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Integrating reflection into a mobile-assisted reading program for learning English as a second language in China

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The application of mobile technology in language education is gaining increasing momentum for its potential benefits, and scholars cast attention to issues such as learner motivation, learning effects and learner behaviors in the mobile learning process. Reflection is an essential part in learning as it can record learner behaviors, cultivate self-awareness of knowledge construction, facilitate cognitive growth, and promote academic achievement. Despite of the wide approval of reflection, not much study has been done concerning the application of reflection in mobile language learning process. Therefore, this study aims to investigate students' perception of a mobile-assisted reading program facilitated with reflective activities as well as their preferences for reflection modes adopted. The participants were 60 students from two classes in a Chinese college. Students read passages on mobile applications and completed a reflection in one mode every two weeks. Four modes (paper journal reflection, e-journal reflection, audio reflection, and collaborative reflection) were adopted in the study. The study lasted approximately nine weeks. At the end of the program, all students were required to complete an anonymous questionnaire concerning their learning perception. In addition, ten students were selected randomly to attend a semi-structured interview. A pretest and a posttest were conducted to observe students' language gains. A combination of quantitative and qualitative analysis was conducted with the data obtained. Results showed students generally approved of the effect of this mobile-assisted reading and their reading proficiency improved significantly after the program. In addition, most students favored reflective practices as a good way to stimulate interest, deepen understanding and promote reflective and summarizing abilities, but they didn't consider it a good method to monitor the learning process in the mobile-assisted reading program. As for the preference for reflection mode, most students favored traditional paper reflection and audio reflection, while collaborative reflection and e-journal reflection received the least support. The findings provided implications for educators and app designers. For educators, based on the understanding of students' age, learning experience, and possible preferences, they may create a good reflective environment with technical and instructional support, and then provide two or three popular modes for students to reflect on whatever they read. For app developers, some preferable reflection modes facilitated with stimulative measures may be offered to cater to more learners to conduct reflective activities.

1. Introduction

Mobile-assisted language learning (MALL) has been widely applied throughout the world for its potential benefit in the process of language acquisition (Kacetl and Klímová, 2019; Metruk, 2021; Wang and Yuizono, 2021). Many learning applications (apps) are available for consumers with different learning purposes and at different levels.

Reflection has been commonly employed to facilitate learners' self-reflection during the learning process. They have been used to help students build connections between what they learned and what they experienced personally and further investigate students' learning habits and preferences (Chang and Lin, 2014). Scholars and educators believe that reflective learning cultivates students' self-awareness of their knowledge construction process, presents learning achievement, facilitates their cognitive growth, and promotes their academic achievement (Morrison, 1996). Traditional reflection usually takes the form of paper journals, but with the booming of mobile technology, diverse modes of reflection emerged, such as e-journal, audio reflection, video reflection, etc.

Reflection is also important in MALL as it can help learners track, reflect, share, and evaluate their flexible and autonomous learning process on MALL apps (Leinonen et al., 2016). Apps, on the other hand, are discovered to support certain levels of reflection such as extending personal experiences and sharing support or providing guidance (Renner et al., 2020). However, scholars like Kessler (2021) have also noted that many apps are restricted in function as they lay more emphasis on vocabulary acquisition, which results in rare opportunities for users to practice reflective activities. Also, the written e-journal is the usual way of reflection for the few apps that provide this function. Consequently, studies about the effect, function, and format of reflection in MALL apps are very limited, and comparisons of reflective modes in students' learning activities are even fewer. However, such activities that promote reflection are useful for learners' learning metacognitive development and language gains (Ahmed, 2020; Ramadhanti et al., 2020). Learners, on their part, also desire more functionality and more personalized feedback from apps (Fitt, 2018). Therefore, the current study aims at addressing the gap by integrating reflective activities into a mobile-assisted reading program and then investigating students' perception of the reading program, reflective practices, and the reflection modes adopted. Three research questions will be answered.

RQ1: How does the proposed mobile-assisted reading program affect students' perception and language achievement?

RQ2: How do students perceive the role of reflective practice in the proposed mobile-assisted reading program?

RQ3: Which mode of reflection is favored and disfavored by students?

2. Literature review

2.1. Mobile-assisted reading

With the increasing popularity of mobile technologies worldwide, mobile-assisted language learning (MALL) has witnessed a growing interest among researchers and educators. Compared with traditional classroom learning, MALL attracts burgeoning users because learners can facilitate their learning with online learning apps and platforms for free or at a low cost. The growing presence of MALL in education triggered the outburst of MALL research in various aspects, which includes topics such as general use, tools adopted, learning motivation, learner perception, and language skills cultivated with apps as well as MALL application issues (Kessler, 2021; Zain and Bowles, 2021).

Recent years witnessed substantial research on MALL, and many studies have focused on vocabulary acquisition. Review studies about MALL (Mihaylova et al., 2020; Peng et al., 2021) suggested that one-third or more studies that involved linguistic skill development were devoted to vocabulary, whereas reading was reported as one of the least focused skills. In addition, many studies (Hung and Young, 2015; Kacetl and Klímová, 2019; Metruk, 2021; Togaibayeva et al., 2022) have reported positive perception from students and effectiveness in promoting students' learning outcomes.

Regarding the effect of MALL application on reading, most studies reported facilitative effects such as improvement in reading proficiency, positive learning attitude, and growing learning motivation (Klimova and Zamborova, 2020). For example, Sofiana and Mubarok's (2020) research indicated that an English game-based mobile application (EBMA) had positive effects on students' reading proficiency and learning motivation. Lin (2014) suggested that students in the mobile group performed better in online activities and reading achievement and showed greater appreciation of the online extensive reading program than their PC counterparts. Valeeva et al. (2019) sought to examine Russian language learners' reading skills and perception of apps and reported improvement in students' learning satisfaction and motivation. Hazaea and Alzubi (2018) also confirmed that in the EFL reading context, participants' learning autonomy could be promoted by using selected mobile applications (instant messaging applications) concerning reading behavior and reading choice. However, some researchers obtained mixed or inclusive findings. For instance, the quasi-experiment conducted by Lin (2017) and Chen et al. (2011) both suggested that MALL

technology did not bring significant differences between control groups and experimental groups in reading comprehension.

These studies may provide aid for app developers as well as language teachers. Understanding learners' experiences may help app developers improve the functions of their products. In addition, it may benefit educators by deepening their understanding of the integration of MALL into their class design to promote students' language acquisition beyond the classroom.

2.2. Reflection and reflection mode

Reflection is an essential part of the learning process. People learn not only through the active process of gaining experiences but also through the reflective process of regaining those experiences (Kessler, 2021). Reflection helps manage the learning process as well as promote learning performance (Chen et al., 2008). Researchers have explored the nature and function of reflection from various aspects. Dewey (1933) regarded reflection as an "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends" in his experiential learning theories. Kolb (1984) further developed Dewey's theory and put forward an experiential learning model with four stages: (a) concrete experience (having the actual experience), (b) reflective observation (reflecting on the experience), (c) abstract thinking (learning from the experience), and (d) active experimentation or application (trying out what you have already learned).

Reflection is widely used in medical professions (Hwang et al., 2018; Schwendimann et al., 2018; Murillo-Llorente et al., 2021), teacher training (Kaplan et al., 2007; Conway et al., 2012; Carter and Kurtts, 2019), and education in various fields (Zhan et al., 2011; Ahmed, 2020; Jaiswal et al., 2021; Rhodes and Brook, 2021). In language acquisition, the reflective practice is believed to be a successful strategy for cultivating reflective and critical thinking. It can support students' metacognitive awareness in five domains: successes, target language linguistic features, the task, strategies, and challenges (Kessler, 2021) and promoted the reflective skills of the learners in classroom disorienting dilemmas (Carter and Kurtts, 2019). Reflective practices such as journal writing are also considered effective tools for monitoring learners' learning process. Students can monitor their metacognition growth in writing with reflective journal guidelines (Ramadhanti et al., 2020) and take responsibility for their own learning by monitoring their own learning process (Sidhu et al., 2010). In addition, reflection has also been proven effective in improving students' various language skills and performance. Researchers reported that reflective journals may help improve communication competence and reflective thinking (Shek et al., 2021), promote academic performance and organizational skills (Chang and Lin, 2014), and cultivate their writing abilities by allowing students to experience some learning moments such as engaging, surprising, challenging, perplexing, enlightening, and transferrable (Ahmed, 2020). From students' perspectives, reflective practices also influence students'

satisfaction and preferences for instructional approaches (Van Der Loo et al., 2019).

Recently technology revolution has brought a growing interest in the multimodality of reflective practice. Various representational modes are applied, such as visual, oral, or collaborative, in addition to writing journals (Yuan and Mak, 2018). Studies have also noted that the mode of reflection influences students' perception and reflection output. For example, Some students may dislike reflective writing (Power, 2012) while others may be less inclined to be video-recorded for reflection (Fakazli and Kuru Gönen, 2017).

The written reflective journal is the most frequently used reflection mode, which enables the writer to express their emotion and reflection through rereading and reorganizing their writings. Some researchers like Rolfe (1997) believed that people could access their memories and sort them out into coherent events only by writing them down and checking them. Paper journal reflection prevailed in the traditional language classroom, but in recent years, reflective e-journals grow in popularity and are reported to aid students' metacognitive development (Kessler, 2021) and improve organizational skills and writing abilities (Chang and Lin, 2014). Some other researchers, however, were concerned with the possible negative influences of journal writing, such as the inability of students to express their reflections clearly and deeply (Brodie, 2007) and the difficulties in assessing those journals (Chan and Luo, 2020). Audio and video reflection emerged with the development of mobile technology, and they are often used in the field of teaching training and other vocational training. The audio reflection is often considered less demanding and intrusive compared with the video reflection journal (Bergman, 2015), and it is also reported more mobile in facilitating expressions than diaries and more flexible in expressing thoughts genuinely than the video reflection (Fitt, 2018). But other studies suggested that the audio reflection might not be carefully planned (Myers et al., 2017) and time-consuming (Bolliger and Armier, 2013). For video reflection, it is reported to enhance students' metacognition and encourage teachers' reflection (Hargis and Marotta, 2011). However, researchers also discovered that video recording might lead to unnatural behavior of learners and anxiety in front of the camera (Fakazli and Kuru Gönen, 2017). Collaborative reflection differs from individual reflection in that it can help learners perceive things from different perspectives and deepen their reflection based on others' shared experiences (McKenna et al., 2009). More importantly, it may help learners come up with solutions to problems that are not likely to be inspired by individual reflections (Fakazli and Kuru Gönen, 2017). Compared with other modes such as diaries or videos, collaborative reflection received fewer negative perceptions from students (Fakazli and Kuru Gönen, 2017; Prilla et al., 2020). However, some studies also reported problems with collaborative reflection such as distraction and awkwardness (Epler et al., 2013).

However, despite wide approval of the effectiveness of reflective practices, studies investigating the facilitation of critical self-reflection activities in MALL applications are limited (Chang and Lin, 2014). In addition, the related research in this field usually focuses on the effect

of reflective e-journals, while literature comparing the different modes of reflection remains lacking (Chan and Wong, 2021). Besides, the limited research about mode preference usually focused on fields of vocational training such as teacher training or medical training (Rolfe, 1997; Shoffner, 2009; Falk-Ross, 2012; O'Reilly and Milner, 2020), with little attention on the terrain of language acquisition. Another problem with research on reflection mode is that they often arrived at inconsistent findings. For example, Bye et al. (2009) examined the reflection using an online discussion forum and reported a preference for technology-based reflection over traditional written reflection among younger students. Yet Chan and Wong (2021) compared students' perception of four reflective modes and discovered a preference for face-to-face reflection and traditional written reflection over audio and video reflection. In addition, several unanswered questions remain, such as what modes of reflection are applicable and favored by students in a mobile learning environment and how students perceive such reflection as a method for process management. The current study aimed to investigate students' understanding of the effect of reflective practices and preferences for various reflection modes in mobile language learning from students' perspectives.

3. Materials and methods

3.1. Experimental setting and participants

This experiment was conducted in two classes majoring in Translation and English, respectively, in Dalian Polytechnic University in 2020. The two majors belonged to the School of Foreign Language. Both two majors aimed to cultivate English talents for social demand. For students majoring in English, they were expected to learn English and various professional skills to undertake English-related professions in the future. For students majoring in Translation, they were expected to grasp English and translational skills to take on translation-related work in the future. As the two majors enrolled students with a requirement for language proficiency (minimum score requirement for language in the Entrance Examination), we considered that most students in the two classes had satisfactory knowledge of English. In addition, since the COVID-19 pandemic in 2020 caused the shutdown of face-to-face education twice in the university, online learning *via* computer or mobile devices was widely adopted as a crisis-responding method. In such situations, mobile learning was frequently used as a supplement to or a part of class instructional activities with more acceptance from students. Sixty students participated in this research, including 53 women and 7 men; Most participants were women because language majors were generally more popular among women than men. They were all college students in their first year and had learned English for over 6 years. The average age of students was 18.7 and the standard deviation was 0.64. All participants possessed a minimum of one smartphone, providing the foundation for the study.

3.2. Resources

One online learning platform Chaoxing was required for all participants as they were supposed to upload their reflections online. Chaoxing (Figure 1), an online learning platform developed for teachers and students, provides a good channel for students's autonomous study and assisted students' learning outside the class.

Regarding the smartphone applications for reading, TED and Baicizhan Love Reading were recommended. TED (Figure 2), an application specializing in speeches, shares speeches of various kinds with learners. Another application, Baicizhan Love Reading,[1] offers students diverse reading materials, such as stories, journal articles, reading comprehension passages, poems, novels, and speeches, to read or listen to. This application also provides passage ranking for students to choose appropriate articles as well as the shadowing function for students to practice pronunciation. However, it is noted that students still have a right to choose other reading applications they like.

3.3. Procedure

The experiment began in October 2021 and lasted about 9 weeks (Figure 3). It was divided into three stages.

In the first week, the students were informed about this experiment's purpose and procedure. They were required to download the necessary smartphone applications and online learning platforms. In addition, a pre-test (see detail in section 3.4) was conducted among all participants on their reading proficiency in the first week. Later, every 2 weeks, the students were asked to read two articles on the application and then complete one reading reflection in one mode assigned by the teacher. After 8 weeks, the students completed four reflections in four different modes in order: paper journal, e-journal, audio reflection, and collaborative reflection. For the traditional paper journal, the students completed their reflections on paper and handed them in. For the e-journal, the students wrote their reflections in digital forms and then uploaded them to the Chaoxing platform. For the audio reflection, the students recorded their reflections with mobile devices and uploaded them to the Chaoxing platform. For the collaboration reflection, students were divided into 7 or 8 groups with 4 or 5 people in each group. For each group, each student read an article on the application individually and then reported what they read and reflected to other members. Later, they chose one or two best articles for group presentation through discussion. Their group presentation included their discussion process, reasons for their choice, and the article they chose. Then, the students uploaded their group reflection output (presentation) online, in written form or audio form, and shared their work with other groups.

After the final week (ninth week), a post-test (see detail in section 3.4) was conducted to see whether the reading proficiency
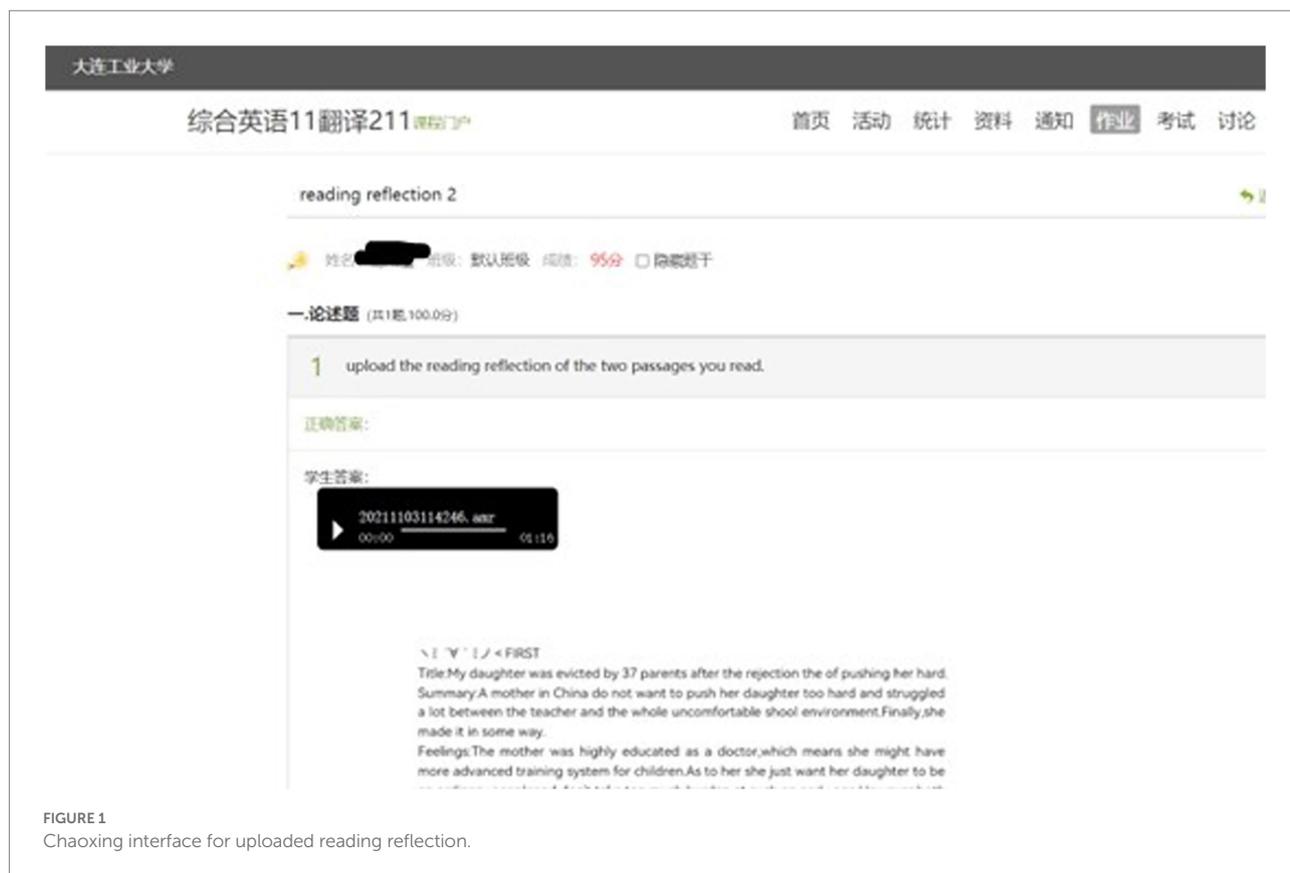
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1 https://www.baicizhan.com/

FIGURE 1
Chaoxing interface for uploaded reading reflection.

of participants improved. In addition, a questionnaire about students' perception and a semi-structured interview were conducted to see their perception of this mobile reading program and preferences for reflection mode.

3.4. Data collection

Data from the questionnaire, the pre-test and the post-test, and the semi-structured interview were collected in this experiment.

The pre-test and post-test were all composed of three passages taken from College English Test 4 (College English Test or CET is a national English test in China that examines the English proficiency of undergraduate and postgraduate students in China. It includes two levels: CET4 and CET6). Passages in the two tests were different, but participants finished the same passages in each test. The tests consisted of two kinds of reading passages. The first two passages were standard reading comprehension passages with five multiple-choice questions for each, designed to test their understanding of details. The third passage, designed to see their textual and vocabulary understanding, required participants to fill in ten blanks to complete the passage by choosing from 15 given choices. The total scores for both tests were 20 for 20 questions.

The questionnaire, designed by the researcher and composed of 6 multiple-choice questions and 10 5-point Likert scale questions, inquired about students' perception of the

mobile-assisted reading program and reflective practices as well as mode preference (Appendix A.1). The questions contained four categories. The first category consisted of two basic questions. The second category consisted of four questions concerning students' perception of this mobile-assisted reading program. The third category contained eight questions probing into students' perception of the effect of reflection in the learning process. The last part consisted of two questions related to students' preferences for reflection mode.

The semi-structured interview was conducted based on students' responses to this mobile-assisted reading and reflective practice. Five interview questions (IQ) formed the foundation of the interview (Appendix A.2). The students answered the interview questions in Chinese after the experiment, and the teacher recorded their answers, and then transcribed and translated them into English.

3.5. Data analysis

Data analysis adopted a mixed method of quantitative and qualitative research.

The first source of data was the two test scores, which were analyzed qualitatively and quantitatively. For qualitative data, a descriptive analysis of score comparison was made between the two tests including the average score, the highest and the lowest score, and the score range. For the quantitative analysis, an
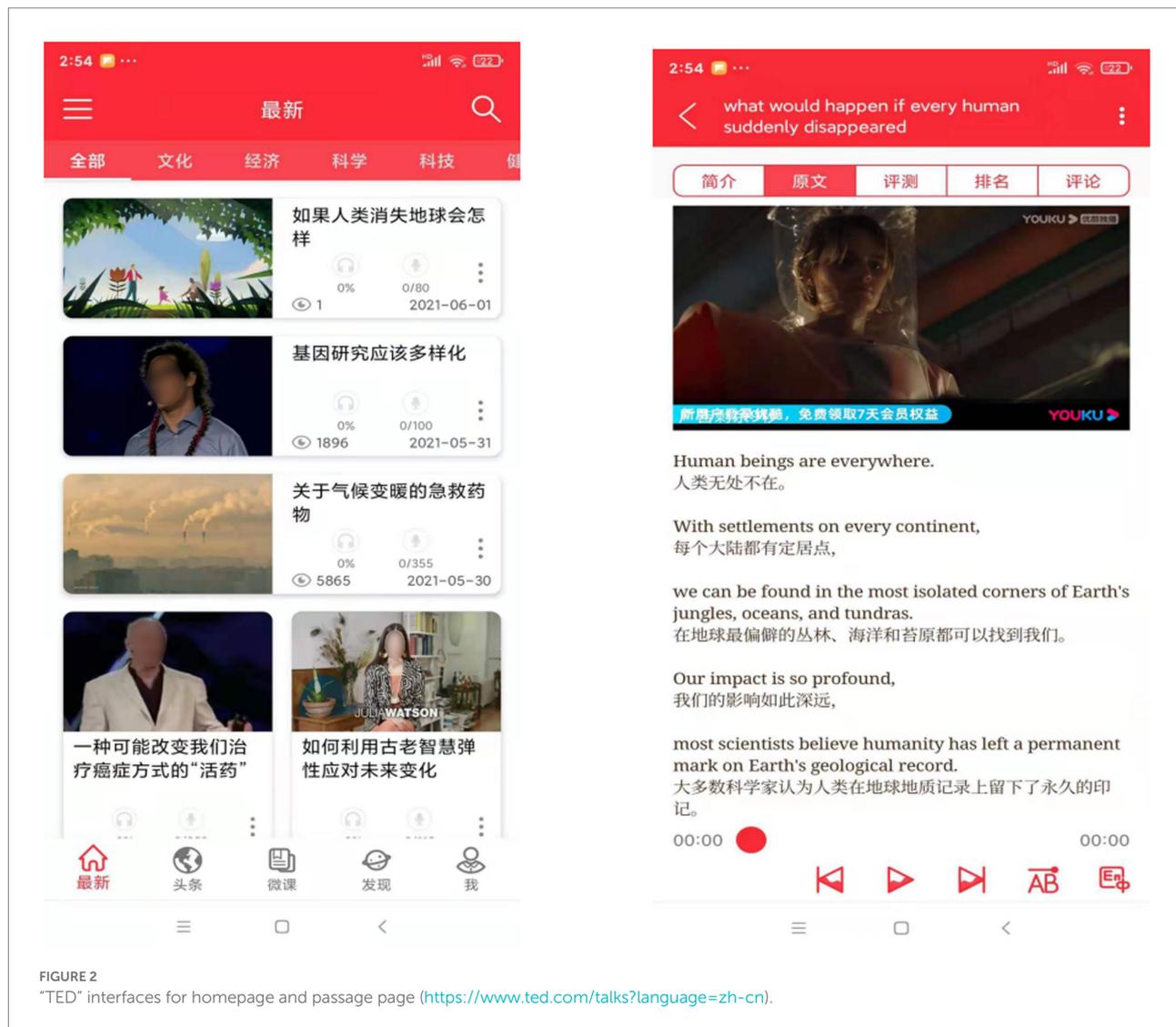
FIGURE 2
"TED" interfaces for homepage and passage page (https://www.ted.com/talks?language=zh-cn).
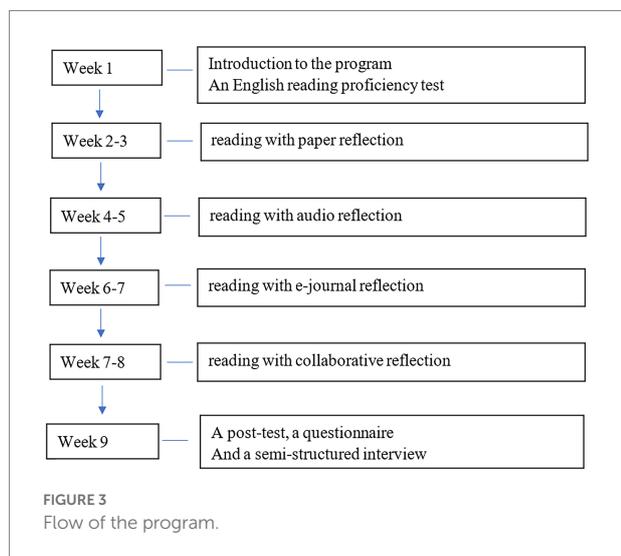
FIGURE 3
Flow of the program.

independent *t*-test and Chi-square tests were employed to check whether gender influenced grade deviance. In addition, a paired *t*-test and effect size calculation was adopted to investigate whether there existed significant differences between the two test scores.

The second source of data was the data from the questionnaire, which was analyzed by both quantitative and qualitative methods. In the first stage, quantitative analysis was employed for the ten Likert Scale questions. One-sample Wilcoxon signed rank tests were conducted to examine whether the intervention of this mobile-assisted reading program affected students' perception. In addition, Chi-square tests were conducted again to examine whether gender differences would affect students' perception. In the second stage, qualitative analysis was adopted for all 16 questions (scale questions and multiple-choice questions) and descriptive data were obtained about students' perception and preferences.

FIGURE 4
Comparison of pre-test and post-test scores (***P<0.001).

TABLE 1 Perception of the effectiveness of the mobile-assisted reading program.

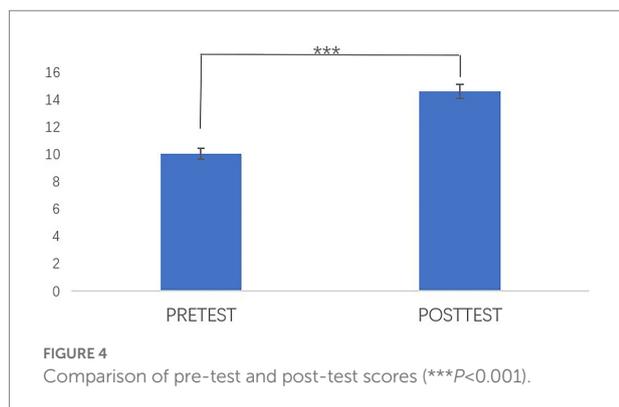| Item	N	M	SD	Null hypothesis (NP)	Sig.
Q3	60	4.00	1.105	The median of Q3 equals 3	0.000***
Q6	60	2.73	1.260	The median of Q6 equal 3	0.088

***$p < 0.001$.

The third source of data was the interview data, which was analyzed qualitatively. As the interview was composed of five questions, answers to each question were coded and recurring themes were identified among students' responses. Then the researcher examined the transcription carefully to locate subthemes or categories through repeated ideas. The main themes were generally derived from students' general perception and subthemes were from students' explanations for their perception.

4. Results

4.1. Test results

The scores of the pre-test and post-test were computed and analyzed with SPSS software. An independent t-test was conducted first to investigate whether gender influenced grade deviance among male and female students. The result showed that the p-value for both tests (0.110 and 0.079) were above 0.05, indicating that there were no significant differences in grades between male students and females in both the pre-test and post-test.

Then score differences between the pre-test and the post-test were analyzed. The average score of the post-test (14.6) was 4.55 points higher than that of the pre-test (10.05). Besides, the lowest score (6) and the highest score (20) in the post-test were all higher than those (4 and 19) in the pre-test. Also, the pre-test scores ranged mainly from 6 to 12 while the post-test scores ranged mainly from 8 to 18.

In addition, a paired t-test was conducted and the result revealed a significant difference in scores between the two tests

($p < 0.001$, $t = -8.057$; Figure 4). Besides, the effect size of the two test scores was calculated. Cohen's d value was 1.28, an effect size showing that the average students scored significantly better in the post-test than in the pre-test.

4.2. Results of the questionnaire and the interview

The internal consistency and reliability of the questionnaire were tested by Cronbach's alpha coefficient. The result was 0.813, showing a high internal consistency of results from the 10 scale questions. In view of the disproportion of female students to male students, Chi-square tests were conducted to examine whether gender differences would affect students' perception of the reading program as well as reflection. The result revealed that the Pearson Chi-square significance value was above 0.05 for all 10 scale questions, showing that gender was not significantly related to any of the questions.

4.2.1. Mobile-learning habit

Regarding their frequency of mobile reading(Q2), data from the questionnaire showed that 21 students (35%) read three times a week and 20 students (34%) read daily. Only five students (8%) read less than three times a week. This revealed that the students had accepted and formed a habit of mobile learning.

4.2.2. Students' perception of this mobile-assisted reading program

For Likert scale questions in the questionnaire (Q3 and Q6), one-sample Wilcoxon signed rank tests were conducted to examine whether the intervention of this mobile-assisted reading program affected students' perception (Table 1). Since the questions were 5-point Likert scales, the null hypotheses were that the median score was 3, which indicates a zero effect of the intervention process. Results showed that for students' general evaluation of this program(Q3), the null hypothesis was rejected at a significance level of 0.05 ($p = 0.000$), indicating students considered this program effective. But for their understanding of the need for process management or supervision by teachers (Q6), the null hypothesis was not rejected ($p = 0.88$), indicating that students regarded process management as ineffective.

For questions concerning the perception of this mobile-reading program in the questionnaire (from Q3 to Q6), a descriptive analysis was made to explore students' understanding. Regarding general opinions about the effect of mobile-assisted reading(Q3), 42 students (70%) approve of the learning effect of this mode, 12 students (20%) remained neutral and another 6 students (10%) expressed disapproval. In their learning gains (Q4), 33 students (55%) believed they improved in speaking and listening. Also, 24 students (40%) thought their reading proficiency was improved. Only nine students (15%) believed their writing ability got improved. For future use (Q5), 42 students (70%) of students expressed their willingness to employ this mode in the future study, while six students (10%) expressed their objection. As to the necessity of teachers' supervision or process

TABLE 2 Perception of the effectiveness of reading reflection.

Item	N	M	SD	Null hypothesis (NP)	Sig.
Q7	60	3.57	1.155	The median of Q7 equals 3	0.000***
Q8	60	3.42	1.253	The median of Q8 equals 3	0.014*
Q9	60	3.85	1.117	The median of Q9 equals 3	0.000***
Q10	60	3.90	0.969	The median of Q10 equals 3	0.000***
Q11	60	3.85	1.482	The median of Q11 equals 3	0.000***
Q12	60	4.15	1.039	The median of Q12 equals 3	0.000***
Q13	60	3.53	1.455	The median of Q13 equals 3	0.011*
Q14	60	3.87	1.186	The median of Q14 equals 3	0.000***

*$p < 0.05$, ***$p < 0.001$.

TABLE 3 The positive effect of reflection.

	1	2	3	4	5
Q7	2(3.3%)	9(15%)	19(32%)	13(22%)	17(28%)
Q8	5(8%)	9(15%)	17(28%)	14(23%)	15(25%)
Q9	2(3.3%)	6(10%)	12(20%)	19(32%)	21(35%)
Q10	1(17%)	4(7%)	13(22%)	24(42%)	18(30%)

1, strongly disagree; 2, disagree; 3, neutral; 4, agree; 5, strongly agree.

management measures in the mobile-assisted reading program(Q6), 23 students (38%) expressed disapproval while 15 students (25%) lent support to it. Another 22 students (37%) remained neutral.

In the interview, the students were asked to explain their opinions about the necessity of process management or supervision (IQ1). Three themes were identified concerning students' perception: (a) positive perception; (b) negative perception; (c) neutral perception. Seven students supported reflection as a way of monitoring the learning process and one disagreed with it. Another two students thought that depended on students' interests or preferences.

For students who supported process management, two subthemes were identified among their responses: (1) multifunction of mobile devices; (2) loose supervision of the check-in service.

S3: I think it is necessary. Mobile devices serve various functions such as watching films or communicating with others. Therefore, if students do not have strong self-control, they might indulge themselves in playing on mobile devices rather than devote themselves to reading on apps (1).

S4: Necessary. Without proper supervision and management, students may skip the reading for various reasons such as negligence or lack of time (2).

S6: If students are required to check-in only, maybe they will only do the check-in without reading the passage (2).

For students who disfavored process management, two subthemes were identified among their responses: (1) the freedom to study at will; (2) convenience and casualness.

S1: I do not think you need to supervise this learning process intentionally. One advantage of mobile reading is that it allows students the freedom to study at will. Convenience and casualness, two main features of mobile reading, are thus lost under supervision in mobile reading (1, 2).

For students who remained neutral, two subthemes were identified: (1) the interest; (2) the preference of individual students.

S2: That depends. Well, if one is interested in it, he does not need to be monitored (1).

S5: That depends. Some people like reading by nature while others dislike reading since they were young. In addition, different people favor different kinds of reading passages (1, 2).

4.2.3. Students' perception of the effect of reflective practice

For Likert scale questions in the questionnaire (Q7–Q14), one-sample Wilcoxon signed rank tests were conducted to examine whether the intervention of reading reflection affects students' perception (Table 2). Results showed that for all eight questions, the null hypotheses were rejected at a significance level of 0.05, indicating that students perceived the reading reflection effective in the learning process.

For questions concerning the perception of reading reflection in the questionnaire (from Q7 to Q14), The researcher still adopted the descriptive analysis. The first four questions were related to the positive effect reflection may bring to students (Table 3). For the stimulative effect in learning (Q7), 30 students (50%) reported a positive effect of this mode upon stimulating reading, 11 students (18%) said it had little effect, and 19 students (32%) remain neutral in attitude. For the learning interest (Q8), 29 students (48%) stated that their interest had been promoted, while 14 students (23%) reported disagreement and another 17 students (28%) remained neutral. For passage understanding (Q9), 40 students (67%) agreed that their reflective journals helped them understand passages better, while 8 students (13%) disagreed with the opinion and another 12 students (20%) remained neutral. For the reflective and summarizing abilities (Q10), 42 students (70%) held that they had developed their reflective and summarizing abilities by completing reflections, but 5 students (8%) disagreed. Another 13 students (22%) remained neutral.

The next four questions were about the possible negative influence of reflection (Table 4). Regarding reading skills or knowledge (Q11), most students (70%) thought it helped improve their reading skills or knowledge, while 14 students (23%) expressed disapproval. Regarding the study load (Q12), 46

TABLE 4 The negative effect of reflection.

	5	4	3	2	1
Q11	31(52%)	11(18%)	4(7%)	6(13%)	8(10%)
Q12	29(48%)	17(28%)	10(17%)	2(3%)	2(3%)
Q13	21(35%)	15(25%)	8(13%)	7(12%)	9(15%)
Q14	22(37%)	20(33%)	10(16%)	4(7%)	4(7%)

5, strongly disagree; 4, disagree; 3, neutral; 2, agree; 1, strongly agree.

students (77%) agreed that it was not a heavy study load, and only 4 students (7%) considered it a heavy load. For the inconvenience of operation (Q13), 36 students (60%) of students thought uploading and typing were not troublesome while 16 students (27%) held it inconvenient. Regarding the necessity of discussion after reading (Q14), 42 students (70%) thought discussion after reading was necessary, but 8 students (14%) held opposite opinions. Another 10 students (16%) remained neutral.

In the interview, two themes were identified: (a) positive perception; (b) negative perception. Most of them (nine students) considered it a useful experience in the learning process with one student disapproving of this practice. For students who supported reflection after reading, five subthemes were identified among all reasons: (1) promotion of passage understanding; (2) understanding of their learning; (3) deepening the memory; (4) internalization of knowledge; (5) accumulation process in reading.

S1: If you only read without reflection, then you only receive the message in the article, nothing else, without any meaning (1).

S2: Reflecting on the words or texts can enhance or promote the understanding of the article, a very important part (1).

S3: If the reflection is not a required task, I think it would be beneficial. You can help yourself understand the writer's message better and help us understand our thoughts better (2).

S4: I thought reflection may deepen our memory about what we read. Nowadays we receive all kinds of messages and we are likely to be forgettable more than ever (2).

S5: Reflection is the internalization of knowledge, which can help us better understand the structure and inner meaning of the passage (4).

S6: If you do not write a reflection, you will not know how much you remember or how much you understand (3).

S7: Reflection is part of the reading process, in my opinion, an accumulation process. It is necessary as I will not know what I read after one day if I did not make any reflection (3, 5).

Only one student expressed negative perception of reflection in reading. She attributed it to the fact that the type of materials she read did not inspire deeper thought in her.

S9: I dislike reading reflection. The news I read did not lead to deep impressions and reflection.

4.2.4. Students' preferences for reflection mode

In the questionnaire, two questions were asked concerning students' preferences for reflection modes. Regarding their favorite mode (Q15), the most preferred mode was traditional paper journal (27 students, about 45%), and audio reflection came next (19 students and 32%). E-journal (7 students, about 12%) and collaborative reflection (12 students, about 20%) gained relatively low popularity. As to their least favored mode (Q16), the most unpopular mode was collaborative reflection (26 students, about 43%), and e-journal and audio reflection came next (12 students, about 20%).

In the interview, students were also asked to rank the four modes of reflection and explained their choices. Paper journal reflection received unanimous positive comments whereas e-journal reflection generally received negative comments from interviewees. Collaborative reflection and audio reflection both received a mixture of positive and negative comments.

For paper journal reflection, four themes were identified among students' responses: (a) deeper memory and thought; (b) spelling practice; (c) casualness and convenience; (d) internalization of knowledge.

S3: I prefer paper journals the most. I can record what I read and deepen my memory through it. Also, paper reflection can convey your thoughts better. In addition, writing things on paper is more casual and real than typing them on screens (a, c).

S4: I like paper reflection the most. I feel it is convenient and kind of ceremonial (c).

S5: I prefer paper reflection the most, and audio reflection comes next. I think the two are similar in that they are the organization or internalization of knowledge in our minds (d).

S10: I prefer paper journals. Paper reflection helps practice spelling. Paper reflection and audio reflection can be combined to practice multi-skills such as listening, speaking, and spelling (b).

For collaborative reflection, six themes were identified: (a) sharing of ideas; (b) sense of participation; (c) promotion of understanding. But some problems were also identified: (d) problems with reading materials; (e) time and place (f) the engagement problem.

S1: I like collaborative reflection the most. It involves the sharing of ideas among different group members. The fierce discussion and the clash of ideas will benefit group members a lot (a).

S2: I think the best one would be collaborative reflection. Well, because in the process of discussion, you may think about the problem from your perspective and other people's perspectives. Such activities bring a sense of participation. In all, we may promote our understanding by being exposed to various thoughts and understandings (a, b, c).

S4: People read different articles, which makes it hard to discuss and reflect. Also, the time and the location of discussions are problems worth our attention. We need to find the proper time and places that are acceptable for all group members (d, e).

S7: For collaborative reflection, if all members can record their opinion for sharing and then make a summary after the discussion, it will be beneficial. But if only the person who is responsible for the presentation does the work, it will not be effective in promoting reading (f).

For audio reflection, three themes were identified among all ideas: (a) adaptability (b) multi-functions; (c) location constraint.

S2: I think talking will be more logical than writing. For audio reflection, you can redo it or reorganize it if your feel certain part is not satisfactory or perfect. You can also revisit it after some time to see your previous ideas (a).

S10: paper reflection and audio reflection can be combined to practice multi-skills such as listening, speaking, and spelling (b).

S4: If you reflect by recording your understanding, you must consider the location problem. For example, the library will not be a good place to make audio reflection (c).

For e-journal reflection, most students (9) regarded it as the least favored mode and one student did not give a response to it. Six themes were identified among all ideas: (a) spelling problems; (b) depth of reflection; (c) impersonality; (d) uselessness; (e) storage problems; (f) inconvenience.

S2: The last one would be e-journal reflection because it is more impersonal. if you always rely on it, then you may forget how to spell words (a, c).

S3: For typing, you will always consider what you will say next during the typing process, and I kind of dislike it (b).

S4: The problem with it is that we may delete the reflection we stored in the smartphone or mobile devices or lost it because we forget where we store it (e).

S5: E-journal reflection is the least preferred mode for me. One problem with it is the prompting function. The other is that typing is not suitable for long passage reflection as I cannot figure out the logic between paragraphs when typing. I feel typing is only suitable for short notes, not long reflections (a, b,).

S7: E-journal reflection is not useful (d).

S8: Typing is inconvenient on mobile devices (f).

4.2.5. Students' perception of problems and suggestions in the program

In the interview, participants were also interviewed about problems they encountered in the mobile reading program. Four themes were identified among their responses: (a) distraction; (b) difficulty in finding suitable reading materials; (c) cultural differences; (d) lack of interest.

S1: The distraction problem. Mobile devices perform various functions such as communication, entertainment, work, and study. Then it is hard for you to focus on reading with such multi-function devices. There are also too many learning resources online and it is hard to find suitable reading materials (a, b).

S4: The most serious problem for me is the vocabulary problem, which greatly hindered passage understanding (b).

S5: The thinking logic and ways of expression are different between English and Chinese, which also caused trouble for the passage understanding (c).

S2: As we are busy in study or other things, we do not spare too much time reading those stuff. People are not very interested in it, to be honest (d).

Then students were invited to give some suggestions to cope with those problems. Three themes were identified among all suggestions: (a) the way of reflection (b) the requirement of reflection; (c) the choice and scaffolding of articles.

S1: For reading reflection, I think it can start from individual reflection by reflecting on what you gain and get from the passage. Then a group discussion may be held for a group reflection to understand from different perspectives. After that, a class reflection may be carried out to summarize the different ideas for inspiration. Such a multi-layer reflection process will benefit a lot I think (a).

S3: I think in each group, group members can make a mini presentation about what they read so that others can have a rough understanding of it and maybe develop an interest in the book later. Also, besides written reflection or presentations, we can use video materials to complement the reading process (a).

S5: I recommend a gradual learning process starting from writing fragmented short notes. After some practice, students may start to write long reflections with logic (a).

S4: I think for reading reflection, requirements like time and length should not be stipulated. Students should be encouraged to write at will (b).

S6: I think if reflection is a voluntary activity, not a compulsory assignment, we may enjoy the process more and participate more actively in it (b).

S3: My suggestion is that we should give students more choices on the kinds of articles they read. Different students may prefer different kinds of stories (c).

S10: I think it is useful to add some comprehension questions for the reading articles (c).

5. Discussion

5.1. Students' perception and language achievement

For RQ1 (How do the proposed mobile-assisted reading program affect students' perception and language achievement), the results of the questionnaire, tests, and interview revealed the effect of this mobile reading program upon students' perception and language achievement.

For students' perception, questionnaire results indicated that students (42 students, 70%) generally considered the mobile-assisted reading program effective in improving their language skills. Speaking (33, 55%), listening (33, 55%), and reading (24, 40%) were three major areas of improvement. In addition, as high as 70% (42 students) believed that they would employ this mode for future study, with 10% disapproval of future use. This positive attitude indicates huge potential for mobile-assisted reading. At the same time, students also reported some problems encountered in this mobile learning program such as distraction, and difficulty in finding suitable materials, etc. in the interview.

For students' language achievement, it could be observed from the analysis of test scores. Students' language achievement improved in terms of the average score, the lowest score, the highest score, and the score range. The paired *t*-test result indicated a significant difference between the two scores. In

addition, the effect size of the two test scores is about 1.2, significant enough to indicate improvement for average students.

The results provided evidence that the mobile reading program or reflective practices might contribute to the cultivation of students' reading proficiency. It is somehow consistent with other previous literature (Schwendimann et al., 2018; Klimova and Zamborova, 2020). However, we are aware that the improvement can be caused by other factors due to the experiment design. First, allowing for the equality of educational opportunities, there is no control group in the program. As a result, the improvement might be the result of multiple factors such as class instruction, gains from other English classes, mobile reading, or students' autonomous learning. Second, the two tests did not adopt the same comprehension passages. Although the passages were all taken from CET 4 (College English Test 4), the slight variation in difficulty might influence students' test scores.

5.2. Students' perception of reflection in this mobile-assisted program

For RQ2 (How do students perceive the role of reflective practices in this mobile-assisted reading program), the results of the questionnaire and interview revealed how students perceived reading reflection in the learning process.

Concerning students' perception of the need for process management and supervision in the mobile-assisted reading program, the questionnaire reported a mixed result: 38% (23) in disagreement, 25% (15) in agreement, and 37% (22) in neutrality. The interview results also indicated that many students recognized the importance of reflection in the mobile reading process but disproved its role as process supervision by teachers. All these showed monitoring or supervision by teachers such as journal writing was not considered necessary in mobile reading. This conclusion partially concorded with Bulpitt and Martin's (2005) study that guided reflection and reflections under supervision are variable processes so they may not bring help to learners. However, scholars like Sidhu et al. (2010) also indicated that reflective journal was useful in helping students monitor their learning. As for this function, future studies may explore more flexible ways to integrate diverse reflective methods and forms into the assessment to achieve better learning results without giving students too much pressure.

In terms of perception of the stimulation and learning interest, questionnaire data showed roughly 50% (30) held that reflective practices were effective in stimulating reading and improving their learning interest, with about 20% (12) disagreement. In addition, almost 70% (42) of all students believed that reflection promoted passage understanding and helped cultivate their reflective and summarizing abilities. This is in accordance with previous research that reflective journal is beneficial for SLA purposes, especially for cognitive development in the writing and reading process (Chang and Lin, 2014).

As for the possible negative influences of reflection upon learning, students, however, did not report being greatly affected by the questionnaire. For example, 42 students (70%) agreed reflective journal improved their reading skills or knowledge. In addition, over 36 students believed (above 60%) that completing reflection is not a heavy load and the operation of typing and up-loading is not inconvenient. Furthermore, discussion after mobile reading is also considered important (about 42, 70%).

In the interview, students presented five reasons for their approval of reflection in mobile reading: (1) promotion of passage understanding; (2) understanding of their learning; (3) deepening the memory; (4) internalization of knowledge; (5) accumulation process in reading. Only one student disapproved of it for the lack of deeper reflection in the passages read.

These findings from the questionnaire and the interview were in line with most previous research that positive perception of reflection overwhelmed negative perception among students (Rolfe, 1997; Bulpitt and Martins 2005; Shoffner 2009; Kessler, 2021). Common negative views such as extra workload (Kessler, 2021), boredom, and consumption of time and effort (Rolfe, 1997; Bulpitt and Martins 2005) were not reported in this study.

5.3. Students' preference for reflection mode

For RQ3 (which mode of reflection is favored and disfavored by students), the questionnaire results revealed students' preferences. For the most favored mode, the top two were paper journal reflection (27 students, 45%) and audio reflection (19 students, 32%).

In the interview, students explained their preference for various modes of reflection. For paper journal reflection, they favored it for reasons such as deeper memory and thought, spelling practice, casualness and convenience, and internalization of knowledge. Some students further suggested a combination of paper journals and audio reflection to practice multi-skills during the reading process. This preference aligned with the research of Fortunati and Vincent (2014) about the preference for paper writing over e-writing because students considered paper writing as being more multi-sensorial and metacommunicative than the use of the keyboard or screen. But very few studies have examined the perception of different modes of reflective practices in mobile reading, esp. the comparison of paper journal reflection with other modes of reflection, which made the study unique in this aspect. This research result was partially consistent with Ross' study (2012) of preservice teachers' use of various modes of reflection that students preferred printing because of its easy access to reviewing the reflection compared with video or recorded reflection. Shoffner (2009) also discovered that the type of technology preservice teachers chose for reflection was primarily based on familiarity rather than challenge or novelty for new learning.

Concerning the audio reflection, students favored it for its adaptability as students noted they could make the recording at any place or time and then repeat the recording process until satisfied. Students also mentioned another benefit of audio reflection as being able to practice speaking, listening, and writing at the same time. Fitt (2018) suggested that Audio recording is more mobile in expressing thoughts and emotions than diaries. Leinonen et al. (2016) also described audio recording as ease of operation and time-saving. However, studies that examined the use of audio recording as a reflective approach in classrooms are very limited as students in this study suggested the primary benefit of audio reflection was the practice of speaking skills rather than the cultivation of metacognitive skills. In addition, some of the audio reflections in this study might lose spontaneity as students wrote down their reflection content first and then recorded it several times, as was noted by Chan and Wong (2021) that students were so conscious of the recording process that they carefully considered and planned the recorded reflection.

For the most disfavored mode, the top two were collaborative reflection (26 students, 43%) and e-journal/recorded journal (12 students, 20%). As audio reflection was confirmed as one of the top two favorite modes in both the interview and the questionnaire, we here considered collaborative reflection and e-journal as the two least favored modes.

For the unpopularity of the collaborative reflection, students reported the problem of engagement as most of the reflection output could be done by one group member. Others reported it was hard to discuss and reflect as they read different materials in collaborative reflection. Also, the time and location of the discussion were a problem worth our attention since they needed to find time and place that were acceptable for all group members. Yet interview results also showed that students noted the necessity of collaborative reflective activities such as discussions or group work after reading, which was consistent with findings of previous studies that collaboration in reflective practice led to shared experience and easy reflection (Shoffner, 2009; Falk-Ross, 2012; Fakazli and Kuru Gönen, 2017; Chan and Wong, 2021). Two reasons might account for the negative attitudes of students in this study. Firstly, the passages students read on mobile applications were diverse and it was hard for them to have a thorough discussion. In addition, the design for collaborative reflection required students to upload their reflective process and output online, which might bring extra load and inconvenience and then discourage students. As Shoffner (2009) indicated convenience was regarded as one of the key factors for students' choice of reflection mode. Future research may continue utilizing the potential of collaborative reflection by constructing a more convenient and motivating collaboration design allowing for better communication and group engagement.

For dissatisfaction with e-journals, lack of practice in spelling, and less reflection ranked the top two reasons. These findings echoed partially with Lee (2020) that e-writing on smartphones led to reduced production and limited students' abilities to express themselves fully. Yet the finding was in contradiction with Chan

and Wong's discovery (2021) about the preference for reflective e-journals over audio and video reflection. The researcher attributed the discrepancy to the fact that most students in this research lacked the experience of digital writing and editing as they were students in the first year and were novel to online writing and editing generally. Another possible explanation for it might be the influence of age and learning stage as participants in this study were students majoring in English in the first year and their age differences were not distinct whereas participants in Cecilia's study involves students from Year 1 to Year 4. Previous studies reported that experienced learners may consider writing as a more effective way to reflect on oneself while novice learners may be more inclined to audio and video reflection (Bye et al., 2009; O'Reilly and Milner, 2020).

5.4. Implications of reading reflection and reflection modes

Findings about students' perception of and preference for reflection are significant for app developers and educators.

Few MALL apps currently offer reflective activities for their users, despite learners' desires for scaffolding, reflection, and personalized feedback on their learning process (Kim et al., 2016). Those who provide the reflection function provide simple ways to conduct reflective activities (such as notetaking or e-journal). This makes the integration of convenient, reflection-type activities into MALL possible and promising. Studies about the effect of reflection modes adopted by Apps are few. As revealed in the current study, the reflective activities could add functionality as well as simultaneously help learners reflect and recollect what they experienced and learned. Therefore, app developers might consider experimenting with proper modes of reflective practices to stimulate reflection and cultivate the target user's interest and stickiness. Firstly, some preferable modes may be offered to cater to more learners to conduct reflective activities. As recording, video, or picture of paper journals are easy to handle and upload, those modes might be given more opportunities in app designing. Secondly, we also believe encouragement or stimulation may be offered for good reflection learners accomplished, which may lead to a personalized environment and stronger stimulation in learning, eventually resulting in user stickiness (Petsilas et al., 2020).

Apart from app developers, such insights into the perception of reflection and reflection mode may also help teachers in designing reading programs. Reflection was not always a positive experience. As revealed in this study, nearly 30% of the students disapproved of it. Therefore, from the perspective of teachers, the development of a reflective environment is of great importance and appropriate support (technical and instructional) should be provided before and during the learning process (Bulpitt and Martin, 2005; Falk-Ross, 2012). As also indicated in this study and previous studies, convenience and familiarity are priority factors students consider in their choice of reflection mode (Shoffner, 2009). Accordingly, If teachers wish to facilitate

students' learning in MALL with reflective practices, then unlike traditional singular reflection requirement (paper journal or e-journal), teachers, based on the understanding of students' learning experience and possible preferences, may provide two or three popular modes (such as traditional paper journal, audio reflection or collaborative reflection) for students to reflect on whatever convenient channel to them (Shoffner, 2009; Falk-Ross, 2012; O'Reilly and Milner, 2020). In addition, teachers may take the learners' age or learning content into consideration and suggest more appropriate modes for students since previous studies indicated that learners with different ages/levels may prefer different kinds of reflection modes (O'Reilly and Milner, 2020). Thirdly, teachers should be cautious when adopting reflection as a supervision or process management method since many students still preferred mobile reading as a kind of autonomous study and did not like to be controlled or supervised as findings in this study indicated. Accordingly reflective tasks can be flexible in times, length, and forms to allow for freedom on students' part. For example, the frequency may be a semi-frequent, bi-monthly basis, or even more sparing basis (Ahmed, 2020; Kessler, 2021). Fourthly, As students in the interview reported difficulties in finding suitable resources and reading without purpose, some scaffolding and recommendations can be given for mobile reading programs such as the topic range and understanding questions, which may help students concentrate and grasp the reading materials better (Ahmed, 2020; Jarvis and Baloyi, 2020). Fifthly, some positive comments toward collaborative reflection in the interview showed that reflection should be interactive, but improper design or implementation may lead to unsuccessful communication and collaboration. Therefore, collaboration reflection should be designed carefully in advance to suit the program and students. For example, students suggested in the interview collaboration should be implemented at different levels (personal level, group level, and class level). Also, some constructive scaffolding questions may be provided as the basis for discussion as previous studies indicated (Jarvis and Baloyi, 2020). Sixthly, records of students' learning behavior on apps can be collected and used. This kind of data was not included in this research, but previous studies revealed that the intention to use check-in services in mobile English learning was positively related to usage behavior as well as students' attitudes and behavioral control in mobile learning check-in service (Cheon et al., 2012; Nie et al., 2020). Therefore, the researchers believed that the adoption of such data could help teachers understand students' usage behavior on apps and then adjust the program for better learning effects.

6. Conclusion

The current study investigated college students' perception of mobile reading and reflection as well as their preferences for reflection modes in a mobile reading program. Its findings revealed that learners generally considered mobile reading

programs beneficial for their language learning process. The reflective practices adopted can stimulate their learning interest, promote understanding, and cultivate reflective and summarizing abilities without a heavy study load and inconvenient operation. Yet students did not consider reflection a good way of process management and supervision. The most favored journal mode is paper journal reflection and audio reflection, while collaborative reflection and e-journal reflection remained the least two favored reflection mode. Based on students' perception of reflection and reflection mode in the mobile reading, some implications were put forward concerning the application of reflective activities in app design and course design. For app developers, some preferable reflection modes facilitated with stimulative measures may be offered to cater to more learners to conduct reflective activities. For language teachers, based on the understanding of students' age, learning experience, and possible preferences, they may create a good reflective environment with technical and instructional support, and then provide two or three popular modes for students to reflect on whatever they read.

Due to limited literature about learners' perception of reflection in mobile learning, this study enriched current literature about the applicability of various reflection modes from learners' perspectives. The findings could help educators design and implement programs in which reflection functions as a vital component of promoting learning. The findings could also enlighten app developers on integrating reflective activities in their apps.

The present study is limited in several aspects. Firstly, the study did not adopt a comparative study of the control group and the treatment group, which makes the analysis of students' learning gain less rigorous. Secondly, the study mainly investigated students' attitudes toward different modes of reflection, but the content and quality of reflection were not analyzed. Thirdly, data about students' learning behavior was not collected. Fourthly, the sample size was not large enough and participants were limited to students in language majors with more females than males.

Given the limitations, future research may invest more attention to the effect of different reflection modes on various language skills as well as cognitive skills.

Future studies may further investigate the adoption of a comparison group and data about learning behaviors on apps to better understand students' learning achievement and usage behavior. Also, worth investigating is the implementation of mobile reading programs for a larger group of gender-balanced participants in a wider variety of majors.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the Life-Science Committee of JAIST. The patients/participants provided their written informed consent to participate in this study.

Author contributions

FW and TY: conceptualization and project administration. TY and EK: methodology. T-YW and FW: software and formal analysis. FW, TY, and EK: validation. YL: investigation, resources, and visualization. T-YW and YL: data curation. FW: writing—original draft preparation. TY and T-YW: writing—review and editing. EK and T-YW: supervision. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc. 2022.1067523/full#supplementary-material

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Appendix A.1

Questionnaire
  Basic Information
1.   What is your gender?
  Male Female
2.   How frequent do you read English via smartphone or other mobile devices per week?
  A.   once   B. twice   C. three times   D. four times
  E.   five times   F. everyday
3.   Do you think the mobile reading program via smartphone applications im-proved your language abilities in certain aspects?
  Strongly disagree   1   2   3   4   5   strongly agree
4.   In which aspects do you think you improved your language ability?
  A.   Reading   B. writing   C. speaking   D. listening E. none
5.   When the program finish, will you like to continue this kind of reading prac-tice.
  A.   Yes   B. No   C. I am not sure
6.   Do you think mobile reading programs of this kind need certain management and supervision from teachers or from other personnel?
  Strongly disagree   1   2   3   4   5   strongly agree
7.   reading reflection is effective in motivating me to read more English passages.
  Strongly disagree   1   2   3   4   5   strongly agree
8.   Reading reflection stimulates my learning interest in reading.
  Strongly disagree   1   2   3   4   5   strongly agree
 9.   reading reflection help me better understand the passage I read.
  Strongly disagree   1   2   3   4   5   strongly agree
10.   Reading reflection help me improve reflective and summarizing ability.
  Strongly disagree   1   2   3   4   5   strongly agree
11.   Reading reflection do not help improve my reading ability or knowledge
  Strongly disagree   1   2   3   4   5   strongly agree
12.   Writing Reading reflection imposes much burden on my study.
  Strongly disagree   1   2   3   4   5   strongly agree
13.The operation of typing and uploading reflection is troublesome.
  Strongly disagree   1   2   3   4   5   strongly agree
14. Communication and discussion after reading is unnecessary for mobile read-ing.
  Strongly disagree   1   2   3   4   5   strongly agree
15. Which mode of reading reflection do you most prefer?
  A.   Paper reflection   B. digital reflection
  C.   audio reflection   D. group discussion and presentation
  Reason:_____ _____
16. Which mode of reading reflection do you least prefer?
  A.   Paper reflection   B. digital reflection
  C.   audio reflection   D. group discussion and presentation
  Reason:_____

Appendix A.2

Interview Questions
Do you think certain process management or supervision measures by teachers such as regular journal writing is needed for a mobile reading program or just daily check-in on Apps will be enough for mobile reading?
Do you think reflection after the mobile reading is useful?
3. Please give a rank of preference for the four modes of reading reflection and explain reasons for your belief.
4. What is the main problem/complaint you had about this reading program or the reflection practices?
5. Any suggestions for the program and for the mode of reading reflection?