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The Influence of Using Online Discussion on Developing EFL Students' Grammar Knowledge

Najla Hais AbdulGhafoor (General Directorate of Education in Anbar, Ramadi, Iraq)
Ala'a Ismael Challob (University Of Anbar, Ramadi, Iraq)

Najla Hais AbdulGhafoor
(General Directorate of Education in Anbar, Ramadi, Iraq)

Ala'a Ismael Challob
(corresponding author)
Professor, Dept. of English, College of Education for Humanities, University Of Anbar, Ramadi, Iraq
dr.alaaismael@uoanbar.edu.iq

ABSTRACT

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The current study aims at investigating the influence of online discussion on developing EFL university students' grammar knowledge. It also aims at identifying the factors that determine the effectiveness of online discussion on developing EFL university students' grammar knowledge. To address these aims, 66 second year EFL university students in English Department at Anbar University were chosen. They were divided equally into the experimental group, and the control group. A mixed-mode quasi-experimental research design was utilized where pre-study and post-study English grammar test, post-study perception questionnaire, focus group interview, and observation was used. The finding indicated a significant difference between the mean scores of the experimental group and those of the control group in the post-study test. Moreover, findings revealed a statistically significant difference between the mean scores of the pre-study and that of the post-study test of the experimental group. These significant differences were in favour of the experimental group. Besides, findings revealed that the power of effectiveness of these factors as perceived by the participants were in the following sequence; pedagogical, psychological, cognitive, and social factors respectively. The study concluded that using online discussion facilitates students' learning of English grammar.

KEYWORDS

online discussion, English grammar, grammar knowledge, EFL students

1. Introduction

Despite the flexibility of the use and structure of the English language, it includes complicated elements that foreign language learners must understand in order to properly use the English language communicatively (Saeedi 2016, Mahmoudi 2020, Manurung et al. 2020). One of these complex language elements and the most difficult to master is grammar. According to Brown and Lee (2015), English language learners must spend much effort and time in order to master the use of English grammar for communicative purposes. This can only be fulfilled by mastering grammar rules, comprehending how to utilize suitable grammatical structures to accurately communicate communicative ideas. Mastering the structures of English grammar improves the correctness of the English language and boosts the fluency of the speakers of the English language (Challob 2021, Manurung et al. 2020).

Due to the complex nature of English grammar, several studies have been undertaken to experiment with new strategies and instructional techniques for delivering grammatical content to students in order to enhance their grammar knowledge and performance. Among these strategies utilized by the previous studies is the use of online discussion forums to decrease the monotonous and tedious routine associated with teaching grammar. Furthermore, using online discussion platforms may make students more engaged and responsible because they must work in small groups to complete assignments, projects, discussions, and so on. For instance, Al-Jarf (2005) examined the impact of online grammar teaching on the performance of a sample of female college students who volunteered to participate in the online English course as compared with another group taught by the use of face-to-face traditional teaching of grammar. The findings indicated a substantial difference in English language proficiency between the two groups in favor of the online course students. Similarly, scholars such as Nagata (1996), Grant (1998), and Collentine (2000) revealed that using technology in teaching grammar is an excellent tool for improving learners' grammatical understanding. Besides, Saeedi (2016), Al-Harbi, and Alshumaimeri (2016) agreed that integrating technology in teaching grammar would provide students with more possibilities to practice the target language both inside and outside of the classroom via utilizing Internet facilities. In Iraq, Almoswai and Rashid (2017) investigated the impact of utilizing YouTube Video as a social online platform on the grammar performance of EFL Iraqi students at Missan University. The study showed a substantial difference in the grammar performance of Iraqi EFL students before and after using YouTube videos.

Based on the aforementioned findings, it is clear that the process of teaching and learning English grammar in the Iraqi context is still lacking several teaching and learning techniques that encourage EFL students to acquire and understand English grammar properly and efficiently. Furthermore, due to the conventional teaching techniques used by the majority of teachers, grammar instruction in Iraq is tedious. The teaching approaches and strategies utilized by them are incompatible with contemporary learning theories.

As a result, the incorporation of online discussion platforms can improve the grammar understanding of EFL university students since online platforms are considered collaborative teaching milieus. When such online platforms are well designed and enriched with many and pleasant learning experiences, they may help students enhance their language abilities, encourage their autonomy in learning, and stimulate their activeness while learning the grammar content (Manurung et al. 2020, Saeedi 2016). This is extremely important for our educational institutions since the majority of EFL university students have deficiencies in several language areas in general, and English grammar in specific. Furthermore, students are unable to use what they have learned in their different speaking and writing daily language activities due to their poor communication outside of the classroom. Hence, the researchers intend to address this gap by employing online discussion activities and examining the effect of using an online discussion on students' learning of English grammar, as well as investigating the most influential

factors that determine grammar learning in the online learning environment. Hence, the following research questions are addressed in the current study:

1. What is the influence of using online discussion in the development of Iraqi EFL university students' grammar knowledge?
2. What are the factors that determine the effectiveness of the use of online discussion on developing Iraqi EFL university students' grammar knowledge?

2. Literature Review

This section explains the main notions pertinent to the study, specifically; online discussion and English grammar are elaborated.

2.1 Online Discussion

Online discussion is defined as a collaborative tool that can facilitate both communication and knowledge construction (Johnson 2007). Online discussion is also considered a kind of computer-mediated communication (CMC) that can provide a constructive learning environment for the students to comfortably exchange ideas and opinions with each other (Corich et al. 2004).

Four essential elements should be available in any online learning activities. These four elements are social interaction, task management, leadership, and trust. These elements should be emphasized and provided to maintain good rapport and communication among the students themselves on one hand and between the students and their teacher in another hand (Resta et al. 2002).

Many researchers have supported the use of online collaborative learning to enhance language learning. For example, Gunawardena et al. (2001), McLaughlin (2002), confirm the effectiveness of online learning in strengthening students' collaboration and fostering knowledge sharing through group work and class discussions. In this vein, online learning can enhance communication, knowledge construction, and problem-solving due to the active exchange of ideas throughout small or big groups that can increase the learners' interest and promote critical thinking. It is also approved that collaborative learning can help learners retain information longer than those who work individually. Thus, it will empower the confidence in their information and help students participate actively in discussions to reflect their knowledge and be responsible for their learning. Moreover, as Althaus (1997) reports, most of the learners who are involved in online discussions reflect their enjoyment in participating in such kinds of discussions and they show their recommendation to be integrated within the learning process to facilitate it.

This reveals the appropriateness of online learning in meeting the learners' needs via framing a unique opportunity for expanding knowledge with a cognitive, interactive learning environment. Under these atmospheres, online learning develops an individualized form of learning for each learner in the educational process to make his/her experience more influential and more productive (Teng and Wang 2021).

Consequently, a great competition among universities and institutions in higher education all over the world was noticed in using online learning strategies (Yusof and Saadon 2012). This is because these educational institutions want to improve the quality of learning by presenting collaborative learning as a substitution to the conventional methods of learning.

2.2 English Grammar

Generally, grammar is defined as a set of rules underlie sentence level that governs the sequence of words in it (Nunan 2003). More specifically, grammar is defined as "a system of meaningful structures and patterns that are governed by particular pragmatic constraints" (Larsen-Freeman 2001: 252).

Accurate learning of the language rules represents an essential element in building the students' language competence. Thus, students will be able to use language properly in both written and oral forms. For this purpose, Azar (2007) stresses the significance of teaching English grammar. She adds that "without grammar, we would have only individual words or sounds, pictures, and body expressions to communicate meaning" (p. 2). Therefore, the teaching and learning methods and strategies should be studied scientifically so as their use can actively help learners understand the English language structures and the rules that govern using them functionally to convey meaning.

Recently, teaching the English language in general and English grammar, in particular, noticed a shift from teacher-centered approaches to learner-centered approaches. This shift leads to a change in the core of the learning process. In other words, learners are considered the core of the learning process, and learners are given responsibility for their learning (Challob 2021). Consequently, English grammar is taught inductively paying attention to the way the students use grammar to convey the communicative function of the utterance. To do this, a context that ensures a close relationship between the grammatical form and the communicative function should be created (Nunan 2003). Online classes and tools are an example of these learning contexts where meaningful, communicative contexts and multiple learning opportunities are provided to the learners. These communicative contexts can create a balance between learning form, meaning, and use of grammar due to the collaborative, constructive nature of online activities.

In the last two decades, many scholars have implemented various online learning tools for teaching English grammar in schools and universities. They attempted to investigate their effects on the students' grammar performance. For instance, Al-Jarf (2005), examined the use of online grammar instruction on students' performance in English grammar. Besides, Abu Naba'h, et al. (2009), and Alian et al. (2018) investigated the effect of using CALL programs and written questions tasks on students' performance in English grammar. Those scholars have implemented experimental research designs with two groups; experimental and control groups and revealed positive effects on students' grammar knowledge.

Other scholars (Baleghizadeh and Oladrostam 2010, Abu Laban 2017, Mahmoudi 2020) have experimentally investigated the effect of Mobile Assisted Language Learning (MALL) on students' grammar accuracy and development. They also indicated positive findings concerning students' development and accuracy in English grammar. Moreover, studies like; Suthiwartnarueput and Wasanasomsithi (2012), AbdElfatah (2016), and Ahmed (2016) studied the effect of Facebook as a discussion platform on students' grammar and writing skills. The findings of these studies revealed noticeable improvement in students' English grammar and writing. Other researchers have utilized other technological tools to examine their effect on students' grammar performance. Almoswai and Rashid (2017) utilized YouTube as a social media platform, Khalil (2018) used Google Docs and Google Classroom as online collaborative instruments in learning grammar. These studies concluded that these technological tools were able to develop students' grammar and cultivate their motivation to study English grammar.

It is clear that the aforementioned studies have experimentally and quantitatively investigated the effect of using various online learning tools on students' grammar performance. To the best knowledge of the researchers in this field, none of these past studies attempted to implement both quantitative and qualitative research instruments to

investigate the effect of using online discussion learning activities on the Google Classroom platform on developing students' grammar knowledge at the university level. Besides, factors that are available in this online learning environment that support students' learning of English grammar were not studied in the previous studies. Hence, the current study attempted to fill this gap and to study the effect of using online discussion learning activities on developing students' grammar knowledge and to scientifically study the main factors that determine students' grammar development in this online learning environment.

3. Methodology

This section provides a detailed explanation for the research design, participants of the study, methods of data collection, and data analysis procedures.

3.1 Research Design

To answer the research questions of the study, a convergent mixed-mode (QUANTI-QUALI) research design was implemented. This type of mixed-mode research design is defined as a triangulation research design where the researcher gathers and analyses data of both types; quantitative and qualitative, and then merges them to triangulate and compare the results obtained from each source of data collection (Creswell and Clark 2018). Besides, the use of mixed-mode method helps in understanding and exploring the various aspects of the investigated phenomena from various perspectives (Gay et al. 2009). In this vein, researchers can state statistical trends and give voice to participants at the same time.

In addition, as the participants of the current study were enrolled in a classroom context, a quasi-experimental research design was implemented in the intervention. This is because it is difficult to follow pure experimental research design as the students in the experimental and control groups are naturally assembled groups as intact classes (Denzin and Lincoln 2018). This is due to the regulations of the educational institutions that prohibit researchers to create new groups as these groups might disorder classroom environment and learning context. Accordingly, the researchers adopted a quasi-experimental research design where they non-randomly selected the sample of the study. Supporting this idea, Creswell (2014) stated that quasi-experimental design is a form of experimental design where a random selection of participants is not accessible for the researchers.

More specifically, "the pretest-posttest non-equivalent groups" were employed in the current study where students were categorized into experimental and control groups. Accordingly, the two groups of students were asked to attend the pre-study English grammar test before the intervention. Then, students of the experimental group were asked to participate in learning English grammar supported by the weekly online discussion learning activities in the Google Classroom platform for thirteen weeks, whereas the students in the control group were taught English grammar traditionally in the google classroom via the use of traditional learning activities. As the intervention ended up, students in the two groups were exposed to the post-study grammar test. Following that, students in the experimental group were asked to reflect their perceptions of the factors that determine their learning of English grammar in the online discussion learning environment based on the post-study perception questionnaire. Finally, students of the experimental group were interviewed using a semi-structured focus group interview protocol.

3.2 Participants and Study Context

The population of the study included all second-year EFL university students enrolled in the English department-College of Education for Humanities- University of Anbar in the first semester of the academic year 2020-2021. There were 139 EFL Iraqi students who were registered in the course entitled (An Introductory English Grammar) as one of the prescribed courses. This course provides a series of lessons that cultivate the EFL students' English grammar knowledge. The course is assigned three hours per week. Those students were taught online only via the use of Google Classroom, and Google Meet Room due to the COVID-19 Pandemic.

During the first meeting with the students, the researchers asked volunteered students to participate in the study. Accordingly, (101) volunteered students were agreed to take part in the study. Those students were non-randomly grouped into two groups; an experimental group consisting of 35 students, and a control group consisting of 36 students. The remaining 30 students were assigned as a pilot sample. However, the examined and analyzed data, in the final analysis, were taken from 66 students only due to reasons such as; incomplete answers of some of the participants, withdrawal of some of the participant from the experiment due to health problems, or lack of interest to participate in the study activities. As such, the total number of students whose data were analyzed was 33 students in the experimental group, and 33 students in the control group.

All students in the two groups were having Internet that allows them to participate in the online learning activities via Google Classroom. Besides, students' age in the two groups ranges from 22-23 years. In addition, all students had a good experience in utilizing computers, smartphones, and Internet, and had their computers and smart phones. Students in the two groups were equalized in terms of age, students' scores in English grammar in the previous academic year, and parents' educational level.

3.3 Instruments

To gather data pertinent to the research questions of the current study, pre-study and post-study grammar tests and a five-point Likert response questionnaire were developed by the researchers based on previous related studies (AbuLaban 2017, Almoswai and Rashid 2017, Khalil 2018, Manurung et al. 2020).

The pre-study and post-study grammar tests were used to examine the students' improvement in their grammar knowledge after the intervention as compared with their grammar knowledge before the intervention. Both the pre-study test and the post-study tests include five questions for each one. Each question consist of ten items. To ensure the validity of the pre-study and post-study tests, their first draft was submitted to a jury of six experts in the field of applied linguistics, computer-assisted language learning, and English grammar. Experts' comments and suggestions were highly considered in the final form of the tests. In addition, the psychometric parameters (difficulty level and discrimination power) of the two tests were ensured by piloting the pre-study and post-study tests to a sample of 30 students. The difficulty level of the items of the pre-study test was between (0.29-0.77) and for the post-study test was between (0.39-0.79) which represents acceptable values. As for the discrimination power, they were also acceptable as their values range between (0.29-0.59) for the pre-study test and between (0.27-0.56) for the post-study test. In addition, based on the Cronbach's Alpha values which should be more than 0.70 (Middleton, 2019), the computed reliability value for the pre-study grammar test was (0.83) and the post-study grammar test was (0.89). These values indicated that these tests were acceptable in terms of their reliability.

As for the five-point Likert response post-study questionnaire, it was used to collect the EFL students' perception relevant to the factors that determine their English grammar knowledge due to their enrollment in the online discussion platform facilitated by Google Classroom. The questionnaire consisted of 40 items distributed among

four domains; psychological factors, cognitive factors, social factors and students' engagement, and pedagogical factors. The first draft of the questionnaire was submitted to the same jury of experts mentioned above. All suggestions given by the jury members were highly considered in the final draft of the questionnaire. Moreover, the questionnaire was piloted to a sample of 30 students to ensure the clarity of the items and its reliability. Then, the value of Cronbach's alpha was found acceptable, as it was 0.92%. This indicated a high reliability value of the questionnaire (Middleton 2019)

As for the qualitative data collection instruments, focus-group semi-structured interview and observation were used to triangulate the data. The first draft of the interview was submitted to the same jury of experts to validate its content in terms of the targeted research questions of the study. Their constructive comments were highly regarded in building the final draft of the interview.

3.4 Procedures

The current study was conducted based on four phases as described below:

1. The pre-study phase (Week-1), where a pre-study grammar test was conducted on the students of both the experimental and control groups.
2. The intervention phase (Week-2 to Week-12), where the researchers engaged students of the experimental group only in group weekly online discussion activities related to the content of the grammar course taught in each week. To do this, the researchers distributed the experimental group students who were in sections A, and B of the second year into groups. Thus, 18 students, who were in section A, were distributed into two groups consisting of 9 students for each group. The other 17 students who were in section B were distributed into two groups; one consisted of 8 students and the second consisted of 9 students. Then, those groups of students were asked to do an online discussion in a weekly basis. The main benefit of these weekly discussions was to encourage students' active participation and engagement in the course content, provide constructive comments and feedback for each other, and thus, learn independently under the supervision of their teacher. Students had the chance to select a suitable time based on their free time.
3. The post-study phase (Week-13), where the post-study grammar test and post-study questionnaire were administered to the students of the experimental group. Besides, 16 students from theexperimental group were randomly selected and divided into four groups; four students in each, to participate in a semi-structured focus group interview. Figure 1 clarifies the phases of data collection procedures of the study.
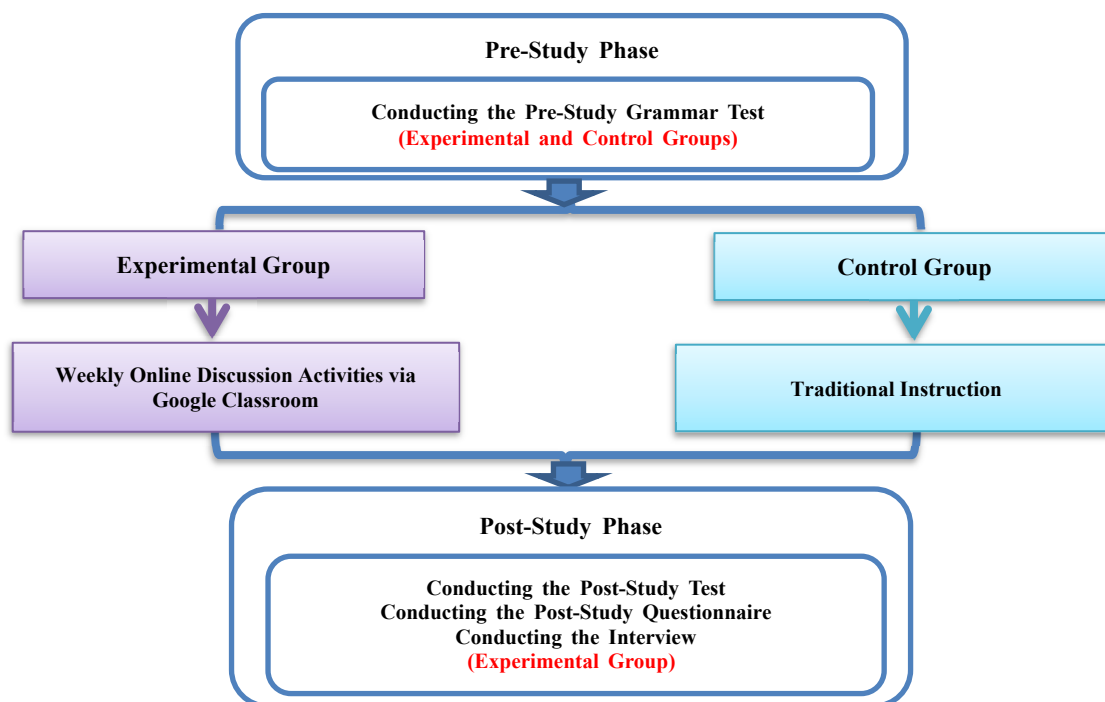
Figure 1. Thre Three Phases of Data Collection Procedures

3.5 Data Analysis

Both quantitative and qualitative data analysis procedures were followed in the current study. To analyze the quantitatively collected data, the researchers used the Statistical Package for the Social Sciences (SPSS), Version 21. Thus, a t-test for two independent samples was used to find out the significant difference between the mean scores of the control and experimental groups in the post-study grammar test. In addition, a paired sample t-test was computed to find out the significant differences between the pre-study and post-study grammar (the first research question of the study). In addition, means, standard deviations, frequencies, and percentages were calculated for the data collected by the questionnaire (the second research question of the study).

As for the qualitative data which were collected by the semi-structured focus group interview, and observation notes, they were explored and analyzed qualitatively based on Creswell's (2012) steps of thematic analysis. These steps are; "preparing and organizing the data, exploring and coding the data, describing findings and forming themes, representing and reporting findings, interpreting the meaning of the findings, and ensuring credibility and trustworthiness of the findings" (p. 238).

To ensure the credibility and objectivity of the qualitative findings and to avoid researchers' misconception and prejudice, two procedures were implemented as suggested by Stake (2010), and Yin (2011). These procedures were the use of triangulation and review by external auditor. First, the researchers employed multiple data collection sources that ensure compatibility and accuracy of the findings (Denzin and Lincoln 2018). Second, the initial analysis of the findings was submitted for critical and thoughtful review by an external auditor. This auditor was a qualified expert and qualitative researcher in the field of English language teaching and technology. After a careful review and examination of the analyzed data, he confirmed the accuracy and plausibility of all the findings and the research process. Finally, inter-rater reliability was conducted to ensure the accuracy of the emerged themes

from the students' interviews and observation (Creswell 2014). Accordingly, compatibility of the themes and their codes were comparatively examined by one of the researchers and the external auditor to ensure the accuracy of the analysis and consequently, the obtained findings. The agreement percentage between the two raters was (0.95%). After scientific discussion of the disagreement points between the two raters, a high agreement percentage (0.98%) was calculated.

4. Results

Mainly, the researchers discussed the findings of the study based on the research questions of the study, as follows.

4.1 Findings Related to the First Research Question of the Study

The findings related to the first research question of the study were discussed in terms of the following two hypotheses of the study:

1. There is no statistically significant difference between the mean scores of the students of the control group and the experimental group in the post-study grammar test.
2. There is no statistically significant difference between the mean scores of the pre-study and the post-study grammar test of the experimental group students.

4.1.1 A comparison between the experimental group and that of the control group in the post-study grammar test

The use of t-test for two independent samples indicated that the calculated t-test value (4.3), is higher than the tabulated t-test value (2.04) at the degree of freedom of (64) at the level of significance (0.05), See Table 1.

Table 1. T-Test Value of the Difference between the Mean Scores of the Experimental Group and Those of the Control Group in the Post-Study Test

Groups	No.	Mean	SD	T-Value		DF	Level of Significance
				Calculated	Tabulated		
Experimental	33	52.6	13.2				
Control	33	39.4	11.5	4.3	2.04	64	0.05

This means that there is a statistically significant difference between the mean scores of the experimental group and those of the control group in favour of the experimental group. This is because the mean score of the experimental group is (52.6) with a standard deviation of (13.2) which is higher than the mean score of the control group which is (39.4) with a standard deviation of (11.5), See Figure 2.
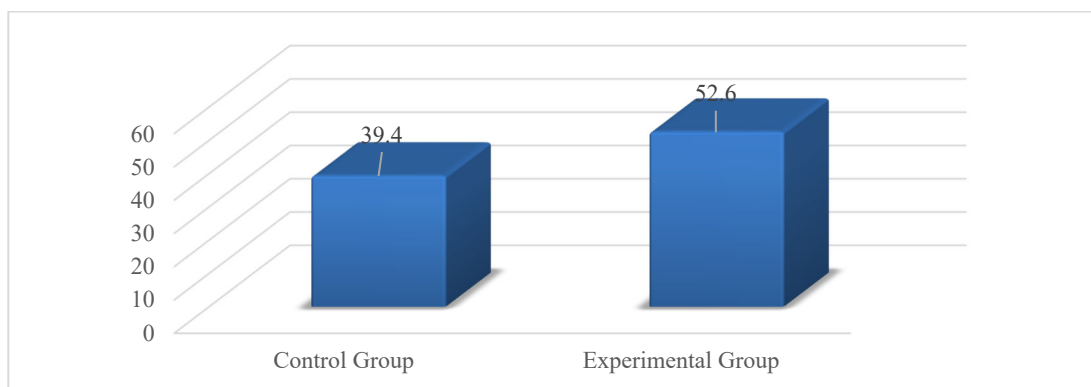
Figure 2. Mean Scores of the Experimental Group and the Control Group in the Post-Study Test

Accordingly, findings revealed that the EFL students in the experimental group were better than those in the control group in terms of their grammar knowledge as measured in the post-study test. Consequently, the null hypothesis is rejected and the alternative hypothesis is accepted which is "There is a statistically significant difference between the mean scores of the students of the control group and the experimental group in the post-study grammar test."

This can be due to the influence of using online discussion activities on the experimental group as compared with the control group who did not use the online discussion activities. Consequently, the students of the experimental group get benefits from the merits of the online discussion activities such as the opportunity to express themselves, give opinions and take suitable feedback from their teacher.

4.1.2 A comparison between the pre-study and post-study grammar tests of the experimental group students

Analysis of the findings revealed that the calculated T-test Value (13.7) is higher than the tabulated T-test value (2.04) at the level of significance (0.05) when the degree of freedom is (32), See Table 2.

**Table 2. T-Test Value of the Difference between the Mean Scores of the Pre-Study Test and
Post-Study Test of the Experimental Group Students**

Grammar Test	No.	Mean	SD	T-Value		DF	Level of Significance
				Calculated	Tabulated		
pre-test/post-test	33	17.7	7.4	13.7	2.04	32	0.05

This means that there is a statistically significant difference between the scores of the students in the experimental group in the post-study test as compared with their scores in the pre-study test. This statistical difference was in favour of the post-study grammar test since its mean score was 52.60, which is higher than that the mean score of the pre-study grammar test (33.45). See Figure 3.
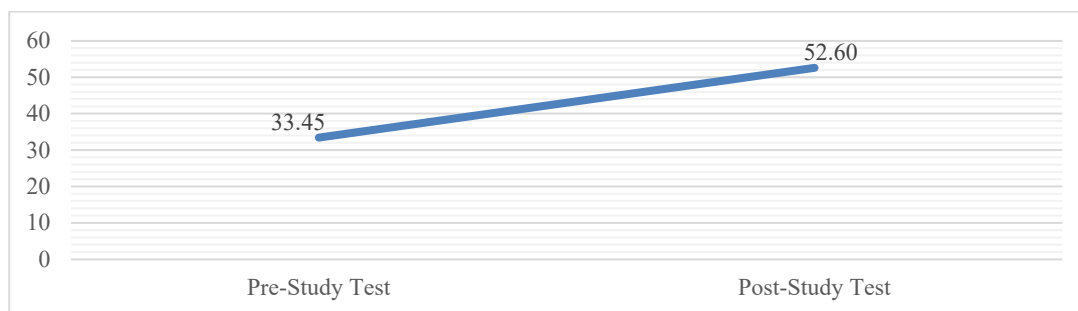
Figure 3. Mean Scores of the Experimental Group in the Pre and Post-Study Test

As a result, the null hypothesis is rejected, and the alternative hypothesis is accepted which is "There is a statistically significant difference between the mean scores of the experimental group students in the pre-study grammar test and the post-study grammar test".

As indicated in the table and figure above, students scored better in the post-study test as compared with their scores in the pre-study test. This means that the students in the experimental group have noticed an improvement in their grammar knowledge. The students' improvement in their grammar knowledge as manifested in the post-study test has resulted from the effectiveness of using online discussion activities experienced by the students in the experimental group throughout the experiment. This can be due to the flexibility of the online discussion learning activities which enables the students to share ideas freely and helps them enhance their grammatical knowledge autonomously.

The aforementioned quantitative results were qualitatively confirmed as they were measured by the students' interviews and observation notes. Thematic analysis of the students' interviews revealed that all participants have attained remarkable and continuous progress in their grammar knowledge during the online discussion activities they have frequently conducted throughout the semester. Expressing this fact, examples from students' responses to the interview prompts were given below:

S1: *Through online discussion activities, I acquired many grammar experiences that I learn them together from my groupmates.*
S5: *I have improved in my English grammar as I learned and shared grammar knowledge with my classmates when we discuss online.*
S9: *I feel that my English grammar now is better than that in the previous year. I got much information in the language structure during this online class.*
S13: *I feel comfortable and happy about my score of English grammar now ... mmmmm ... The flexibility of the online class helped me to get grammar experience anytime and in any place.*

Besides, some students indicated that the online discussion activities were not only beneficial in enriching their grammar knowledge. They also help them in improving their speaking and writing abilities. This idea is expressed by S2, and S12 as mentioned below:

S2: *Online discussion activities helped me not only in improving my grammar but also helped me in the speaking and writing skills... Hmm ... It helped me in writing and speaking without grammar mistakes.*
S12: *Through this online course, I learned English grammar better than before. Not only this, I feel that this helped me in speaking also.*

The majority of students were observed comfortable, responsive, and active in their online discussion activities. They were continuously noticed share grammar rules and knowledge, provide corrective grammar feedback in a friendly manner when other students need feedback or committed a grammar mistake. Other students used to share grammar exercises in Google Classroom main platform and raise constructive discussion about these exercises. Finally, gradual improvements in students' English grammar knowledge were noticed in performing these online activities and exercises and in the structures of their comments on Google Classroom.

4.2 Findings Related to the Second Reserach Question of the Study

To attain the second research question of the study, the researchers statistically analyzed the students' responses to the post-study perception questionnaire which were collected from the students of the experimental group.

Results showed that the mean scores values of the four domains of the questionnaire (Psychological factors, Cognitive factors, social factors and students' engagement, and pedagogical factors) are (36.30, 36.09, 35.78, and 37.67) respectively, which are all higher than the hypothetical mean which is (30). Applying one sample T-test revealed that there were statistically significant differences between the mean scores of the four domains (factors) of the questionnaire mentioned above and the hypothetical mean. The calculated t-test values of these four domains (Psychological factors, Cognitive factors, social factors and students' engagement, and pedagogical factors) are (7.15, 4.87, 6.82, and 7.03) respectively, which are all higher than the tabulated T-test value which is (1.69) at the level of significance (0.05) with a degree of freedom (32). This means that these four domains (factors) which were facilitated via the use of online discussion activities have an actual effect on improving students' grammar knowledge, See Table 3.

Table 3. Mean Scores, Standard Deviations and T-Test Values of the Domains of the Questionnaire

Questionnaire Domains	Number	Mean Score	SD	Hypothetical Mean	DF	T-Value		SL 0.05
						Calculated	Tabulated	
Psychological	33	36.30	5.10	30	32	7.15	1.69	Sig.
Cognitive	33	36.09	7.21	30	32	4.87	1.69	Sig.
Social	33	35.78	4.99	30	32	6.82	1.69	Sig.
Pedagogical	33	37.67	6.29	30	32	7.03	1.69	Sig.

This fact is also confirmed by the qualitative data collected by the use of students' interviews and observation notes. Analysis of the data gathered by students' interviews revealed that the students improved in their grammar knowledge due to the pedagogical factors afforded by the online discussion learning environment. Table 4 provides examples of the students' perception as they are taken from their interview responses that indicate this fact.

**Table 4. Interview Extracts Representing the "Pedagogical Factors in
the Online Discussion Learning Environment"**

Participant	Interview Extracts
S2	*Online discussion enriched my English grammar because there are various teaching and learning techniques and activities that helped me work collaborative and help each other in English grammar.*
S6	*Online discussion promoted my problem solving strateby ... hmmm, I solved many grammar mistakes and improved my grammar.*
S9	*I believe that my grammar is good now. In online discussion I got feedback from my group mates immediately and consequently, I improved in English grammar.*
S16	*Group work was so effective in online discussion. Mmm ... it helped me receive and share grammar experiences with friends.*

Moreover, observation notes revealed that students in each group were so responsive to the various learning techniques and activities of English grammar. Besides, they were observed working independently in building grammar knowledge and collaboratively share them with groupmates. In addition, students were so responsive to the feedback provided by the other students that help them correct their grammar mistakes and learn from their mistakes.

Besides, students indicated that the online discussion learning environment helped them enrich their grammar knowledge as it created a psychological learning atmosphere for them to learn and improve their grammar knowledge. Table 5 gives illustrative examples supporting this fact:

**Table 5. Interview Extracts Representing the "Psychological Factors in
the Online Discussion Learning Environment"**

Participant	Interview Extracts
S4	*I enjoyed learning English grammar because online discussion encouraged and motivated me to learn grammar comfortably.*
S8	*Online discussion activities are not threatening...mmm... these activities reduced my apprehensi on attached to English grammar.*
S11	*The discussion activities we made in this course promoted my confidence in learning English grammar and encourage shy students to participate in discussion and thus, learn grammr comfortabley.*
S15	*Online discussion platform created a friendly and safe learning atmosphere for learning English grammar.*

In doing the online discussion activities, students were noted comfortable. They used to discuss and share ideas confidently and easily. There was no sign of apprehension and hesitation in these learning activities. This means that the online discussion learning environment was psychologically suitable and interesting for them.

As for the cognitive factors, students stated in their interviews that learning English grammar via the use of online discussion activities helped them construct grammar knowledge, share ideas and develop their deep understanding and critical thinking abilities. In table 6, extracts from students' interviews are given:

Table 6. Interview Extracts Representing the "Cognitive Factors
in the Online Discussion Learning Environment"

Participant	Interview Extracts
S3	*I think that my grammar knowledge is better now as online discussion activities enabled me to learn independently and construct grammar knowledge together with my classmates.*
S6	*I learnt English grammar in a good way as I can think critically and deeply when dealing with the structure of sentences in English language.*
S10	*To me, mmm … online discussion activities were so valuable in learning English grammar. In online class, there were so many learning sources for me to learn English grammar. This helped me be creative in my thinking and learning.*
S13	*Discussing in online mode with group mates help me improve my English grammar as there were various abilities in the group members. This promotes scaffolding and cooperation in learning.*

As for the social factors and students' engagement, students indicated that online discussion activities helped them improve their grammar knowledge since it promoted students interaction, socialization, and group work when learning English grammar. In the following table, extracts from students' interviews are provided:

Table 7. Interview Extracts Representing the "Social Factors in
the Online Discussion Learning Environment"

Participant	Interview Extracts
S1	*The interactive nature of online discussion activities help me improve my grammar knowledge.*
S7	*Online discussion helped me be close to my teacher and classmates at any time and any place. We together build strong relationship that help us learn English grammar in a good way.*
S9	*In online discussion, learning English grammar is so flexible. This encourages me to socialize and share grammar experience with others at a suitable place and time.*
S12	*Online discussion encourages me to be more active and engaged in the online grammar activities.*

Besides, students were observed committed in the timetable of the weekly online discussion learning activities. They were discussing constructively the grammar drills, reflect their points of view, and provide feedback and scaffolding to each other.

Further analysis of the questionnaire data to identify the power of the effect of each domain in the questionnaire on the students' improvement in their grammar knowledge as perceived by the students in the experimental group showed a priority of one domain over the other domains. In the following, factors (domains) that have an effect on the students' grammar knowledge are arranged in sequence based on the power of their effect.

1. The pedagogical domain comes first since its mean score is 37.67, which is higher than the mean scores of the other three domains of the questionnaire. This means that this domain was the most effective one on the students due to the importance of online discussion as a learning strategy in facilitating students' comprehension of the learning material through their exchange of ideas and opinions with others.
2. The psychological domain comes in the second rank on its effect, as its mean score is 36.30, which is higher than the mean scores of the cognitive domain (36.09) and the social domain (35.78). These values indicate the priority of the psychological domain over the remaining two domains, i.e., cognitive and social domains.
3. The cognitive domain occupies the third rank among the other domains in the questionnaire. Its mean score recorded 36.09, which is higher than the mean score of the social domain (35.78).

4. The social domain occupies the last rank among the other domains where its mean score is 35.78, which is the lowest one. This refers to its little effect on the sample of the study.

5. Discussion

Though Internet technologies and online learning have been extensively utilized in teaching the English language skills and elements, yet, their effectiveness in developing the EFL students' grammar knowledge is still researchable. Besides, the factors available in the online environments that determine students' improvements in English grammar are still ignored and unclear in the previous studies.

The findings of the current study indicated that the EFL students' grammar knowledge was improved due to the effect of continuous online discussion activities conducted by the students on Google Classroom. The EFL students in the experimental group attained better scores in the post-study grammar test as compared with the scores of students in the control group. In addition, the EFL students' in the experimental group achieved higher scores in the post-study grammar test as compared with their scores in the pre-study grammar test. Moreover, similar findings were attained via the use of qualitative instruments; i.e., students' interviews and observation. In their interviews, students indicated that they were in continuous progress in terms of their grammar accuracy and fluency throughout the various online discussion grammar activities. The findings of the study are in concord with many past studies which have implemented online learning platforms such as; Google Classroom, Blogs, Facebook, etc. Though studies like (AbdElfatah 2016, AbuLaban 2017, Abu Naba'h et al. 2009, Alian 2018, Al-Jarf 2005, Almoswai and Rashid 2017, Baleghizadeh and Oladrostam 2010) have utilized different online platforms, different procedures and methodologies to obtain their findings related to English grammar, the results were as same as those in the current study. This means that the EFL students' grammar knowledge was cultivated after their enrolment in the experiment. This can be due to the fact that the EFL students enriched their grammar knowledge as they acquired language experiences and exposed to further authentic grammar materials and practices with their groupmates in online discussion group activities which were taken place in google classroom. In addition, those students were in a motivating collaborative learning environment where they can construct knowledge independently and provide feedback and scaffold each other. This is in harmony with Vygotsky's (1978) social constructivism theory of learning which views that learning is taken place when students socialize and interact to construct new knowledge independently.

With reference to the factors that determine the EFL students' improvement in the online discussion learning environment, findings resulted from the students' post-study perception questionnaire revealed that the four factors; i.e., psychological factors, cognitive factors, social factors and students' engagement, and pedagogical factors, contributed to this improvement. However, the superiority of their effect on the EFL students grammar knowledge was different as calculated based on the mean score of each factor as follows; pedagogical factors (37.67), psychological factors (36.30), cognitive factors (36.09), and social factors and students' engagement (35.78), respectively, which were all higher than the hypothetical mean which is 30. This indicated that the four factors facilitated students' learning of English grammar. However, the most influential factors were the pedagogical factor and psychological factors respectively based on their mean scores. Qualitative findings were in harmony with the quantitative ones as students indicated similar views in their interviews.

Although the previous studies (AbuLaban 2017, Almoswai and Rashid 2017, Khalil 2018, Manurung et al. 2020) have investigated students' general perception and attitudes towards the use of online learning environments in learning English grammar, the current study was, to some extent, the first one that investigated students' perceptions towards the factors that determine and facilitate their learning of English grammar in a Google Classroom learning platform. Besides, unlike the previously mentioned studies, the current study implemented a

qualitative research methodology along with the questionnaire to confirm the quantitative findings.

The main reason for the positive effect of all of these factors on improving the EFL students' grammar knowledge is that they were all gathered in one online space and were utilized appropriately by the teacher to encourage the EFL students to interact, negotiate, and share learning experiences and scaffold each other. Furthermore, the interactive nature of these online discussion learning activities created a comfortable learning atmosphere where the EFL students participated actively in self-learning opportunities. These learning opportunities which were provided in collaborative and non-threatening learning conditions encouraged students to overcome their psychological barriers of learning English grammar associated with the traditional learning environments. Accordingly, autonomous learning was created among the students as they felt that they can reflect their point of views and share grammar and language knowledge with their colleagues freely, and receive constructive feedback from them anytime and anywhere.

6. Conclusion

The current study proved the effectiveness of the use of online discussion activities in improving the EFL students' grammar knowledge at the university level. In addition, the study revealed that the factors that contribute to the students' learning of English grammar in this online learning environment were pedagogical factors, psychological factors, cognitive factors, and social factors and students' engagement, respectively.

This study is novel as it investigated the influence of online discussion activities on improving students' grammar knowledge by using both qualitative and quantitative research instruments. The previous studies were conducted experimentally using numerical evidence only. Besides, unlike the previous studies, this study provided a deep understanding of the main factors that contributed to improving the students' grammar knowledge in this online learning environment as perceived by the students.

Notwithstanding the positive findings of the current study, few shortcomings should be addressed for future studies. To some extent, the period of time of conducting the study was only one semester which is short to adequately track students' improvements in their grammar knowledge as they are impacted by the use of online discussion activities. Consequently, a period of time longer than one semester is recommended as it might give the students ample practice exercises that help improve their English grammar knowledge. Besides, the long period of time of the experiments provides the researchers with more observation opportunities of the students' performance and behaviour throughout the course. Nevertheless, the implementation of qualitative instruments helped the researchers in diminishing the negative effect stemmed from the short period of time allotted to the current study. Second, the current study is restricted to students' discussion in an online mode only. Consequently, further studies are encouraged to investigate the effect of discussion activities in a blended learning mode where students should be encouraged to discuss in both in-class and online modes.

Though the aforementioned limitations of the present study, it provides a step onward in the teaching and learning process of English grammar in a foreign language learning context specifically in the critical period of the Covid-19 pandemic. It alerts the EFL educationalist and teachers' attention to the importance of online learning environments in cultivating students' active and independent learning via the use of online discussion activities that address their learning needs and interests. Accordingly, educationalists and teachers are required to think seriously in enriching the English language textbooks and lessons with such online learning activities to ensure encouraging learning situations within the interest of their students. Finally, the findings of the current study help the EFL students believe in the advantages of the use of the Internet and online learning platforms in maintaining

their autonomous and authentic learning due to the flexibility and collaborative nature of learning opportunities supported by these online learning platforms.

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