Effects of Blended, Explicit and Implicit Instruction on EFL Learners in English Pronunciation Class under Emerging Technology

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Abstract—As the most important foreign language in China, English poses great challenge for teachers to improve the performance of ESL (English as a second language) learners through in-class instruction. Blended, explicit, and implicit instruction are three widely used approaches in English class teaching, and it may be difficult to choose which one should be used in class to help the English language learners. With audio synthesis technology applied as an enhancement for teaching, this study aims to research the three effects on English pronunciation teaching in aspects of the performance and satisfaction of English language learners. 120 English learners in China were equally divided into three groups which were instructed by blended, explicit, and implicit instruction respectively. Based on the data collected by test and questionnaire in pre-test, in-test, and post-test, the results show that the blended instruction performs best in aspects of the improvement of performance and the class satisfaction. These findings indicate the great potential of blended instruction in English language teaching and more investment should be taken to promote its application to help the Chinese to better acquire this important language.

Keywords—blended instruction, explicit instruction, implicit instruction, English pronunciation teaching, audio synthesis technology

1 Introduction

English language education has been treated as a policy tool to enhance China's integration to the worldwide economy, and develop the country's economic and cultural scenario [1]. Being proficient in English has become one of the greatest advantages for them to be more socialized and involved in further communication with the world [2], [3]. Learning English now becomes amust for any students, specifically EFL students for academic purposes [4].

Even though great resources have been invested in this educational field in China, there is still a large number of Chinese students struggling to learn English in their home country [5]. As EFL learners, they feel overwhelmed and frustrated to live where they do not speak the target language. As speaking is important in English learning,

which includes the way to produce sound, utterance and sentences correctly and accurately [3], another difficulty for students is accent. Accent difference among American, British and Australian accents may confuse learners' understanding and make them feel hard [6]. Additionally, the third challenge is correct word pronunciations of target language. Though it is hard for foreign language learners to pronounce like native speakers, they still need to pronounce correctly. Furthermore, pronunciation is closely related to the mother tongue, giving that some sounds or phonetics may not exist in the mother tongue. And also, students face difficulties in pronouncing differently in the same words, whereas the same pronunciation in different words [7].

Above cultural and educational phenomena and learning challenges have attracted the attention of scholars who started to look for ways to improve the quality of English language education [8], [9]. Evidently, teachers play a key role in this scenario, so training and developing professionals' teaching skills is essential to guarantee the improvement of the sector [8]. Teacher's role becomes significant to instruct with strategies and increase efficiency and fill the gaps between the learners and the challenges [3]. In order to overcome difficulties of learning language, Brown [10] hold that strategies can be applied in the class include: *repetition* (in practice and exercise); *self-evaluation* (learning assessment); *self-monitoring* (checking for each scenario to measure performance development). Moreover, teachers also face challenges of teaching non-native language. Due to limited access to economic power and resources [11], online resources and websites are preferable and effective ways to use, for these mediums facilitate students' direct access to native English pronunciation [12]. Furthermore, different instruction types provided by teachers can greatly affect how much students can learn in class [13]. Currently, English teachers can mostly rely on three instruction types that have been frequently researched to improve learners' performance, i.e., explicit, implicit, and blended instructions [14]. These have been applied in English pronunciation teaching to help students master speaking skills [5].

These three instructional approaches have advantages and disadvantages respectively [15]. Both implicit and explicit instruction have been proved to promote language learning equally effectively. The promoting and inhibitng effects of explicit instruction were observed if mother tongue similarity was taken into account [16]. The blended instruction approach balanced explicit and implicit techniques and has been regarded as the most efficient classroom guiding style for ESL learners [14], [17]. In the past years, these three instruction types have been largely researched to verify their widespread application and efficiency. However, few scholars have focused on associating these instruction styles with class satisfaction and instruction efficiency. Hence, this study aims to determine whether blended instructions are more appropriate than explicit and implicit instructions for English language learners in China from the perspective of their overall class satisfaction and instruction efficiency with the help of audio synthesis technology.

Chapter one introduced why this study is significant, what hope to find out and how it is structured. Chapter two reviews the outcomes of existing literature, as well as theories and concepts related to form the foundation of the study. Chapter three seeks to advance a new methodology to conduct an experiment. Chapter four makes analysis on data results. Chapter five makes discussion on the targeted outcome, and chapter six concludes the study by presenting its implications and potential future research directions.

2 Literature review

2.1 Implicit and explicit instruction in English teaching

Implicit and explicit instructions are commonly used approaches in English language teaching. Implicit instructions help students understand the rules of the English language by letting them read and recite corresponding materials without any previous explanations. Zhang [18] stated that students who receive implicit instruction improve their pronunciation by constantly correcting themselves after imitating, reading aloud, comparing their pronunciation with the original sound and doing follow-up exercises repeatedly. Godfroid [19] held that implicit instruction primarily affects implicit learning, even though prior knowledge and memory have been reported to be important to the interactions between implicit processing, implicit knowledge, and explicit knowledge. Differently, explicit instructions are associated with an instructional approach that guides language learners through detailed explanations of the rules of the language [5]. According to Hughes et al. [20], in practice, explicit instructions are not a unitary intervention but comprise teaching behaviors or components that can be applied to guide learners. Akakura [21] conducted a research based on four tasks including elicited imitation, oral production, and grammaticality judgment and concluded that explicit instructions could potentially improve the learning process of ESL students in both the implicit knowledge and explicit knowledge.

In the last decades, the efficiency of implicit and explicit instructions has been compared and analyzed by scholars, and it has been widely proved that explicit instructions perform better than implicit instructions. Andrews [22] conducted a study with 70 L2 (second language) English learners and found that for guiding students through complex grammatical structures, explicit instructions are more efficient. However, when it comes to simple grammatical structures, explicit and implicit instructions have a similar impact on students' performance.

In addition, it has also been confirmed that explicit instructions also have significant advantages in teaching spelling rules. Kemper et al. [23] conducted a study focused on the teaching methods used for Dutch spelling rules and stated that explicit instructions are more efficient overall. Explicit instructions can help students with spelling disabilities to get the instance-based knowledge about morphological spelling rules and help average students to acquire rule-based knowledge as well. For orthographical spelling rules, both instructional frameworks perform well. However, even though the advantages of explicit instruction have been widely accepted in the educational field, there are still limitations that have to be acknowledged, especially regarding the difficulty that learners may have to deeply understand implicit knowledge.

There is a dilemma in using which instruction type in class for the teachers as different strengths and limitations for implicit and explicit instruction, when conforming to the needs of students, the implicit instruction is treated to be a necessary and useful tool [24]. In classroom practice, implicit and explicit instructions are usually complementary to each other, and the combination of these two frameworks have been used to improve the performance of language learners. The term *blended instruction* is such a set of instructions that combines explicit and implicit instructions to guide students in their learning journeys [25].

2.2 Blended instruction in English teaching

Blended instructions became a popular approach used to improve students' performance as it mixes the advantages of explicit and implicit instructions [25], [26]. Initially, it was developed to meet the special requirements for distance learning by improving the quality of online learning environments [27]. Vernadakis et al. [26] treated the blended instruction should be an instruction approach embraced by teachers to improve their students' performance. According to Li et al. [28], learning by comparison and trial-and-error will promote understanding and acquisition of new knowledge, so multiple knowledge sourcing channels are conducive to the acquisition of heterogeneous information through at least two different mechanisms, leading to cross-validation. The modern development of technologies and the worldwide economy made it possible for teachers to use diversified approaches, methods, and material in their classrooms, enriching the quality of English language education. In turn, this has popularized the application of explicit instructions in English teaching and different contemporary studies have proved the efficiency of this method [5], [29].

There is still controversy about whether blended instruction really performs better than the other two types, especially explicit instructions. Fainman et al. [14] conducted a research in 2019 with 12 fourth-year undergraduate students and found that blended instructions were the most efficient approach according to the results from the delayed test. They have also concluded that explicit instructions were more effective than blended instruction when it comes to immediate word acquisition in the post-test. Oğuz et al. [30] studied the same phenomenon and shared similar conclusions. Their study involved a quasi-experiment applied in a state school in Turkey, and they found that in both the post-test and delayed test, explicit instructions perform significantly better than blended instructions, as in the post-test, the scores for explicit instruction and blended instruction were 0.735 and 0.647, and in the delayed test, the coressponding scores for explicit instruction and blended instruction were 0.764 and 0.701, respectively. Zhang [18] focused on undergraduate learners' self-correction in foreign language speaking and found that in many cases learners cannot correctly distinguish error categories, resulting in error correction failure, thus multiple approaches should be applied to promote students' ability in phonetic perception and spelling. In addition, different blending modes involving implicit and explicit instructions also affect the performance of students. A study conducted with 200 freshmen university students suggested that the blended mode which explicit instruction comes before implicit instruction performs better than the blended mode which explicit instruction comes after implicit instruction regardless of students' language level [5].

Even though the advantages of blended instructions have been proved in classroom-related studies, there are issues that hamper the widespread application of this methodology, such as faculty workload and lack of motivation and enthusiasm [27], [30]. Other challenges may involve inadequate cognition and use of instruments and equipment required to provide blended instructions [27], [32]. Moreover, existing literature on blended instruction most focused on the application and efficiency of the method in a classroom environment, but there is a research gap in the field when it comes to the way students perceived this approach and whether they can be fully satisfied with it.

2.3 Emerging technology in use

The modern era gives us constant access to emerging technology that brings new possibilities to the way we live our personal and professional lives [33], [34]. Speech synthesis emerged as such a new technology was applied in this study to help learners improve learning efficiency and break through the bottleneck of non-standard pronunciation of Chinese ESL teachers [35]–[37]. Speech synthesis refers to the input text converted into a form that can be phonetised by a machine [38], [39]. According to Sefara [41], factors such as stress, phonetics, intonation, accent, age and motivation can cause inappropriate or incorrect pronunciation from non-natives. As novel technologies are more widely applied to create new solutions in the educational field, teachers can rely on these novelties to overcome the limitations of classroom teaching and provide a more natural scenario for pronunciation practice. A good example of these modern solution is the encoder deep learning neural network applied to speech recognition that can provide computer assistance for English teaching [2], [42]. Based on research by Stepp-Greany [40], technology assisted language learning promotes and leads to higher motivation.

Modern speech synthesis systems have already achieved high synthesis quality and can be used for multiple purposes. According to CHIVOX [44], the MOS score of the mainstream speech synthesis system reaches more than 4.0, which can synthesize standard and natural pronunciation for teaching and learning. Thu et al. [45] presented a speech synthesizer including a text normalizer, a grapheme-to-phoneme convertor, and an HMM-based speech synthesis engine, and their positive results proved the efficiency of this type of technology. Sefara [41] used a mean opinion score (MOS) test to evaluate the quality of a synthesized audio from a text-to-speech synthesis system and concluded that the audio material performed well. The speech was recognized as natural, pleasant, and understandable. A similar study conducted by Bansal et al. [38] showed a rise of 28% in pronunciation accuracy and a 0.9 gain in mean-opinion-score (MOS). Werner and Hoffmann [46] evaluated the quality of different approaches and obtained a high mean opinion score (MOS) for both synthetic and natural speech samples. Segi et al. [47] used Japanese broadcast news programs as a speech database, synthesized news sentences and performed subjective evaluations of the synthesized speech to confirm the effectiveness and high-quality of text-to-speech (TTS) conversion. Atkar and Jayaraju [48] also use neural networks to generate audio data in Hindi and concluded that synthetic audios can be very similar to natural speech from native Hindi speakers.

The design of this study adopts a synthesis system called VoiceMaker, an online free text-to-speech converter website that combines Neural TTS (NTTS), Standard TTS engines, Artificial Intelligence (AI), and Machine Learning (ML). Testing materials were converted into human-like AI-speaking voices and synthetic audios were used in the teaching and learning process. Learners are expected to receive input through listening synthetic audio, and then transform input to output.

3 Methodology

This study aims to understand the effect of different classroom instruction frameworks for English pronunciation teaching and Chinese ESL learners and better understand which set of instruction best satisfies their needs. A quantitative approach

was applied based on a pronunciation test and a questionnaire survey that consisted of six items designed to identify students' level of satisfaction in classes conducted with different instruction types. The questionnaire was prepared based on the "Adolescent students life satisfaction scale" proposed by Zhang et al. to evaluate young Chinese students [49]. All student participants were asked to rate each item after the class using a five-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree). Students were tested for their performance in English pronunciation via a pre-test, an in-test, and a post-test applied by a group of English teachers based on a hundred-mark system. The final score for each participant was recorded after five teachers reached a consensus to avoid subjective error.

3.1 Sample

A total of 120 English learners were included in this study which were all junior students from higher vocational college in Chongqing, China. All participants were randomly divided into three groups of 40 learners. Group 1 received implicit instructions, Group 2 received blended instructions, and Group 3 received explicit instructions. The proportion of male and female participants in each group ranged between 1.1–1.5. In addition, as shown in Table 2, before the experiment there was no significant difference in study performance among the students ($F = 0.293$; $P = 0.747$).

3.2 Testing materials

This study was designed to test students' performance regarding English pronunciation. A foreign teacher from Canada and four college English teachers with overseas academic experience evaluated the similarity of students' pronunciation considering factors such as pauses, extension of syllables at the end of tone group, and stress of unstressed syllables based on the audio program from the textbook. Testing materials were converted into synthetic audios in advance, and were officially extracted from Unit 16 in the Student Book One of *Cambridge International Course of English (third edition)*. The sample contained a total of 79 words:

"Setting personal goals can give your life a sense of direction. Before you set personal goals, think about what you want to achieve with your life. Write down your goals and think about them carefully. Divide your goals into smaller tasks. For example, if you want to reach a major goal in ten years, set a three-month goal, and a one-month goal. Remember, your goals can change with time. Adjust them regularly to reflect this growth in your personality."

3.3 Experiment processes

The overall research processes is represented in Figure 1. For each instruction, there were seven steps involved. In "Blended Instruction", for example, the first step requires the researcher to briefly introduce the teaching experiment processes and requirements of the study. Then, the participants were instructed about the vocabularies of the target paragraph to remove the semantic cognitive blindness and confusion. In the third step—implicit instruction, learners were given five minutes for reading practice and

the synthetic audio was played simultaneously before the pre-test activity. After that, researchers also had to provide explicit instructions focused on explaining sentence stress and syllable stress of core words, emphasizing rules of pronunciation and intonation, and explaining syntactic structure, sense group and pause skills. Later in the fifth step, learners were given another five minutes to practice reading with the official audio and participated in the in-test that evaluated their performance. Similarly, the sixth step repeated followed the same guidelines but learners' performance was evaluated with a post-test conducted to check their overall perception of the target characteristics. Generally, the implicit instructions followed the method of repeated listening, imitation and questioning and the synthetic audio was played for learners to follow-up the audio imitation. Differently, the explicit instructions focused on converting learners' pronunciation perception into explicit guidance by explaining spelling skills, semantic and syntactic rules and identifying sense groups [18], [3]. The entire teaching experiment processes lasted for about 45 minutes. The final step involved the distribution of questionnaires to the participants to measure their satisfaction with the different instructions they received during the study.

The data collected was analyzed by SPSS for reliability and validity. The official analysis involved the differences in test scores in each group and among three groups, and the differences in each item and mean score among different groups. The value of performance and each item were presented by mean ± standard deviation ($\overline{X} \pm S$). Data were treated with statistical significance when $P<0.05$.

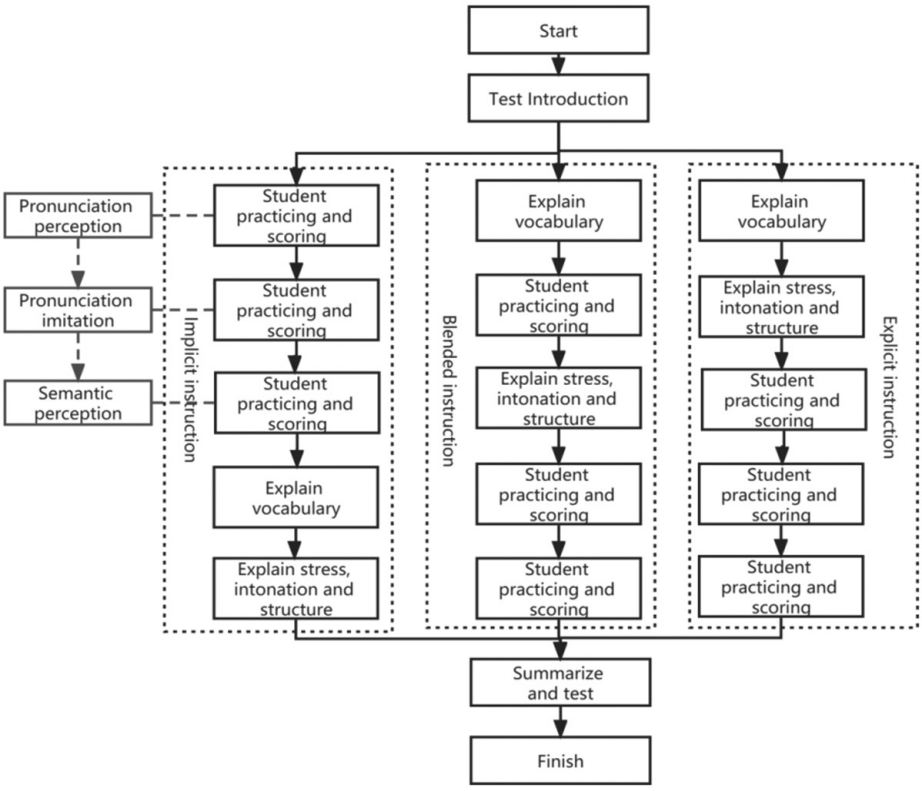

Fig. 1. Teaching experiment processes of this study

4 Results

4.1 Reliability and validity

The Cronbach's Alpha value of the questionnaire survey reached up to 0.833 and the composite reliability value reached 0.88. Since both scores were higher than 0.7, the reliability of the method was confirmed. In addition, all the factor loadings were higher than 0.6 and the AVE was 0.552 which higher than 0.5 (Table 1). Hence, it was concluded that the survey had good converge validity.

Table 1. Reliability and validity analysis

	Factor Loadings	Cronbach's Alpha	Composite Reliability	AVE
Item 1: I have learned something in this class.	0.683	0.833	0.88	0.552
Item 2: I am satisfied with the audio of the testing material in this class.	0.853			
Item 3: I have overall improved in this class.	0.769			
Item 4: I learned more in this class compared with other students.	0.670			
Item 5: I think I am respectable among classmates for the learning outcome.	0.734			
Item 6: I have a sense of achievement for what learned in this class.	0.734			

4.2 Performance of English pronunciation under each instruction type

The performance of English pronunciation was first analyzed by ANOVA to measure the difference among three groups. Details of the analysis are presented in Table 2. Before the instructions, no significant difference was found among the three groups ($F=0.293$, $P=0.747>0.05$), indicating that the sample English learners had similar performances in the implicit, blended, and explicit groups. Furthermore, significant differences were found in three groups during and after the instructions (In-test: $F= 10.297$, $P<0.001$; Post-test: $F=18.131$, $P<0.001$). In addition, considering the mean values in each group, it was also identified that during and after the instruction, the English learners in the blended group performed best among the three groups. The participants in the implicit group had the worst performance.

Table 2. Performance analysis among different groups

	Pre-Test	In-Test	Post-Test
Implicit	70.40±9.09	71.40±8.94	72.7±9.51
Blended	68.88±9.06	80.50±6.91	84.2±7.06
Explicit	69.98±9.45	74.13±11.26	79.1±8.91
F	0.293	10.297	18.131
P	0.747	<0.001	<0.001

The improvement of English pronunciation was also statistically analyzed using the students' test scores, as shown in Table 3. The results showed that implicit instructions could not help students improve their English pronunciation as all the P values were higher than 0.05 (Pre. vs. In.: P=0.651; Pre vs. Post: P=0.284; In. vs. Post: P=0.564). The results also showed that blended instructions could significantly improve students' pronunciation skills as their performance in the in-test was significantly higher than their performance in the pre-test (Pre.: 68.88±9.06, In.: 80.50±6.91, P<0.001). Also, their performance in the post-test was significantly higher than their performance in the in-test (In.: 80.50±6.91, Post.: 84.20±7.06, P=0.007). The results from the explicit group also showed a better performance in the post-test compared to the pre-test (Pre.: 69.98±9.45, Post.: 79.10±8.91, P<0.001) and the in-test (In.: 74.13±11.26, Post.: 79.10±8.91, P=0.037). However, there was no significant difference between their performance in the in-test and in the pre-test (In.: 74.13±11.26, Pre.: 69.98±9.45, P=0.037).

Table 3. Performance analysis in each group

	Marching		**Performance**	**T**	**P**
Implicit	1	Pre-test	70.40±9.09	–0.455	0.651
		In-test	71.40±8.94		
	2	Pre-instruction	70.40±9.09	–1.087	0.284
		Post-test	72.70±9.51		
	3	In-test	71.40±8.94	–0.581	0.564
		Post-test	72.70±9.51		
Blended	1	Pre-test	68.88±9.06	–6.865	<0.001
		In-test	80.50±6.91		
	2	Pre-test	68.88±9.06	–9.114	<0.001
		Post-test	84.20±7.06		
	3	In-test	80.50±6.91	–2.83	0.007
		Post-test	84.20±7.06		
Explicit	1	Pre-test	69.98±9.45	–1.978	0.055
		In-test	74.13±11.26		
	2	Pre-test	69.98±9.45	–4.531	<0.001
		Post-test	79.10±8.91		
	3	In-test	74.13±11.26	–2.158	0.037
		Post-test	79.10±8.91		

4.3 Class satisfaction for each instruction type

Among six items included in the analysis, significant differences were found in items 1–3 and items 4–5 (P<0.05) (Table 4). In addition, for all these five items, it was observed that the blended group always kept the highest values. The explicit group had lower scores than the blended group but always higher than the ones registered in the implicit group. No significant difference was observed among these three groups

(P=0.061>0.05). These outcomes indicated that there was a similar percentage of learners among the three groups who believe that they have learned more than the others. Overall, it was concluded that learners in the blended groups were highly satisfied, while the ones in the explicit and implicit groups presented a lower level of satisfaction with the instructions they have received (Implicit: 3.33 ± 1.00, Blended: 4.17 ± 0.67, Explicit: 3.80 ± 0.75, P<0.001).

Table 4. Item analysis of class satisfaction in each group

	Scores			F	P
	Implicit	**Blended**	**Explicit**		
Item 1	2.95±1.41	4.18±1.01	3.18±1.17	11.61	<0.001
Item 2	3.48±1.15	4.25±1.03	3.83±1.32	4.37	0.015
Item 3	3.33±1.38	4.33±1.12	3.83±1.08	6.91	0.001
Item 4	3.38±1.03	3.93±1.25	3.93±1.27	2.86	0.061
Item 5	3.50±1.40	4.15±0.92	3.93±1.05	3.36	0.038
Item 6	3.38±1.19	4.20±0.79	4.15±0.70	10.13	<0.001
Mean	3.33±1.00	4.17±0.67	3.80±0.75	10.53	<0.001

5 Discussion

The results of this study expand the research content of English pronunciation teaching by clarifying ESL students' learning efficiency and satisfaction of implicit, explicit and blended instructions on foreign language pronunciation, and enrich the evaluation research of three pronunciation instructions. The major outcomes of this study showed that blended instructions are more efficient than explicit and implicit instructions in guiding the English language learners in China, which can improve the levels of class satisfaction. The results presented in this research confirm the potential of this method for widespread application. The statistical analysis of the performance of students' pronunciation showed that in the post-test and in-test, learners in the blended group had significantly better results than the ones in the explicit and implicit groups. These results are consistent with the conclusions presented by other scholars who conducted similar studies, as in the research by Vernadakis et al. [26], the blended instruction was observed to significantly improve the students' performance compared to the traditional instruction, and in the report by Fainman et al. [15], the blended instruction performs significantly better than the implicit instruction, and it performs significantly better than the explicit instruction in the delayed test. Besides, it has also been found that in the blended instruction group, the score performance has improved step by step from the pre-test to the post-test. These conclusions highlight the fact that blended instructions may represent a new educational paradigm [50], with great potential to improve the efficiency of English pronunciation teaching in China.

Whether the English learners welcome the class which they attend is also an important factor affecting whether the instruction type can be continuous and motivating. In the questionnaire, the specific item analysis showed that except for *whether students have learned more in the class compared with others students* which showed no significant difference, in the other five items, English learners in the blended instruction group

obtained the highest level of satisfaction comparing to participants in the other groups. This may be associated with the overall application of different instruction approaches [26]. These findings are aligned with the conclusions of blended instructions used as a favorable approach to meet the language and personal needs of Malaysian undergraduate students [51].

Furthermore, the results presented in this study confirm the advantages of explicit instructions for students learning English without denying the role of implicit instructions. Rahman et al. [24] previously stated that students tend to prefer explicit instructions, but implicit instructions is still deemed as necessary. Hence, even though learners who received implicit instruction did not perform as well as the ones who received explicit and blended instruction, the method should also be considered by English teachers especially in English pronunciation class.

6 Conclusion

The implications of this study for English pronunciation teaching are as follows. Firstly, the advantages of explicit instruction in the whole process can not be fully brought into play, because the knowledge in phonetic characteristics of foreign language is not as obvious as the knowledge in vocabulary and grammar field. The explicit knowledge conveyed by teachers can not effectively help learners perceive phonetic characteristics, which hinders students from improving their actual pronunciation; Secondly, learners' implicit learning can not effectively help them perceive the phonetic features of foreign language, though it is conducive to learners' in-depth understanding of implicit knowledge. Giving that learners may not be able to pay full attention to the target phonetic features and systematically establish pronunciation awareness, a single frequency effect in implicit acquisition can not fully improve the learning efficiency, though its role in foreign language acquisition has been verified to a certain extent. In addition, in the process of implicit instruction, synthetic audio as emerging technology was used to promote the diversification of pedagogy, stimulate learners' motivation, and internalization of knowledge in pronunciation, so as to eliminate ESL teachers' non-native pronunciation challenges and the limitation and interference of mother tongue to a certain extent. Finally, by integrating explicit instruction in generalizing language rules and implicit instruction through repetitive practice, students gradually and effectively improve their pronunciation perception, pronunciation imitation and semantic cognition in learning. Furthermore, teachers should focus on collecting learners' emotional feedback in learning, and make adjustment in time in accordance with evaluation, so as to give full play to the effectiveness and efficiency of teaching.

Giving that it is a tentative study based on foreign language pronunciation teaching, the conclusion drawn requires further discussion for its universality and adaptation. For example, whether blended instruction is conducive to all foreign language courses or if it is conducive to pronunciation learning only; is there an optimal sequence and combined proportion for implicit knowledge and explicit knowledge in blended instruction; whether the sequence of implicit knowledge and explicit knowledge is universally conducive to all language courses. Since the experiments are based on administrative classes, the teacher need to continue to teach the course in accordance with the teaching plan after the experiment, therefore, only pre-test, in-term test and post-test were

carried out. If conditions permit, the delayed test could be conducted to further explore the sustainable effects of blended teaching.

Finally, teachers of today have to adapt to the constant changes brought by emerging technologies and it can be challenging to understand the best way to use them. The way teachers engage with these possibilities limit the broader uptake of modern solutions and this has a direct impact on whether it's insufficient ongoing professional development or the reluctance to accept the need for digital literacy, various challenges might get in the way we embrace these modern options. More meaningful than technology itself is the application of emerging tech-related solution that can help teachers take actions and involve these solutions to create visionary approaches to boost the performance of their students. In this study, the researcher applies synthetic audio as an example of emerging technology in teaching and learning experiments, makes improvement and optimization over the course teaching, and bridge the gap between non-native English teachers and native English teachers, further demonstrating teaching and learning enhancement in the study. By presenting impressive efficiency and satisfaction, it pushes the study into fresh stage and poses implications for individual ESL teachers who are weak in pronunciation but ready to making this attempt.

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8 References

[1] L. Pan and D. Block, "English as a "global language" in China: An investigation into learners' and teachers' language beliefs," System, vol. 39, no. 3, pp. 391–402, 2011. https://doi.org/10.1016/j.system.2011.07.011

[2] G. Hu, "English language education in China: Policies, progress, and problems," Language Policy, vol. 4, no. 1, pp. 5–24, 2005. https://doi.org/10.1007/s10993-004-6561-7

[3] M. H. J. I. J. o. S. S. Mohammed and E. Research, "Challenges of learning English as a Foreign Language (EFL) by non-native learners," vol. 3, no. 4, pp. 1381–1400, 2018.

[4] O. F. J. J. o. F. L. T. Hibatullah and Learning, "The challenges of international EFL students to learn English in a non-English speaking country," vol. 4, no. 2, pp. 88–105, 2019. https://doi.org/10.18196/ftl.4240

[5] C. Cai, "Effects of blended instruction and language proficiency on the perception accuracy of english sentence stress," Foreign Languages and Their Teaching, no. 5, pp. 100–110, 2021. https://doi.org/10.13458/j.cnki.flatt.004808

[6] T. M. Derwing and M. J. Munro, Pronunciation fundamentals: Evidence-based perspectives for L2 teaching and research. John Benjamins Publishing Company, 2015. https://doi.org/10.1075/lllt.42

[7] H. Al-Khatib, M. A. Malak, R. Sleiman, and H. Zadorian, "Difficulties that Arab students face in learning English research project," Ed: Lebanon: Arab Open University. Retrieved from: https://www.academia.edu, 2013.

[8] L. J. Mwalongo, "Learning through English language in early childhood education: A case of English medium schools in China," Journal of Education and Practice, vol. 7, no. 28, pp. 28–35, 2016.
[9] H. Zheng, Teacher beliefs as a complex system: English language teachers in China. Springer, 2015. https://doi.org/10.1007/978-3-319-23009-2
[10] H. D. Brown, Principles of language learning and teaching. Longman New York, 2000.
[11] D. Rodriguez, A. Carrasquillo, E. Garcia, D. J. I. J. o. B. E. Howitt, and Bilingualism, "Factors that challenge English learners and increase their dropout rates: Recommendations from the field," vol. 25, no. 3, pp. 878–894, 2022. https://doi.org/10.1080/13670050.2020.1722059
[12] D. Adas, A. J. I. j. o. h. Bakir, and S. science, "Writing difficulties and new solutions: Blended learning as an approach to improve writing abilities," vol. 3, no. 9, pp. 254–266, 2013.
[13] E. Macaro, S. Curle, J. Pun, J. An, and J. Dearden, "A systematic review of English medium instruction in higher education," Language Teaching, vol. 51, no. 1, pp. 36–76, 2018. https://doi.org/10.1017/S0261444817000350
[14] I. Fainman and Y. Tokar, "Explicit, implicit, and blended vocabulary instruction: Efficiency in an Aviation English Course," The Collegiate Aviation Review International, vol. 37, no. 2, pp. 110–132, 2019. https://doi.org/10.22488/okstate.19.100218
[15] A. S. Reber, S. M. Kassin, S. Lewis, and G. Cantor, "On the relationship between implicit and explicit modes in the learning of a complex rule structure," Journal of Experimental Psychology: Human Learning and Memory, vol. 6, no. 5, pp. 492–502, 1980. https://doi.org/10.1037/0278-7393.6.5.492
[16] S. Andringa, K. de Glopper, and H. J. L. L. Hacquebord, "Effect of explicit and implicit instruction on free written response task performance," vol. 61, no. 3, pp. 868–903, 2011. https://doi.org/10.1111/j.1467-9922.2010.00623.x
[17] M. H. M. Tahir, I. S. M. A. Albakri, A. H. M. Adnan, and R. Abd Karim, "The effects of explicit vocabulary instructions on secondary ESL students' vocabulary learning," 3L, Language, Linguistics, Literature, vol. 26, no. 2, pp. 158–172, 2020. https://doi.org/10.17576/3L-2020-2602-12
[18] H. Zhang, "A study on the English majors' pronunciation self-correction after imitative oral reading," M. A. thesis, Beijing Foreign Studies University, Beijing, IL, 2019.
[19] A. Godfroid, "The effects of implicit instruction on implicit and explicit knowledge development," Studies in Second Language Acquisition, vol. 38, no. 2, pp. 177–215, 2016. https://doi.org/10.1017/S0272263115000388
[20] C. A. Hughes, J. R. Morris, W. J. Therrien, and S. K. Benson, "Explicit instruction: Historical and contemporary contexts," Learning Disabilities Research & Practice, vol. 32, no. 3, pp. 140–148, 2017. https://doi.org/10.1111/ldrp.12142
[21] M. Akakura, "Evaluating the effectiveness of explicit instruction on implicit and explicit L2 knowledge," Language Teaching Research, vol. 16, no. 1, pp. 9–37, 2012. https://doi.org/10.1177/1362168811423339
[22] K. L. Z. Andrews, "The effects of implicit and explicit instruction on simple and complex grammatical structures for adult English language learners," Tesl-Ej, vol. 11, no. 2, pp. 1–15, 2007.
[23] M. J. Kemper, L. Verhoeven, and A. M. Bosman, "Implicit and explicit instruction of spelling rules," Learning and Individual Differences, vol. 22, no. 6, pp. 639–649, 2012. https://doi.org/10.1016/j.lindif.2012.06.008
[24] A. M. A. Rahman and R. A. Rashid, "Explicit and implicit grammar instructions in higher learning institutions," English Language Teaching, vol. 10, no. 10, pp. 92–101, 2017. https://doi.org/10.5539/elt.v10n10p92
[25] C. R. Tucker, "The basics of blended instruction," Educational Leadership, vol. 70, no. 6, pp. 57–60, 2013.

[26] N. Vernadakis, M. Giannousi, V. Derri, M. Michalopoulos, and E. Kioumourtzoglou, "The impact of blended and traditional instruction in students' performance," Procedia Technology, vol. 1, pp. 439–443, 2012. https://doi.org/10.1016/j.protcy.2012.02.098
[27] E. Oh and S. Park, "How are universities involved in blended instruction?," Journal of Educational Technology & Society, vol. 12, no. 3, pp. 327–342, 2009.
[28] Q. Li, J.-J. Guo, W. Liu, X.-G. Yue, N. Duarte, and C. Pereira, "How knowledge acquisition diversity affects innovation performance during the technological catch-up in emerging economies: A moderated inverse U-shape relationship," Sustainability, vol. 12, no. 3, p. 945, Jan. 2020. https://doi.org/10.3390/su12030945
[29] M. Ö. Akel Oğuz, "The effects of implicit, explicit, and blended types of vocabulary instruction on the fourth graders," Doctoral Dissertation, DEÜ Eğitim Bilimleri Enstitüsü, 2012.
[30] M. Ö. A. Oğuz and F. Çubukçu, "The effects of implicit, explicit and blended vocabulary instruction on the fourth graders' achievement," Başkent University Journal of Education, vol. 1, no. 1, pp. 48–54, 2017.
[31] G. E. Marsh, A. C. McFadden, and B. J. Price, "Blended instruction: Adapting conventional instruction for large classes," Online Journal of Distance Learning Administration, vol. 6, no. 4, 2003. [Online]. Available: https://www.learntechlib.org/p/161758/
[32] M. Schneider, "Do school facilities affect academic outcomes?," Academic Achievement, ED470979, 2002. [Online]. Available: https://files.eric.ed.gov/fulltext/ED470979.pdf
[33] Y.-M. Luo, W. Liu, X.-G. Yue, and M. A. Rosen, "Sustainable emergency management based on intelligent information processing," Sustainability, vol. 12, no. 3, p. 1081, Feb. 2020. https://doi.org/10.3390/su12031081
[34] L. Wang, G.-L. Luo, A. Sari, and X.-F. Shao, "What nurtures fourth industrial revolution? An investigation of economic and social determinants of technological innovation in advanced economies," Technological Forecasting and Social Change, vol. 161, 120305, 2020. https://doi.org/10.1016/j.techfore.2020.120305
[35] S.-Y. Zheng, S.-P. Jiang, X.-G. Yue, R. Pu, and B.-Q. Li, "Application research of an innovative online education model in big data environment," International Journal of Emerging Technologies in Learning (iJET), vol. 14, no. 8, 2019. https://doi.org/10.3991/ijet.v14i08.10404
[36] K. Yu, X.-G. Yue, A. A. Madfa, and Y.-H. Du, "Application of Problem-Based Learning Network Teaching Platform in Medical Education," vol. 13, no. 5, 2016. https://doi.org/10.1166/jctn.2016.5007
[37] T. Haikun, W. Shiying, and X.-G. Yue, "Application of big data technology in emergency decision system," 2019. Available: https://www.scilit.net/article/a08406290a0404c38a84dd8469bd9d52
[38] S. Bansal, A. Mukherjee, S. Satpal, and R. Mehta, "On improving code mixed speech synthesis with mixlingual grapheme-to-phoneme model," in Interspeech, 2020, pp. 2957–2961. https://doi.org/10.21437/Interspeech.2020-2654
[39] P. Taylor, *Text-to-speech synthesis*. Cambridge university press, 2009. https://doi.org/10.1017/CBO9780511816338
[40] J. Stepp-Greany, "Student perceptions on language learning in a technological environment: Implications for the new millennium," Language learning & technology, vol. 6, no. 1, pp. 165–180, 2002.
[41] T. J. Sefara, "The development of an automatic pronunciation assistant," Doctoral dissertation, 2019.
[42] Haikun, W. Shiying, L. Xinsheng, and X.-G. Yue, "Speech recognition model based on deep learning and application in pronunciation quality evaluation system," presented at the Proceedings of the 2019 International Conference on Data Mining and Machine Learning, Hong Kong, 2019. Available: https://doi.org/10.1145/3335656.3335657

[43] A. M. Pinto-Llorente, "Assessing the impact of a digital ecosystem to learn English pronunciation," in Research Anthology on Applied Linguistics and Language Practices: IGI Global, 2022, pp. 747–767. https://doi.org/10.4018/978-1-6684-5682-8.ch035
[44] Chivox. "How to improve the efficiency of oral English teaching with intelligent audio technology." https://www.chivox.com/sounddynamics/info.aspx?itemid=1202 (accessed September, 2021).
[45] Y. K. Thu et al., "HMM based Myanmar text to speech system," in Sixteenth Annual Conference of the International Speech Communication Association, 2015. https://doi.org/10.21437/Interspeech.2015-132
[46] S. Werner and R. Hoffmann, "Spontaneous speech synthesis by pronunciation variant selection-a comparison to natural speech," in Eighth Annual Conference of the International Speech Communication Association, 2007. https://doi.org/10.21437/Interspeech.2007-498
[47] H. Segi, T. Takagi, and T. Ito, "A concatenative speech synthesis method using context dependent phoneme sequences with variable length as search units," in Fifth ISCA Workshop on Speech Synthesis, 2004.
[48] G. Atkar and P. Jayaraju. "Speech synthesis using generative adversarial network for improving readability of Hindi words to recuperate from dyslexia." Neural Computing and Applications, vol. 33, no. 15, pp. 9353–9362, 2021. https://doi.org/10.1007/s00521-021-05695-3
[49] X. Z., L. H, and X. Z., "Adolescent students' life satisfaction: Its construct and scale development," Psychological Science, vol. 27, no. 5, pp. 1257–1260, 2004.
[50] D. R. Garrison and N. D. Vaughan, Blended learning in higher education: Framework, principles, and guidelines. San Francisco: Jossey-Bass, 2008. https://doi.org/10.1002/9781118269558
[51] S. M. Thang, et al., "A quantitative inquiry into the effects of blended learning on english language learning: The case of Malaysian Undergraduates," International Education Studies, vol. 6, no. 6, pp. 1–7, 2013. https://doi.org/10.5539/ies.v6n6p1

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