fahady (2022) examined EFL learners' attitudes in Iraq on curiosity-based instruction which showed that there was a direct relationship between curiosity-based instruction and enhanced language proficiency. In the same vein, Sarac et al. (2022) investigated the perceptions of students on EC at a tertiary level in Turkey which indicated that e-learning experiences increased EC of the students, so students had positive views on EC considering their achievement and motivation levels.

Some scholars (Litman & Spielberger, 2003; Lauriola et al., 2015; Peterson & Cohen, 2019; Celik & Kara, 2022) hinted that EC period cannot produce expected results if some criteria are not met. To illustrate, Nakamura et al. (2022) conducted a study in an oral communication course at a tertiary level in Thailand which revealed that organizing the whole program meticulously is the pre-requisite of reaching success in classes where EC-based instruction is prevalent. Otherwise, the lessons cannot be inspiring enough to appeal to students in classes. Likewise, Palmer (2018) analyzed university students in Australia which showed that choosing appealing topics, balancing the degree of difficulty, building a strong relationship with students increase the positive effects of curiosity-based instruction. If mentioned prerequisites are ignored, the possibility of achieving success may reduce sharply. In addition, Takkaç-Tulgar (2018) examined the effectiveness of EC in language learning domains which revealed that the efforts can be fruitless if learners are not exposed to target language. In other words, some elements should be combined harmoniously to increase the success rate of EC-based instruction.

Methodology

Research Design

This study utilized a mixed-methods approach to combine qualitative and quantitative research techniques. Fetters et al. (2013) attest that a mixed methods design provides researchers with numerous advantages, including in-depth perspectives and statistical analysis. Two exams, including items about grammar and pronunciation, were used to collect quantitative data, whereas a questionnaire and an interview were used to collect qualitative data in this study.

Setting, Participants and Sampling Procedure

This study was conducted at TISHK International University (hereafter TIU) in Erbil, Iraq, where, according to records in the 2021-2022 Academic Year, over 5,000 students were pursuing degrees in 29 departments. The selection of this university was based on the fact that many students of various nationalities completed their courses entirely in English which was the medium of instruction. Additionally, the majority of students communicated with their peers in English which stimulated their EC as they attempted to learn more about their backgrounds, culture and interests through various endeavors. In this regard, the population of this research consisted of 250 Foundation English students who participated in a yearlong intensive English learning program. In addition, the students attended all of their classes in their respective departments. The cluster sampling method was used to select participants. Initially, 250 students were divided into ten sections. Using a software application called Random Name Picker, the researcher then selected participants from each group in the subsequent phase. Once 50 students were selected, they were divided into two groups to represent the population in the control or experimental group. Participants were enrolled in 10 distinct departments; their ages ranged from 18 to 23; and the proportion of female students was greater than that of male students.

Instruments

Quantitative data were collected through two exams which were pre-test and post-test. The exam included two sections which were about

grammar and pronunciation. They could get up to 50 points in each section according to the pre-defined rubric. Students took the grammar exam including 25 multiple choice questions as paper-based format. On the other hand, they took the pronunciation exam in the instructor's office. Once the exam was completed, their grammar and pronunciation marks were merged in one point and saved out of 100. When exam results were available, the results were inserted into SPSS 26 to receive independent samples t test analysis. However, qualitative data were collected through a questionnaire and an interview. The questionnaire was created by Google Form including items based on 5-point Likert scale. The interview was also recorded and transcribed with the help of NVivo software program.

Data Collection Procedure

The study lasted 12 weeks to initialize and finalize the data. All participants received both types of instruction regardless of being in control or experimental group in a week. The underlying reason to introduce both types of instructions was that they could compare one instruction with another after joining the study in one group. Once common lessons were completed, the participants were placed in two groups to receive different treatments.

Control Group

The participants in control group completed 5 units in Scope 1 published by Oxford. They learned basics of present simple, modal verbs, present continuous, comparative, superlative and past simple. Additionally, countries, nationalities, types of family, holiday activities, health and diet, expressions about feelings were introduced with different reading, vocabulary, listening, writing and listening activities. The instructor covered the lessons in a traditional way. S/he only highlighted the points given in the book. Apart from regular activities, they completed official worksheets of the same series if time was sufficient.

Experimental Group

The participants in experimental group completed 5 units in Scope 1 published by Oxford. They learned basics of present simple, modal verbs, present continuous, comparative, superlative and past simple. Additionally, countries, nationalities, types of family, holiday activities, health and diet, expressions about feelings were introduced with different reading, vocabulary, listening, writing and listening activities. In the same vein, students were encouraged to listen to the audio tracks and watch the videos of the lessons to improve their pronunciation. When they learned certain pronunciation rules, they were directed to watch relevant videos on YouTube to expand their learning and retain information in their memories in the long run. They also took some pronunciation quizzes to distinguish the differences between sounds. As observed clearly, instructor covered the lessons in an unorthodox way. In other words, EC was emphasized in each stage of the lesson. To illustrate, the students surf the internet about real life examples of present simple, tips to use modal verbs accurately. Additionally, they prepared some presentations on present continuous; they investigated the highest grossing movies, the largest continents, the least populated countries and the life in the 1950s. After searching thoroughly on the internet, they shared their ideas in the class. Thus, they could exchange their information as they wanted to uncover the novel information they learned by EC. The type of instruction switched from teacher centered to student centered in these points. The instructor served as a guide to channel students into different activities to discover more. In the final phase, the instructor formed a common Google Drive file to save noteworthy materials such as videos, news, images, links, so both the instructor and participants could upload files to enrich their learning. As seen clearly, discovery, exploration, knowledge sharing were primary motivation sources in experimental group rather than sticking to all activities in the book traditionally.

Findings

This study's findings were categorized under three headings: the questionnaire, the interview, and the precise analysis of exam results; therefore, each instrument was elaborated to obtain a detailed analysis and corresponding interpretations.

Questionnaire

Students' opinions towards EC based instruction were visualized in Table 1.

Table 1.
Participants' responses in experimental group

ITEMS	Mean	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
		%	f	%	f	%	f	%	f	%	f
1. This study increased my motivation as I learned by satisfying my curiosity.	4.8	80%	20	20%	5	0%	0	0%	0	0%	0
2. This study helped me to stimulate my critical thinking skills.	4.32	48%	12	36 %	9	16 %	4	0 %	0	0	0
3. This study fostered my learning in terms of grammar.	4.92	92 %	23	8 %	2	0 %	0	0 %	0	0%	0
4. I regained my self-confidence in pronunciation after joining this study.	5	100 %	25	0 %	0	0 %	0	0%	0	0%	0
5. I realized that I learned better when I researched thoroughly at home and shared my ideas in the class.	4.88	88 %	22	12 %	3	0 %	0	0%	0	0%	0
6. My instructor guided us to learn with different online resources rather than keeping us passive.	4.92	92 %	23	8 %	2	0%	0	0%	0	0%	0
7. I wish I had received an instruction based on EC in the past.	4.84	84 %	21	16 %	4	0 %	0	0 %	0	0%	0

When item 1, which was designed to pinpoint the relationship between motivation and curiosity, was examined, it was noticed that the majority of the participants had positive opinions on EC based instruction with a 4.8 mean score. To illustrate, 20 (80 %) participants chose strongly agree, while 5 (20 %) of them chose agree options. No participant chose other options. It can be stated that EC based instruction earned the appreciation of the participants, so their motivation increased accordingly.

Item 2 analysis indicated that participants had varied views about the relationship between fostering critical thinking skills and EC with a 4.32 mean score. To illustrate, 12 (48 %) of the participants chose strongly agree; 9 (36 %) participants chose agree; 4 (16 %) participants chose neutral. On the other hand, no student opted in neither disagree nor strongly disagree. These figures hinted that participants did not observe a positive correlation between EC and critical thinking skills.

Responses to item 3, which was about the link between grammatical competence and being curious, revealed that most of the participants acknowledged a positive relationship with a 4.92 mean score. To illustrate, 23 (92 %) participants chose strongly agree, while 2 (8 %) participants opted in agree one. However, the participants did not choose any other options. Based on the gathered data, it can be postulated that EC based instruction yielded better results in terms of improving grammar skills of learners.

When given responses to item 4 were analyzed meticulously, it was noticed that all participants had no hesitation about the positive effects of EC in boosting their pronunciation performance with a 5 mean score. It can be attested that EC-based instruction increased students' self-confidence, so pronunciation accuracy increased correspondingly.

Item 5 was designed to investigate the correlation between the value of prior research and active participation. The responses indicated that

participants had mostly positive views about the positive effects of research with a 4.88 mean score. To illustrate, 22 (88 %) participants chose strongly agree, while 3 (12%) of them chose agree option. However, no student chose neutral, disagree or strongly disagree options which revealed that doing thorough research increased participants' willingness to contribute to lessons more actively.

Item 6 analysis, which was related to rating the performance of the instructor, showed that the instructor earned the respect and appreciation of the participants by offering further materials with a 4.92 mean score. To illustrate, 23 (92 %) participants chose strongly agree, while 2 (8 %) participants chose agree option. On the other hand, no participant chose other options. These figures display that the instructor cemented a good relationship with participants and guided them with engaging materials.

Item 7 was designed to receive participants' genuine ideas on the whole study. The responses were mostly positive with a 4.84 mean score. To illustrate, 21 (84 %) participants chose strongly agree option, whereas 4 (16 %) participants chose agree option. On the other hand, no student chose other options. These figures revealed that participants were satisfied with the overall gains of the study and would rather have joined a study earlier.

Students' opinions towards traditional teaching methods were visualized in Table 2.

Table 2.
Participants' preferences in control group

ITEMS	Mean	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
		%	f	%	f	%	f	%	f	%	f
1. This study increased my motivation as I learned by satisfying my curiosity.	2.56	12%	3	16%	4	16%	4	28%	7	28%	7
2. This study helped me to stimulate my critical thinking skills.	2.08	0%	0	0 %	0	44 %	11	20 %	5	36	9
3. This study fostered my learning in terms of grammar.	2.72	12 %	3	16 %	4	28 %	7	20 %	5	24%	6
4. I regained my self-confidence in pronunciation after joining this study.	1.44	0 %	0	0 %	0	0 %	0	44 %	11	56	14
5. I realized that I learned better when I researched thoroughly at home and shared my ideas in the class.	1.56	0 %	0	0 %	0	0 %	0	56 %	14	44	11
6. My instructor guided us to learn with different online resources rather than keeping us passive.	1.52	0 %	0	0 %	0	0 %	0	52 %	13	48	12
7. I wish I had received an instruction based on EC in the past.	2.32	0 %	0	0 %	0	52 %	13	28 %	7	20 %	5

Once item 1 was analyzed in detail, it was observed that the mean score was only 2.56 which hinted that the participants did not find the learning and teaching process engaging in a traditional classroom atmosphere. To illustrate, 3 (12 %) participants chose strongly agree; 4 (16 %) participants chose agree; 4 (16 %) participants chose neutral. However, 7 (28 %) participants chose disagree or strongly disagree respectively. It can be stated that traditional learning and teaching atmosphere was not appealing to capture students' attention.

The responses to item 2, which was related to the relationship between traditional instruction and fostering critical thinking skills, varied. To illustrate, no participant chose strongly agree or agree options. On the other hand, 11 (44 %) participants chose neutral; 5 (20 %) participants chose disagree; 9 (36 %) participants chose

strongly disagree. These figures show that the participants did not find a correlation between traditional teaching and improving critical thinking skills.

The responses to item 3 which was about the connection between grammatical competence and traditional teaching ranged from strongly agree to strongly disagree with varying percentages. The mean score was only 2.72 which unearthed that the participants did not regard traditional instruction as a means of developing grammatical competence. To illustrate, 3 (12 %) participants chose strongly agree; 4 (16 %) participants chose agree; 7 (28 %) participants chose neutral; 5 (20 %) participants chose disagree; 6 (24 %) participants chose strongly disagree.

Item 4 was designed to get students' opinions on pronunciation enhancement through following a traditional teaching methods. The collected data revealed that the mean score was the lowest with 1.44. To illustrate, no student chose strongly agree, agree or neutral. However, 11 (44 %) participants chose disagree, and 14 (56 %) participants chose strongly disagree which can be contemplated as a sign of dissatisfaction among participants. These figures showed that traditional teaching methods did not yield satisfactory results on the way of mastering pronunciation.

The responses to item 5, which was about rating the instructor`s performance, were compressed in disagree and strongly disagree options with a 1.56 mean score. To illustrate, no student chose strongly agree, agree or neutral. However, 14 (56 %) participants chose disagree, and 11 (44 %) participants chose strongly disagree. These figures unearthed that traditional teaching methods did not receive any compliments from the participants.

Once item 6 was analyzed in detail, it was observed that participants were in favor of researching online to have further information rather than learning passively in a traditional classroom atmosphere. In other words, 13 (52 %) participants chose disagree, and 12 (48 %) participants chose strongly disagree which hinted that doing thorough research was praised by the participants.

The last item in this questionnaire was related to overall satisfaction about the study which indicated that it was rather low with a 2.32 mean score. To illustrate, no student chose strongly agree or agree options. On the other hand, 13 (52 %) participants chose neutral; 7 (28 %) participants chose disagree; 5 (20 %) participants chose strongly disagree options. Considering the gathered data, it can be argued that students would rather have taken part in other activities.

Descriptive Data Analysis

Independent samples t test was used to collect and analyze descriptive data, so mean scores of each group were compared to make interpretations.

Independent samples t test analysis was given in Table 3.

Table 3.
Independent samples t test

Variables	Groups	N	Mean	SD	t	df	Sig
Pre-test	Control	25	53.80	13.790			
Pre-test	Experimental	25	53.20	13.140	.157	48	.876
Post-test	Control	25	55.80	14.726			
Post-test	Experimental	25	70.20	13.653	-3.599	48	.001

Note. P<0.05

P-value, .876, for the pre-test data in Table 3 was greater than 0.05, so there was no statistically significant difference between the groups. In addition, there was no statistically significant difference between the two groups' mean scores, which were 53.80 for the control group and 53.20 for the experimental group. No statistically significant change was observed in the initial phase. However, when the p-value was examined in relation to post-test results, it was determined to be .001, which was statistically significant. The mean score increased substantially from 53.20 to 70.20 as well in experimental group. However, control group students increased their marks by only 2 points which was far from being significant. On the basis of post-test results, it can be concluded that the experimental group students' grades increased significantly more than those of the control group. In other words, the experimental group significantly outperformed the control group in terms of improvement.

Interview

NVivo software was utilized to transcribe and categorize the participants' genuine opinions. Common themes emphasized by each group were described in detail below.

Selected Interviews in Experimental Group

Contributing to the Learning Process Actively

I enjoyed being a member of experimental group in this study. The overall process was a mind-blowing one for me. We researched continuously and learned more and more. Additionally, we learned how to double check the accuracy of the information with different websites. Subsequently, we enriched our grammar and pronunciation knowledge substantially Another point to be considered was that we contributed to the learning process actively, so we were encouraged to read further in the previous days. Once the focus shifted from teacher to student, I noticed that my introvert friends started speaking gradually. In the final phase, we took the quiz to pinpoint whether we learned well or not which was another plus for me. I researched, contributed, checked my learning during this study. I wish I had joined such a great study previously, so I could be inspired to do research for the sake of accessing to novel information. (Student 7)

Taking Advantage of Online Learning Resources

Taking grammar lessons used to be so boring for me. We used to learn by following grammar drills which were not engaging for me. In addition, our only source was the teacher and the textbook. However, we were exposed to different learning and teaching materials to improve our grammatical competence in this study. We watched some videos, joined some free grammar lessons from different teachers, took online quizzes and downloaded various presentations on certain grammar topics. These extra learning materials enhanced our learning dramatically and increased our motivation to develop grammatical competence. Now our updated opinion on grammar is that it can be developed easily by having fun if enriched with various sources rather than relying on only the teacher and the textbook in a traditional format. (Student 12)

Positive Effects of Epistemic Curiosity to Develop Pronunciation

I had no idea about EC previously. However, I had some information about learning by discovery. This study helped me to express my ideas confidently because we did thorough research about the topics to be covered in the following day. When we researched in advance, we took notes and revised our sentences earlier. Thus, this preparation period was a fruitful period for us. In addition, we expanded our vocabulary knowledge substantially while examining various sources. In the past, our teacher asked us questions to tell our ideas immediately during which we suffered a lot. However, our instructor guided us professionally in this study. We took the initiative to master pronunciation and speak more confidently. Making prior research and increasing the duration of pronunciation activities gradually increased the quality of education and boosted our performance tremendously. (Student 16)

Strengthening Relationship with Friends through Collaboration

I had cemented good relationships with my friends in this study. My instructor assigned some assignments to be completed as a team, so we exchanged our ideas while researching and composing our ideas together. Additionally, we had video talks with our group members to finalize our works. Each member had some strengths and weaknesses in English. We helped each other fill the gap and eliminate their weaknesses in English. Subsequently, we improved our computer literacy skills while creating presentations. Additionally, our public speaking skills developed dramatically. All in all, this study increased our productivity to a large extent. (Student 16)

Stimulating Critical Thinking Skills via Thorough Research

This study stimulated my critical thinking skills substantially. For example, we went one step further while doing exercises on grammar topics. When we researched on the internet, we noticed some exceptions for each grammar rule. We asked the reason of these exceptions to our teacher, and s/he clarified all points. Apart from grammar topics, speaking activities also developed our critical thinking skills. While our friends were making a presentation on superlative, we checked the accuracy of the information and offered corrections from time to time. We learned to investigate more about the

correct information rather than relying on the given information in a single textbook. I suggest all my friends to join such a great study throughout their education. (Student 18)

Selected Interviews in Control Group

Losing Enthusiasm via Traditional Instruction

I joined the study in control group where I received a traditional instruction. We followed the book's activities according to the syllabus. Our instructor was the primary source to pass on knowledge. Similarly, s/he did not create opportunities to foster communication. We were passive in the lesson except answering his/her questions. Although we did not mind it in the initial phase, we lost our enthusiasm towards learning and teaching day by day. This issue affected our willingness to learn and contribute to the lesson. I wish our instructor had enriched the lessons with supplementary activities. I have the notion that traditional methods should be combined with modern ones to increase students' learning outcomes. (Student 20)

Proceeding in a Monotonous Way

Being a member of the control group was not appealing for me. Doing exercises in an order was so monotonous for me. Additionally, I did not feel excited about the lessons to be covered in the following weeks because I memorized which pages would be studied on these days. I learn better when I am exposed to novel information and experiences during the lessons. However, it was missing in this study. I used to learn grammar from different sources. I also took some e-exams about grammar. I absolutely know that my learning increases when I learn from online and traditional resources in a well-established way. I wish we could have taken an instruction which embraced both traditional and modern teaching methods. (Student 22)

Discussion

This study examined the effects of EC-based instruction on the pronunciation and grammatical competence of students. Based on the findings gathered through various instruments, the following important points have been uncovered:

Pre-test and post test results revealed that EC based instruction paved the way for grammar expansion and pronunciation enhancement. This finding is in line with Nakamura et al.'s (2022) assertions which emphasize that EC based instruction encourages learners to improve grammar and pronunciation skills. In addition, learners reiterated that they regained their self-confidence while speaking during the study. It is consistent with Piotrowski et al.'s (2014) study which reveals that EC based education urges the learners to research more and share their ideas within society. Another point to deserve a special attention was about students' overall attitudes towards EC based instruction. They postulated that their motivation and involvement increased when they learned by curiosity. On the contrary, they asserted that the lessons were monotonous in a traditional classroom where they mostly listened to the teacher passively. Similarly, Eren (2009) and Kucuk (2023) highlight that students are alert to be more motivated and get more pleasure while learning if the lessons are designed to satisfy curiosity. Additionally, students highlighted that they commenced thinking more critically, so their knowledge expanded accordingly as they researched more to reach in-depth knowledge. Likewise, Dyer and Hall (2019) attest that EC goes hand in hand with critical thinking. Furthermore, students appreciated the shift from theoretical knowledge to practical one which was achieved through an EC based instruction. This finding is in line with Schmitt and Lahroodi's (2008) study which states that embedding theoretical knowledge into practice can be succeeded through an EC based instruction because learners can see many practical solutions and reflections while researching. Moreover, students held the opinion that they learned in cooperation during the study as they were assigned to work together and submit some of their projects as a team rather than individually. Ruiz-Alfonso and Leon (2019) underline the importance of EC based instruction to foster collaboration in classes. They also assert that collaborative initiatives can reduce anxiety of the learners and increase peer-learning opportunities if they research as a team. Considering the given positive gains of EC based instruction, it can be stated that learners can improve their skills in many aspects including academic and inter-personal as expected from individuals in the 21st century.

Conclusion

The present study revealed that EC based instruction had pivotal roles in changing the quality of education and improving learners' skills substantially. To name a few, EC based instruction increased students' grammar and pronunciation scores significantly. Additionally, students' motivation, enthusiasm, self-confidence levels were enhanced dramatically.

Subsequently, students' overall attitudes towards learning were affected positively. They were hopeful about overcoming any challenges by researching thoroughly from multiple sources. The findings of this study are consistent with each other which indicate that EC based instruction promises a lot to students, teachers, and administrators.

Some recommendations can be made for further studies. This study investigated the effects of EC-based instruction on grammar and pronunciation skills in 12 weeks. Subsequent studies can focus on other primary skills in English by assigning longer periods to get more reliable results. Additionally, this study examined the students' marks without investigating the effects of gender and age. Further studies can be conducted to test whether gender and age differ substantially in terms of findings. Moreover, this study extracted the data from only freshman students, which can be extended to other stages to represent the population more reliably in future studies.

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