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Exploring English newspaper reading of Chinese college English majors in mobile-assisted language learning

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Abstract: With advances in mobile technology, mobile devices have been widely applied in language learning. English newspaper reading apps are emerging language learning tools for Chinese English majors. However, little has been published on reading in mobile-assisted language learning (MALL) environments. Studies of English newspaper reading are limited to the classroom environment. To explore English newspaper reading in MALL, this study analysed the features of English newspaper reading apps, usage patterns, and users' language learning strategies by adopting both quantitative and qualitative methods. This research found that (1) apps incorporating multimedia technology mainly provide vocabulary instruction. Most English majors prefer English newspaper reading apps with explanations; (2) Learners tend to use WeChat as the main reading platform instead of utilising apps in combination; and (3) The most frequently used strategies by English majors are affective strategies, while the least frequently used strategies are social strategies, although most English newspaper reading apps support collaborative learning. The study is expected to inspire the design of English newspaper reading apps and the reform of the English newspaper reading course.

Keywords: English majors; English newspaper reading; language learning strategies; mobile-assisted language learning

1 Introduction

In the era of 5G, mobile-assisted language learning (MALL) is on the cutting edge of online language learning (Han & Gao, 2020). Mobile applications designed for out-of-classroom language learning have been used on an unprecedented scale (Rosell-Aguilar, 2017). While in-class practice is limited in time and place, mobile applications extend language learning beyond the classroom and learners can access online

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resources anytime and anywhere. These changes brought about by mobile technology require digital language learners to employ appropriate language learning strategies (LLS) in this emerging context (Pawlak & Oxford, 2018; Zhou & Wei, 2018).

In the golden age of information, English newspapers are regarded as useful materials for learning English. The latest news on various topics arouses students' interest and boosts their vocabulary learning in an authentic context. In China, English majors are required to take the English Newspaper Reading Course, where students enhance their ability in text analysis, thinking and view-presenting (Duanmu, 2006). As technology develops through leaps and bounds, out-of-classroom English newspaper reading via mobile devices is available for most students, thus extending their opportunities to read beyond textbooks.

However, there has been little analysis of this newly emerging form of language learning in the context of mobile-assisted language learning. To address this gap, this study focuses on the out-of-classroom mobile English newspaper reading of English majors by approaching it from the perspective of both technology and language learners. The features of English newspaper reading apps were evaluated to shed light on the affordances they provide to language learning. Learners' usage patterns of English newspaper reading apps were examined to understand what apps English majors choose, how often they utilise the apps and what types of content they prefer. It helps inform the design of language learning apps that are expected to be in tune with the needs and preferences of learners. Learning strategies were also explored to probe into the process of English newspaper reading in MALL. It is hoped that this research will contribute to the improvement of newspaper reading applications, as well as a deeper understanding of strategy usage in MALL.

2 Literature review

2.1 MALL

MALL is defined as 'the use of smartphones and other mobile technologies in language learning, especially in situations where portability and situated learning offer specific advantages' (Kukulska-Hulme, 2018, p. 743). Its advantages boil down to the following four aspects: the ubiquity of the device, mobility in time or space, individualised experience and interaction and collaboration (Klopfer et al., 2002; Kukulska-Hulme, 2009). Flexibility and portability allow learners to capitalise on mobile devices in both formal and informal language learning settings (Kukulska-Hulme, 2021). While a majority of studies have concentrated on the measurable benefits gained from merging technology with classroom instruction, the self-

initiated use of mobile phones for language learning is underexplored (Demouy et al., 2016; Ma, 2016; Stockwell, 2013).

Up to now, several studies have confirmed the generally positive outcomes of MALL (Burston, 2015; Burston & Giannakou, 2022; Chen & Jia, 2020; Elaish et al., 2019; Hwang & Fu, 2019), particularly in vocabulary acquisition (Duman et al., 2015). In contrast, reading and writing activities supported by mobile technology have not been examined thoroughly (Chen & Jia, 2020; Hwang & Fu, 2019; Şad et al., 2022). For example, featuring the functions of push mechanisms, subscription services and group chatting, the social communication app WeChat has been integrated into English reading courses (Jiang et al., 2016). It was found that WeChat provided a platform for English majors to improve their reading abilities, as average scores and the highest and lowest scores were raised in the post-test. However, the underlying promotive factors in the process leading to improvement have not been explored. The evaluation of technological affordances is needed to provide more evidence of how the design of mobile applications supports language learning. Meanwhile, language learning strategy is warranted to provide insights into the process of reading.

Few studies have evaluated language learning apps in a systematic way (Burston, 2014). Kim and Kwon (2012) analysed various Android and IOS applications for MALL from the aspects of “content and design”, “L2 approaches” and “technology”. They found that vocabulary apps constituted the majority of English as a Second Language (ESL) apps and that there was a lack of opportunities for collaborative learning. Rosell-Aguilar (2017) classified apps into three types, namely, apps designed for language learning, apps not designed for but useful for language learning and a separate category for dictionaries and translators. He also provided a framework for evaluating language learning apps, consisting of four categories: language learning, pedagogy, user experience and technology, each with several criteria. The study raised the question of whether owning a mobile device means the competence to select and use apps accordingly. Given the discrepancy between the instructional design of applications and the actual use of learners reported in previous research (Chwo et al., 2018; Gao & Shen, 2021), it is essential to survey when and how they utilise apps to study an L2 in addition to the evaluation of apps from the technological perspective.

2.2 Language learning strategies in MALL

Language learning strategy is a notion close to learners’ hearts. According to Rubin (1975), strategy means ‘the techniques or devices which a learner may use to acquire knowledge’ (p. 43). To explore common features in previous definitions, Oxford (2017) conducted a content-analytic study of the previous 33 definitions and provided an encompassing definition of LLS. According to her, second language learning

strategies are complicated, dynamic actions and thoughts. Learners apply them in specific contexts with consciousness so as to adjust factors like cognitive, affective and social. Meanwhile, Oxford's (1990) classification was regarded as superior and comprehensive (Chamot, 2004). Strategies were divided into direct strategies (memory, cognitive and compensation strategies) and indirect strategies (meta-cognitive, affective and social strategies). The Inventory for Language Learning (SILL), based on this classification, is still the most frequently used (Pawlak, 2021).

Given the importance of strategy in the language learning process, it is imperative to investigate specific strategy usage in the context of MALL, which is in need of further research (Hwang & Fu, 2019). While studies have shown that students use cognitive and metacognitive strategies to facilitate mobile language learning (García Botero et al., 2019; Ma, 2017; Zhang & Pérez-Paredes, 2021), far too little attention has been paid to the affective strategies used in self-directed language learning assisted by mobile technology (Lai et al., 2022). Different from the strategies utilised in teacher-led classrooms, those in self-directed MALL by Chinese postgraduate students involve observable satiation and emotion control strategies (Gao & Shen, 2021). Since technology was regarded as a holistic concept in this study, what is not yet clear is strategy used in a more concrete context, such as reading via mobile devices (Gutiérrez-Colón et al., 2020). Auer (2014) investigated metacognitive and cognitive strategies employed by seven Danish high school students in reading via iPad, as well as the technological features that support strategy usage. According to Zhou and Wei (2018), reading strategies in a technology-enhanced environment are scaffolded by “platform design or software programming” (p. 474). Therefore, the affordances of English newspaper reading apps will feed into the analysis of strategy usage in the mobile-assisted language learning context. This study first evaluates the English newspaper reading apps on which the language learning strategy questionnaire is based.

2.3 English newspaper reading

English newspaper reading and teaching can be traced to 1932, when the Newspapers in Education (NIE) programme was sponsored in America. Newspapers were introduced to the classroom as a type of “living textbook”. In Japan, Kitao (1995) applied newspaper reading to ESL learning. A series of practical exercises was designed to help comfortable English newspaper reading. In Malaysia, it was found that students’ vocabulary grew with good absorption after using English newspapers as learning material for a full month (Parilia & Katemba, 2019).

As a global programme, NIE also has a profound impact on China. Wu (2013) illustrated the successful application of NIE in China in the *21st Century*, a high-quality English newspaper designed for students. A handful of studies were

carried out to evaluate the feasibility of English newspaper reading in learning English. Wei (2012) pointed out that resourcefulness, conciseness and multi-mode make English newspapers a pivotal tool in English reading. The integration of English newspaper reading and comprehensive English courses proved effective, as both formative and summative performances showed good outcomes (Song et al., 2015). However, Zhang (2018) criticised the fact that the print material in the course of English newspaper reading is not updated enough, thus dampening students' enthusiasm. In addition, through searching the CNKI (China National Knowledge Infrastructure) database for CSSCI (Chinese Social Sciences Citation Index) papers, it was found that studies about English newspapers have been sparse since 2017 and the electronic version of English newspapers deserves further investigation.

The current study goes one step forward from the learners' perceptions and the devices used in the learning process. As indicated in the above review, it is noticeable that there is a dearth of studies on reading in MALL. One key contributor is that reading material like books may not fit a small screen, mobile and time-fragmented situation well (Duman et al., 2015; Lai & Zheng, 2018; Luo & Shi, 2022), thus failing to attract the attention of researchers in MALL. However, the current English newspaper in electronic version is a suitable material because of its appropriate length, timeliness and edibility. However, studies of English newspaper reading are limited to the teacher-led classroom, without considering the radical change brought about by advancing mobile technology. To address this gap, this study aims to address the following research questions (RQs):

RQ1: What are the features of English newspaper reading apps?

RQ2: What are the English majors' usage patterns of English newspaper reading apps?

RQ3: What learning strategies do English majors use to read English newspapers in the context of mobile-assisted language learning?

3 Methodology

3.1 Participants

The participants were 122 English majors from Chinese universities. Those who lacked previous experience reading English newspapers in MALL were excluded. The remaining participants ($N=102$) consisted of 17 males and 85 females. At the time of the study, almost half of the participants were sophomores (21.6 %) or juniors (23.5 %). Freshmen and seniors accounted for the same percentage of survey takers (26.5 %). The remaining two were students in their fifth academic year.

The participants were chosen because several factors were at play. For one thing, compulsory courses in English majors include intensive reading, extensive reading and newspaper reading. Through these courses, students increase their reading ability and learn some basic reading strategies from professional teachers, thus paving the way for English reading in an informal environment. Furthermore, English majors spend more time and energy learning English after class than their counterparts, whether out of the teacher's requirements or self-discipline. Meanwhile, mobile devices contain numerous apps that offer them colourful learning resources. Therefore, they are considered to have more experience with technology-based newspaper reading, an innovative way of learning English.

3.2 Instruments

A questionnaire was designed to explore the way students engaged with newspaper reading apps and the learning strategies they utilised. The design of the strategy questionnaire was based on Oxford's Strategy Inventory Language Learning (SILL) 7.0, a version targeting ESL/EFL learners. Items were tailored to the specificities of English newspaper reading apps that had already been fully evaluated. What's more, to ensure an accurate understanding of those items, questions and statements were presented in Chinese, the native language of participants.

The questionnaire consisted of four sections. The first section contained participants' basic information, i.e., gender and grade, and asked them to fill in the blanks the English newspaper reading apps they used. The second section was related to the way English majors interacted with reading apps, with items designed based on Rosell-Aguilar (2018). The third section utilised a 5-point Likert scale of learning strategies. Participants were asked to answer each statement with "never or almost never true of me" (1 point), "usually not true of me" (2 points), "somewhat true of me" (3 points), "usually true of me" (4 points) or "always or almost always true of me" (5 points). The averages between 3.5 and 5.0 mean that the frequency of strategy use reaches a high level. Strategies with averages between 2.5 and 3.49 were used at a medium level. Averages below 2.5 represent a low frequency of strategy use. The final section was an open-ended question asking the subjects to share their user experiences or problems with English newspaper apps. This questionnaire had a high Cronbach's alpha value (0.889), indicating good reliability. The Kaiser–Meyer–Olkin index was 0.784, higher than 0.6, and the *p* value of Bartlett's test was less than 0.05, meaning that the data is suitable for factor analysis. With factor loadings from 0.432 to 0.84, six factors were extracted through principal component analysis, explaining 73.669 % of the total variance of the 20 items (see Table 1). All of the extraction communalities were higher than 0.5. In other words, the variables fit well with the factor solution.

Table 1: Descriptive statistics on English majors' strategy use in English newspaper reading ($N=102$).

Categories	Items	Mean	SD	Cronbach α (=0.889)	Factor loadings
Cognitive strategies	1. I mark words and expressions or add them to favourite	3.43	0.99	0.74	0.820
	2. When I use English newspaper reading apps, I take some notes	3.03	1.16		0.823
	3. I use words, phrases and sentences acquired from English newspaper reading apps	3.11	0.91		0.593
	4. I summarise the reading contents in my hearts while reading	3.20	0.90		0.724
	5. I distinguish facts and opinions of the author while reading	3.20	0.90		0.720
	6. I form my own opinions towards the topic after reading	3.32	0.89		0.676
Memory strategies	7. I recite words by means of visual images and sounds	3.38	0.90	0.76	0.741
	8. I make use of the vocabulary list or other vocabulary-related function to recite words	3.33	0.99		0.760
	9. I classify contents in favourite according to topic to facilitate memory	2.95	1.05		0.654
	10. I review what I have learned during English newspaper reading	2.81	0.92		0.476
	11. When encountering unknown words and complex sentences, I guess their meaning based on context	3.37	0.81	0.80	0.749
Compensation strategies	12. When encountering unknown words and complex sentences, I guess their meaning based on structure	3.19	0.88		0.815
	13. When encountering unknown words and complex sentences, I guess their meaning based on background information	3.36	0.82		0.735
	14. I make plans to read English newspaper via apps	2.97	0.95	0.74	0.610
Metacognitive strategies	15. I allow notification of English newspaper reading apps or its function of reminder	2.99	1.05		0.736
	16. I can focus on reading on paragraph without distraction	3.26	0.84		0.432

Table 1: (continued)

Categories	Items	Mean	SD	Cronbach α (=0.889)	Factor loadings
Affective strategies	17. I have used various English newspaper reading apps to increase interest	3.25	0.94	0.64	0.840
	18. I prefer to English newspaper reading apps whose layout is clear and concise	3.68	0.97		0.700
Social strategies	19. I share my feelings in the comment section or the app-related WeChat group	2.34	1.09	0.78	0.758
	20. I ask other users or teachers questions via WeChat after reading	2.51	1.04		0.840

3.3 Data collection

The first step was to evaluate mainstream English newspaper reading apps. Given that learners adopt strategies based on the artefacts they own (Gao & Hu, 2020), English newspaper reading apps were systematically reviewed to gain insight into their features. The analysis was based on the evaluation framework proposed by Rosell-Aguilar (2017).

Five apps were filtered by searching both iOS and Android App Store with the key phrase “English newspaper reading” by March 2022. Downloads, rankings and views of each article were used for selection, as they reflect popularity and representativeness. English newspaper reading apps were categorised into two groups based on the taxonomy proposed by Rosell-Aguilar (2017). One group was reading apps designed for learning English, such as Liuli Reading and Shanbay Reading, in which words and expressions are explained by editors in some way. The other are apps not designed for but useful to language learners. News is released on these apps without many annotations, such as Sixth Tones, which offers content regarding contemporary China through news reports. WeChat and Bilibili also belong to this category, which serves as platforms that allow official accounts or uploaders to provide English newspaper reading material. It should be noted that WeChat, as a multi-function platform supporting communication and social networking, is widely used in the implementation of MALL in China (Luo & Shi, 2022). All subjects were downloaded and reviewed carefully. By comparing and contrasting, the major features of these apps were obtained, thus laying the groundwork for the questionnaire design.

After the pilot study, an online questionnaire was distributed, and 122 responses were collected. Among these participants, 20 students without any experience with English newspaper reading apps were excluded. Therefore, 102 valid questionnaires were finally received, and the response rate was 83.6 %.

After collection, three students (S1, S2 and S3) from different grades were interviewed, since they expressed their willingness in the questionnaire. Each interview lasted for 10–15 min. Participants were asked to explain their strategy utilisation in detail and were encouraged to share their user experiences with English newspaper reading apps.

4 Results and discussions

4.1 RQ1: what are the features of English newspaper reading apps?

As can be seen from the Appendix I, English newspaper reading apps mainly deal with vocabulary instruction. The meaning of words and expressions is essential to current text analysis, which is in the form of audio, video or just text. Conjugations, collocations and example sentences are also supplemented. Students are able to grasp the meaning of words in authentic texts and learn to use them. This finding is consistent with that of Heil et al. (2016), who found that vocabulary instruction was the main instructional focus. In addition, the problem of learning vocabulary in isolated units is solved by using English newspaper reading apps. With regard to technical support (see Appendix IV), the hover translation included in most apps is convenient for users to consult for the meaning of words on mobile phones. The floating window offers learners quick access to the entries of the dictionary, freeing them from the technical constraints discussed in Lai and Zheng (2018). According to their research, learners are limited to choosing laptops when tapping authentic learning resources due to the ease of switching between windows when referring to a dictionary. Apart from the hover translation, keywords can be highlighted and added to favourites, and the review is scheduled automatically, greatly facilitating vocabulary acquisition. In short, vocabulary can be well acquired by English newspaper reading apps, as sufficient explanations, contexts and technological support are provided.

In contrast, other aspects of language learning do not receive enough attention. First, as shown in Appendix I, grammar instruction, if any, is limited to syntax parsing. This is reasonable since mobile-assisted language learning is informal. Given the constraints of time and attention span, grammar instruction is used to foster understanding of the passage rather than to introduce related language points systematically. Second, there is a lack of in-depth structural analysis. A mind map is presented in the post-reading section to show the overall structure of the passage, but detailed explanations for the paragraph structure are rarely involved. Lastly, topic-

related analysis accounts for only a small portion. Admittedly, improvements have been found in previous reading apps studied by Kim and Kwon (2012), as background information is available in the lead-in section. However, an insightful analysis of the topic and content is generally lacking. In line with evidence from previous research (Hwang & Fu, 2019), the cultivation of higher-order skills, such as critical thinking, and interdisciplinary knowledge received scant attention in the MALL.

Another feature is the incorporation of multi-modality, which is manifested from Appendix II. This accords with Huang's (2021) finding that multimedia technology has been widely applied in foreign language teaching. When using English newspaper reading apps, learners can read the text while listening to the audio file. In apps such as Shanbay Reading, the paragraph is highlighted in sync with the recording. Pictures are attached to articles and matched to the meaning of words, thus visualising abstract concepts. A mind map is also utilised to illustrate the structure of passages. What's more, text editors often use video to supplement background information, as it is a good combination of auditory and visual modality. Interestingly, uploaders on Bilibili present the whole article and their analysis in the form of video rather than merely regarding it as a supplement to the text analysis. Print modality is also frequently employed, such as italics, bold and various colours. Such a variety of modalities raises a higher requirement for layout design.

According to Appendix III, collaborative learning is now available in English newspaper reading apps. Following the end of the text is the comment section, where readers post a list of words and expressions they acquired and ask editors questions about language learning. The WeChat group also provides the opportunity for collaborative learning, just as Liuli Reading exemplifies. However, this feature has not been described in previous studies. This may be explained by the fact that applications are always updating and that previous apps may not support such a function.

4.2 RQ2: what are English majors' usage patterns of English newspaper reading apps?

To investigate learners' usage patterns of English newspaper reading apps, answers to what and how they read in the environment of MALL were obtained through a questionnaire.

Participants were asked to choose apps or platforms they used to read English newspapers. They were allowed to select one or more choices. According to Figure 1, WeChat is by far the most popular, selected by 74.5 % of respondents. This was followed by apps exclusively designed for English newspaper reading, which were

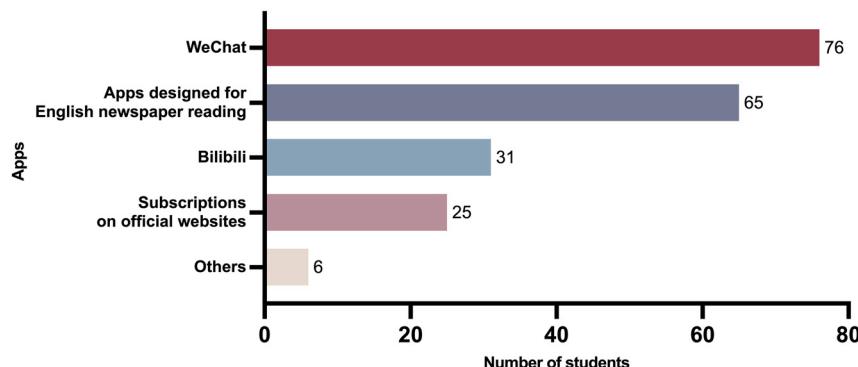


Figure 1: Apps used to read English newspapers.

used by almost two-thirds of the participants (63.7 %). Bilibili and website subscriptions are less frequently used as means to read English newspapers, with 31 (30.4 %) and 25 (24.5 %) users, respectively. Other apps include comprehensive language learning apps, such as Kekenet, which occasionally provide articles from the foreign press. Students also showed a preference for the use of WeChat, for example:

I'd like to read an English newspaper via WeChat. It's much more convenient to read on a frequently used app than to install a new app just for learning. (S3)

I download a lot of reading apps, but WeChat is used more frequently. When I check updates on it, the push media reminds me to read some articles. (S1)

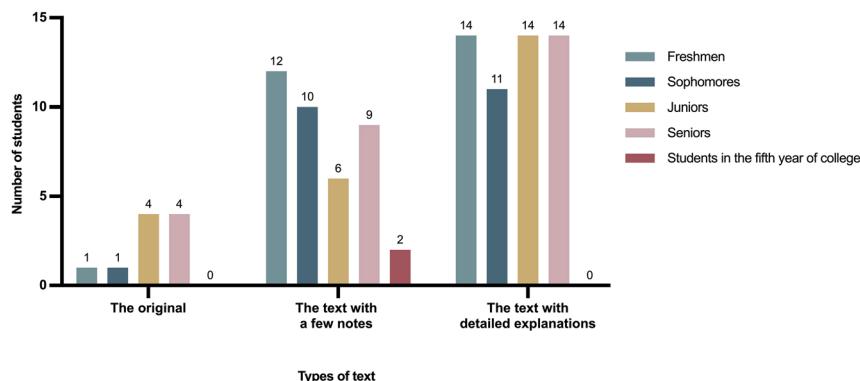


Figure 2: Preferred types of text.

The selection of texts was also examined and categorised according to the different academic stages of the students (see Figure 2). According to the data, almost half of the users (52 %) read passages explained in detail (e.g., background information, vocabulary or grammar). The original attracted only a handful of students, 10 % of all participants. Neither freshmen nor sophomores showed preference in terms of the elaboration of explanations, while students at higher academic stages preferred detailed analysis.

During the interview, the juniors expressed the need for the analysis of long and complicated sentences, while the sophomores were likelier to read the original. A possible explanation for this might be that elementary learners require adequate input in the target language. However, as students step into a higher stage, an analysis may be required to facilitate understanding.

I prefer to read the text with annotation because some points in the English newspaper are too complicated to understand. Annotations related to words or cultural backgrounds facilitated my understanding. I don't need to stop reading to refer to other sources. (S1)

The above statement is as opposed to the statement below:

I think reading the original can improve my comprehension abilities. Notes are quite unnecessary, as some just explain the meaning in Chinese. (S3)

Students were also asked how often they read English newspapers via mobile devices (see Figure 3). From the bar chart below, we can see that the majority of the survey takers (76 out of 102, 75 %) read at least once a week. Among them, there were 12 consistent users, almost reading on a daily basis. Two-thirds of students who read every 2 or 3 days are freshmen or seniors. In contrast, juniors reading weekly outnumber students of other grades.

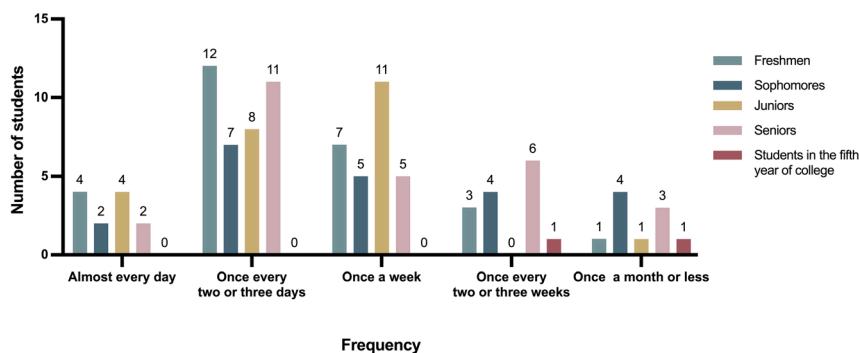


Figure 3: Frequency of the use of English newspaper reading apps.

4.3 RQ3: what learning strategies do English majors use to read English newspapers in the context of MALL?

Regarding the language learning strategies used in English newspaper reading, social strategies are the least used among English majors, while other strategies are all used at a medium level. Generally, the willingness to engage in discussion is low ($M=2.34$, $SD=1.09$) and only 17 % learners indicated “usually true of me” or “always or almost always true of me”. In contrast, collaborative learning is now available in most apps, as identified in the evaluation of apps. Additionally, a lack of common topics was shown to lead to the least positive engagement in social communication (Lai & Gu, 2011), while the concern does not exist in this context where learners share the topic of authentic reading resources. In effect, disagreement can be attributed to the following factors. For one thing, a lack of differentiation regarding learners’ proficiency levels is detrimental to the efficiency of communication. S3 reported that:

I used the app Liuli Reading. The app creates a chat group on WeChat for every 500 users. I find it difficult to take part in discussions because people in the group from all walks of life have different degrees of proficiency in English. Later, I tried Shanbay Reading. The target learners of each passage are marked in that app and the comment section is set after the end of the text. It's more convenient for me to communicate with others and more beneficial to learn from people whose English is at a similar level.

For another, poor management of the learning community discourages engagement. This observation also matches that of Jing (2020), who reported that learners complained of the management of the WeChat group and requested guidance from educators. S2 held a negative attitude towards the WeChat group:

Group administrators usually organise an activity to raise our interest and upload learning materials, but it's really annoying to see their advertisement for the English learning courses of the app. Administrators just raise questions related to the topic of daily reading, like a robot, but seldom actually lead us to discuss the topic deeply.

Similarly, the results show a lack of interaction in asking questions ($M=2.51$, $SD=1.04$), despite the fact that communication is convenient with almost no restrictions on time and place, with the benefit of mobile technology. Currently, apps provide instant feedback on technological questions, while questions raised in the process of reading are not paid much attention to, thus undermining students’ motivation. These results echo previous findings that learners do not actively communicate with others in an out-of-classroom learning setting and prefer to engage in social interaction oriented towards problem solving (Lai et al., 2018).

Affective strategies were the most frequently used strategies in this questionnaire. Students expressed a strong preference for a clear and concise interface design ($M=3.68$, $SD=0.966$). Positive emotions triggered by the design can make reading more enjoyable. In addition, item 18 is concerned with the comprehensive use of apps. Its mean value was above 3.0, indicating that students could utilise English newspaper reading apps in combination to make the most of them. However, nineteen percent of them only focused on one reading application.

Following the affective strategies are compensation strategies and cognitive strategies. Functions of highlighting and adding to favourites (item 1) are used most frequently among the 6 strategies ($M=3.43$, $SD=0.99$), while notetaking (item 2) scores the lowest mean value ($M=3.03$, $SD=1.16$). This is due to the function of marking or saving being available in the majority of reading apps, while only a few apps, such as Shanbay Reading, support notetaking within the app. Interviewees said they had to turn to other notetaking apps and cry for the incorporation of such a function. Apart from language learning, students also ponder the topic of the article (item 6), which is the second most frequently used ($M=3.32$, $SD=0.89$) cognitive strategy. Summary (item 4) and fact-opinion differentiation (item 5) have similar averages and standard deviations, indicating that summarising and critical thinking occur at the same rate, but less than that of forming their own opinions on the topic. Reading can naturally inspire feelings related to the topic, while efforts need to be made to filter out key information and detect bias in the text by considering complex background information.

Memory strategies are aimed at promoting the storage and retrieval of new information. Most built associations with images and sounds to facilitate memory ($M=3.38$, $SD=0.90$). This result is due to the multimodality feature of current English newspaper reading apps, thus assisting students in remembering new words or expressions. Word reciting comes next, with a mean value of 3.33, indicating that the function of the vocabulary list is sometimes used in memorising. The result supports that of Lai et al. (2018), who found that participants attach importance to vocabulary when accessing technological resources oriented at instruction. Notably, the average of classification and review of words are well below that of item one, with 2.95 and 2.81, respectively. When it comes to further classifying or reviewing what they have learned, students are not as active as when they mark key points by just tapping the screen.

As for metacognitive strategies, English majors with the habit of making plans or allowing notifications from reading apps do not have an overall majority. Concentration (item 16) is the most frequently used metacognitive strategy among English majors, with a mean value of 3.26. Among them, over one-third (40 %) can ignore distractors while reading since it is not demanding to pay attention to just one paragraph. However, forty-one percent of students reported limited attention span sometimes.

5 Conclusions

This research provides a specific picture of English newspaper reading via mobile devices by adopting both quantitative and qualitative methods. It contributes to our understanding of the learning process in the MALL context, as advocated in a previous study (Loewen et al., 2019). Both technology and education were taken into consideration, thus making the previous study on perceptions and ways of usage a step further. The study found that meaning-based instruction, including vocabulary and translation, is predominant in English newspaper reading apps. English newspaper reading apps benefit users in that they can learn words and phrases in an authentic environment rather than remember isolated word lists. However, few apps analyse the text itself with a critical eye or guide readers to explore the position and intention behind words, which are essential for cultivating the critical thinking of English majors. The results also reveal that students tend to use an already installed app rather than utilise English newspaper reading apps in combination. Consequently, functions such as differentiation, for which users of WeChat cry, may be found in another English newspaper reading app. Finally, the most frequently used strategies among English majors are affective strategies, while the least frequently used are collaborative strategies, even if most apps offer opportunities for collaborative learning. There is a discrepancy between design and actual use.

Therefore, the design of English newspapers should be modified in terms of both technological affordance and guidance on collaborative learning. Technical support within reading apps should be strengthened so that users no longer need to access many apps in combination, just for functions such as notetaking and discussion in the community. With regard to the design of content, by offering

profound analyses of insightful articles, apps can innovate their methods of instruction and allow users to learn beyond vocabulary acquisition. The findings of this study also suggest that collaborative learning should be encouraged among the same level of proficiency. In addition, community or group administrators can take on the role of guiding topic-related discussions rather than uploading material. Apart from technological problems, they are required to answer questions related to language learning. In this way, collaborative learning in English newspaper reading apps can move past the action of creating a group and turn towards high engagement among learners. It collaborates with the ideas of Godwin-Jones (2011), who argued that the limited degree of engagement in collaboration is partially attributed to technical constraints but more to the design of developers. While improvements in applications may take days or months, English majors are expected to be active users who can use learning strategies appropriately to facilitate learning. Teachers can integrate English newspaper reading apps with the English Publication Reading Course. Teachers can also create their own official accounts to release their students' annotations of the article in an English newspaper to stimulate students' enthusiasm. It is practical, since the operation of WeChat is user-friendly, and its function is as powerful as other commercial English newspaper reading apps.

This study is subject to the limitations of self-report data collected from questionnaires. Further research could adopt qualitative methodologies, such as think-aloud and stimulus recall, to investigate the fluctuation of various learning strategies in real time. In addition, this study focuses only on English majors' usage of English newspaper reading apps. With the increasing number of non-English undergraduates being exposed to this form of language learning, the impact of using English newspaper reading apps among non-English majors could be explored in future studies. Language learning strategy research in the context of MALL could be carried out to determine the extent to which they are other-regulated, self-regulated and co-regulated.

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Appendix I:

Evaluation of English Newspaper Reading Apps (Category One: Language Learning)

Dimensions Apps	Reading	Listening	Vocabulary	Grammar	Cultural info
Applications designed for language learning					
Liulil Reading	– English – Bilingual	Audio of the text	– Pronunciation – Meaning (E-E) – Collocations – Synonyms	Parsing	– Lead-in – Extended reading
Shanbay Reading	– English – Bilingual	Audio of the text	– Example sentences – Pronunciation – Meaning (E-C) – Example sentences	/	Annotation
Applications not designed for but useful for language learning					
Sixth Tone	English	/	/	/	/
Subscriptions on WeChat					Featuring stories
CHINADAILY	English	Audio of the text	/	/	
LearnAndRecord	– English – Bilingual	/	Meaning (E-C, E-E)	/	Lead-in Lead-in
Intensive Reading of The Economist	– English – Bilingual	Audio of the text	– Example sentences	Parsing	Lead-in
Daily reading of The Economist	– Bilingual	Audio of the text	Meaning (E-E)	/	Annotation
Uploaders on Bilibili					

(continued)

Dimensions Apps	Reading	Listening	Vocabulary	Grammar	Cultural info
Quesmagique	English	Audio file	Meaning (E-E)	/	Annotation
Knowing and Speaking	English	Audio file	Meaning (E-C)	Parsing	Annotation
Zhahuoshe	English	Audio file	Meaning (E-C)	– Parsing	Lead-in

Appendix II:

The Evaluation of English Newspaper Reading Apps (Category Two: Pedagogy)

Dimensions Apps	Teaching	Progress track	Use of media	Differentiation
Applications designed for language learning				
Liuli Reading	Voice recording	+	Images and video	+
Shanbay Reading	Annotation	+	Images	+
Applications not designed for but useful for language learning				
Sixth Tone	/	/	Images and video	/
Subscriptions on WeChat				
CHINADAILY	/	/	Images and video	/
LearnAndRecord	/	/	Images and video	/
Intensive Reading of The Economist	Annotation	/	Images and video	/
Daily reading of The Economist	/	/	Images	/
Uploaders on Bilibili				
Quesmagique	Video recording	/	Images and video	/
Knowing and Speaking	Video recording	/	Images and video	/
Zhahuoshe	Video recording	/	Images and video	/

Appendix III:

Evaluation of English Newspaper Reading Apps

(Category Three: User Experience)

Dimensions Apps	Interaction	Interactivity	Price	Advertising
Applications designed for language learning				
Liuli Reading	WeChat group	Passive	Paid	+
Shanbay Reading	Comment section	Passive	Free & lite version	+
Applications not designed for but useful for language learning				
Sixth Tone	/	Active	Free	/
Subscriptions on WeChat				
CHINADAILY	Comment section	Active	Free	+
LearnAndRecord	Comment section	Active	Free	+
Intensive Reading of The Economist	Comment section	Active	Free	+
Daily reading of The Economist	Reflection	Passive	Free	+
Uploaders on Bilibili				
Quesmagique	Comment section and bullet screen	Active	Free	/
Knowing and Speaking	Comment section and bullet screen	Active	Free	/
Zhahuoshe	Comment section and bullet screen	Active	Free	/

Appendix IV:

Evaluation of English Newspaper Reading Apps (Category Four: Technology)

Dimensions Apps	Hover translation	Notetaking	Add to favourite	Classification	Review
Applications designed for language learning					
Liuli Reading	+	/	+	+	For vocabulary
Shanbay Reading	+	+	+	+	For vocabulary
Applications not designed for but useful for language learning					
Sixth Tone	+	/	/	+	/
Subscriptions on WeChat					
CHINADAILY	+	/	+	/	/
LearnAndRecord	+	/	+	/	/
Intensive Reading of The Economist	+	/	+	/	/
Daily reading of The Economist	+	/	+	/	/
Uploaders on Bilibili					
Quesmagique	/	+	+	+	/
Knowing and Speaking	/	+	+	+	/
Zhahuoshe	/	+	+	+	/

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