QR Codes as a Potential Tool in Teaching and Learning Pronunciation: A Critical Review

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ABSTRACT

The implementation of QR codes in education has become increasingly popular recently, and quite a number of studies in this area are available. Numerous studies have been carried out on the use of QR codes in the teaching and learning process. In relation to such research, this critical review aims to examine the potential of integrating QR codes in teaching and learning pronunciation. Given that no previous study on integrating QR codes to teach and learn pronunciation has been carried out, the articles were chosen on the basis of two main themes, namely, the potential use of QR codes in language teaching and the implementation of technology-based methods in teaching and learning pronunciation. After filtering past studies, 20 relevant articles published between 2011 and 2020 were identified and analysed. The findings were presented from these aspects: (a) the integration of QR codes in language teaching, (b) the perspectives of users towards the integration of QR codes, (c) the implementation of technology-based methods in teaching and learning pronunciation and (d) the impacts of implementing technology-based methods in teaching and learning pronunciation. The review revealed that QR codes have the potential to be integrated in teaching and learning pronunciation because of their positive impacts on the teaching and learning process. This review also delivers some suggestions for further research in the use of QR codes in teaching and learning pronunciation.

Keywords: ESL; QR codes; pronunciation; technology-based; education

INTRODUCTION

English is considered a global lingua franca because of its wide usage worldwide. It meets the need for a common language because it maintains the relationship amongst people from different nations (Rao, 2019). People who speak different mother tongues communicate with one another using English. Therefore, it plays a crucial role in connecting people around the world. Given the importance of English, many people learn it as a second language (ESL) or as a foreign language (EFL). Four language skills, namely, listening, speaking, reading and writing, play an essential role in learning English (Sadiku, 2015). To teach and improve the performance of students in language skills, teachers have employed different teaching methods in the teaching and learning process. One of the teaching methods is integrating technology into classroom activities. These activities can act as supporting tools in improving the quality of teaching and learning.

Currently, technology is widely used in education, as it can ease teaching in different ways. Apart from facilitating the teaching process, it also helps in improving the learning process of learners. According to Peeraer and Van Petegem (2012), technology facilitates the efficient delivery of the learning content. One example is the use of QR codes. The Quick Response code, also known as the QR code, is a scannable image that can access different information, such as texts, links, email addresses and websites (Sharma, 2013). It is a 2-dimensional barcode in which a wide variety of information can be embedded. Moreover, it is an effective and time

saving tool, as only a mobile phone is needed to scan the code. By scanning this code, people can access the information that they want.

The use of technology, such as QR codes, is becoming common in various fields nowadays, such as in the marketing, communication or industry sectors. QR codes are also being introduced and employed in education. The use of QR codes in education brings numerous benefits to both educators and learners. This usage is supported by Sharma (2013), who stated that QR codes is an ideal tool in education, as it allows educators and learners to access information easily. In recent years, the use of QR codes in education has gradually increased. Thus, it has great potential in facilitating the teaching and learning process.
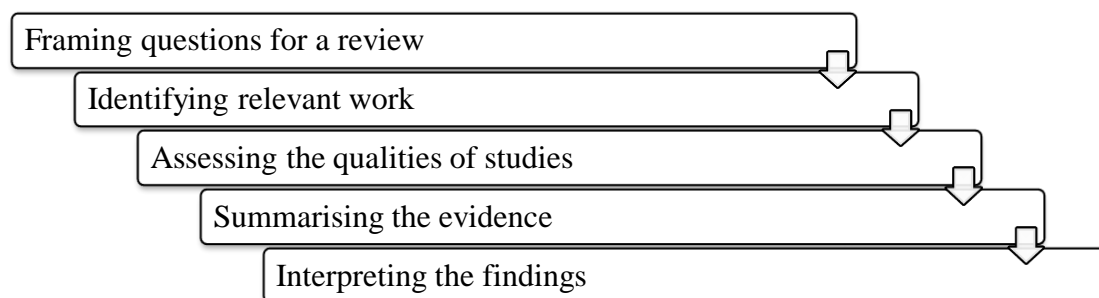
As mentioned earlier, language skills play a vital role in language learning. Nevertheless, pronunciation, as one of the subskills in speaking, has always been overlooked. Thus, learners tend to have difficulty mastering pronunciation. Poor pronunciation amongst learners is a major problem faced by young learners and even adult learners in higher education. Poor pronunciation may greatly influence the future of these learners. They may not be able to convey their thoughts and share information with others accurately. Comprehensible input is important in communication, as it ensures that others can comprehend our language and obtain the information that we aim to convey. Furthermore, it may also affect employment opportunities in the future. Poor pronunciation can lead to low self-confidence during a job interview, as learners with poor pronunciation skills cannot answer questions with proper pronunciation and confidence. Hence, these individuals fail to impress and convince the employer.

Given the importance of pronunciation, teaching pronunciation must be improved. QR codes can be integrated in teaching and learning pronunciation, as QR codes have been implemented in other language skills. Nonetheless, no study has been carried out in this area. Therefore, the use of QR codes in teaching pronunciation can be further explored. This review is developed with the focus on the following contexts: (a) the integration of QR codes in language teaching, (b) the perspectives of users on the integration of QR codes, (c) the implementation of technology-based methods in teaching and learning pronunciation and (d) the impacts of implementing technology-based methods in teaching and learning pronunciation.

RESEARCH METHOD

A systematic review attempts to answer research questions (Yannascoli, Schenker, Carey, Ahn & Baldwin, 2013), and it must have comprehensive and clear evidence in interpreting data. A guideline for systematic reviews has been proposed by Khan, Kunz, Kleijnen and Antes (2003), and it is adopted as follows:

FIGURE 1. Steps of systematic review

Framing questions for a review

Identifying relevant work

Assessing the qualities of studies

Summarising the evidence

Interpreting the findings

Step 1: Framing questions for a review

This review focuses on investigating the potential of implementing QR codes in teaching and learning pronunciation. However, no research has been done on such implementation. Thus, the articles are based on two scopes, namely, the implementation of QR codes in the language teaching context and the implementation of technology-based methods in teaching and learning pronunciation. The QR code is a technology-based teaching and learning tool. Hence, its potential use in pronunciation can be identified through other examples of technology-based methods. Accordingly, the research questions conveyed in this study are:
i.   What is the potential use of QR codes in language teaching?
ii. What are the perceptions of users towards the integration of QR codes in the classroom?
iii. How are technology-based methods being implemented in teaching and learning pronunciation?
iv. What are the impacts of implementing technology-based methods in teaching and learning pronunciation?

Step 2: Identifying relevant work

After framing the research questions, relevant studies are selected. Two databases are used in searching the relevant studies: Eric and Google Scholar. Keywords, such as 'QR codes in language teaching' and 'teaching methods of pronunciation', are employed in finding the relevant studies. The search results are refined on the basis of the inclusion and exclusion criteria. The general criteria for choosing the studies include a time frame, which covered studies published from 2011 to 2020. The selected studies comprise peer review journal articles, full-text articles and conference proceeding. To fulfil the research questions, the studies that focus on technology-based methods are chosen, and other teaching methods of pronunciation are excluded from the review. Additionally, the studies that focused on the use of QR codes in teaching English are chosen instead of other subjects.

Step 3: Assessing the qualities of studies

The quality of studies is assessed using the inclusion and exclusion criteria. The inclusion and exclusion criteria are developed from the research questions (Meline, 2006). The studies that fulfil the inclusion criteria are selected, and those that meet the exclusion criteria are excluded from the selection. Hence, the identified inclusion and exclusion criteria are as follows:

Inclusion criteria
• Published between 2011 and 2020
• Integration of QR codes in English classroom activities
• Studies that presented the perspectives of teachers or students on the integration of QR codes in the classroom
• Technology-based methods were implemented in teaching and learning pronunciation
• Studies that revealed the positive or negative impacts of implementing technology-based methods in teaching and learning pronunciation

Exclusion criteria
• Studies that were not published between 2011 and 2020
• Articles that did not integrate QR codes in classroom activities
• Articles that studied the integration of QR codes in other areas, such as medical, marketing and nursing education
• Studies that did not implement technology-based methods in teaching and learning pronunciation

- Articles that studied the implementation of technology-based methods in contexts other than pronunciation
- Studies that did not report the impacts of implementing technology-based methods in teaching and learning pronunciation

Step 4: Summarising the evidence

A total of 20 articles are selected from Eric and Google Scholar after examining the inclusion and exclusion criteria. Eleven articles focus on the integration of QR codes in classroom activities and the perspectives of users towards the integration of QR codes in classroom activities. Meanwhile, nine articles focus on the implementation of technology-based methods in teaching and learning pronunciation and their impacts. The synthesised data are tabulated according to the research questions. The similarities and differences amongst the data are studied.

Step 5: Interpreting the findings

The last step of the systematic review is interpreting the findings. The review uses content analysis to interpret these observations. Then, content analysis is used to analyse the meanings from the data collected and draw conclusions for the review (Bengtsson, 2016). The data are investigated according to the categories classified by research questions. The following shows the categories for each research question:

i. What is the potential use of QR codes in language teaching?
- Integration of QR codes in language teaching context
ii. What are the perceptions of users on the integration of QR codes in the classroom?
- Benefits of using QR codes in the classroom
- Limitations of using QR codes in the classroom
iii. How are technology-based methods being implemented in teaching and learning pronunciation?
- Implementation of technology-based methods in teaching and learning pronunciation
iv. What are the impacts of implementing technology-based methods in teaching and learning pronunciation?
- Positive impacts of implementing technology-based methods in teaching and learning pronunciation
- Negative impacts of implementing technology-based methods in teaching and learning pronunciation

FINDINGS

In this section, the findings are presented according to the research questions.

i. What is the potential use of QR codes in language teaching?

Table 1 shows the integration of QR codes in the language teaching context. Most of the researchers integrated QR codes in classroom activities as an additional learning support. These codes help students to obtain the information needed to complete a classroom task. They also act as a medium for teachers to share learning materials to students. The studies revealed that QR codes are used in teaching language skills, such as listening, speaking, reading, writing and vocabulary.

TABLE 1. Integration of QR codes in language teaching context

No	Authors	Findings
1	(Shahril, Tarmudi, Hamid & Mohi, 2019)	QR codes act as an interactive teaching and learning tool through which students can obtain relevant sources for learning directly from instructors.
2	(Ali, Santos & Areepattamannil, 2017)	Preservice teachers include links, videos, illustrations and hints in QR codes to provide extra support for students to complete classroom tasks.
3	(Saprudin, Goolamally & Latif, 2014)	The information that is intended to be delivered to students is inserted into a QR code generator. The students scan the image of the saved code during the lesson.
4	(Thorne, 2016)	Materials and questions regarding the teaching of language skills, such as reading, listening and speaking are included in QR codes. Students can find and check the answers to the questions using QR codes.
5	(Rikala & Kankaanranta, 2012)	A treasure hunt activity is carried out using QR codes whereby the hints can be found from different coloured QR codes prepared along the route. Students complete the task by scanning and retrieving the information from a black QR code.
6	(Latif, Fadzil, Azzman & Ng, 2011)	Additional learning support for high-risk courses (high failure rate) is given to students using QR codes. Video lectures, questions and exercises are decoded in QR codes.
7	(Goh & Jarrett, 2014)	QR codes are implemented in listening and speaking activities in which the works of students are displayed with QR codes.
8	(Hapsari, Ekawati & Molla, 2019)	Students carry out reading activities by scanning QR codes to obtain the reading text, worksheets and the activities explained in QR codes.
9	(Young, 2015)	In a writing class, students scan to find five photos in QR codes and write sentences. The sentences are then inserted in QR codes to be shared with other students.
10	(Kossey, Berger & Brown, 2015)	QR codes bridge the gap between online resources and books. By scanning the codes, students are led directly to certain websites wherein they can obtain the intended information.
11	(Arikan & Ozen, 2015)	In learning vocabulary, students scan the codes to watch videos and answer follow-up questions at the end of each video. The videos

		include flashcards of learning objects and grammar rules.

ii. What are the perceptions of users towards the integration of QR codes in the classroom?

The perceptions of users towards this teaching and learning tool are also studied on the basis of research on the potential use of integrating QR codes in the language teaching context. The findings are presented on the basis of the perceptions of teachers and students. The findings related to these perceptions are summarised in Table 2.

TABLE 2. Users' perceptions of the integration of QR codes in classroom

No	Authors	Findings
1	(Shahril, Tarmudi, Hamid & Mohi, 2019)	QR codes are convenient to use, thus enabling the development of the positive behaviour of students and increasing their participation in classroom activities. These codes also encourage educators to integrate technology-based methods in the learning process.
2	(Ali, Santos & Areepattamannil, 2017)	The students stated that the application is easy to use, and they are able to access information quickly. The application has positive impacts on the learning experience of students. However, some students claimed that Internet speed poses a problem in using QR codes.
3	(Saprudin, Goolamally & Latif, 2014)	QR codes can increase the motivation and curiosity in learning amongst the students. Nevertheless, tutors who are not familiar with QR code have difficulty preparing suitable materials to be inserted into QR codes. Internet connection is another challenge in integrating QR codes in the classroom.
4	(Rikala & Kankaanranta, 2012)	Independent learning and group work can be supported through the use of QR codes. These codes are interesting and motivating tools in the learning process. The students expressed that they need help as they face technical problems while using smartphones.
5	(Latif, Fadzil, Azzman & Ng, 2011)	QR codes fulfil the learning needs of students, as they are convenient, fast and efficient. They also encourage participation amongst the students because these students find the learning enjoyable and exciting. A few limitations are found, such as the lack of Internet access. Moreover, some students do not have a smartphone.
6	(Goh & Jarrett, 2014)	QR codes encourage active participation amongst students by increasing their interest and motivation for learning. These codes promote a

		sense of ownership and allow the students to take control of their learning process.
7	(Hapsari, Ekawati & Molla, 2019)	QR codes are a fun medium, as it motivates, encourages and piques the curiosity of students towards learning. Using QR codes has some limitations, such as unstable Internet connection and lack of storage space in the smartphone.
8	(Young, 2015)	Authentic activity can be encouraged by using QR codes. It motivates students and arouses the curiosity of these learners.
9	(Kossey, Berger & Brown, 2015)	QR codes promote student engagement and make learning enjoyable. Students are able to explore a topic on their own using QR codes. Some of the challenges identified are the slow Internet connection and the lack of smartphones and access amongst some students.
10	(Arikan & Ozen, 2015)	Students are curious and excited to use QR codes in classroom activities. The codes are easy to use, and the students show positive attitudes towards the use of QR codes. Internet access is one of the challenges faced by the students. Moreover, the students are are scared of damaging the device.

According to the findings on the perceptions of users towards the integration of QR codes in the classroom, these perceptions can be categorised into two subcategories, namely, the benefits and limitations of using QR codes. From the results shown, one study reports more than one benefit and limitation. At the same time, the same benefits and limitations are reported in different studies. However, the benefits and limitations can be explored further in acquiring a deep understanding on the impacts of QR codes on classroom activities. Table 3 and 4 summarise the results on the benefits and limitations of using QR codes in the classroom.

TABLE 3. Benefits of using QR codes in classroom

Subcategory	Number of studies
Motivation	5
Ease of use	4
Active participation	4
Curiosity	4
Enjoyment	3
Stimulation of positive attitudes	2
Learning interest	2
Quick access to information	2
Gaining learning experience	2
Self-exploration	1
Authenticity	1
Independent learning	1
Collaborative learning	1
Sense of ownership	1

TABLE 4. Limitations of using QR codes in classroom

Subcategory	Number of studies
Lack of Internet connection	6
Lack of smartphones	2
Technical problems with smartphones	2
Teachers face difficulties in generating QR codes	1
Fear of damaging the device	1

iii. How are technology-based methods being implemented in teaching and learning pronunciation?

The review attempts to investigate the potential use of QR codes in teaching and learning pronunciation. Given that using QR codes is one of the technology-based methods in teaching, the implementation of technology-based methods in teaching pronunciation is studied. Table 5 presents the findings on how these methods are being implemented in teaching and learning pronunciation.

TABLE 5. Implementation of technology-based methods in teaching and learning pronunciation

No	Authors	Findings
1	(Wang, 2017)	WeChat is utilised in learning pronunciation. Teachers correct the pronunciation of students through online courses and sharing learning materials in WeChat groups.
2	(Gao & Hanna, 2016)	Students listen to, practice and record their pronunciation in an instructional software (New Oriental Pronunciation) that has been developed by the authoritative language-training agency.
3	(Cox, Henrichsen, Tanner & McMurry, 2019)	An online resource guide, which contains online video resources, is developed in teaching specific pronunciation aspects to the students.
4	(Yuruk, 2020)	Kahoot activities are given to students to improve problematic sounds in the pronunciation of students.
5	(Wongsuriya, 2020)	Google Translate is integrated in facilitating students in pronouncing words correctly. The students practice the pronunciation of words by putting the vocabulary into Google Translate, listening to them and imitating the sounds.
6	(Everly, 2018)	Interaction between teachers and students, sharing of learning materials and delivery of instructions can be done through Microsoft Office 2016 OneNote Class Notebook.
7	(Mompean & Fouz-González, 2016)	Twitter is used to improve pronunciation, as some Twitter accounts offer pronunciation learning.
8	(Liu & Hung, 2016).	Students listen to the model recording provided in a computer-assisted pronunciation instruction and practice the pronunciation of the sentence shown.

| 9 | (Gilakjani & Rahimy, 2019) | Learning pronunciation on phoneme, word and sentence levels is improved using Pronunciation Power 2 (PP2) in Pronunciation Power Software. It is one of the software in computer-assisted pronunciation teaching (CAPT). |

iv. What are the impacts of implementing technology-based methods in teaching and learning pronunciation?

To determine the effectiveness of the presented technology-based methods in teaching and learning pronunciation, their impacts are analysed. The findings for the studies are tabulated in Table 6.

TABLE 6. Impacts of implementing technology-based methods in teaching and learning pronunciation

No	Authors	Findings
1	(Wang, 2017)	WeChat is found to be helpful in stimulating a self-directed learning environment and enhancing learning flexibility. However, it may distract the attention of the learners, as they can use WeChat for entertainment purposes during the lesson.
2	(Gao & Hanna, 2016)	An increment in pronunciation scores is observed as the instructional software promotes positive learning experience and attitude.
3	(Cox, Henrichsen, Tanner & McMurry, 2019)	Preselected videos can fulfil the needs of students and provide better instructional procedures to increase their confidence in learning pronunciation.
4	(Yuruk, 2020)	Kahoot can encourage the active participation in the classroom, and it is easy to access.
5	(Wongsuriya, 2020)	Google Translate has positive impacts on pronunciation learning, as students show improvement in pronouncing difficult words. They are motivated to learn and become more confident.
6	(Everly, 2018)	The needs of students are met individually and collaboratively. The learning tool can be adapted to various learning situations, and the progress of students can be tracked.
7	(Mompean & Fouz-González, 2016)	Twitter has a positive effect on learning pronunciation, as it encourages the participation of students.
8	(Liu & Hung, 2016).	The pronunciation performance of students is improved. The students receive better scores when they are able to obtain visual feedback from the software.
9	(Gilakjani & Rahimy, 2019)	A significant improvement in pronunciation can be observed amongst students. The software promotes a student-centred teaching method

	which motivates the students to learn, participate actively and increase their confidence.

The findings clearly show that all the studies report positive impacts on the implementation of QR codes in teaching and learning pronunciation. This method only has one limitation, as reported by Wang (2017), that is, the students can become distracted during the lesson. Hence, the limitations of implementing technology-based methods should be explored further. For instance, improvements can be made in the integration of technology in teaching. Table 7 shows the summary of findings on the positive impacts of implementing technology-based methods in teaching and learning pronunciation. The impacts are categorised on the basis of the subcategory shown below. Some of the benefits are mentioned repeatedly in multiple studies.

TABLE 7. Positive impacts of implementing technology-based methods in teaching and learning pronunciation

Subcategory	Number of studies
Positive learning experience	3
Active participation	3
Increase in confidence	3
Self-directed learning	2
Motivation	2
Ease of use	1
Student-centred	1
Collaborative learning	1
Stimulation of positive learning attitude	1

DISCUSSIONS

The findings that have been presented earlier show that the use of QR codes is becoming increasingly common in education as more research has been conducted in recent years. The results demonstrate that QR codes are being integrated in classroom activities in different ways. One of the common roles of this technology in language teaching is to share learning materials to students. QR codes enable teachers to input all the learning materials in these codes; then, students can obtain these materials easily by scanning the code provided to them (Shahril, Tarmudi, Hamid & Mohi, 2019; Saprudin, Goolamally & Latif, 2014; Kossey, Berger & Brown, 2015). Moreover, this technology supports the learning process of students by providing hints, videos, pictures and extra information (Ali, Santos & Areepattamannil, 2017; Rikala & Kankaanranta, 2012; Latif, Fadzil, Azzman & Ng, 2011). In other words, QR codes facilitate the students in completing their tasks by providing extra guidance. Besides their supportive role in classroom activities, QR codes have also been significantly implemented in teaching and learning language skills, such as listening, speaking, reading, writing and vocabulary. Previous studies have stated that students can share their works with others using QR codes (Ali, Santos & Areepattamannil, 2017; Rikala & Kankaanranta, 2012; Latif, Fadzil, Azzman & Ng, 2011) and check answers immediately after completing the task (Thorne, 2016). Notably, QR codes have been integrated in different classroom activities and teaching language skills. However, they have not been integrated in teaching pronunciation yet. Therefore, research on the integration of QR codes in teaching and learning pronunciation should be explored.

The benefits and limitations of QR codes in classroom activities must be determined. Hence, the perceptions of teachers and students towards QR codes have been studied. Motivation has a major benefit to students. It can drive them to participate actively in classroom activities. Four studies (Shahril, Tarmudi, Hamid & Mohi, 2019; Latif, Fadzil, Azzman & Ng, 2011; Goh & Jarrett, 2014; Kossey, Berger & Brown, 2015) observed active participation amongst students. The students also expressed that QR codes are easy to use, and they can access information quickly using these codes. Another benefit that is mentioned in the four studies is curiosity. The QR code is a novel concept in the teaching and learning process. Thus, students are eager to try it. The integration of QR codes has helped students to develop their interest in learning, stimulate their positive attitudes and gain learning experience. Furthermore, QR codes are beneficial to the individual and collaborative learning. Despite their benefits, some limitations have been discovered from previous studies. Six studies revealed that Internet connection is the main limitation in integrating QR codes. Some schools and the students themselves do not have Internet access. Smartphones are another challenge for students, as some of them do not own a smartphone and they face technical problems when using smartphones. Saprudin, Goolamally and Latif (2014) stated that teachers who are not familiar with QR codes tend to have difficulties in selecting suitable instructional materials and inserting them into QR codes.

Previous studies on the implementation of technology-based methods in teaching and learning pronunciation are analysed. Other examples of technology-based methods are presented, as no study has been carried out on the use of QR codes in teaching pronunciation. However, their implementation and impacts can be applied in QR codes, as QR codes are also part of technology-based teaching and are used as learning tools. Many examples of technology-based teaching and learning tools have been presented in the review, such as WeChat, Twitter, computer-assisted pronunciation software, Google Translate and Kahoot. Amongst these resources, the most frequently used method is the computer-assisted pronunciation software. The impacts of these technology-based methods are analysed, and all the studies report the same result. The studies agreed that technology-based methods can improve the pronunciation performance of students and the quality of teaching. The studies stated that the integration of technology can promote a positive learning experience (Gao & Hanna, 2016; Wongsuriya, 2020; Wang, 2017). Moreover, technology-based methods encourage the active participation of students and increase their confidence in learning. Other reported positive impacts are motivation, ease of use, the stimulation of a positive learning attitude and the promotion of collaborative learning (Cox, Henrichsen, Tanner & McMurry, 2019; Yuruk, 2020; Everly, 2018; Gilakjani & Rahimy, 2019). The findings show that the implementation of QR codes in classroom activities and the implementation of technology-based methods in teaching pronunciation share the same impacts. They can motivate students, promote positive learning attitudes and encourage active participation amongst students. QR codes are also believed to have positive impacts on teaching and learning pronunciation as other technology-based methods have done.

CONCLUSION

A systematic review on two main themes, namely, the integration of QR codes in language teaching and the implementation of technology-based methods in teaching and learning pronunciation, has been presented through the analysis of 20 articles. The findings show an increment in integrating QR codes in education. The presented findings reveal that QR codes have brought many advantages to teachers and students during the teaching and learning process. These codes promote the motivation of students and provoke their learning interest, thus leading to positive learning attitudes of students. In addition, the QR code is a novel tool

in the classroom. Thus, new elements are brought into the learning process. This new technology creates excitement for students to learn, as they are curious towards the new teaching method and learning tool (Liu, Kang and McKelroy, 2015). In addition, it is easy to use, as students can conveniently access information and teachers can deliver information to students effortlessly. Nevertheless, the limitations of using QR codes are also reported. Internet connection is the main problem according to the findings collected. Some schools have limited access to the Internet, especially rural schools (Garba, Byabazaire and Busthami, 2015). Moreover, some teachers have mentioned that they lack experience in using QR codes. Hence, teachers should familiarise themselves with the use of QR codes so that this technology can be integrated in their teaching process.

The implementation of technology-based methods in teaching and learning pronunciation and their impacts have been analysed and presented in the review. Many technology-based teaching and learning tools can be implemented in the classroom. WeChat, Twitter, Kahoot and Google Translate are amongst the examples presented in the review. The findings show that these platforms have positive impacts on teaching and learning pronunciation. Notably, the benefits of QR codes match with the positive impacts of integrating technology-based methods in teaching pronunciation. They share the same advantages, such as motivation, ease of use, the promotion of positive learning attitudes and the encouragement active participation. Accordingly, the relationship between QR codes and the implementation of technology-based methods in teaching and learning pronunciation can be seen. Thus, QR codes have the potential to be integrated into teaching and learning pronunciation and research on the use of QR codes in this aspect should be further explored.

REFERENCES

Ali, N., Santos, I. M., & Areepattamannil, S. (2017). Pre-service teachers' perception of Quick Response (QR) code integration in classroom activities. *Turkish Online Journal of Educational Technology-TOJET, 16*(1), 93-100.

Arikan, Y. D. & Ozen, S. O. (2015). A learning environment for English vocabulary using Quick Response codes. *Educational Sciences: Theory & Practice, 15*(2), 539-551. https://doi.org/10.12738/estp.2015.2.2139

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open 2*, 8-14. https://doi.org/10.1016/j.npls.2016.01.001

Cox, J. L., Henrichsen, L. E., Tanner, M. W., & McMurry, B. L. (2019). The needs analysis, design, development, and evaluation of the" English pronunciation guide: An ESL teachers' guide to pronunciation teaching using online resources". *TESL-EJ, 22*(4), 1-24.

Everly, P. (2018). Expanding pronunciation instructional time beyond the classroom: Microsoft Office 2016 OneNote Class Notebook as an interactive delivery platform. *TESOL Journal*, *10*(2), 1-18. https://doi.org/10.1002/tesj.421

Gao, Y., & Hanna, B. E. (2016). Exploring optimal pronunciation teaching: Integrating instructional software into intermediate-level EFL classes in China. *Calico Journal, 33*(2), 201-230.

Garba, S. A., Byabazaire, Y., & Busthami, A. H. (2015). Toward the use of 21st century teaching-learning approaches: The trend of development in Malaysian schools within the context of Asia Pacific. *International Journal of Emerging Technologies in Learning, 10*(4), 72-79.

Gilakjani, A. P. & Rahimy, R. (2019). Using Computer-Assisted Pronunciation Teaching (CAPT) in English pronunciation instruction: A study on the impact and the teacher's

role. *Education and Information Technologies*, *25*(2), 1129-1159. https://doi.org/10.1007/s10639-019-10009-1

Goh, L. H. & Jarrett, B. W. (2014). Integrating QR codes and mobile technology in developing listening and speaking skills in the teaching of English language. *International Journal on E-Learning Practices, 1*(1), 26-38.

Hapsari, S., Ekawati, Y. N., & Molla, N. L. (2019). Implementing Quick Response (QR) codes in teaching reading. *Journal of English Language Education, 2*(2), 70-80. https://doi.org/10.24905/efj.v2i2.57

Khan, K. S., Kunz, R., Kleijnen, J., & Antes, G. (2003). Five steps to conducting a systematic review. *JRSM, 96*(3), 118–121. https://doi.org/10.1177/014107680309600304

Kossey, J., Berger, A. & Brown, V. (2015). Connecting to educational resources online with QR codes. *FDLA Journal, 2*(1), 1-10.

Latif, L. A., Fadzil, M., Azzman, T. A. M. T. M., & Ng, M. S. (2011). Can the use of QR codes enhance m-learning in a blended learning environment?. *Journal Lifelong Learning Society, 8*(2), 1-20.

Liu, M., Kang, J., & McKelroy, E. (2015). Examining learners' perspective of taking a MOOC: reasons, excitement, and perception of usefulness. *Educational Media International, 52*(2), 129–146. https://doi.org/10.1080/09523987.2015.1053289

Liu, S. C. & Hung, P. Y. (2016). Teaching pronunciation with Computer Assisted Pronunciation Instruction in a Technological University. *Universal Journal of Educational Research*, *4*(9), 1939-1943.

Meline, T. (2006). Selecting studies for systemic review: Inclusion and exclusion criteria. *Contemporary issues in communication science and disorders, 33*, 21-27. https://doi.org/10.1044/cicsd_33_S_21

Mompean, J. A., & Fouz-González, J. (2016). Twitter-based EFL pronunciation instruction. *Language Learning & Technology*, *20*(1), 166-190.

Peeraer, J., & Van Petegem, P. (2012). Measuring integration of information and communication technology in education: An item response modeling approach. *Computers & Education, 58*(4), 1247–1259. https://doi.org/10.1016/j.compedu.2011.12.015

Rao, P. S. (2019). The role of English as a global language. *Research Journal of English, 4*(1), 65-79.

Rikala, J., & Kankaanranta, M. (2012). The use of Quick Response codes in the classroom. *mLearn,* 148-155.

Sadiku, L. M. (2015). The importance of four skills reading, speaking, writing, listening in a lesson hour. *European Journal of Language and Literature Studies, 1*(1), 29-31. http://dx.doi.org/10.26417/ejls.v1i1.p29-31

Saprudin, A. A., Goolamally, N. & Latif, L. A. (2014). Embedding QR codes in the teaching and learning process. *Seminar Kebangsaan Pembelajaran Sepanjang Hayat 2014*, 201-210.

Shahril, A. M., Tarmudi, S., Hamid, R., & Mohi, Z. (2019). Interactive knowledge experience: encouraging student using Quick Response code in higher learning institution in Malaysia. *International Journal of Management Sciences and Business Research*, *8*(5), 73-78.

Sharma, V. (2013). QR codes in education – A study on innovative approach in classroom teaching. *IOSR Journal of Research & Method in Education, 3*(1), 62-70.

Thorne, T. (2016). Augmenting classroom practices with QR codes. *TESOL Journal, 7*(3), 746-754. https://doi.org/10.1002/tesj.257

Wang, K. (2017). Status quo and prospective of Wechat in improving Chinese English learners' pronunciation. *English Language Teaching, 10*(4), 140-149.

Wongsuriya, P. (2020). Improving the Thai students ability in English pronunciation through mobile application. *Educational Research and Reviews*, *15*(4), 175-185.

Yannascoli, S. M., Schenker, M. L., Carey, J. L., Ahn, J., & Baldwin, K. D. (2013). How to write a systematic review: A step-by-step guide. *University of Pennsylvania Orthopaecic journal,* 64-69. https://doi.org/10.1186/s41182-019-0165-6

Young, J. J. (2015). A study on technology embedded English classes using QR codes. *International Journal of Contents, 11*(1), 1-6. https://doi.org/10.5392/IJoC.2015.11.1.001

Yuruk, N. (2020). Using Kahoot as a skill improvement technique in pronunciation. *Journal of Language and Linguistic Studies*, *16*(1), 137-153. https://doi.org/10.17263/jlls.712669

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