NOVITAS-ROYAL
RESEARCH ON YOUTH AND LANGUAGE

2024, 18(1), 18–36
Novitas-ROYAL (Research on Youth and Language)
ISSN: 1307–4733

Research Article

Reaping the Fruits of Technology-Integrated Grammar Instruction in EFL Classes at the Tertiary Level Through Web 2.0 Tools

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Article information

Submission	24/02/2024	Revision received	28/03/2024
Acceptance	11/04/2024	Publication date	28/04/2024

Keywords:

Grammatical competence,

intrinsic motivation,

technology-integrated grammar instruction,

Web 2.0 tools

Abstract: Thanks to their advantages, technology-integrated tools have risen in English classes, especially in the last two decades. In this respect, a paucity of research has been conducted to measure the influence of web-enhanced tools in improving linguistic skills. However, a gap in the literature has been observed about the effects of technology-integrated instruction on EFL learners' grammar performance at the tertiary level in the Iraq context. In light of this, the present study aimed to explore the influence of Web 2.0 tool-oriented instruction in developing grammar on 40 EFL learners, chosen by systematic sampling method, studying at the language preparatory school of a private university in Erbil, Iraq, in the 2023-2024 academic year. The study lasted nine months and adopted the principles of a mixed-methods research design study. Control group students were exposed to traditional instruction, while experimental group students' lessons were enriched with web 2.0 tools via various websites on English language learning. The findings, analyzed by SPSS 26 and MAXQDA, revealed that experimental group students increased their grammatical competence, intrinsic motivation, self-confidence, and overall attitudes toward learning English more significantly than the control group students. In line with these findings, this study has certain pedagogical implications for integrating Web 2.0 tools into grammar lessons.

Anahtar Sözcükler:

Dilbilgisel yeterlilik,

içsel motivasyon,

teknolojiyle bütünleşik dilbilgisi öğretimi,

Web 2.0 araçları

Teknoloji Destekli Dilbilgisi Öğretiminin Meyvelerini Üniversite Düzeyindeki Yabancı Dil Olarak İngilizce Öğrenen Öğrenciler Üzerinde Web 2.0 Araçlarıyla Toplama

Özet: Teknolojiyle bütünleşik araçlar, avantajları sayesinde özellikle son yirmi yılda İngilizce derslerinde yükselişe geçti. Bu bağlamda, dil becerilerini geliştirmede web ile geliştirilmiş araçların etkisini ölçmek için birçok araştırma yapılmıştır. Bununla birlikte, Irak bağlamında teknolojiyle bütünleşik öğretimin EFL öğrencilerinin yükseköğretim düzeyindeki dilbilgisi performansı üzerindeki etkileri hakkında literatürde bir boşluk gözlemlenmiştir. Bu bağlamda, bu çalışmada, 2023-2024 eğitim-öğretim yılında Irak'ın Erbil şehrinde bulunan özel bir üniversitenin dil hazırlık okulunda öğrenim gören ve sistematik örnekleme yöntemiyle seçilen 40 İngilizce öğrencisi üzerinde Web 2.0 araç odaklı öğretimin dilbilgisi geliştirmedeki etkisinin araştırılması amaçlanmıştır. Çalışma, karma yöntemli araştırma deseni çalışması ilkeleri benimsenerek 9 ay sürmüştür. Kontrol grubu öğrencileri geleneksel öğretime maruz bırakılırken, deney grubu öğrencilerinin dersleri çeşitli web 2.0 araçları ile zenginleştirildi. SPSS 26 ve MAXQDA ile analiz edilen bulgular, deney grubu öğrencilerinin dilbilgisi yeterliliklerini, içsel motivasyonlarını, özgüvenlerini ve İngilizce öğrenmeye yönelik genel tutumlarını kontrol grubu öğrencilerine göre daha anlamlı bir şekilde artırdıklarını ortaya koymuştur. Bu bulgular doğrultusunda, bu çalışmanın Web 2.0 araçlarını dilbilgisi derslerine entegre etme noktasındaki etkileri göz önüne alarak bazı pedagojik çıkarımlar yapılabilir.

To Cite This Article: Celik, B., & Kara, S. (2024). Reaping the fruits of technology-integrated grammar instruction in EFL classes at the tertiary level through web 2.0 tools. *Novitas-ROYAL (Research on Youth and Language)*, *18*(1), 18–36. https://doi.org/10.5281/zenodo.10973103

1. Introduction

In today's globalized world, the terms bilingualism and multilingualism, have received considerable attention thanks to increasing mobility via transportation and communication. More specifically, relocating to another country or staying in touch with others via voice or video call is a matter of time, which was unimaginable in the past. Accordingly, when people are privileged to move or communicate without much difficulty, their inclinations to receive education in a foreign country, embark on business initiatives overseas, know different cultures globally, seek decent job opportunities around the world, and search for cures regarding health issues in various parts of the world may increase correspondingly (Alam, 2023). In this regard, the necessity to determine a common language arises so people from different countries can establish communication and proceed. In other words, considering the number of living languages, 7,111, a compelling need arises to prioritize one language over others, such as lingua franca. In this respect, English is ahead of other languages, with over 1.5 billion speakers, as its dominance has been observed starkly in education, scientific journals, websites, trade, aviation, tourism, and media (Celik & Kara, 2022). According to the urgent need for a professional life in the current century, English plays a pivotal role in many educational institutions and English proficiency exams. For instance, the global need to master English shapes schools' curricula globally. Besides, English has been taught intensively at different stages of education in many countries. In the same vein, the English knowledge of the learners has been measured in national university exams or international standardized tests of English (Elder & Davies, 2006; Ibatova, 2019). It can be argued that knowing English is essential to earning academic success, landing a well-paid professional deal, and initiating communication with people instantly, regardless of their nationalities.

English language learning and teaching methods have evolved significantly since the advent of the Grammar Translation Method and Direct Method in the last quarter of the 19th century. The Audiolingual Method, Suggestopedia, Silent Way, Total Physical Response, and Community Language Teaching methods have come to the forefront upon the fading popularity of previous methods (Chekhratova et al., 2022; Sharma, 2017). However, the 21st century has witnessed another revolution in developing learners' skills by employing the principles of the communicative language teaching method (CLT hereafter), which prioritizes the role of authentic materials to foster communication, thereby facilitating the mastery of English. Although CLT arose in the 1970s through the pioneering initiatives of British linguist Wilkins, it has increased in popularity since the 2000s because the readily available technological tools have offered ample opportunity to exploit authentic materials via videos, images, books, quizzes, worksheets, podcasts, and AI applications under the umbrella term of Web 2.0 tools (Stecula & Wolniak, 2022; Yucedal, 2023). Technological tools and CLT go hand in hand by supporting each other to have social interaction so learners can seize the chance to learn English in a social environment where they can foster communication with meaningful tasks. In the same vein, technological tools have certain advantages in English classes, such as appealing to different learning styles, promoting independent learning, and allowing collaboration (Khan & Tas, 2020; Küçük, 2023). Additionally, they are primarily flexible to rewind or revise conveniently, so they help close the knowledge gaps among students by employing the principles of student-centered learning. It is evident that the shift from a teacher-centered to a student-centered approach is stark in CLT with the contribution of Web 2.0 tools.

The transition from traditional boards to smart ones has encouraged educators to use Web 2.0 tools in education. Likewise, other portable devices such as laptops, PDAs, tablets, and

mobile phones have become more affordable over the years, so it did not take much time to realize the potential of such devices at educational institutions (Ilyashenko et al., 2019; Solano et al., 2017; Yildiz, 2021). Accordingly, mobile technologies have launched complementary applications to use technology effectively in English language learning and teaching. To name a few, Zoom, Cisco Webex, Microsoft Teams, and Google Hangouts serve as video-telephony apps to cover lessons virtually. Similarly, Kahoot, Quizizz, Schoology, Mentimeter, and Quizlet have released their features to offer countless tests so learners can entertainingly practice English. In addition, Pinterest, ESL Printables, Live Worksheets, and ISL Collective allow learners and educators to filter topics according to their priorities. Subsequently, Zip Grade and Google Forms facilitate the conduct of exams and the analysis so the learning rate of the students can be figured out with a detailed report for each student (Can & Karacan, 2021). Furthermore, prominent websites such as the British Council, Voice of America, and BBC Learning English display comprehensive materials to develop macro and micro skills with a graded plan. Meanwhile, the convenience of online streaming has encouraged tutors on social media platforms to upload their videos (Kara & Yildiz, 2022). Thus, learners have various choices according to their interests, levels, and needs. As it is evident, the examples of Web 2.0 tools are prevalent in many forms thanks to advanced technology in the 21st century.

Grammar is a fundamental micro-skill that learners need to master so they can command English precisely. To illustrate, tenses, noun clauses, parts of speech, passive voices, modals, and adjective clauses are some common topics to study in grammar instruction. Mastering such topics plays an integral role in language communication and comprehension. When learners figure out grammar rules appropriately, they can convey the message more precisely, write and speak more effectively, increase their credibility, polish their professional presence, and enhance their overall performance in academic settings (Akbari, 2014). Although different methods assert different types of grammar instruction in a conscious or subconscious mode, it does not change its status as an essential skill to be developed progressively. This notion can be supported by the popularity of Raymond Murphy's Essential Grammar in Use books, which have been ranked as one of the best-selling ELL books over the years (Webb & Giovanelli, 2023). Likewise, Betty Azar and Stacey Hagen's collaborative trilogy, Basic, Fundamentals, Understanding and Using English Grammar has been employed exponentially to learn and teach grammar globally (Schrampfer Azar & Hagen, 2023). In this regard, there are three well-known approaches to teaching grammar: deductive, inductive, and eclectic. While deductive grammar suggests explicit teaching and conscious learning based on Chomsky's Transformational Grammar Theory principles, inductive grammar highlights implicit teaching and unconscious acquisition based on Krashen's Communicative Approach (Jean & Simard, 2013). In other words, the deductive approach unleashes the rule initially and provides specific examples to strengthen learning in the subsequent phase, whereas the inductive approach displays examples initially and leaves room to infer the rule later. On the other hand, the eclectic approach combines the positive aspects of the approaches mentioned above and allows flexibility in choosing either a deductive or an inductive approach at different stages of the language learning and teaching process (Mwanza, 2017). It is unambiguous that grammar instruction is at the heart of the language learning process to lay a solid foundation in English and support other crucial skills.

1.1. Literature Review

A dramatically accelerating pace has been noticed in the development and adoption of new technologies in the last two decades. This new wave has influenced all fields, including

education. In this respect, feasibility projects have been accelerated in integrating technology into education. Foreign language learning and teaching process has also been shaped according to the practical implementation of technology in traditional or virtual classes at different stages (Ece et al., 2023; Lee et al., 2022; Masykuri, 2022). Another compelling reason to adopt new technologies more instantly is that all parties of education, namely educators, managers, and students, are digital natives whose ICT skills are far better than previous generations thanks to living in the information age with readily available ICT devices. The above facts have urged curriculum makers to enrich students' learning with web-enhanced tools. Accordingly, equipping educators and students with ICT skills has come to the fore at educational institutions. Some scholars (Küçük, 2023; Raygan & Moradkhani, 2022; Warschauer & Meskill, 2013) posit that technology-integrated language teaching (TILT hereafter) affects students' learning positively, whereas others (Sasan & Rabillas, 2022; Stecula & Wolniak, 2022; Zhao & Lai, 2023) assert some hesitations about the effectiveness of it in EFL classes. To name a few, Chapelle (2016) surmises that integrating technology into classes can positively modify language curricula, change the nature of teaching methodology, and increase the rate of learning considerably in English classes. Likewise, Blake (2016) and Celik et al. (2022) attest that using technology allows educators to teach English entertainingly via games and e-quizzes, so students find more common grounds to learn English with e-authentic materials. Similarly, Hwang (2005) asserts that technology-oriented instruction captures learners' attention by offering up-to-date and intriguing information. In addition, Zeinali Nejad et al. (2021) point out that adopting technological tools in classes gives flexibility to learners who prefer self-study over collaborative efforts. Subsequently, Motteram (2013) contends that technology-based English classes appeal to various senses and learning channels, so students feel more engaged while participating in technology-enriched instruction in EFL classes. In the same vein, Yang and Chen (2007) also postulate that enhanced technology in classes encourages learners to enhance their performance in various ways, including increasing their motivation, nurturing social and cooperative learning, promoting cross-cultural awareness, and boosting students' speaking performance. On the other hand, some hesitations arise about the effectiveness of technology use in classes. For example, Abdu (2018) states that there is no miraculous formula to ensure success in classes where the latest technology is prevalent, so it is a stress source for educators considering implementing it in the classroom. He also attests that it poses certain risks for educators to lag behind other classes if they cannot balance between technology use and required activities in the syllabus. In addition, motivating students to write on paper, fill out the exercises in the course book, and take exams in an orthodox format can be troublesome if educators put more emphasis on TILT and underestimate the importance of official materials.

A paucity of research has been conducted to measure the effects of TILT in ELL settings with varying findings. To illustrate, Lee et al. (2022) carried out a meta-analysis on K-12 students to measure the effects of technology use on reading literacy in the American context, which unearthed that using technology in English classes provides ample opportunity to put theory into practice with meaningful tasks, thereby developing students' reading literacy substantially. Similarly, Masykuri (2022) carried out a study on Indonesian high school students, revealing that TILT is a promising approach to improving learners' listening skills in English with well-balanced and stimulating activities. Additionally, Hwang et al. (2016) found that technology-enriched classes yield better results in boosting students' speaking performance through web-based storytelling activities at an elementary level in the Taiwanese context. Subsequently, Sadiq's (2023) study revealed that technology use helps learners

sharpen their writing skills considerably at the tertiary level in Iraq. The influence of TILT on vocabulary expansion was measured by Guaqueta and Castro-Garces (2018) in Colombia high school students, which showed that technology-enriched instruction is a fruitful attempt to increase students' word power in English. Another notable study was conducted by Zeinali Nejad et al. (2021) in Iran on adult learners, revealing that technology-integrated learning is a revolutionary approach to dramatically enhancing learners' pronunciation performance. After that, Celik et al. (2022) conducted a study on EFL learners at the tertiary level in Iraq, which unearthed that using technology in classes fosters grammatical competence, increases self-confidence, and reduces language learning anxiety.

However, some studies did not find a positive correlation between TILT and some gains in terms of English proficiency. For example, Blake (2016) emphasized that allocating much time to technology use in classes has certain drawbacks, so implementing it in EFL classes should be carefully planned to avoid negative consequences for educators. They also highlight that a wide array of choices may be time-consuming if materials are not narrowed according to the objectives in line with the syllabus. Similarly, Rahmawati (2016) attests that some web-enhanced tools can be beyond learners' understanding, so they may adversely affect students' language learning experiences. They may reduce learners' ambition rather than encourage them to master English soon. Considering all these, measuring the influence of technology-integrated English classes on students' progress is critical in reshaping English classes.

1.2. Significance of the Study and Research Questions

Incorporation of digital tools into EFL settings has been recommended in increasing numbers as they enrich students' learning with multiple endeavors. However, previous studies did not specify the prioritization of certain tools over others in the Iraq context based on the researchers' knowledge. In this regard, the present study has been conducted to implement an instruction that requires technology in EFL classes to increase grammatical competence. Thus, the current study, to address the gap in the literature, is driven by the following research questions:

1. How effective are Web 2.0 tools to improve grammatical competence?
2. What is the role of Web 2.0 tools in changing learners' attitudes regarding learning English?

2. Method

2.1. Research Design

This investigation employs a mixed-method design, allowing the researcher to get the stronger points of qualitative and quantitative research methods. More specifically, an explanatory sequential design was employed in a sequence to collect quantitative and qualitative data with a well-established plan, thereby coming to more reliable interpretations while cross-checking the data in the final phase. It entails grammar exams and questionnaires to get quantitative data; on the other hand, qualitative data were gathered by the interview. By utilizing this research method, the study aimed to understand better the impacts of technology use on developing learners' grammatical competence in English classes. According to Bowen et al. (2017), an explanatory sequential design is found reasonable to

apply widely in social sciences thanks to its convenience while combining narrative data with numeric values.

2.2. Participants

A total of 40 students enrolled in the language preparatory school (LPS hereafter) program at a private university in Erbil, Iraq, encompassed the core part of the study, thereby representing the control and experimental group equally. The participants were chosen from the population according to the principles of the systematic sampling method. More specifically, the population was listed, and participants were determined randomly, reducing the biases suggested by Rahman et al. (2022). When participants were analyzed demographically, it was observed that the number of female students (60 %) was higher than male friends (40%). Once their ages were compared, it was noticed that all students were between 17 and 21 years old. It can be said that there was not a generation gap among students, and the number of female students was on the rise, a promising sign of encouraging them to earn a degree at universities in increasing numbers. The university has around 5000 students in 30 departments with a well-rounded system that puts English Medium Instruction into practice in all departments as of the 2023-2024 academic year. A typical LPS student has been placed in this category after getting an unsatisfactory score on the proficiency exam, which was the mixture of Oxford and Cambridge Proficiency Exams based on the meticulous elimination of the questions by testing experts. Proficiency Exam includes all macro and micro-skills of English to measure their levels appropriately. Test takers answer reading, listening, grammar, and vocabulary questions in a multiple-choice format to be graded by Zip Grade, a world-renowned application for automated grading within seconds. The Zip Grade application is used for convincing reasons, such as efficiency, transparency, accuracy, and accountability. In other words, it takes a second to grade a student's paper, shows detailed analysis for each test-taker, provides a trustable source of accurate grading, and offers easily understandable graphs for test-takers, exam committee members, and other stakeholders. Additionally, writing tasks were graded by two raters and finalized by the authorized exam committee members. Of particular attention is that two raters do speaking tasks in lecturers' offices, so a fair grading policy is implemented in all stages of the exam. Once students are placed, they get a top-notch education in technology-enriched classes with qualified and dynamic lecturers, spanning ten months to get the highest benefit from the program. All lessons are designed to sharpen learners' written and spoken English, so they can adapt to departmental courses in the following year, which directly affects their professional lives.

2.3. Data Collection

Oxford Placement Test was employed to distribute participants in groups homogeneously because it is a well-known exam that measures students' levels fairly and places them correspondingly. It included vocabulary, grammar, listening, and reading questions which were graded out of 50. Additionally, students responded to speaking queries and writing tasks, which were graded out of 25. It is important to note that speaking and writing prompts were chosen from the official source of OWN IT 2 by experts with solid experience in ELT for over ten years. In the same vein, the placement test was piloted on other students who had similar characteristics. The pilot study revealed that the Cronbach Alpha Index, .83, was adequate to meet the reliability criteria successfully. After completing the pilot test and distributing them homogeneously, students were ready to represent either the control or experimental group in the treatment period.

Grammar exams were formed by choosing the relevant grammar questions from OWN IT 2 official materials. Unit worksheets are sequenced as basic, standard, and extension in terms of difficulty. The topics included various topics, such as tenses, comparative, superlative, and passive voice. The committee, including ELT experts, formed the pre-test and post-test within standard worksheets as Foundation English students' levels are between A2 and B1. When exams were ready, they were piloted, culminating in a .89 Cronbach Alpha Index. This value indicates that it was reliable enough to meet the internal consistency criteria.

The questionnaire was created based on five items on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to gain a deeper insight into TILT in the eyes of the participants. The items in the questionnaire were modified with the suggestions of Christensen and Knezek (2009), who devised a questionnaire scale to measure students' satisfaction in technology-integrated language learning and teaching classes. It is essential to mention that in the pilot study, face and content validity were assured before directing the questions to the participants.

The interview underwent a rigid process to ensure excellence as well. The questions in the interview were designed by the researcher. After that, a vetting process was initiated and finalized by four experts in the field of English for over 15 years. They raised their doubts when there were some unambiguous questions or redundant parts. After the initial screening, the final form of the interview was saved. Additionally, interview questions were directed to some other students as a pilot study, so the duration and possible hindrances were determined before the main study. These procedures helped the researcher minimize the possible problems so that efficiency could be guaranteed in each step.

The data collection procedure lasted nine months in this study to measure the effects of TILT on students' grammatical competence more systematically by using the instruments mentioned above after getting the required permission from the scientific committee of the university to conduct the study in line with ethical considerations. Of particular attention is that the scientific committee monitored the study periodically and expressed some points for its betterment. In this regard, upon choosing the participants, two comprehensive workshops were held to inform them about the stages of the study so that they could be familiar with two types of instruction. Their consent forms were also signed to join the study as volunteers. Some students did not want to join, expressing valid reasons, so they were replaced with new members.

2.3.1. The Cycle of Lessons in Control and Experimental Group

Control group students received the education according to the principles of the curriculum in OWN IT 1 by Cambridge University Press. THE OWN IT series was released by Cambridge in 2020. Since then, their popularity has increased globally thanks to appealing topics for adults and offering a spectrum of supplementary materials. In other words, they followed all activities in the course book orthodoxly without switching to supplementary or web-enriched materials. In the final phase, they took the official exams on the paper.

On the other hand, the experimental group of students received not only traditional education but also modern means of education with web-enhanced tools. To illustrate, they followed all the topics in the book. However, their lessons were supported with web-enhanced tools through YouTube, Facebook, and some educational websites based on relevancy. The goal of integrating technology into the classes was that they increased their motivation in an engaging atmosphere because e-materials were visually stimulating, relevant,

coherent, well-balanced, and flexible. Students discussed the themes, watched videos, read a wide range of texts, took quizzes, and analyzed their mistakes in cooperation to activate peer learning. They were free to use them as much as they wanted in a cost-free format. E-materials were used in class and as homework, so students were privileged to reap the benefits of blended learning. Students were also informed that they could make a video call with their lecturer through Zoom if they needed to be clarified. When the e-materials were over, the lecturer and students' peers provided valuable feedback in the analysis part so they could have ample opportunity to analyze and update the feedback. CLT was at the heart of their instruction from the beginning till the end. The platforms to be exploited during the study are visualized below in Table 1.

Table 1.
Platforms to Integrate TILT

Name of the Platform	Specified Forms
Facebook	English Grammar Test Advanced Grammar & Vocabulary English Grammar Zone Grammar for All
YouTube	Englishclass101 10 English Quiz Oxford Online English Woodward English
Websites	BBC Learning English VOA Learning English Live Worksheets All Things Grammar ESL Printables
Google Forms	Various Tests
Kahoot	Various Kahoots
Prezi	Presentations on Relevant Grammar Topics

As can be seen starkly in Table 1, six different platforms were used in harmony to meet the needs of the students in terms of grammar. When it was observed in detail, Facebook, YouTube, some established websites on ELL, Google Forms, Kahoot, and Prezi were leading platforms to develop students' grammatical competence. When given pages or sites are observed, it is clear that they have received much attention from learners and educators thanks to their popularity.

2.4. Data Analysis

Descriptive statistics were used to analyze quantitative data from grammar exams and questionnaires. SPSS 26 was used to measure the difference between the pre-test and post-test grammar exams through independent samples t-test. Similarly, SPSS 27 was employed to pinpoint the differences in students' opinions towards technology-enhanced grammar instruction through the lens of mean and standard deviation figures. On the other hand, thematic analysis was applied to process the qualitative data gathered from the interview. Thematic analysis is a reliable qualitative data analysis method, categorizing under certain themes and adopting an inductive approach (Vears & Gillam, 2022). There are four stages of content analysis: examining the transcribed data thoroughly, assigning codes, organizing data under categories, and converting categories into themes. These themes offer valuable insights while addressing research questions with an in-depth perspective.

Saturation, member reviews, and analytical memo writing were utilized to ensure the dependability and credibility of the coding process (Braun & Clarke, 2021). The investigation commenced by compiling comprehensive analytical memoranda in a journal. Throughout the coding process, the coder could scan whether some insights were inserted. At the point of saturation, all programmers who were responsible for conducting content analysis made their contributions and finalized the files after getting some feedback from the participants. Some measures were also taken to exclude the author's bias by excluding him from the coding process.

Several initiatives were taken in line with the suggestions of Chetwynd (2022) and Drost (2011) to address the reliability and validity of the instruments to gather quantitative data. To illustrate, a panel of experts checked the instruments' qualities in relevance and clarity so that the content and face validity of the items were ensured without leaving any room for doubts. In the subsequent phase, an internal consistency analysis was done to measure the reliability of the instruments, culminating in .82 for the questionnaire and .88 for the grammar exam. Thus, reliability criteria were met successfully according to Kennedy's (2022) instructions.

3. Findings

3.1. Findings of the Quantitative Analysis

Grammar exams and questionnaires comprised quantitative data in terms of pre-test and post-test figures. They were analyzed using descriptive analysis principles, so statistical measurements were integrated to address the research questions with quantitative data.

3.1.1. The Analysis of the Grammar Exams

Grammar exams were created based on the official supplementary materials of OWN IT 2. More specifically, certain grammar topics were initially chosen to cover. They were designed as basic, standard and extension in terms of difficulty by the publisher. The team, consisting of ELT experts, chose relevant ones and applied them as pre-tests and post-tests. The precise descriptions are illustrated in Table 2.

Table 2.
T-test Results for Independent Groups Performed for Pre-test Scores

Group	*N*	Mean	*SD*	*df*	*t*	*p*
Experimental Group	20	54.67	13.819	28	.079	.938
Control Group	20	54.33	8.837			

Table 2 shows that a significant difference was not observed in pre-test scores in each group with a .938 p-value, higher than .05. It was also confirmed by the mean scores, which were 54.33 and 54.67, respectively.

Table 3.
T-test Results for Independent Groups Performed for Post-test Scores

Group	*N*	Mean	*SD*	*df*	*t*	*p*
Experimental Group	20	70.33	9.155	28	3.525	.002*
Control Group	20	56.67	11.902			

* $p < 0.05$

As depicted in Table 3, a substantial difference was recorded in post-test scores with a .002 p-value, less than .05. The same difference was also figured out in mean scores, which were 56.67 for the control group and 70.33 for the experimental group. In other words, control group students increased their average by 2 points, whereas it was more than 15 points in the experimental group. These results revealed that experimental group students whose curriculum was enriched with TILT outperformed control group students whose curriculum was covered in a traditional format.

3.1.2. The Analysis of the Questionnaires

The questionnaires were also designed to measure whether students' opinions differed before and in the aftermath of the study. The statistical analysis is visualized in Table 4.

Table 4.
Combination of Pre-Test and Post-Test Questionnaire Results

Item	*Pre M*	*Post M*	*Pre SD*	*Post SD*	*p*
1.Web-enhanced tools sharpen my grammatical competence	3.05	4.78	1.41	.620	.000*
2.Web-enhanced tools increase my motivation in English classes.	2.95	4.50	1.35	.877	.000*
3.Web-enhanced tools help me speak more confidently.	2.90	4.43	1.39	1.10	.000*
4.Web-enhanced tools expand my word power.	2.83	4.35	1.35	1.16	.000*
5.Web-enhanced tools affect my attitude towards learning English positively.	2.58	3.80	1.33	1.48	.000*

* $p < 0.05$

The questionnaires sought certain implications of technology-enriched instruction on students' performance in English classes. Table 4 summarizes students' opinions regarding integrating web-enhanced tools in classes in terms of the pre-treatment and post-treatment periods so that more reliable interpretations can be made while statistically analyzing the differences. To begin with, item 1 analysis reveals that grammatical competence improved, as asserted by the participants. More specifically, their mean score leapt from 3.05 to 4.78 with a .000 p-value. Those figures unearth that the treatment period to develop students' levels in grammar paid off. Subsequently, item 2 was related to the correlation between receiving instruction in a technology-enriched class and increasing motivation, indicating a positive link. For example, the mean score increased by 1.55 points with a .000 p-value, which enabled students to figure out a positive connection between boosted motivation and receiving instruction in a technology-integrated class. Furthermore, item 3 was designed to measure the effects of technology-integrated classes on students' speaking performance, showing that both were harmonious enough to boost students' performance. To illustrate, their mean score increased from 2.90 to 4.43 with a .000 p-value, so their opinions were also validated statistically. The next item was related to increasing word power through web-enhanced tools, which hints that students could have ample opportunity to expand their vocabulary knowledge. To name a few, their mean score elevated from 2.83 to 4.35 with a .000 p-value. Finally, item 5 was composed to gauge students' overall attitudes toward learning English by adopting technology-enriched instruction in English classes, which led to a positive correlation. For example, the mean score was 2.58 on the pre-test, while it

skyrocketed to 3.80 with a .000 p-value on the post-test. Considering all items in the questionnaire, it can be postulated that students noticed the positive aspects of technology-enriched instruction and appreciated the treatment period completely without leaving any room for hesitation.

3.2. Findings of the Qualitative Analysis

Semi-structured interviews were formed to reflect students' opinions on TILT. Accordingly, the following questions were directed:

1. Are you in favor of or against TILT? (before the treatment)
2. Which platform was more appealing than others to increase your grammatical competence? (after the treatment)
3. How did this study affect your attitudes towards TILT? (after the treatment)

Participants prioritized some Web 2.0 tools over others, as can be seen in Table 5.

Table 5.
Participants' Favourite Platforms

Name	Frequencies (f)	Percentage (%)
Facebook	4	27
YouTube	2	13
Websites	5	33
Google Forms	1	7
Kahoot	2	13
Prezi	1	7
Total	15	100

Once Table 5 is examined, it is observed that websites such as BBC Learning English, VOA Learning English and ESL Printables were favored more than other platforms. Websites were followed by Facebook and YouTube, respectively. It was also noticed that Google Forms and Prezi were the least popular ones among students.

3.2.1. Description of Content Analysis Through Interview

Participants' opinions were classified under certain themes to emphasize TILT's positive and negative aspects. Positive sides are illustrated in Table 6, whereas negative aspects are depicted in Table 7.

Once students' ideas in the interview were analyzed thoroughly, several themes emerged to be highlighted. Firstly, they asserted that being accessible (f=6, 15 %) is one of the most essential advantages of technology-integrated instruction. It seems that access to the websites instantly with a click urges the students to be in favour of such platforms. In the second place, various platforms with countless features were another theme that was highlighted by many students (f=5, 12.50%). It can be postulated that having the freedom to choose the activity independently among many websites increases the rate of positive feedback. Subsequently, offering grammar topics in context, images, videos or games attracted many students' attention, so they regarded web-enhanced tools as enjoyable and visually stimulating (f=7, 17.50%). Afterwards, the content of costless format f=3, 7.50%) and up-to-date (f=4, 10 %) were other themes that the students emphasized. They posited that it is

intriguing to be exempt from the payment and reach the updated content. Another crucial theme that deserves special attention is the contribution to sustainability (f=3, 7.50%). Students reiterated that online materials reduce the need for paper, positively affecting ecology. After that, the idea of being accountable was raised by many students (f=8, 20%). They pointed out that reaching the trustable content, checking the answers, and being able to communicate easily increase the accountability of such platforms, so they welcome users in increasing numbers. It can be argued that the popularity of the themes changed considerably among the participants.

Table 6.
Positive aspects of TILT

Theme	Frequencies (f)	Percentage (%)
Accessible	6	15
Varied	5	12.50
Enjoyable	7	17.50
Visually Stimulating	4	10
Cost-free	3	7.50
Up to date	4	10
Sustainable	3	7.50
Accountable	8	20
Total	30	100

However, it does not necessarily mean that all themes were positive in the interview. Some drawbacks of technology-integrated instruction were emphasized. To name a few, being exposed to many materials at the same time (f=2, 5%), being unable to balance the time spent on websites (f=1, 2.50%), having insufficient digital literacy (f=3, 7.50%), encountering technical difficulties (f=1, 2.50%)losing concentration(f=4, 10%), suffering from poor vision (f=7, 17.50%), and were expressed by the students. Apart from content analysis, notable comments of some students are given below to exemplify their genuine points of view:

Table 7.
Negative aspects of TILT

Theme	Frequencies (f)	Percentage (%)
Overwhelming	2	5
Time-consuming	1	2.5
Lack of ICT literacy	3	7.5
Technical difficulties	1	2.5
Get distracted	4	10
Eye-fatigue	7	17.50
Total	23	58

However, it does not necessarily mean that all themes were positive in the interview. Some drawbacks of technology-integrated instruction were emphasized. To name a few, being exposed to many materials at the same time (f=2, 5%), being unable to balance the time spent on websites (f=1, 2.50%), having insufficient digital literacy (f=3, 7.50%), encountering technical difficulties (f=1, 2.50%) losing concentration(f=4, 10%), suffering from poor vision (f=7, 17.50%), and were expressed by the students. Apart from content analysis,

notable comments of some students are given below to exemplify their genuine points of view:

> *I was not familiar with TILT before because all my English lessons were covered in a traditional format. When we started learning English with TILT, we noticed the difference. Our motivation, engagement, and enthusiasm rose tremendously. Accordingly, our marks rose substantially in terms of grammar. My favorite platform was Facebook because the pages we covered asked many grammar questions to sharpen my grammar. In addition, we discussed the answers in the lesson with our lecturer and classmates, so it was a great experience to learn collaboratively.* (St. 3)

> *Being a part of this study was an awesome experience for me. I was informed about various ways to learn English in an entertaining and stress-free environment. In addition, I had some friends to ask some questions on Facebook, so we expanded our knowledge correspondingly. Subsequently, presentations on the Prezi platform were catchy, so I learned grammar rules with well-designed illustrations and sample sentences given in context. In addition to Facebook and Prezi, YouTube channels were so informative in shaping our learning. I increased my knowledge of grammar after watching the videos several times. Overall, supporting our learning with different platforms was great for highlighting any platform that fits our interests and learning styles.* (St. 7)

> *English lessons were monotonous for me before this study. I like learning English on the web, so I found common ground to combine my daily life with academic endeavours in this study. Online learning materials were taken from daily life, so I applied such knowledge to my daily life. Additionally, having some alternatives to expand my English knowledge was intriguing for me. I chose a platform by weighing the pros and cons, so having a say in choosing the learning platform was an excellent advantage. After that, taking some quizzes on Google Forms was beneficial because we took the tests by racing against time, checking our results, learning from our mistakes, and analyzing each question with our lecturer and friends. As a result, I can assert that TILT should be considered in EFL settings globally for its far-fetched effects.* (St. 9)

> *I am into drama, so I learn better if topics are illustrated as if I were in a theatre. The YouTube channels in this study were designed professionally. Thus, I was so concentrated while watching them. As I watched such videos on YouTube, I noticed positive effects in my daily life and lessons because I used the information I learned in videos in my daily life and classes. In conclusion, inserting some professional role plays and choosing realistic scenes taken from daily life were real game changers in this study. I wish I had a chance to continue till graduation.* (St. 12)

> *I used to log in to Facebook to kill time before this study. However, I noticed that there was another world to expand my English knowledge through various pages. The pages whose concentration was improving our English were up-to-date and user-friendly. We scanned some presentations, read some stories on contextualized grammar, took tests, and watched videos. All activities fostered our learning dramatically. Now I have much self-confidence to express my ideas in English because my grammatical competence has developed to a great extent thanks to this inspiring study.* (St. 15)

4. Discussion

The effects of TILT on EFL learners' grammatical competence at the tertiary level were sought meticulously by employing a mixed methods research design study through grammar exams, questionnaires, and interviews. Quantitative findings documented that enriching English lessons with web-enhanced tools paid off with enhanced grammar scores. On the contrary, the control group students' progress was far from noticeable as they merely followed the coursebook's activities without switching to web-based teaching materials. The noticeable gains of the experimental group students in grammar can be ascribed to the effects of education, which welcomed relevant online materials to support their learning. In other

words, the experimental group students outperformed the control group by employing the principles of CLT with top-notch web-based websites that specialized in teaching English engagingly. This finding suggests that educators have limitless potential to unlock technology-integrated language learning and teaching methods so that learners' linguistic skills can be improved dramatically. Those findings dovetail with previous studies of Dwipa (2021) and Umirova (2020), who have stressed that using technology in classes is indispensable in this century because covering lessons in an orthodox format does not capture students' attention. In the same vein, incongruent with Yusof and Saadon's (2012) study, technology-integrated grammar education helps educators close the gap between real and academic life thanks to offering materials which reflect learners' social life. Thus, students can find more common grounds to bridge the gap between the theory and the practice.

In the second place, questionnaires shed light on significant points to be emphasized in detail, addressing the second research question. The findings of the questionnaire unleashed students in the experimental group noticed considerable improvement in grammar lessons, became more motivated to speak more confidently, expanded their word power, and positively changed their attitude towards learning English. It can be argued that TILT has far-fetching effects rather than only fostering grammatical competence. Those findings are harmonious with the studies of Küçük (2023) and Sing (2014), who have posited that combining English lessons with technological tools paves the way for making impressive strides in education because learners have the freedom to choose one tool among countless options, figure out the essential themes in context and increase their learning with videos, games, illustrations and graded quizzes in a stress-free environment. The wave of positive feedback in developing speaking skills through grammar-oriented web materials can be ascribed to the fact that both are interrelated to feed each other. In other words, learning fundamental grammar points appropriately can function well in conversations; otherwise, some pauses or miscommunication issues are inevitable. Similarly, students' assertions about vocabulary expansion in the treatment period can be the result of offering grammar topics in context, so they were exposed to a wide range of words to increase their vocabulary breadth. Rubrico (2012) and Amoroso (2005) elucidate that technology-integrated grammar instruction encourages learners to improve their multiple skills simultaneously thanks to their versatility. On the other hand, the questionnaire findings are not in line with Ramorola's (2013) study, which indicates that technology integration in English classes poses many challenges, so educators should be cautious while implementing it.

Qualitative findings also reveal crucial points through content analysis in the interviews. The freedom of accessing numerous visually stimulating, updated materials in a cost-free format at any time was found appealing to the students. They also expressed that breaking monotony with insightful activities motivated them to satisfy their hunger for novel information, so this cycle urged them to promote their learning in all skills and grammar. Those findings are consistent with Zhao and Lai's (2023) study, which shows that technology-enhanced education has many benefits both for the learners and educators because there is a bitter rivalry to welcome the highest number of users, thereby increasing the quality of materials by taking all reasonable measures. The interview findings also revealed some drawbacks of TILT: overwhelming, time-consuming, posing difficulties with ICT literacy, losing concentration, and suffering from poor eyesight. Those findings are in line with Yucedal's (2022) study, which hinted that there are some obstacles to technology-enhanced English classes, so logical measures should be taken to eliminate them. Similarly, Lee et al. (2022) pointed out that distraction and low vision are two reflections of technology-integrated

instruction in EFL classes, which can be tackled by reducing the duration and frequency. As findings demonstrated, technology-enhanced classes can be fruitful in many aspects unless the duration and the frequency are not exaggerated.

A further discussion of the findings can be dedicated to employing the CLT approach while indulging in grammar exercises on websites. Presentations, stories, illustrations, role-play activities, and well-established quizzes sparked students' curiosity to learn collaboratively. In other words, students got assistance from each other while discussing, analyzing, and playing educative games. In this respect, Yucedal and Kara (2023) underlined that teaching English in collaboration with online tools is crucial to keeping students' enthusiasm active because they are likely to engage all students in activities via numerous formats. Additionally, organizing the lessons in a debate mode to analyze some common mistakes in quizzes and learn from them increased students' self-confidence because they defended their ideas civilized and updated their knowledge when their friends persuaded them with convincing ideas. This finding dovetails with Iman's (2017) study, which indicated that well-established debates are essential to improve students' fluency, thanks to being exposed to constructive conversations. It can be claimed that this positive cycle of exchanging ideas helped students make impressive strides in their language learning journey.

5. Conclusion

This research purported to explore the unfulfilled potential of technology-integrated language teaching methods on EFL students' grammatical competence at the tertiary level in Iraq. Correspondingly, quantitative data evidenced that TILT boosted experimental group students' performance considerably, whereas control group students' progress was not noticeable enough. Apart from exam scores, questionnaire findings documented that having received the instruction through web-enhanced tools, students' speaking performance, motivation, and vocabulary breadth improved substantially. Apart from quantitative findings, complementary qualitative findings showed that students were satisfied with the technology-enhanced grammar instruction because they observed positive effects on their academic and social lives. Cross-checking all data as a part of the explanatory research design also revealed that they were compatible with each other, confirming that the technology-integrated language teaching method increased students' grammar performance and changed their overall attitude towards learning English in a stress-free atmosphere.

Based on the findings of the study, some pedagogical implications are illustrated. Firstly, stakeholders in education should pay utmost attention to designing English classes with relevant technological tools and upgrading the systems to increase effectiveness. In addition, English teachers should be trained, monitored, and offered constructive feedback with easily understandable reports on the appropriate integration of technology into classes. Besides, authorized bodies should encourage the teachers to take further courses to sharpen their computer literacy skills and apply them in English classes successfully. Furthermore, English teachers should give online learning tools a chance to notice their limitless potential in classes or assignments. Thus, reaping the fruits of technology in English classes can be ensured, increasing the satisfaction rate of the students, teachers, administrators, parents, and policymakers.

Concerning the limitations of the study, a wide range of recommendations can be made for future studies in this regard. Firstly, this study reflected the effects of TILT on grammatical competence, which can be extended to other skills. Additionally, only 40 students were chosen as the participants, which can be increased with a high volume of students.

Subsequently, only students in the language preparatory school of a private university in Iraq were included, and they can encompass other stages such as sophomore, junior, or senior ones. Finally, other students studying at a private or public university can be integrated into the study to reflect the students' tendencies in the same region and come to more reliable interpretations.

Note on Ethical Issues

The authors confirm that ethical approval was obtained from Tishk International University (Approval Date: 08/09/2023).

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