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Using QR codes to develop EFL learners' pronunciation skills and expand vocabulary knowledge

İngilizceyi Yabancı Dil Olarak Öğrenen Öğrencilerin Telaffuz Becerilerini Geliştirmek ve Kelime Bilgisini Arttırmak için QR Kodlarının Kullanılması

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Abstract

Developments in technology have affected education in an unprecedented way. The affordability of mobile technologies has prompted educators to implement mobile enriched instructions in classes. In this regard, QR codes have received much attention at educational institutions for their advantages, such as being flexible, handy, and cost-free, particularly in the last two decades. For this purpose, the current study was carried out at TISHK International University in Erbil, Iraq, on fifty advanced English students during the 2022-2023 academic year, spanning 6 weeks. The participants were chosen via stratified random sampling method. Control group students received traditional education, while experimental group students were exposed to QR code-based instruction through recorded audio tracks, videos, presentations, and e-exams. The findings, collected through exams and analyzed using SPSS 25 in this quantitative study, revealed that QR code-based instruction significantly improved students' vocabulary knowledge and pronunciation accuracy, with p-values of .002 and .003, respectively. The findings of this study can have implications for education stakeholders who aim to devise novel ways to enhance students' levels with web-enhanced tools like QR codes.

Keywords: QR codes, vocabulary enhancement, pronunciation accuracy.

Özet

Teknolojideki gelişmeler eğitimi eşi benzeri görülmemiş bir şekilde etkilemiştir. Mobil teknolojilerin uygun fiyatlı olması, eğitimcileri sınıflarda mobil zenginleştirilmiş yönergeleri uygulamaya teşvik etmiştir. Bu bağlamda, QR kodları son yirmi yılda özellikle esnek, kullanışlı ve ücretsiz olmaları gibi avantajları nedeniyle eğitim kurumlarında büyük ilgi görmüştür. Bu amaçla, mevcut çalışma, 2022-2023 akademik yılında Erbil, Irak'taki TISHK Uluslararası Üniversitesi'nde 6 hafta boyunca elli ileri düzeydeki İngilizce öğrencisi üzerinde gerçekleştirilmiştir. Katılımcılar stratifiye edilmiş rasgele örnekleme yöntemi ile seçilmiştir. Kontrol grubu öğrenciler geleneksel eğitim alırken, deney grubu öğrenciler kaydedilmiş ses parçaları, videolar, sunumlar ve e-sınavlar aracılığıyla QR kod tabanlı yönergelere maruz kalmışlardır. Bu nicel çalışmada sınavlar aracılığıyla toplanan bulgular SPSS 25 kullanılarak analiz edilmiş ve QR kod tabanlı yönergenin öğrencilerin kelime dağarcığı bilgisini ve telaffuz doğruluğunu anlamlı bir şekilde geliştirdiği ortaya çıkmıştır, sırasıyla p-değerleri .002 ve .003'tür. Bu çalışmanın bulguları, QR kodları gibi web tabanlı araçlarla öğrenci düzeyini geliştirmek için yeni yöntemler geliştirmeyi amaçlayan eğitim paydaşları için önem taşımaktadır.

Anahtar kelimeler: QR kodları, kelime dağarcığı geliştirme, telaffuz doğruluğu.

Introduction

English is regarded as a lingua franca to communicate on a global scale, so it allows the speakers to remove the barriers of communication between people from different nationalities to a great extent. Learning a new language is a process that involves adapting not

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just to a new language but also to a new culture, way of thinking, and geographical location (Celik & Yildiz, 2019; Celik et al., 2022). Statista (2021) reports that 1.5 billion people speak English either natively or as a second language, so it ranks first in the competition to be the most widely spoken language in the world. Accordingly, the number of methods to teach and learn English has transformed considerably since the advent of Grammar Translation Method (GTM). The benefits of teaching can be traced back to the teacher's ability to establish and maintain rapport with students (Kapukaya & Yildiz, 2023). Traditional teaching methods have less emphasized interaction, communication and hands-on activities. However, these notions have been altered in this century as modern teaching methodologies such as Communicative Language Learning (CLL) and Task Based Language Learning (TBL) emphasize the necessity to switch the focus from the teachers to the learners, so communication channels between the students and the teachers can be used actively during classes (Ding et al., 2019). In addition, offering courses to appeal to different styles with modern methodologies has received much attention because some learners can learn well in an auditory format, while others prefer learning by visual materials. It can be seen that modern teaching methodologies consider learners' differences and customize their learning endeavors correspondingly. Moreover, the ratio of students to teachers is very high in today's schools. As a result, dealing with learners individually becomes challenging for teachers. With the proliferation of mobile technologies, solutions such as English online chat and chatbot apps have emerged to fill the demand for ESL instruction (Yildiz, 2022a).

Technology plays pivotal roles to increase the efficient delivery of the content to the learners in modern education. Teachers can modify classroom activities with the aid of technology to improve language acquisition. Learning, both inside and outside of the classroom, now heavily involves the use of technology (Yildiz, 2021). It is important to note that today's youth rely heavily on computers and the internet. Existing pervasive computer technologies have the potential to revolutionize classroom settings (Yildiz, 2022b). In this context, Quick Response (QR) codes are technological tools to enhance learning and teaching English to meet this need (Bakla, 2018). These codes can be basically defined as scannable images to be directed to various links through which videos can be watched; texts can be read; quizzes can be taken; presentation can be examined and images can be illustrated. Their popularity has grown tremendously in this decade because they are mostly free of charge, handy and time-savers. To illustrate, an English teacher can create a QR code on a reading passage to raise students' awareness of global warming, and students can access to information in a second just by a QR code scanner installed on their mobile devices. Once students can read the text, they can take a relevant quiz to check their comprehension instantly. On the other hand, sending the same text and quiz to the student can take much time if the link has been sent by Learning Management Systems or knowledge sharing groups on WhatsApp, Viber and Telegram (Alzubi, 2019). Considering the advantages of QR codes, it can be stated that they have great potential to be unlocked for language learning and teaching purposes.

EFL students are not interested in a study of English that focuses primarily on rote memorization of grammar and vocabulary. However, in elementary schools, English as a Foreign Language and English as a Second Language teachers, should focus on expanding their students' vocabularies rather than teaching them to read and write (Yildiz, 2019). Afterwards, pronunciation is one of the sub-skills of English along with grammar and vocabulary. Pronunciation includes not only voicing the words accurately but also rhythm, intonation and stress (Celik, 2018). There has been a consensus that commanding rules of pronunciation urges the speakers to develop good habits towards English, so those speakers can progress at a faster pace than others. The speakers who mastered pronunciation can communicate well and leave a good impression. On the other hand, speakers who are difficulty pronouncing words cannot convey the meaning accurately, so having some troublesome situations can be unavoidable. Considering the importance of pronunciation skill, its instruction starts at kindergarten with phonics and continues till the end of university education with graded activities (Levis & Grant, 2003). In addition, pronunciation plays essential roles upon graduation in several aspects. For instance, a newly graduated teacher can have some interviews to be employed; candidates who want to seek master programs abroad are required to get internationally accepted examinations such as TOEFL, IELTS, PTE which encompass sections on mastery of pronunciation; an administrator can inform the teachers during workshops which necessitate transferring the message to the audience with a perfect English. Thanks to the advancements in technology, there have been numerous web-

enhanced tools to improve pronunciation such as podcasts, e-dictionaries, e-books, movies and e-quizzes (Kara, 2023). It can be stated that an increasing number of opportunities arise to master pronunciation in this century and be ahead of other people in this respect.

Vocabulary is one of the most fundamental sub-skills of English which determines the success rate of the speakers or writers on the way of conveying the message to the other side. It is difficult for teachers in the modern world, when most people are engrossed in technology, to instill a love of reading in their learners (Yildiz, 2020). However, if they succeed, their students' vocabulary will expand. It can be said that, vocabulary is a central hub in communication while composing sentences and expressing ideas regardless of being in a spoken or written format. Horst (2019) divides the vocabulary into 4 main sections which are high frequency, low frequency, academic and technical words. He asserts that ordering the instruction considering the priorities of the curriculum and the learners can facilitate their learning and increase their enthusiasm. Language learners whose vocabulary knowledge are limited can pause several times which may reduce their self-confidence. On the other hand, learners who master vocabulary can express their ideas in a persuasive manner, so their self-confidence can increase accordingly. In addition, figuring out the meaning of the word can help the learners to understand the concepts well in a song, poem, story, novel, article, movie or series (Hunt & Beglar, 2005). Considering the importance of vocabulary knowledge, nearly all textbooks to teach English reserve special sections only to master vocabulary. In addition, vocabulary knowledge of the learners is measured in many local and international exams through fill in the blank, matching, multiple choice, ordering activities. Expanding word power is also in line with Krashen's (1992) input hypothesis which hints that learning new concepts in a systematic way can facilitate having a solid background in English to be exposed whenever needed. It can be argued that increasing vocabulary knowledge is of paramount importance to master English in terms of fluency and accuracy.

Purpose of the Study and Research Questions

Recent developments in technology have attracted the attention of users in all aspects of the life. Accordingly, the popularity of web-based learning platforms has increased dramatically as stakeholders of education have been striving for offering more hands-on activities to close the gap between the real life and theoretical sessions. In this regard, QR codes have been widely used recently to expand learning with the help of mobile technologies. The primary goal of this study was to pinpoint the effects of QR code-based instruction on students' vocabulary expansion and pronunciation accuracy. To this aim, following research questions were formed:

- Does QR code-based instruction enhance vocabulary knowledge of EFL learners?
- Do QR codes raise the level of pronunciation accuracy of EFL learners?

Literature review

QR codes have been widely used in various fields such as marketing, communication, industry and education since its advent in 1994 by a Japanese company Denso Wave for use as a label for automotive parts. They are mainly used to be directed to various websites, make payment, access to statistics and save contacts. To name a few, some QR codes created by WHO can give further details on some chronic diseases; a credit card owner can proceed to make payments for a product with a QR code, a newspaper article can lead the readers to get some statistics about global electric car sales and mobile phone users can save the contacts or log in to social media platforms with a QR code. The popularity of QR codes has increased 750 % in 2020 after global closures due to Covid-19, and there was a 433 % surge in using the QR codes in 2022 (Ricson, 2023). It is inevitable that the effects of QR codes in social life will be reflected in education. Thanks to the feasibility of QR codes, QR codes have been widely used in education to extend students' learning with supplementary materials. Some scholars (Ramsden, 2008; Googova & Koceska, 2014; Chee & Tan, 2021) argue that QR codes are beneficial to raise standards in education, while others (Bakla, 2018; Alzubi, 2019; Ding et al., 2019) elucidate that they pose some risks for educators and learners. To name a few, Shahril et al. (2019) postulate that QR codes serve as an interactive tool to form a communication bridge between the teacher and the students. Additionally, Ali et al. (2017) assert that QR codes can function to provide links, videos and illustrations, so students' learning can be enhanced dramatically. In addition, Thorne (2016) states that teachers can provide answer keys with their explanations in an embedded way with the help of QR codes, so students can have privileges to learn from their mistakes and ask any questions to be clarified in the following session. Likewise, Young (2015) asserts that QR

codes can be used to make interpretations on images, so they can learn how to make comments on images and devise novel ways to speak English simultaneously. Similarly, Arikan and Ozen (2015) contend that QR codes are revolutionary tools to expand students' vocabulary knowledge and improve their pronunciation because the words can be written and prompted to read aloud flexibly. Likewise, Fasimpaur (2011) puts forwards the idea that QR codes can be used as a scaffolding tool through which students can construct their knowledge in a graded way from easy to difficult. Afterwards, Deineko et al., (2022) states that students are already familiar with QR codes in their social lives, so students' motivation increases when they use same tools for educational purposes which they use in daily lives. Conversely, Hicks and Sinkinson (2011) postulate that exposing students to large chunk of information can be overwhelming for some students whose levels are not satisfactory enough. In the same vein, Kossey et al. (2015) contend that students who are suffering from visual or physical impairment can find it difficult to scan and read in a relatively small screen on the mobile devices, so they prefer learning from a larger screen on the smartboard. After that, Valencia (2023) postulates that ICT literacy levels vary among students, so it can be a hurdle to offer QR codes as a standard in all stages regardless of students' capabilities.

Correspondingly, the findings of the studies in different domain of language learning differ greatly. To illustrate, Rivers (2009) carried out a comprehensive study about the effects of QR codes on Japanese university students' reading comprehension and writing expansion which unearthed that QR codes offered useful links to develop reading and writing skills. Another notable study was conducted by Huah (2014) on 76 Malaysian teachers during an intensive training period which displayed that QR codes increased teachers' listening and speaking competence tremendously. In the same vein, Hung (2018) conducted a study on 48 Taiwanese university students which displayed that QR code instruction improved students' speaking performance to a great extent. Subsequently, Robles Becerra (2022) conducted a study on 28 Spanish university students which revealed that QR code enriched instruction enhanced their grammar and vocabulary knowledge dramatically.

He also reiterated that using Web 2.0 tools such as Kahoot and Zip Grade with QR code was so handy to save time and eliminate technical problems. Moreover, Polok and Starowicz (2022) conducted a study on 101 primary school teachers who asserted that QR code enriched instruction expanded their vocabulary considerably. They also noticed considerable improvement in their pronunciation. Afterwards, Balintag and Wilang (2020) conducted a study on Thai EFL students at a tertiary level which revealed that QR code enriched instruction reduced students' anxiety and boosted their writing performance dramatically. Additionally, Sari et al. (2020) conducted a study on 240 university students in Indonesia to assess students' learning by Google Form which revealed that students found such quizzes quite helpful to measure their skills and learn from their mistakes.

On the other hand, some studies revealed that some points need to be improved to increase the efficiency of QR based instruction. For instance, Alzubi (2019) received 41 teachers' opinions on QR codes which revealed that the necessity to sign up with a valid e-mail address, the obligation to make payment after a two-week trial period, lack of ICT literacy and prohibition of mobile phones at some institutions are some hindrances to use QR codes widely. Similarly, Vigil (2017) conducted a study in the US on teachers, administrators and students which unearthed that QR code based instruction can have negative implications if orientation period for all parties has been ignored or completed in a hurry. He also highlights that self-efficacy, overall attitudes, harmony between students and teachers, the tendency of the parents to use technology for educational purposes are factors to be considered meticulously, so the success rate of the program increases accordingly. Otherwise, some barriers can turn into technophobia and reduce the implementation of technology-enriched instruction in classes. QR codes are promising tools to revolutionize lessons, but their effectiveness may vary depending on the application. Careful planning, collaboration, harmony, and regular workshops are key factors for success. Careful planning, collaboration, harmony and regular workshops are key factors to success.

Methodology

Research Design

This study was undertaken according to the procedures of quantitative research design which required the researcher to conduct exams as pre-test and post-test on vocabulary and pronunciation. The effects of dependent variable, QR codes, were investigated thoroughly prior to

intervention and after the intervention period. Once the exam results were fetched, they were inserted into SPSS 25 to get detailed analysis via independent samples t-test. According to the analysis, some interpretations were made. Lowhorn (2007) points out that quantitative research design offers precious data to observe the situation, measure objectively and figure out the causal relationship between various variables. Subsequently, Gerald (2018) asserts that independent samples t test is used to compare the means of independent groups and come to the decisions whether statistical values differ significantly or not in an objective manner.

Participants, Sampling and Setting

The current study was conducted at TISHK International University where around 5000 students have been receiving high quality education from qualified lecturers in 2022-2023 Academic Year in Erbil, Iraq. The language of instruction has been completely in English which has prompted the researcher to conduct the study in this setting because it is feasible to measure the effects of QR codes in improving students' English proficiency. Stratified random sampling method was employed to choose the sample from the population. To illustrate, they were grouped as strata based on their departments. In the next phase, two students were chosen randomly from each strata, so fifty participants aged between 17 and 22 from ten departments were chosen as participants in an unbiased way to represent the population as equal as possible. 23 (46 %) participants were female, whereas 27 (54 %) participants were male. The common point of participants was taking Advanced English course which was designed to help students master English in four domains in their first year at university by experienced lecturers of language preparatory school of the university. The students had a solid background in English and ICT which was not excellent though, so it was easy to orient them and collect data.

Instruments

The researcher composed two complete exams from Scope 2 which has been published by Oxford to teach English for B1 learners. This series has a good reputation globally as it has a user-friendly I-tools set, increases the degree of difficulty gradually, offers extra worksheets on each macro and micro-skill, teaches English in context, provides relevant videos and games in each unit. Rahmawati (2018) attests that a top-notch text book should be a complete set which includes a good design, illustration, cultural connections, contextual perspective and sufficient supplementary materials to increase students' learning and engagement. Once these criteria were cross-checked, Scope 2 met these criteria successfully. The researcher covered three units and formed the questions based on pronunciation and vocabulary which included 20 questions respectively. In other words, each exam included twenty pronunciation twenty vocabulary questions based on the covered units. Pronunciation questions were composed to measure some elements in pronunciation such as phonetics, stress, rhythm, pitch, intonation, while vocabulary questions were formed to check their understanding in terms of parts of speech.

Data Collection Procedure

The researcher, who has been teaching English professionally for over 15 years at different stages of education, formed a committee to design and implement the study successfully, so each step can be handled more professionally by exchanging ideas of the colleagues. Apart from the researcher, two EFL experts were assigned to help the researcher organize the whole process from beginning till the end. In this regard, students were oriented with an intensive workshop, so they figured out all the steps before commencement. In the orientation period, the researcher introduced the goal of the study, some sample exams and some tips. Additionally, students asked any question in their mind to be clarified. Later, the students took the pre-test to measure their current level in terms of pronunciation and vocabulary. Once pre-test exam was taken, the intervention period started with a QR code enriched instruction.

The Cycle of Lessons in Experimental Group

Data collection period lasted 6 weeks when they learned by the textbook and some links to be directed through QR codes. For example, the researcher turned essential words of the units into voice in a sentence, so they could listen to the recorded versions of the key words in a context. In addition, they learned how to use stress and intonation during these activities. The recorded versions allow the students to listen to them until they master in a stress-free atmosphere, so they could have a chance to improve their pronunciation. After listening to the key words in a sentence, the students were required to record their voices twice. In the first recording, they recorded the same version as the researcher sent, while in the second assignment, they were required to compose unique sentences by given key words. The researcher also sent some videos

through QR codes on phonetic transcriptions, so they could learn basics of English pronunciation gradually.

Students had ample opportunity to practice extensively in terms of vocabulary enhancement. For example, the researcher displayed the definition of key words randomly on the smartboard asked the students to match definition with the word. Additionally, the researcher composed various fill in the blank activities to sharpen their vocabulary skills. In the final phase, the researcher formed some mock exams which encompassed multiple choice questions. Meanwhile, all the activities in vocabulary enrichment section were accompanied with QR codes as well. After taking the mock exams by Zip Grade, the researcher analyzed their common mistakes based on the detailed report which showed records of each student question by question. The reports of each student were also e-mailed to each student, so they could have a chance to learn from their mistakes and eliminate them in the upcoming exams. As illustrated clearly, QR codes were central hubs to direct their learning to different channels by links, illustrations, mock exams, recordings, videos etc. Detailed illustration of activities in experimental group was given below in Figure 1.

Fig 1. Practical reflections of QR codes in experimental group

The Cycle of Lessons in Control Group

The cycle of lessons in control group was not changed. They followed the instruction in an orthodox way. In other words, they followed the lessons according to the pre-defined syllabus.

Findings

Findings of the study were illustrated by two tables and two figures which showed the analysis of exam results in terms of vocabulary and pronunciation through independent samples t test.

Table 1.
Independent samples t test analysis in vocabulary

Variables	Groups	N	Mean	SD	t	df	Sig
Pre-test	Control	25	53.20	13.910			
Pre-test	Experimental	25	54	17.017	-.182	48	.856
Post-test	Control	25	54.40	16.222			
Post-test	Experimental	25	71.80	21.010	-3.278	48	.002

Note. P< 0.05

Table 1 illustrated the difference between pre-test and post-test in terms of vocabulary. According to the figures in Table 1, it was unsubtle that there was no significant difference between experimental and control group students because p-value,.856, was less than 0.05. It was also figured out when mean scores were compared which were 53.20 and 54 respectively. However, the gap between control and experimental group increased dramatically in terms of post-test results. According to post-test results, p-value, .002, was less than 0.05, so there was a significant difference. In other words, the experimental group outperformed the control group. Control group students increased their average by only 1.20 points, while experimental group students increased their average 17.8 points. It can be stated that experimental group students who followed a QR based instruction progressed more significantly than control group students who were exposed to traditional education. The comparison of their vocabulary marks can also be observed in Figure 2 below:

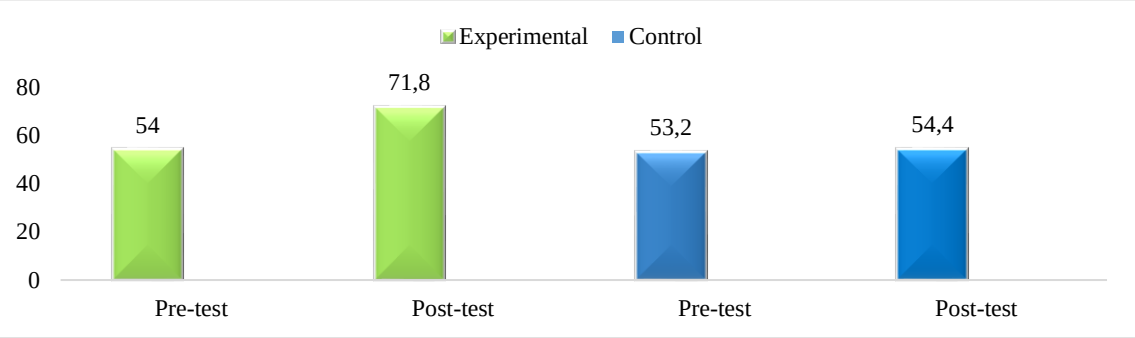

Fig 2. The average of vocabulary marks in each group

Table 2.
Independent samples t test analysis in pronunciation

Variables	Groups	N	Mean	SD	t	df	Sig
Pre-test	Control	25	51.20	12.014			
Pre-test	Experimental	25	51.60	18.412	-.182	41	.928
Post-test	Control	25	53	10.801			
Post-test	Experimental	25	66.80	19.305	-3.278	37	.003

Note. P< 0.05

Table 2 visualized the difference between pre-test and post-test in terms of pronunciation. The same cycle, like vocabulary, was observed in terms of pronunciation as well. Once pre-test results were compared, it was noticed that there was not a noticeable difference between pre-test and post-test in control and experimental group. The former's average was 51.20, and the latter one's average was 51.60. In the same vein, p-value, .928, was higher than 0.05. It can be concluded that the students who received a QR based instruction increased their marks more dramatically in experimental group than the students whose lessons were covered with the regulations of traditional instruction. The comparison of their pronunciation marks can also be observed in figure 3 below:

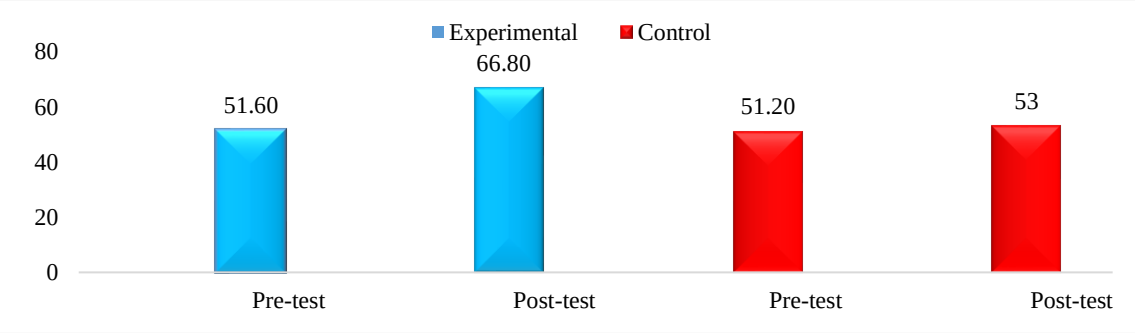

Fig 3. The average of pronunciation marks in each group

Discussion

The impact of QR codes in enhancing students' pronunciation and vocabulary knowledge was sought in this study which uncovered essential points to be considered. The first essential point was about positive effects of using key words in context. This activity increased students' engagement and motivation dramatically. Darling-Hammond and Snyder (2000) postulate that teaching words in context enhances students' motivation and enthusiasm considerably. Another significant point to be highlighted was about the positive role of turning text into recorded versions which helped students to develop their pronunciation gradually. This finding was in line with Yoshida's (2018) study which revealed that recording versions of the texts can yield better results in terms of pronunciation skills. Subsequently, offering supplementary videos on phonetic transcriptions facilitated students' learning because they learned the theoretical background of relevant pronunciation rules in given texts and audio tracks. Speights Atkins et al. (2023) points out that phonetic transcriptions help learners have automaticity if they have been taught systematically. Additionally, matching the definition with the words had far-fetching effects on students' vocabulary enhancement. Nagy (2019) asserts that matching activities are essential to retain the meaning of the words in the long term memory. Furthermore, fill in the blank activities required the students to find the correct word and make necessary changes according to tenses, so they developed their skills to use the words accurately as well as sticking to grammar rules. In the same vein, they trained themselves to race against time, submit the exam on time and analyze their mistakes through Zip Grade exams. Kara (2023) elucidates that Zip Grade exams are beneficial to teach students how to manage time, come to right decisions and learn from their mistakes by detailed analysis.

Once overall progress was observed, both skills have improved significantly. However, it was noticed that vocabulary enhancement was greater than pronunciation. In other words, the average of pronunciation increased 15.20 points, while the average of vocabulary rose 17.8 points. This finding hints that QR codes-based instruction offers more opportunities to teach vocabulary. Grande and Pontrello (2016) state that QR code enriched instruction expands newly hired teachers' and students' vocabulary substantially, so it is of greatest importance to support such activities for the sake of mutual benefits.

Conclusion

The main goal of this quantitative study was to obtain a clear understanding of QR code-based instruction on pronunciation accuracy and vocabulary expansion. The results unearthed that QR codes expanded students' vocabulary knowledge through which they answered vocabulary items in the activities in a more self-confident way. In the same vein, students' pronunciation accuracy rose substantially. They developed their skills to pronounce words accurately by paying attention to stress, rhythm, pace and phonetic transcriptions. It was also witnessed that technology enriched classes have had the potential to convert the monotonous lessons into more engaging ones because their learning channels can be triggered in various ways with well-designed activities. The final point to be emphasized was that QR code enriched instruction fostered communication through recorded voices, videos, illustrations, presentations, dictionary definitions, e-quizzes because all assessment tools were completed individually and analyzed in cooperation to encourage the students join the activities actively. Learning English through QR codes can be activated with ubiquitous exercises, so there has been a great potential to be unlocked.

Some recommendations can be made for future studies. This study investigated the effects of QR code-based instruction at a private university in Erbil, Iraq which can spread to other universities in the region. In addition, only freshman students encompassed the participants which could be enlarged with other stages to represent the population well. Likewise, only quantitative instruments were employed in this study which could be enriched with qualitative instruments. In the same vein, only pronunciation and vocabulary skills were included in this study which could be expanded with other skills.

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