




[www.ijemst.net](http://www.ijemst.net)

## The Effect of ChatGPT-Integrated English Teaching on High School EFL Learners' Writing Skills and Vocabulary Development

**Melek Sapan**   
Ministry of National Education & Bursa Uludag University,  
Türkiye

**Levent Uzun**   
Bursa Uludag University, Türkiye

### To cite this article:

Sapan, M. & Uzun, L. (2024). The effect of ChatGPT-integrated English teaching on high school EFL learners' writing skills and vocabulary development. *International Journal of Education in Mathematics, Science, and Technology (IJEMST)*, 12(6), 1657-1677. <https://doi.org/10.46328/ijemst.4655>

The International Journal of Education in Mathematics, Science, and Technology (IJEMST) is a peer-reviewed scholarly online journal. This article may be used for research, teaching, and private study purposes. Authors alone are responsible for the contents of their articles. The journal owns the copyright of the articles. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of the research material. All authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations regarding the submitted work.



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

## The Effect of ChatGPT-Integrated English Teaching on High School EFL Learners' Writing Skills and Vocabulary Development

Melek Sapan, Levent Uzun

---

### Article Info

#### Article History

Received:

10 August 2024

Accepted:

29 November 2024

---

#### Keywords

ChatGPT-integrated instruction

Student perception

Vocabulary development

Writing skill development

English teaching and

learning

---

### Abstract

Artificial intelligence (AI) has gained importance and popularity in education recently. As an AI-based chatbot, ChatGPT has attracted the attention of educators and researchers from different fields, as well. The present study aims to explore the effect of ChatGPT-integrated English lessons on the 10th grade Turkish EFL learners' writing skill and vocabulary development. Additionally, it attempts to gather the perceptions of the participant students about ChatGPT-integrated language teaching. This research is a mixed-method study which combines both quantitative and qualitative data. 66 students who study at two different classes participated in the study by taking place in experimental phase and completing pre-and post-tests. 7 students took place in semi-structured interview at the end of the implementation. Throughout the implementation, the experimental group took ChatGPT-integrated vocabulary and writing instruction whereas the control group took traditional instruction which lasted for 5 weeks. Quantitative data were calculated statistically by using SPSS 29 and qualitative data were investigated by conducting thematic analysis via MaxQDA24. The results of pre- and post-tests showed that the traditional instruction had more effect on writing and vocabulary development of the participant students. The findings gained from semi-structured interviews revealed that students consider mostly positively ChatGPT and they reflected some concerns about academic integrity and ethics and laziness in learning. There are some pedagogical implications recommended for teachers, students and researchers at the end of the study.

---

### Introduction

The increase of artificial intelligence (AI) usage has affected our lifestyle recently by changing and shaping it differently (Gocen & Aydemir, 2021). As the interaction between AI and humans is like real-life, it has started to be used instead of humans in most areas (Kwon, Shin & Lee, 2023). Artificial intelligence, as a branch of computer science, is used for human intelligence-related cognitive problem solutions like learning, solution of the problems and recognizing conditions as well as for fun activities by humans. AI makes technological tools think like humans and function like a human (Rukiati, et al., 2023; Fitria, 2021). The main purpose of AI is to work like a human

with a high level of accuracy and impact. That's why, it is applied in many areas like speech recognition, processing images, cars working without humans, and translation (Bartneck et. al., 2021).

Upon experiencing the reality of COVID-19, the inclusion of Artificial Intelligence (AI) in educational methods has arisen as a game-changing influence, presenting new prospects and hurdles for the future of English Language Teaching (ELT) (Ng, et al., 2023). These changes have occurred not only in distance education but also in teaching strategies in terms of the usage of technology efficiently (Abrenilla, et al., 2023). In this vein, for three years the number of the research conducted about AI usage in ELT has risen (Ali, et al., 2023). On the other hand, considering the benefits of technology in ELT, it gives learners the opportunity to learn a foreign language in a more real-life manner by using more original materials, to develop four language skills, to keep traces of their own learning and to gain autonomy and motivation during their learning process (Xiao & Zhi, 2023). The innovations in technology have also enabled language learners to practice the target language outside the class and socialize with the target community. Especially after 2020's, AI technologies have started to dominate ELT by adopting a number of language models (Liu & Ma, 2023). Utilizing AI in the realm of English Language Teaching (ELT) involves employing AI technology for English learning purposes, encompassing virtual instructors, language-based gaming, chat-bot interactions, and tailored learning modules (Rukiati, et al., 2023).

AI-based chatbots have gained the attention of the researchers in ELT since they interact with the learners in the target language like in real life. Another feature of these chatbots is their favorable effect on AI techniques like machine learning, natural language processing and deep learning. These AI-based chatbots answer the users' statements by depending on their human language database (Jiang et al., 2022). So, they could engage in smart conversations, consistently gather insights from past interactions, evolve gradually, and function as dedicated aids in language learning (Fryer, et al., 2019). The examples of the famous chatbots are ChatGPT-3.5, ChatGPT-4.0 and Bing Chat from OpenAI, PaLM2 from Google (Liu & Ma, 2023) and Google Bard (Nield, 2023).

As one of the most developed AI-based chatbots, ChatGPT (generative, pre-trained transformer) was created by OpenAI (Microsoft-supported company) and it became available in November 2022. As its definition, ChatGPT is explained as a sort of GenAI and AI chatbot and it gets involved in interactions like humans (Chiu, et al., 2023). In regard to the usage of ChatGPT in educational process, it is stated that this AI chatbot enables students to write essays and find solutions to the math problems. By using ChatGPT, learners can improve their learning skills and reach information in a faster manner. Besides, this chatbot has teachers gain different point of view about any topic and do their administrative work easier (Chiu, et al., 2023). ChatGPT is also thought to be draw freshly minted and captivating ways for language acquisition by providing real-life conversations (Al-Obaydi, Pikhart & Klimova, 2023; Kohnke, Moorhouse & Zou, 2023). There are many ways to use ChatGPT during language learning process. Learners can have real-life conversations, ask for the definition of any word and sample sentences, fix mistakes in language, write different types of texts and translate any sentence through the usage of ChatGPT (Kohnke, Moorhouse & Zou, 2023). Therefore, there are many ways to implement ChatGPT and other AI tools in language-learning and more and more different ways to utilize them are still coming forth (Li, Bonk & Kou, 2023).

ChatGPT can be integrated into language learning in different ways with the purpose of personalizing learning, doing administrative works easier and aiding for the teaching process (Zhai, 2022). ChatGPT-integrated teaching means replacing ChatGPT in the center of teaching process instead of teachers. Students deal with the learning materials via ChatGPT individually in classroom while the teacher just monitors them. The rationale behind this instruction is that ChatGPT is believed to present different ways from traditional assignments and assessments (Stokel- Walker, 2022) by providing personalized, interactive and adaptive teaching depending on the performance of the learners, needs and interests and also give customized feedback (Elbanna & Armstrong, 2023).

The literature reveals that there are few studies (Al-Obaydi, et al., 2023; Chiu, 2023; Liu & Ma, 2023; Xiao and Zhi, 2023) regarding the skill development and perceptions of the students on ChatGPT usage in language learning process. The existing literature proves that the effect of ChatGPT has not been explored completely and there is a need to conduct experimental research to demonstrate the influence of ChatGPT by comparing learners who use and do not use ChatGPT (Baskara & Mukarto, 2023). Moreover, despite the increasing interest for technological tools in language education such as ChatGPT, it is expressed that there is still a gap in the literature considering the influence of these tools from the students' perspectives. Whereas the past research explored the advantages of AI-based chatbots, more research should be conducted to acquire a deeper understanding of students' perceptions by taking their requirements and difficulties in using ChatGPT (Jeon, 2021).

The current study aims to fill in the gap in this field by being experimental research testing the impact of ChatGPT on skill development in English language learning and gaining students' perspectives about the effectiveness of the tool. Clearly, this study intends to investigate the effect of ChatGPT-integrated English lessons on writing skill and vocabulary development of 10th grade EFL learners and it also intends to explore the perceptions of these students about the usage of ChatGPT in English lessons. The research questions of the study are as follows:

1. What is the effect of ChatGPT-integrated English teaching on writing skill of 10th grade EFL learners studying at an Anatolian high school in Turkiye?
2. What is the effect of ChatGPT-integrated English teaching on vocabulary development of 10th grade EFL learners studying at an Anatolian high school in Turkiye?
3. What are the perceptions of 10th grade EFL learners about ChatGPT-integrated English lessons who study at an Anatolian high school in Turkiye?

## **Literature Review**

### **ChatGPT in Language Learning**

In recent times, AI has started to gain much more interest. According to the 17th Annual Survey published on 4 September, 2023, in total 2.022 votes were given and ChatGPT has dived right into the chart by taking number four place and 2023 is defined as the year that artificial intelligence has finally gained momentum (Top 100 tools for learning, 2023). In spite of being a new tool, the number of ChatGPT studies in English teaching related to its use has increased recently (Hong, 2023; Kohnke et. al., 2023; Li, Bonk & Kou, 2023). Baskara and Mukarto (2023), for instance, investigated the possible applications of ChatGPT in English language lessons for higher education. By using a multidisciplinary approach, the researchers defined limitations, challenges, implications

and benefits of ChatGPT in language education. The study stated that there are many opportunities to apply ChatGPT in class and to see its influence on foreign language development of the students in especially higher institutions. The researchers claimed that ChatGPT could present a chance for teachers to implement personalized education in their classrooms and create more original materials for their students. Another study by Kostka and Toncelli (2023) investigated the place of ChatGPT in English language education. The researchers used ChatGPT as a discussion topic in their classroom for two lesson hours to get their students' perceptions about the possible use and policy of the tool. As a result, it was found that the level of engagement and peer interaction among students accelerated and they showed favorable attitude towards ChatGPT. In a similar vein, a study (Hong, 2023) evaluated ChatGPT with its functions and misconceptions and it was recommended that teachers and education institutions should use and evaluate ChatGPT by using the opportunities it gives. Another research about the usage of ChatGPT (Li, Bonk & Kou, 2023) aimed to find out the understanding of educational opportunities or possibilities for incorporating ChatGPT into language teaching. The result of the study showed that educational opportunities change according to task and language, ChatGPT is an important tool for teaching a language and it cannot be used instead of teacher or replace them. Differently, Kohnke et. al. (2023) made a technology review for ChatGPT in order to show the opportunities for language education. The researchers explained that there some affordances and benefits of ChatGPT for language education such as having real-life conversations with the tool, using it as a dictionary or mistake correction and generating authentic materials. Teachers also use the tool for differentiate their instruction by generating different kind and level of materials for the students. The study put forward that there are some skeptical opinions such as ethical issues for the usage of the tool, false answers of the tool and cultural bias. Also, the digital competencies that both teachers and student need to own to use the tool efficiently were mentioned in the study. Interestingly, the research conducted by Topsakal and Topsakal (2022) attempted to show the capabilities of ChatGPT by combining it with Augmented Reality (AR) and Voicebots to create a software so that young learners can learn a foreign language in an enjoyable way. As a result, the researchers made up a software framework by hoping that framework will be used by the educators.

From the writing aspect, Fitria (2023) tried to explore how ChatGPT writes English essays. As a descriptive qualitative study, the researcher benefited from documents and observation. As a result, the researcher determined the steps for writing an essay via ChatGPT and reflected that the users can benefit from this chatbot for doing their tasks or finding information much more quickly. Another study by Uzun (2023) approaches ChatGPT as one of large language models from philosophical aspect by considering concerns and recommendations. The researcher mentions the concerns such as academic integrity and plagiarism in his article and claims that it can be useful to integrate ChatGPT in our teaching as a writing tool for students so that they can enhance their writing skill and improve their critical thinking ability.

### **ChatGPT and Motivation/ Autonomy**

Some studies investigated the effect of ChatGPT on students' motivation or autonomy like the one carried out by Ali, et al. (2023). In this study, the researchers intended to find out the impact of ChatGPT on the English language learning process of the students and implemented a questionnaire on 80 participant students and teachers as a quantitative study. It was found that ChatGPT increased the level of motivation of the students especially for the

improvement of reading and writing skills. Similarly, Yıldız (2023) used ChatGPT to generate dialogs, integrated them into language materials to utilize at the end of the lessons and defined the level of students' motivation. As a quasi-experimental study, the researcher applied a questionnaire in a university class as a pre- and post-test and the results demonstrated that ChatGPT has a positive effect on the motivational level of the students. In addition, Agustini (2023) aimed to investigate the effect of ChatGPT on students' autonomy. As a mixed-method study, the researcher benefited from both quantitative and qualitative instruments which were questionnaires and semi-structured interviews. The results of the study revealed that ChatGPT has the potential to accelerate the level of autonomy in college understudies since it supports self-work of the students such as self-reflection, self-assessment, self-practice and immediate feedback.

### **Student Perceptions about ChatGPT**

Several studies dealt with the perceptions of students about ChatGPT in education. A perceptual study by Al-Obaydi, et al. (2023) investigated the perceptions of the student about ChatGPT after doing writing tasks by using it. As qualitative study, the interviews were used for gathering the perceptions of the participant university students. The researcher concluded that ChatGPT should be used for longer period of time to see its positive effect and it should be utilized with other learning strategies. In a different way, Liu and Ma (2023) explored the perceptions of EFL students on ChatGPT as out-class usage by being based on technology acceptance model. As quantitative research, the researchers applied TAM questionnaire on 405 EFL learners and found that students having favorable attitudes toward ChatGPT reveal high level of behavioral intention. This means positive and strong usage of ChatGPT by the students as an out-class tool. As the final perceptual study, Xiao and Zhi (2023) conducted qualitative research to get a deep insight into students' experiences and perceptions on ChatGPT in language education. Five university students in China participated in semi-structured interviews and their answers showed that ChatGPT is an important learning assistance for them and they are skeptical about the ideas put forward by ChatGPT. The researchers stated that ChatGPT is an important tool for giving faster feedback to students and providing personalized learning.

As the mentioned literature shows, there is a gap about ChatGPT in terms of experimental studies considering the development of the language skills and especially students' perceptions and experiences. That's why, the current study aimed to explore the impact of ChatGPT as a novel GenAI tool on students' writing and vocabulary development and their perceptions on the tool. In this way, this research has a purpose of filling in this gap in the literature.

### **Method**

The current research adopted mixed method approach which is an inquiry to including both quantitative and qualitative data in the same research. The reason for using this approach is the assumption that the utilization of these two approaches at the same time makes the research problem more understandable in comparison with using only one of these approaches in research (Creswell, 2014). In terms of its worldview, the study supports the pragmatic worldview in which understanding the research problem is prioritized over specific methodologies and

all available approaches are used to gain insight into it (Creswell, 2012). Being a quasi-experimental design, the study aimed to explore the impact of ChatGPT integrated English lessons on high school Turkish EFL learners' writing skill and vocabulary development and investigate their perceptions about it by implementing ChatGPT for 6 lesson hours as in-class activity.

### **Participants**

The researcher utilized cluster random sampling to choose participants. This kind of sampling means the group, cluster or subject selection rather than individuals (Fraenkel & Wallen, 2000, p. 109). Two intact 10th grade classes at an Anatolian high school in Bahcelievler, Istanbul participated in the study as the control (CG) and experimental group (EG). Both in control (F=18, M=15) and experimental groups (F=20, M=13), there were 33 participant students aged between 14-16 in each group. In total, 66 students took place in the research as the participants. The reason for choosing 10th graders is that paragraph writing in English lesson curriculum of Turkiye begins at 10th grade. Before and after the implementation, two paper-based pre-achievement tests and a post-achievement test were taken by the participants. In addition, seven students from the experimental group reflected their perceptions about their ChatGPT experience as a writing skill and vocabulary development assistance tool in their English lesson via a semi-structured interview conducted by the researcher. Before the implementation process began, the consent was taken from the parents of the participants.

### **Instruments**

Two data collection instruments were used in the study: pre- and post-achievement exams as the quantitative data collection instrument and a semi-structured interview as the qualitative data collection instrument. These two instruments were implemented in order to strengthen the reliability of the results by providing triangulation. Before the implementation, so as to determine the level of the students, two pre-achievement exams (see Appendix A) were applied. Both exams included a vocabulary part out of 50 points which had two parts with 20 words taken from Theme 2 'Plans' and Theme 3 'Legendary Figure' from their coursebook and a writing part consisting of two paragraph writing activity in parallel with their coursebook again out of 50 points. The average point taken from two pre-tests was calculated for each student and written as their pre-test score. Post-achievement exam (see Appendix B) included repeatedly a vocabulary part whose words were taken from Theme 4 'Traditions' and Theme 5 'Travel' in the coursebook. The achievement exams were also prepared by the researcher through ChatGpt. Besides, a paragraph assessment scale was used (see Appendix C) for scoring the writing part of the achievement exams. To test the validity and reliability of the achievement exam questions and the scale, the researcher, her two English language teacher colleagues working at the same school and an expert (academician) from ELT department of a Turkish University analyzed them and agreed upon the validity and reliability of the instruments.

The content of semi-structured interview was adapted from Xiao and Zhi (2023) and applied at the end of the implementation in a separate room at school (See Appendix D). The interviews were audio-recorded after getting the consent of the participants. The researcher conducted the interview in Turkish (The participants' mother

tongue) so that the participants can express themselves freely. The researcher turned the interviews into written form by utilizing the ‘Transkriptor’ application and analyzed the data thematically by utilizing MaxQDA24.

**Procedure**

The current study constituted three phases: pre-implementation, implementation and post-implementation. In the pre-implementation phase, the researcher carried out two pre-achievement exams in both control and experimental group in separate sessions on different days to define their level of achievement in terms of writing and vocabulary development in English. In another session, the researcher made a presentation to the experimental group about what ChatGPT is, how to use ChatGPT and how to enter prompts while doing vocabulary exercises and writing paragraphs in English. Before the implementation, the researcher also conducted a pilot study with experimental group to let them use ChatGPT so as not to waste their time in implementation phase. The pilot study revealed that the participants had some difficulties in writing appropriate prompts, so the researcher solved the problem by instructing them for writing perfect and detailed prompts. In implementation phase, the researcher enabled the participants of the experimental group to use ChatGPT in vocabulary (fill-in-the-blanks, definition matching, synonym/antonym matching) and writing exercises (paragraph writing by using the taught vocabulary) during 6 sessions each of which was 40-minute lesson hour while she taught the same vocabulary and writing in traditional classroom instruction to the control group. Lastly, post-achievement exam for both control and experimental group and semi-structured interviews for the experimental group were applied in the post-implementation phase of the study. The following table demonstrates the overall process of the whole study:

Table 1. The Process of the Whole Study

Phases	Week	Sessions	The Experimental Group	The Control Group
Pre-implementation	Week 1	Session 1	- Pre-achievement exam was taken.	- Pre-achievement exam was taken.
		Session 2	- Pre-achievement-2 exam was taken.	- Pre-achievement-2 exam was taken.
		Session 3	- The researcher made a presentation about ChatGpt and informed the students about the study and did pilot study. - The official procedures for the research started.	- They were informed about the research.
Implementation	Week 2	Session 4	- Vocabulary activities for Theme 4 with ChapGpt assistance.	- Vocabulary activities for Theme 4 in traditional classroom instruction.
		Session 5	- Writing activity via ChatGpt.	- Writing activity in traditional classroom



Phases	Week	Sessions	The Experimental Group	The Control Group
				instruction.
	Week 3	Session 6	- Vocabulary activities for Theme 5 with ChatGpt assistance.	- Vocabulary activities for Theme 5 in traditional classroom instruction.
		Session 7	- Writing activity via ChatGpt.	- Writing activity in traditional classroom instruction.
	Week 4	Session 8	- Overall Vocabulary activities covering both Theme 4 and 5 with ChatGpt assistance.	Overall Vocabulary activities covering both Theme 4 and 5 in traditional classroom instruction.
		Session 9	- Overall writing activity via ChatGpt.	- Overall writing activity in traditional classroom instruction.
Post-implementation	Week 5	Session 10	- Post-achievement exam was taken.	- Post-achievement exam was taken.
		Session 11	- Semi-structured interview was carried out.	-

Consequently, with the help of this plan, it was aimed to collect more detailed, concrete, highly reliable and valid data from the participant students.

### Data Analysis

The current study benefited from the IBM Statistical Package for the Social Sciences (SPSS) 29 for the statistical calculations. The researcher carried out the descriptive statistical analyses for Mean (M), Median (Mdn), Standard Deviation (SD), Minimum (Min), Maximum (Max), Significance (Sig.) values and used non-parametric tests to find out intra-group and inter-group differences while analyzing pre- and post-achievement exam results as the skewness and kurtosis values were between -1.0 and 1.0 and the data did not provide normality distribution. Moreover, the data gained from the semi-structured interviews was investigated thematically. The analysis was conducted by the two researchers. After the first researcher investigated the qualitative data thematically, the second researcher delved deeply into the data and they reached the final form.

### Results

#### The Effect of ChatGPT-integrated English Lessons on Student Writing Skill

The research question 1 attempted to find out whether the ChatGPT-integrated English lessons had an impact on

writing skill development of the 10th grade Turkish EFL learners. First of all, descriptive measurement for in-group pre-writing and post-writing scores was demonstrated in table 2:

Table 2. Descriptive Statistics for pre- and post-writing tests of EG and C

Group	Achievement Test	N	M	Mdn	SD	Min	Max
EG	Pre-writing	33	7.39	6.00	7.67	0	33
CG	Pre- writing	33	6.78	3.00	9.01	0	37
EG	Post- writing	33	11.96	8.00	13.39	0	47
CG	Post- writing	33	13.66	12.00	10.86	0	48

As demonstrated in Table 2, the post-writing test score of EG increased by 47 from 33 whereas the CG increased by 48 from 37. On the other hand, the post-test mean score of the CG raised more (CG = 13.66, EG = 11.96) whereas the mean score of the two groups were close to each other (CG = 6.78, EG = 7.39). The maximum score for post writing test of the CG increased by 48 from 37 and for post writing test of the EG increased by 47 from 33 while the minimum score of both groups remained 0.

Secondly, in order to show the intra-group differences, Wilcoxon Signed Ranked test was implemented as a non-parametric statistical calculation. Table 3 shows the results gained from Wilcoxon Signed Ranked test for intra-group writing skill development of both CG and EG.

Table 3. Wilcoxon Signed Ranked Results of EG and CG

Group	Achievement Test	Negative Ranks	Positive Ranks	Ties	Z	Asymp, Sig, (2-tailed)
EG	Pre-writing			5 <sup>c</sup>		
	Post-writing	14 <sup>a</sup>	14 <sup>b</sup>		-1.630	.103
CG	Pre- writing			5 <sup>c</sup>		
	Post-writing	4 <sup>a</sup>	24 <sup>b</sup>		-3.969	.001

a. *Post < Pre*

b. *Post > Pre*

c. *Post = Pre*

Wilcoxon Signed results of both groups were revealed in Table 3. In the table, the negative ranks means the participants whose pre-test scores are higher than post-test results and the positive ranks show the participants whose pre-test results are lower than their post-test results. As the Table 3 shows, in EG, both the number of the participants whose pre-test scores are higher than post-test results and whose post-test scores are higher than pre-test scores is 14. In CG, the number of participants whose post-writing scores are higher than pre-writing scores is 24 whereas 4 participants' post-writing results are lower than their pre-writing scores. In each group, the pre- and post-tests of 5 students remained the same.

As explained in Table 3, the pre- and post-writing results of EG are not statistically different ( $z=-1.630$ ,  $p=.103>.05$ ) while there is statistically difference between pre- and post-writing test scores of CG ( $z=-3.969$ ,  $p=.001<.05$ ).

To compare groups, as a non-parametric two independent sampled test, the Mann-Whitney U Test was used. Table 4 summarizes the outcome gained from this statistical calculation:

Table 4. Mann-Whitney U results for Comparison of EG and CG

Test	Group	N	Mean Rank	Sum of Ranks	U	Z	p.
Pre-writing	EG	33	35.32	1165.50	484.500	-.776	.438
	CG	33	31.68	1045.50			
Post-writing	EG	33	30.45	1005.00	444.000	-1.295	.195
	CG	33	36.55	1206.00			

As Mann-Whitney U test results showed, for the pre-writing scores, the mean rank of EG is higher than in the CG. However, when the p value is considered ( $p= 0.438 > 0.05$ ), it is seen that there is not statistically difference between EG and CG for pre-writing results. Moreover, in terms of the post-writing scores, the mean rank of CG is higher than in the EG. But the Mann-Whitney U calculation does not reveal any statistically significant difference between two groups as the p value proves ( $p=0.195 > 0.05$ ). These results show that both groups' scores increased but the increase in the control group is higher which means that traditional instruction has more influence on writing skill development.

### The Effect of ChatGPT-integrated English Lessons on Student Vocabulary Development

The second question of the current study intended to find out if there was an effect of ChatGPT-based English teaching on vocabulary development of the 10th grade Turkish EFL learners. To begin with, the descriptive statistics of intra-group vocabulary scores were revealed in Table 5.

Table 5. Descriptive Statistics for pre- and post-vocabulary tests of EG and CG

Group	Achievement Test	N	M	Mdn	SD	Min	Max
EG	Pre-vocabulary	33	17.66	15.00	8.56	5.00	46.00
CG	Pre- vocabulary	33	14.33	14.00	7.13	3.00	34.00
EG	Post- vocabulary	33	21.24	15.00	13.25	3.00	50.00
CG	Post- vocabulary	33	21.57	20.00	10.85	3.00	40.00

Table 5 clarifies that the mean score of pre-vocabulary test in EG increased by 21.24 from 17.66 whereas it increased by 21.57 from 14.33. This result shows that the increase in CG is higher than in EG. When the minimum scores are taken into consideration, there is a decrease in EC from 5.00 to 3.00 while the same type of score remains the same in CG as 3.00. Besides, there is an increase in both EG (Pre-test=46.00, post-test= 50.00) and CG (Pre-test= 34.00, post-test=40.00) for maximum scores.

To explain the in-group differences in terms of vocabulary development, Table 6 reveals Wilcoxon Signed Ranked results.

Table 6 . Wilcoxon Signed Ranked Results of EG and CG

Group	Achievement Test	Negative Ranks	Positive Ranks	Ties	Z	Asymp, Sig, (2-tailed)
EG	Pre-test	10 <sup>a</sup>	18 <sup>b</sup>	5 <sup>c</sup>	-1.744	.081
	Post-test					
CG	Pre- test	4 <sup>a</sup>	25 <sup>b</sup>	4 <sup>c</sup>	-3.775	.001
	Post-test					

a. *Post < Pre*

b. *Post > Pre*

c. *Post = Pre*

The gained results show that the number of the students in EG whose post-test score is lower than their pre-test is 10 whereas this number is 4 in CG. Those whose pre- and post-test scores are the same are 5 students in EG and 4 students in CG. In addition, it is observed that there is not statistical difference between pre- and post-vocabulary test of EG ( $z=-1.744, p=.081 > .05$ ). But the results of pre- and post-test of CG show statistical difference between each other ( $z=-3.775, p=.001 < .05$ ). Moreover, so as to investigate the inter-group difference in terms of vocabulary development, Table 7 condenses the Mann-Whitney U results for CG and EG.

Table 7. Mann-Whitney U results for Comparison of EG and CG

Test	Group	N	Mean Rank	Sum of Ranks	U	Z	p.
Pre- vocabulary	EG	33	37.27	1230.00	420.000	-1.600	.110
	CG	33	29.73	981.00			
Post- vocabulary	EG	33	32.68	1078.50	517.500	-.349	.727
	CG	33	34.32	1132.50			

The table above states that in pre-vocabulary test, the mean rank of EG is higher than in CG. Additionally, there is not any significantly statistical difference as the p value reveals ( $p= 0.110 > 0.05$ ). On the other hand, the mean rank of CG in post-vocabulary test is higher than in EG and repeatedly there is not any statistical difference between two scores ( $p= 0.727 > 0.05$ ). As a conclusion, it can be figured out that the traditional instruction affected vocabulary knowledge improvement of the participant students much more than the ChatGPT-integrated instruction.

### **Student Perceptions about ChatGPT-integrated English Lessons**

Along with quantitative analysis, qualitative analysis was conducted via semi-structured interviews with 7 participant students. By implementing thematic analysis via MaxQda24, three themes were extracted with the

guidance of another study's thematic map (Yan, 2023) from students' interviews about their perceptions on the ChatGPT-integrated English lessons as "the powerful side of ChatGPT", "potential obstacles of ChatGPT" and "correct usage of ChatGPT". Besides, 8 sub-themes were extracted from main themes. Initially, the first theme constitutes perceptions of the students related to the powerful aspects of ChatGPT. This main theme consists of two sub-themes which are individualized learning and learning assistant and reliability and truthfulness. Their related perceptions are demonstrated below.

### **Individualized Learning and Learning Assistant**

Five out of seven students reflected that ChatGPT helped them a lot to study on their own and provided great assistance while doing their homework as the student 1 and 3 stated below.

*S1. Actually, it's not so much about having my assignments done for me, but by providing examples that elevate to a level of ten, I learned and improved my vocabulary and grammar by deriving my own conclusions from those examples, and it has greatly contributed to my understanding.*

*S3. For instance, I used to struggle with preparing for speaking exams. Because, you know, while pronouncing, I could use incorrect words. But after the practice, when we were questioned in the application, it could explain to us more clearly and concisely how to prepare.*

As the participant students uttered, ChatGPT was a personal tutor for them by showing examples about any topic, preparing them for their in-class activities, correcting their language-related mistakes and supplying guidance to them for their understanding.

On the other hand, three participant students stated that ChatGPT exemplified any topic that they wanted in a detailed way that they could understand the issue well.

*S1. I had him write a paragraph in English. Afterwards, I crafted a paragraph of my own based on that paragraph.*

*S2. For instance, when I asked him to provide me with a sample English paragraph related to a given word, he would show me excellent examples. This was the most influential aspect.*

*S3. In essence, to help me understand, he provided more example paragraphs and taught me how to write.*

The extracts show that the students were pleased about the samples that ChatGPT supplied because they said that its samples guided them to write the expected paragraphs perfectly.

On the other hand, four out of seven students declared that ChatGPT was very efficient for giving faster corrective feedback when they asked whether they had any mistake or not. Besides, especially student 1 added that ChatGPT was faster for correcting their mistakes than a teacher since just one teacher could have difficulty in replying to the questions of all students in a class at the same time. Some of the related sentences are:

*S1. In a regular English class, since there is usually only one teacher, they may not be able to reach everyone or there may be lingering questions in our minds. I can ask any kind of question I want, or if*

*there's a thought on my mind, or if, for example, I think there's a grammar mistake, I can raise it, and he helps me.*

*S4. After writing, he corrects it for me, and what he corrected still stays in my mind.*

*S5. It was good that when we asked a question, it was right there to give us clear answers.*

Furthermore, six students agreed on the idea that ChatGPT helped them improve their English language skills as revealed below:

*S1. It was very helpful in reading for me because I had vocabulary but struggled a lot with pronunciation, and thanks to ChatGPT, my pronunciations gradually began to improve.*

*S2. I believe it definitely supports writing. Because, in terms of grammar, memorization, and word meanings, it provides us with a lot of support.*

*S3. For example, I used to struggle with paragraph writing, but thanks to ChatGPT, it has become easier. It has been more effective in terms of writing.*

*S4. I think it would be very effective in terms of writing skills.*

*S5. I believe it contributes more to writing.*

Especially, four students claimed that ChatGPT improved their writing skill impressively. Also, it was added that the tool was very useful for learning vocabulary and grammar. Interestingly, all the participants stated that their vocabulary improved via ChatGPT.

*S1. I believe it provides better answers when I ask for word examples.*

*S2. It has positively influenced me because I think I have learned more word meanings.*

*S4. I think it's very good at teaching words because it can provide examples related to the word, and those examples stay in my mind.*

*S6. I got to know the words of the units we covered better. I got to know them better than the quizzes we took from the vocabulary we entered.*

Another important point that four participants put emphasis was that ChatGPT enabled them work more independently in comparison with their regular English lessons.

*S1. It helps me with independent study.*

*S3. Generally, we were working, but this way, I can work more independently.*

*S4. I think he understands the subject better independently of the teacher.*

*S5. I worked independently.*

As the statements reveal, the participants think that they were more autonomous while using ChatGPT in their English lesson since they worked much more independently and actively.

### **Reliability and Truthfulness**

The second sub-theme of the main theme “the powerful aspects of ChatGPT” is reliability and truthfulness. Six students said the sentences below in their semi-structured interviews.

*S1. I had another doubt on this matter, but I also researched it from different sources. I noticed that ChatGPT provides a correct answer from reliable sources.*

*S2. ChatGPT doesn't rely on information from just one source. It gathers information from various sources, allowing us to have a broad knowledge. I believe it's accurate because it doesn't present information directly from one source; instead, it compiles and evaluates information from multiple sources.*

*S5. I tend to believe that ChatGPT's translation, for example, is more accurate. It compiles information from different sources, which is beneficial.*

As a result of the analysis, it could be figured out that the participants found ChatGPT reliable because they think that the tool collects the data from various sources by comparing which is an action that takes longer time to do for a student. On the other hand, as a second main theme “potential obstacles of ChatGPT” includes sub-themes as ethical issues, causing laziness and teachers’ perspective. The sub-themes were presented below with their extracts:

### **Ethical Issues**

Four students mentioned some ethical concerns that they see while using ChatGPT as revealed below:

*S4. ChatGPT does not give us a bibliography, for example, we have to specify where that information is obtained or its sources when we prepare a project. Maybe it would be better if he told us from which source that information was taken.*

*S2. It can affect both good and bad. This is an ethical thing because people who don't know how to use it when they directly copy and paste are the ones who use it incorrectly. This goes directly into information theft. In other words, it's copy-pasting like stealing, that's why it has bad effects. I saw that some of my friends didn't really bother, they just copied and pasted.*

The participants claimed that the users could copy and paste whatever ChatGPT writes like their own writings. Along with this concern, they said that ChatGPT did not give names of any sources to them when they searched something through it. They believe that the tool should give the sources of anything that it writes because they use it for their assignments. These two issues are the ethical concerns that the students have.

### **Causing Laziness**

Causing laziness is the second sub-theme of “potential obstacles of ChatGPT”. Three out of seven students declared their opinions as demonstrated below:

*S1. It provides convenience but can sometimes make people lazy. This is a downside; for example, it can make people lazy because it provides too much help or gives every answer in a good manner.*

*S2. Laziness can develop in people. They might finish all their assignments, all their tasks, and make ChatGPT do everything, leading to a lack of learning. This is because they simply copy and paste.*

*S4. It can push us towards laziness, and when we only tell it what needs to be done and have it do*

*everything, it pushes us towards laziness.*

These excerpts indicate that ChatGPT is believed to result in laziness among students since it performs every prompt easily and quickly as the student 1 says “it provides too much help or gives every answer in a good manner”.

### **Teachers' Perspective**

The second question of the semi-structured interview was “Has any teacher ever mentioned or recommended ChatGPT before?”. All the participant students answered this question negatively.

*S6. I had never heard of such a thing before English class. I didn't know about it. I got to know the application better after our teacher introduced it.*

*S3. When we think about it, I mean, I haven't heard it from many teachers.*

*S2. Apart from English class, none of my teachers gave me information or mentioned ChatGPT. For this reason, I didn't know anything about ChatGPT, but I discovered ChatGPT when our English teacher told us about it.*

*S1. We did not use it with another teacher.*

Considering whether other teachers have ever mentioned ChatGPT in class before, none of the students approved that they have mentioned the tool before. There could be many reasons behind this. Teachers may have negative attitude towards the usage of integration of artificial intelligence into lessons or they might not have any knowledge about artificial intelligence tools and how they can be integrated into the curriculum.

Lastly, the third main theme is “correct usage of ChatGPT”. The stated theme consists of three sub-themes that are knowing appropriate usage, writing prompts properly and practical usage. The mentioned sub-themes are showed below with their sample extracts taken from the interviews of the students:

### **Knowing Appropriate Usage**

Four participants emphasized the correct usage of ChatGPT as revealed below:

*S1. In fact, I have been using it incorrectly because when you don't pronounce it correctly, it can misunderstand you. I've learned that when talking to artificial intelligence, I need to be very precise in expressing every detail.*

*S2. ChatGPT can actually be both good and bad. This is because some people misuse ChatGPT. They directly make it do everything for them, essentially.*

*S5. There is a technical drawback; it is not supported on some phones.*

Participants agreed that knowing how to utilize ChatGPT is essential while using the tool. Otherwise, expected answers may not be taken from the tool. Another usage-related issue is technical problems. Student 5 especially stated that the tool does not work on some phones and fonts are not understood on some smartphones which is a



technical problem for ChatGPT-integration in lessons.

### **Writing Prompts Properly**

Writing appropriate prompts whilst using ChatGPT was considered as important by four participants depending upon their short-term experience.

*S3. Initially, it misunderstood what we were doing. But when we wrote in detail, we could understand each other.*

*S4. For example, when I tell it my level and say I want to write a paragraph, it writes using words appropriate for my level. So, expressing myself and telling it what I need is more important, I believe.*

Students reflected that they tried to write proper prompts to get correct answers from the tool and they saw that it was very important and should be known for the correct usage of ChatGPT.

### **Practical Usage**

Six out of seven participants declared that using ChatGPT was very practical as the following statements taken from their speeches prove it.

*S1. I was trying to search on Google more, but I couldn't reach conclusive results. I was attempting to do it on my own, but when I recognized ChatGPT, I started doing it more easily.*

*S2. It is easily accessible and fast. In terms of convenience, instead of researching from multiple sites, we can just type on ChatGPT and acquire information. It already evaluates numerous sites for us.*

*S4. Firstly, it's easy to access and easy to use. It's efficient and helpful as well.*

*S7. It makes things like reading and writing more practical.*

Regarding the demonstrated statements, it can be understood that ChatGPT is seen as very practical since the participants reach the comprehensive results from multiple sources in a very short time thanks to the tool.

### **Discussion**

The present research aimed to explore the influence of ChatGPT on the 10th grade Turkish EFL learners' writing skill and vocabulary development. The study also attempted to examine the perceptions of these students on ChatGPT based upon their experience during the experimental phase of the study. First, depending on the pre- and post-writing test results, the writing scores of both EG and CG raised. But the increase in the scores of CG was higher than in the EG. This conclusion revealed that there was a significant difference between pre- and post-test scores of CG while there was not any significant difference in the scores of EG and the traditional instruction had more positive effect on writing skill development of the students.

The reason for the efficient increase in the writing score of the CG can be the idea that ChatGPT can be used as a learning partner, an assistance for students but cannot replace humans, especially teachers and cannot provide

traditional instruction components such as teacher-student interaction, which is in line with the conclusion of the study carried out by Xiao and Zhi (2023) and Li, Bonk and Kou (2023).

Apart from the results of writing tests, the results also indicated that there was an increase in the vocabulary mean scores of both EG and CG but the vocabulary scores of the CG were significantly different whereas the vocabulary score of the EG were not. This finding means that the traditional instruction has more favorable impact on vocabulary development of the students than ChatGPT-integrated instruction. The factor for gaining this result can be the duration of the implementation which might be short for observing the effect of ChatGPT-integrated instruction. As Al-Obaydi et al. (2023) stated, it is not possible immediate influence of ChatGPT-integrated instruction, to be able to observe it, the repeated implementation is needed. This factor can be valid for the results gathered from both writing and vocabulary tests. Besides, the results of writing and vocabulary tests support the idea that ChatGPT can be used as a tool in language learning along with other strategies which is in line with Sirichokcharoenkun et al. (2023). This view is also supported by Pasquale (2020 as cited in Kostka & Toncelli, 2023) who stated that while integrating AI into any area, humans should be in the center and explains that humans should make the decisions whilst AI is used for producing anything.

Moreover, considering the perceptions of the participants students about ChatGPT-integrated instruction in their English lessons, the gained results showed that the participants reflected their perspectives in three categories as “the powerful side of ChatGPT”, “potential obstacles of ChatGPT” and “correct usage of ChatGPT”. Students stated their positive perceptions about ChatGPT such as helping in language learning, providing information, feedback and samples, developing language skills and vocabulary and feeling autonomy. Similarly, Xiao and Zhi (2023) found out that ChatGPT can be a great learning assistance, help students in learning and give faster feedback to them. In the current study, participants also reflected their concerns about academic integrity and stated that they got the expected answers from ChatGPT by changing and writing prompts in detail which is in line with another study, as well (Xiao and Zhi, 2023). The present study also concluded that the participants described ChatGPT as causing laziness which is in accordance with another study’s result (Al-Obaydi, 2023).

## **Conclusion**

The existing literature lacks especially empirical research about ChatGPT-integrated language teaching. That’s why, the present study represents experimental research related to ChatGPT-integrated English teaching which is a rare one in the field. The study triangulated the data by using both quantitative and qualitative method. It was concluded that traditional instruction is more effective in the development of writing skill and vocabulary for 10th grade Turkish EFL learners and it is recommended that ChatGPT can be used as an assistant tool in class with another instruction or learning technique especially to increase students’ level of autonomy and motivation.

The study also reported that students had both positive and negative perceptions about ChatGPT-integrated language instruction. In a positive way, they reflected that they considered ChatGPT as a practical learning partner, information-provider, immediate feedback-provider, a tool for developing especially writing and reading skills and a tool for vocabulary enhancement. However, they also indicated their negative perceptions which are their

concerns about academic integrity and ethics and causing laziness.

Obviously, more ChatGPT-integrated language teaching or AI-based language teaching studies are needed in the field. The existing studies related to ChatGPT in ELT focus on revealing how to use this tool in ELT. There is few experimental research about this issue. So, carrying out more experimental research regarding students' level of achievement, motivation, autonomy and engagement can provide more fruitful implications.

### **Limitations and Suggestions for Further Research**

This research has some limitations.

- First of all, this study was conducted with only 10th grade students. Doing another study with other age groups can supply different and detailed findings.
- Secondly, the implementation phase lasted for only 6 lesson hours. A different study can be done for longer period of time to see the exact effect of the tool.
- Thirdly, the current research included 33 students from two different classes and aimed to determine the change on their achievement level before and after the implementation. However, there can be other variables influencing the test scores of the students such as anxiety, intrinsic motivation, tiredness, cognitive overload, etc. That's why, conducting ChatGPT-integrated English teaching research with a larger number of participants at different times would be beneficial for gaining more reliable and valid results.
- Lastly, this study focused on merely the development of writing skill and vocabulary of students. Another one including other skills might be carried out to compare the findings and see the similarities and differences.

### **Pedagogical Implications**

Some pedagogical implications are recommended as a result of this study. Firstly, the participants reflected at the beginning of the interview that none of their teachers mentioned ChatGPT before. For this reason, in-service technology or artificial intelligence education can be organized for teacher for their refreshment and so that they can learn how to integrate artificial intelligence into their lessons and they do not consider this technology negatively. Secondly, in this study the researcher first introduced ChatGPT by making a presentation and conducted a pilot study with experimental group to give them chance to practice ChatGPT. This shows that it is essential to teach students how to use artificial intelligence or ChatGPT for their education. For this purpose, information and computer technology lessons should teach the usage of AI and ChatGPT to students instead of focusing on teaching just technology or computer jargon.

In brief, this research makes great contribution to the current literature as being the rare experimental ChatGPT-integrated language teaching study by considering both achievement level and perceptions of the high school students. It shows that how important to adopt new technologies and integrate them into our teaching and learning process.

## References

- Abrenilla, E. M. C. Redido, C. R. Abendan, C. F. K. & Kilag, O. K. T. (2023). The Next Chapter of ELT: Embracing AI-Infused Pedagogies and Evolving Educational Strategies in the Post-Pandemic Landscape, *Excellencia: International Multi-disciplinary Journal of Education*, 1(5), 124-135.
- Agustini, N. P. O. (2023). Examining the Role of ChatGPT as a Learning Tool in Promoting Students' English Language Learning Autonomy Relevant to Kurikulum Merdeka Belajar, *EDUKASIA: Jurnal Pendidikan dan Pembelajaran*, 4(2), 921-934.
- Ali, J., Shamsan, M., A., A., Hezam, T. & Mohammed A. A. Q. (2023). Impact of ChatGPT on learning motivation: Teachers and students' voices. *Journal of English Studies in Arabia Felix*, 2 (1), 41-49. 10.56540/jesaf.v2i1.51
- Al-Obaydi, L.H., Pikhart, M., Klimova, B. (2023). ChatGPT and the General Concepts of Education: Can Artificial Intelligence-Driven Chatbots Support the Process of Language Learning? *International Journal of Emerging Technologies in Learning (iJET)*, 18(21), pp. 39–50. <https://doi.org/10.3991/ijet.v18i21.42593>
- Aydın Yıldız, T. (2023). The impact of ChatGPT on language learners' motivation. *Journal of Teacher Education and Lifelong Learning*, 5(2), 582-597.
- Bartneck, C., Lütge, C., Wagner, A., & Welsh, S. (2021). What Is AI? In *SpringerBriefs in Ethics* (pp. 5–16). [https://doi.org/10.1007/978-3-030-51110-4\\_2](https://doi.org/10.1007/978-3-030-51110-4_2)
- Baskara, R., Mukarto, M. (2023). Exploring the Implications of ChatGPT for Language Learning in Higher Education. *Indonesian Journal of English Language Teaching and Applied Linguistics*, 7(2), 343-358
- Chiu, T. K. F. (2023). The impact of Generative AI (GenAI) on practices, policies and research direction in education: a case of ChatGPT and Midjourney, *Interactive Learning Environments*, DOI: 10.1080/10494820.2023.2253861
- Chiu, T. K. F., Moorhouse, B. L., Chai, C. S., & Ismailov, M. (2023a). Teacher support and student motivation to learn with Artificial Intelligence (AI) chatbot. *Interactive Learning Environments*, 1–17. <https://doi.org/10.1080/10494820.2023.2172044>
- Chiu, T. K. F., Xia, Q., Zhou, X.-Y., & Chai, C. S. (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 4. <https://doi.org/10.1016/j.caeai.2022.100118>
- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston, MA: Pearson.
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.). Thousand Oaks, CA: Sage.
- Elbanna, S. & Armstrong, L. (2023). Exploring the Integration of ChatGPT in Education: adapting for the future, *Management & Sustainability: An Arab Review*, 3(1), 16-29. DOI 10.1108/MSAR-03-2023-0016
- Fitria, T. N. (2023). Artificial Intelligence (AI) Technology in OpenAI ChatGPT Application: A Review of ChatGPT in Writing English Essay, *Journal of English Language Teaching*, 12(1), 44-58.
- Fitria, T. N. (2021). Artificial Intelligence (AI) In Education: Using AI Tools for Teaching and Learning Process. *Prosiding Seminar Nasional & Call for Paper STIE AAS*, 4(1), 134–147. [---

1675](https://prosiding.stie-</a></p></div><div data-bbox=)

aas.ac.id/index.php/prosenas/article/view/106

- Fraenkel, J. R., & Wallen, N. E. (2000). *How to design & evaluate research in education*. Boston: McGraw Hill.
- Fryer, L. K. Nakao, K. and Thompson, A. (2019). Chatbot learning partners: Connecting learning experiences, interest and competence, *Computers in Human Behavior*, 93, 279–289. <https://doi.org/10.1016/j.chb.2018.12.023>
- Gocen, A., & Aydemir, F. (2021). Artificial intelligence in education and schools. *Research on Education and Media*, 12 (1), 13-21.
- Hong, W.C. H. (2023). The Impact of ChatGPT on Foreign Language Teaching and Learning: Opportunities in Education and Research, *Journal of Educational Technology and Innovation*, 5(1).
- Jeon, J. (2021). Chatbot-assisted dynamic assessment (CA-DA) for L2 vocabulary learning and diagnosis. *Computer Assisted Language Learning*, 1–27.
- Jiang H, Cheng Y, Yang J, et al. (2022) AI-powered chatbot communication with customers: dialogic interactions, satisfaction, engagement, and customer behavior. *Computers in Human Behavior* 134: 107329.
- Kohnke, L. Moorhouse, B. L. & Zou, D. (2023). ChatGPT for Language Teaching and Learning, *RELC Journal*, 54(2), 537-550. DOI: 10.1177/00336882231162868
- Kwon, S. K., Shin, D., & Lee, Y. (2023). The application of chatbot as an L2 writing practice tool. *Language Learning & Technology*, 27(1), 1–19. <https://doi.org/10125/73541>
- Li, B. Bonk, C. J. & Kou, X. (2023). Exploring the Multilingual Applications of ChatGPT: Uncovering Language Learning Affordances in Youtuber Videos, *International Journal of Computer-Assisted Language Learning and Teaching*, 13(1), DOI: 10.4018/IJCALLT.326135
- Liu, G. & Ma, C. (2023). Measuring EFL learners' use of ChatGPT in informal digital learning of English based on the technology acceptance model, *Innovation in Language Learning and Teaching*, DOI: 10.1080/17501229.2023.2240316
- Ng, D. T. K., Ching, A. C. H., & Law, S. W. (2023). Online learning in management education amid the pandemic: A bibliometric and content analysis. *The International Journal of Management Education*, 21(2), 100796.
- Nield, D. (2023). How ChatGPT and other LLMs work—and where they could go next. *Wired*. <https://www.wired.com/story/how-chatgpt-works-large-language-model/>
- Rukiati, E. Wicaksono, J. A. Taufan, G. T. & Suharsono, D. D. (2023). AI on Learning English: Application, Benefit and Threat, *JLCT*, 1(2).
- Stokel-Walker, C. (2022), “AI bot ChatGPT writes smart essays-should academics worry?”, *Nature*.
- Topsakal, O. & Topsakal, E. (2022). Framework for a Foreign Language Teaching Software for Children Utilizing AR, Voicebots and ChatGPT (Large Language Models), *The Journal of Cognitive Systems*, 7(2), 33-38. DOI: <https://doi.org/10.52876/jcs.1227392>
- Top 100 Tools for Learning* (2023). Retrieved January 10, 2024, from <https://toptools4learning.com/>
- Uzun, L. (2023). Are concerns related to artificial intelligence development and use really necessary: A philosophical discussion. *Digital Society*, 2(3), 40.
- Xiao, Y. & Zhi, Y. (2023). An Exploratory Study of EFL Learners' Use of ChatGPT for Language Learning Tasks: Experience and Perceptions. *Languages*8: 212. <https://doi.org/10.3390/languages8030212>
- Yan, D. (2023). Impact of ChatGPT on learners in a L2 writing practicum: An exploratory investigation.


*Education and Information Technologies, 1–25.*

---

**Author Information**

---

**Melek Sapan**


 <https://orcid.org/0000-0003-1660-4223>

Ministry of National Education & Bursa Uludag  
University  
Turkiye

Contact e-mail: [812293012@ogr.uludag.edu.tr](mailto:812293012@ogr.uludag.edu.tr)

---

**Levent Uzun**

 <https://orcid.org/0000-0002-2321-391X>

Bursa Uludag University  
Turkiye