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M-Reads: Mobile Application Based on OSS (Open Source Software) for Reading Materials

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ABSTRACT

Background: Although the previous data indicated that students have met the expected standard, further engagement and literacy skills still need to be improved through innovative learning media. Few studies have explored the feasibility and acceptance of *M-Reads* applications. Hence, this study seeks to fill this gap by creating and testing the *M-Reads* AI-based learning app.

Aims: This research aimed to design and develop applications within the scope of Mobile Assisted Language Learning (MALL) with research targets in the English department in the Reading for General Information (RGI) course in semester 2.

Methods: This research used the Research and Development (R&D) method from Borg and Gall (2007). The steps consisted of needs assessment, plan, early product development, field test, product revision, operational test, and implementation. The data were collected quantitatively using questionnaires from 56 RGI English students and supported by qualitative interviews. The validation instruments were reviewed for content validity and demonstrated acceptable reliability. Data analysis was performed using quantitative and thematic analysis.

Results: The research results showed that media experts, material experts, and 56 students have provided responses and input. In addition, *M-Reads* was supported in terms of an attractive appearance, updated material, reading tips, quizzes, good application performance, and features that helped students with their reading skills. This research concluded that the percentage of validity level criteria is 85%, which indicated that *M-Reads* is "valid" and provided several important recommendations for RGI courses to integrate reading learning with *M-Reads*.

Implications: These findings were expected to contribute to the RGI course and spur further research in this field.

Keywords: *Designing application; EFL reading materials; M-Reads application; open-source software; mobile-assisted language learning*

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1. INTRODUCTION

In Indonesia, reading literacy has been made a national priority by the government because education quality has become an agenda to equip students with the needed skills in the 21st century. The Ministry of Education, Culture, Research, and Technology has been actively encouraging the pursuit of literacy by implementing several programs, one of which is the National Assessment, which assesses literacy competencies at different levels of education. Recent National Assessment data show that 61.53% of middle school students, 59% of elementary school students, and 49.26% of high school students are performing at literacy levels higher than the minimum standard ([Reiber-Kuijpers et al., 2021](#)). These results are promising, but reading literacy is a key area of development, especially at a higher educational level.

Students continue to struggle with higher-order reading skills like critical comprehension, word recognition, and text analysis. Thus, it is still necessary to create innovative media that can be used to enhance students' reading literacy and participation in learning. Such difficulties may persist when the students proceed to a higher education level, especially in those classes that involve much reading. In the RGI class, students are required to understand diverse academic texts, such as articles, biographies, novels, and journal articles. But the initial needs analysis shows that students still experience some trouble in comprehending academic vocabulary, finding main ideas, and obtaining the necessary reading sources. Thus, the necessity for developing a mobile-based reading application arises.

Through various offers of technological innovation, students get interesting and easy reading variations through a wide variety of sources, especially for the Reading for General Information (RGI) course. This learning should not be limited by time and place; the use of a mobile application or technology that can be accessed anytime and anywhere will provide exposure for students to reading material. Even though technology has opened up greater accessibility to information sources, in reality, many problems arise in the context of the RGI course. This is because the reading environment, combined with technology, will provide the impression of challenges and opportunities in developing students' reading skills ([Reiber-Kuijpers et al., 2021](#)). However, even though it has its opportunities and challenges, the most important thing is that the material presented remains in line with the learning flow and is also relevant to the curriculum being implemented. Therefore, it is necessary to prepare texts that suit students' needs ([Muhid et al., 2020](#)). This research focuses on the RGI course because the material that comes from an academic context is very suitable for the university level. In this course, there will be a lot of discussion about articles, novels, biographies, and journal articles. It has the aim of gaining a deeper understanding of a particular topic in the scientific realm. The material to be conveyed in learning is scientific and academic; the learning process must be intensively considered by the lecturer.

The lecturers need to highlight the process of providing reading material to approach students, therefore lecturers can understand what students need during learning and minimize students' target material errors. Teachers need to adapt to student levels, student interests, and student needs in receiving existing learning ([Rokhayati, 2022](#)). It helps facilitate student understanding when students can receive material that is appropriate to their level, interests, and also according to their needs. All learning remains structured and connected to current developments, especially in the use of technology. Currently, there are many technological innovations, both existing and being conceptualized. The role of technology in education is undeniably high. It has a significant impact on education, including access to information, distance learning, interactive learning, personalization of learning, collaboration and communication, advances in learning evaluation, innovation in learning methods, and availability of

learning resources. Definitely, these innovations prioritize user convenience, and they can easily be applied in various fields, one of which is mobile applications.

There are many phenomena that are encountered today regarding the integration between technology and education. Seeing that various types of mobile applications continue to be offered in the scope of education in the current millennial era will provide important functions in daily life, providing convenience, protection, and mobility (Irudayasamy et al., 2021). The application of mobile technology in language learning has contributed to the development of Mobile-Assisted Language Learning (MALL), where the focus is placed on the implementation of mobile technologies in the process of language learning outside the classroom. According to Kukulska-Hulme and Shield (2008), mobile technologies help to provide students with easy access to learning resources and facilitate their autonomous learning beyond the classroom. Moreover, Burston (2014) points to the increasing importance of mobile technologies that facilitate the process of language learning in a personalized and easily accessible way. In this regard, MALL can be especially useful for teaching students how to read since they can read different materials irrespective of the time and place. As regards the problem of second language reading, one should take into account that reading numerous texts can contribute to the development of reading comprehension skills and vocabulary knowledge. Grabe (2009) claims that successful reading development requires frequent contact with meaningful texts and chances to work strategically. A mobile application for reading can serve as a good instrument in achieving the aims of the RGI course since students will have access to academic reading materials all the time.

Along with the development of the communication tool revolution, technology has provided innovation in the form of cell phones, which are considered smaller, easier to carry, easier to use, and almost cover the components of user needs, whether in the context of communication, information, transactions, searching, or solving problems. Users also like devices that are smaller in size with an interface that simply uses a touch layer rather than having to use a computer (Persson & Nouri, 2018). Out of the range of educational technologies available today, one technology that has garnered significant attention is open-source software (OSS). This is due to the fact that it helps in developing accessible, flexible, and economical digital content for educational purposes. With these points in view, *Thunkable* has been selected in this study as the platform for developing mobile applications. In this study, OSS is used for software systems that support application development without requiring a lot of programming knowledge. *Thunkable* was chosen because it offers a no-code, multi-platform environment to help educators create, build, and publish mobile learning applications quickly and easily, making it ideal for supporting educational application development.

The research and development currently being carried out is a development of previous research, which has found modules and media to develop students' mastery of reading skills. The first previous research, from Habibi and Dehghani (2022), analyzed the learning needs of class VIII students in improving reading skills. Through research and product development, it provides quite significant results regarding learning material innovation, showing that every aspect developed is considered "feasible" by experts. In the previous research by Mohanty et al. (2021), digital games were developed. This mobile application can be accessed via Android, which can facilitate its users. The third previous research is Mustadi et al. (2022), which developed the *Pancalis* mobile application as an Android-based learning media focused on 18 teachers and 5 students in elementary schools. After going through an assessment using an expert validation scale, the results showed that *Pancalis* was suitable for use and was considered practical when used by students and teachers. Additionally, the fourth previous research is a study by Ahmetovic et al. (2023), which provides an innovative *WordMelodies* development mobile application that supports inclusive literacy skills for elementary school students. This mobile application is also considered easy by participants because

it is easy to access and can help their learning in reading. This research gap found that the researcher will focus on the university target.

1.1 Research Gap and Novelty

There have been few studies carried out to create mobile applications that are used in RGI at the university level. Most of the previous research done by Habibi and Dehghani (2022), for instance, centered on creating learning materials for reading. In addition, the study conducted by Mohanty et al. (2021) highlighted the importance of employing Android-based digital games as educational media. Another research which studied mobile applications for literacy included Mustadi et al. (2022) and Ahmetovic et al. (2023). Their studies involved the implementation of mobile applications for literacy teaching at the elementary school level. While these previous studies have shown that the use of digital media facilitates literacy learning, the previous studies mostly addressed general literacy skills, game-based learning, or were in elementary school contexts. Most studies done before this research did not include both reading materials and exercises in the same application that was created especially for university students.

In terms of pedagogical aspects, combining reading exercises and materials in one software can be considered more efficient in terms of developing reading comprehension skills. The immediate possibility to check comprehension right after the completion of reading gives students an opportunity to assess their comprehension skills, practice vocabulary learning, and perform some reading activities. It seems to be especially important when talking about RGI classes because, in addition to accessing texts, students should prove their comprehension skills.

Along with the advent of technology in education, mobile learning media could facilitate independent learning and allow the students to access the learning resources from anywhere. From this gap analysis, *M-Reads* is designed and developed as a mobile application intended for university students enrolled in the Reading for General Information course. In contrast with previous research that concentrated on literacy learning and general mobile learning media, *M-Reads* is a specially designed application containing both reading and exercise elements intended for university-level reading courses. *M-Reads*, meaning Mobile Reading, intends to help the students to improve their reading comprehension and vocabulary skills.

As per the findings from the initial study done through needs analysis, it was established that students were having difficulties in vocabulary mastery and text analysis in the RGI class. Students were also keen on developing innovative learning materials for reading. Hence, the importance of developing an interactive mobile application for reading learning in universities cannot be overemphasized. The significance of this study can be seen in terms of technology-based reading learning materials development via the OSS technology mobile application.

1.2 Research Questions

Based on what has already been stated, this study formulates the following research questions:

1. How does the appropriate design on *M-Reads* work for the Reading for General Information (RGI) course materials through the mobile application?
2. How can *M-Reads* be developed for Reading for General Information (RGI) course materials through a mobile application for higher education students?
3. How is *M-Reads* implemented in the Reading for General Information (RGI) course materials through the mobile application?

2. METHODS

2.1 Research Design

This research is a type of Research and Development (R&D). Gall et al. (2007) argue that educational R&D is an industry-based development model in which the findings of research are used to design new products and procedures, which are then systematically field-tested, evaluated, and refined until they meet specified criteria of effectiveness, quality, or similar standards.

2.2 Research Subjects

The research was carried out among six groups comprising 56 students. The whole-class sampling technique was used to research the participants in the six RGI classes. The 56 subjects were spread among the six RGI class sections. The subjects were the second-semester students registered for the RGI course. The subjects were chosen due to their relevance to the research problem and their active participation in the learning process throughout the investigation.

In the current research, whole-class sampling was adopted. Needs analysis was carried out among fifteen senior students who had taken the RGI course before. These students were interviewed in order to find out about the needs of the learners and get feedback on the design of *M-Reads*. In the preliminary field test, five students from those who took part in the operational field test were selected. Then, the operational field test was carried out among 56 students from six RGI classes, including five students from the preliminary field test group. The summary of the participants is listed below in Table 1.

Table 1 Summary of Participants

Stages	Participants	
Need Analysis	1 lecturer	15 students
Expert Validation	1 content expert	1 media expert
Field Test	5 students	
Operational test	56 students	

2.3 Research Procedures

Mobile application product development requires several steps in the production process. The development procedure developed by Gall et al. (2007) describes the major steps in the R&D cycle used to develop minicourses as follows: needs assessment, plan, early product development, field test, revise products, operational test, and implementation.

The framework showed that in Borg and Gall's model, it was applied in seven steps: needs assessment, plan, early product development, field test, revise product, operational test, and implementation. The following figure is the *M-Reads* model framework for this research.

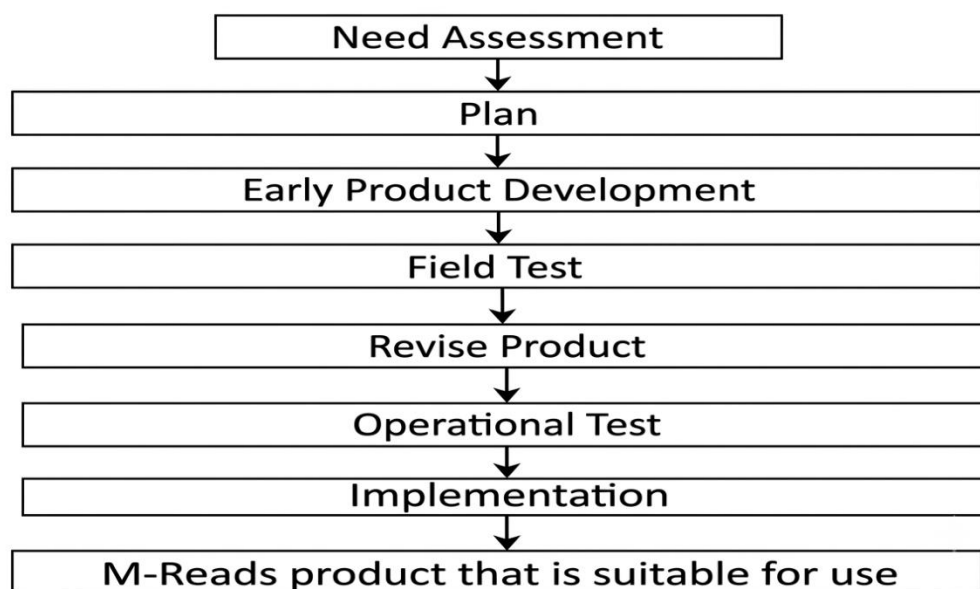


Figure 1. M-Reads model framework.

2.4 Research Instruments

The instrument in this study is a research sheet regarding the feasibility of a mobile application for learning to read. This instrument is prepared to determine the feasibility and attractiveness of the developed learning resources. The research was conducted by 1 material expert who is an English Language Education lecturer, 1 media expert who is a specialist in educational media development, especially for English learning, lecturers teaching RGI courses, and responses from 2nd-semester students in RGI classes. In this research, treatment, interview, and questionnaire were used for data collection techniques, and data collection techniques with instruments proposed by Walker and Hess (Arsyad, 2002) were also used. The development and determination of instruments were adjusted and modified according to the needs of the researchers.

Questionnaires and semi-structured interviews served as the research instruments in collecting data for this study. The questionnaire was distributed among a material expert, a media expert, the Reading for General Information (RGI) course lecturer, and students in the field test. All questionnaires utilized a five-point Likert scale from 1 (disagree) to 5 (agree). The material expert questionnaire was adapted from Susilana and Riyana (2008), which comprised 17 questions about validity, importance, usefulness, learnability, and attractiveness. The media expert questionnaire was adopted from Walker and Hess (1984) as quoted by Kustandi and Sutjipto (2011), and had 17 questions related to quality of content and purpose, learning quality, and technical quality, including readability, usability, presentation, answer handling, program management, and documentation quality. The lecturer questionnaire assessed learning and language aspects, content quality, and presentation quality, while the student questionnaire was about content quality, learning quality, and technical quality, including readability, language use, interface, color composition, and image quality. The questionnaire was tested on 30 students, and its validity was statistically analyzed using SPSS. The obtained *r* values fell at the score of 0.81. These findings collectively affirm the validity and reliability of the instrument.

A semi-structured interview was conducted during the needs analysis stage by interviewing one Reading for General Information instructor and students who have undertaken the reading class. The protocol for the interviews was based on the work done by Hutchinson and Waters (1987), Menggo et al. (2019), and Barghamadi (2020). The interviews were structured on three aspects of the target needs, which include

necessities, lacks, and wants. For the student interviews, there were six questions asked, of which four questions dealt with the necessities of the learners, one question was about the lacks, while one question was about the wants. For the lecturer interviews, there were five questions that were asked, of which three covered the necessities, one covered the lacks, and one covered the wants.

2.5 Data Analysis

Descriptive analysis was used in this study in compliance with the development protocols that have been followed. The initial development phase is completed by creating a mobile application. This research uses descriptive analysis in accordance with the development procedures that have been carried out. Quantitative data obtained from respondents through questionnaires with a Likert scale were analyzed descriptively using statistical methods with the following steps: (a) collecting rough data, (b) giving scores for quantitative statistics, and (c) converting the scores obtained into values with a scale of five. In addition, the scores obtained (percentage) were compared with the criteria listed in the table below (Akbar, 2013).

Table 2 The Feasibility of Level and Criteria

Feasibility Criteria	Feasibility Level
80, 00% - 100%	Valid, can be used without revision
70, 00% - 79,99%	Fair, can be used with small revision
50,00% - 69,99%	Less, proposed to be unimplemented because need major revision
1% - 49,99%	Invalid, forbidden to be implemented

Validity = Gained score: Maximum score $\times$ 100% (Akbar, 2013).

3. FINDINGS AND DISCUSSION

3.1 Findings

This part presents the findings in relation to the three research questions that have been formulated in this study. The first research question considers how the appropriate design of *M-Reads* was designed for the Reading for General Information (RGI) course using mobile technology. The second research question focuses on how *M-Reads* was developed for university students. The third research question is concerned with the implementation of *M-Reads* in the RGI course. Hence, the findings will be discussed in order.

Based on the research that has been conducted, data on the results of the process of *M-Reads* in RGI classes have been obtained. The design and development of this application uses the Borg and Gall model, which involves several steps by adjusting the research needs, including needs assessment, plan, early product development, field test, revise product, operational test, and implementation. Validation results of all individual items by the media and materials experts are provided in the Appendices. The research results of each step of this development are described as follows.

The Appropriate Design of *M-Reads* Need Assessment

This preliminary research serves as the first step taken by the researchers to identify problems and needs in order to determine what is required to support the RGI course in semester 2, and this identification is carried out through literature research (examining both current phenomena and previous studies) as well as interviews with one lecturer and one class of 15 third-semester students who had previously passed the Academic

Reading course. The following is a description of the researchers' findings: based on the results of the preliminary needs assessment through interviews for needs analysis, it can be taken from the exposure of the Extensive Reading lecturer, who explicitly stated, "if there is an application that you want to create, add vocab features and report scores so that students can do self-evaluation of student learning improvement." This answer suggests that vocabulary support is seen as an important element of the Reading for General Information (RGI) course. It was stated that during the process of reading, students tend to meet some unknown vocabulary. In such a way, adding a vocabulary element will allow them to obtain more information about word meanings without pausing in the process of reading. Moreover, the lecturer also stressed that adding a score report function to the application would be beneficial for the students as it could be used for self-assessment purposes. In such a way, it will give an opportunity to track students' progress, see their weak and strong points, and evaluate their performance after finishing every activity. Thus, it can be concluded that students require not only reading materials but also some supporting elements for their reading practice and vocabulary development. This need was taken into account and the *M-Reads* application was created.

As for the statement from the student, who said, "there is a mobile application that will use materials, strategies, and it also recommends for later use in difficult situations," this answer demonstrates that what is needed is a mobile application that not only provides reading materials but also offers learning assistance throughout the entire reading process, as the student expected to have appropriate reading strategies and advice that would be helpful in case of any problems while understanding the text, which implies that students need proper direction in choosing the right reading materials and the strategies that assist them in overcoming comprehension problems independently; moreover, easy access to well-organized reading material is an important element to meet the need for regular reading practice, and taking all these demands into consideration, *M-Reads* was created with carefully chosen reading texts together with reading strategies and learning assistance.

Plan for Initial Design of M-Reads

Planning was carried out after the researchers' obtained data from interview needs analysis from lecturers and students. The researcher made a plan to make innovations in the reading course. In the plan step, the researchers did conceptual design. With good planning, *M-Reads* will provide an effective and user-friendly solution. The following is the design concept of the OSS-based *M-Reads* application.

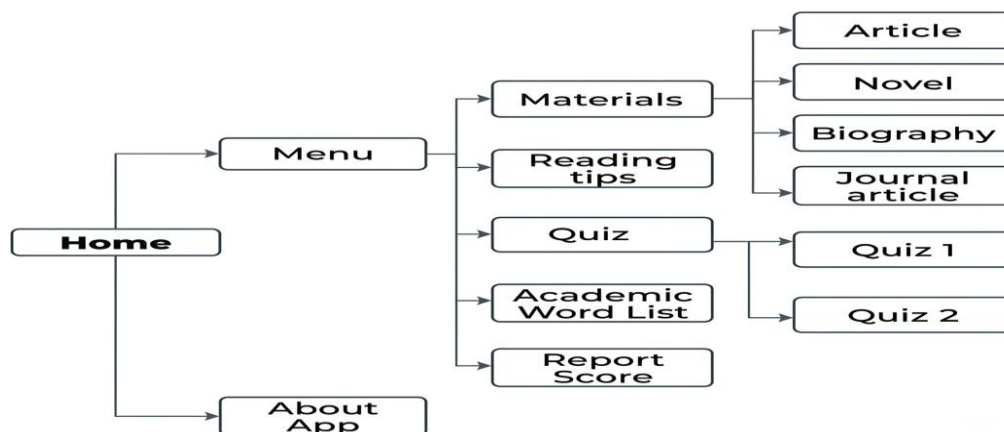


Figure 2. Design concept of the OSS-based M-Reads application.

Figure 2 shows the design of *M-Reads* starting from the main menu access to the choice of features that students need. After doing conceptual design, there is the *M-Reads*

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design, using the no-coding OSS *Thunkable*. *Thunkable* is a no-code app builder platform that allows users to create their apps free of charge. The following is a view of the *Thunkable* platform.

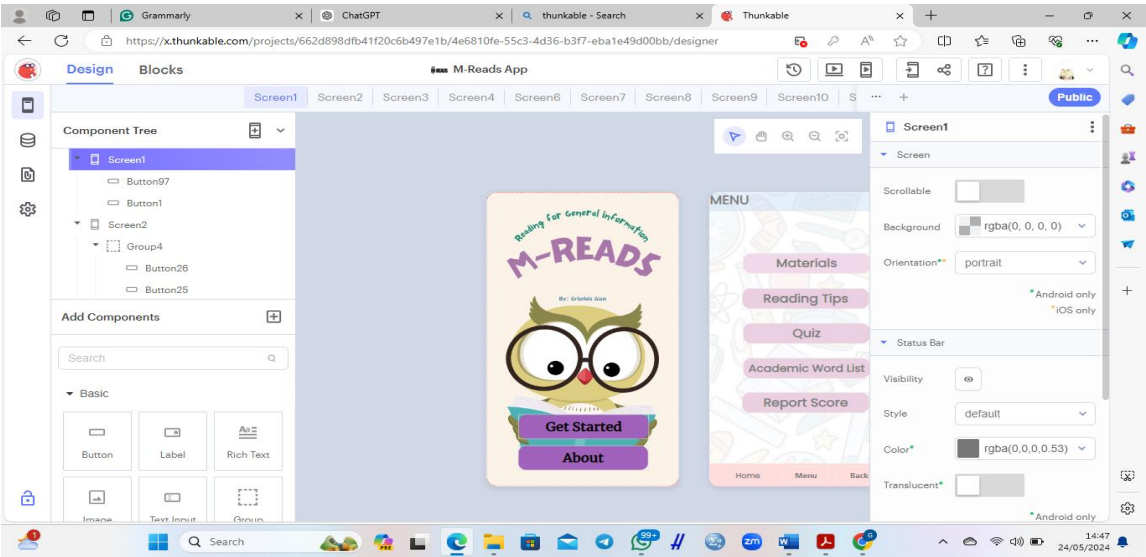


Figure 3. The display of Thunkable’s platform.

Based on Figure 3, on the left side of the settings, some components are designated according to the user’s wishes. Users can start designing their application by adding buttons, links, labels, screens, and so on. Then, users can adjust the colour, font size, typeface, and screen background on the right side of the settings.

Development Stages of *M-Reads*
Early Product Development

After planning, the researcher developed a preliminary product for the first product concept. This is the phase where the initial concept of the product is transformed into a more concrete and testable form. This is the basic version of the product that includes the main features and functions, but needs optimization as this design is not fully complete. The visual design used in *M-Reads* was obtained from Canva. Furthermore, validation was carried out by media experts and material experts before proceeding to the main field test phase. Table 3 presents the media expert validation results.

Table 3 Media Expert Validation Results

Indicators	Σx	Σx_i	Percentage	Validity Criteria
Aspect of Content Quality	32	35	91,4	Valid
Aspect of Learning Quality	48	50	96	Valid

Based on the data description in Table 3, it can be seen that the overall assessment of the media expert is 91.4% for the aspect of content quality and 96% for the aspect of learning quality, which indicates that both are valid for testing. Table 4 shows media, content, and material expert validation revision in terms of qualities.

Table 4 Aspect of Qualities

Indicators	Σx	Σx_i	Percentage	Validity Criteria
Content	34	35	97,1	Valid

Indicators	ΣX	ΣX_i	Percentage	Validity Criteria
Media	50	50	100	Valid
Material	78	85	91,7	Valid

Based on the data description in Table 4, it can be seen that the total percentage is 97.1% for content quality. The validity criteria in the aspect of content quality in *M-Reads* are "valid". The total percentage is 100% for the media quality aspect and 91.7% for the material expert, which are both also "valid". This shows that the aspects of the learning qualities in *M-Reads* are "valid". In the material expert validation sheets, the results are "suitable for production without revisions".

The Implementation Process of *M-Reads*

Field Test

After going through several revisions from the media expert, as well as validation from the material expert, researchers began to conduct a main field test on 5 RGI students. In this phase, the product was tested by users to ensure that it functions properly and meets the needs and expectations of users. Table 5 is the result of the main field test on 5 RGI students.

Table 5 Result of the Main Field Test

Indicators	ΣX	ΣX_i	Percentage	Validity Criteria
The material in the application is easy for me to understand	24	25	96	Valid
The examples in the application increase my knowledge of the material.	25	25	100	Valid
Instructions for use help me to use the learning resources easily	25	25	100	Valid
The visual appearance of the application makes me interested in following the lesson	22	25	88	Valid
The writing is clear and easy to read	22	25	88	Valid
The font size and font colour are appropriate and interesting to me	24	25	96	Valid
The use of language in the story is clear so that it makes it easier for me to understand the material	25	25	100	Valid
Total	167	175	95	Valid

In the description of Table 5, it can be seen that the percentage shows 95% with the criteria "valid". This shows that the product is ready for production to the "operational field testing" step, with more subject coverage, which consists of 6 classes in the RGI course.

Revise Product

After conducting the main field test on 5 students in the RGI class and also considering and revising the media expert's response, the researcher made several revisions to the *M-Reads* application.

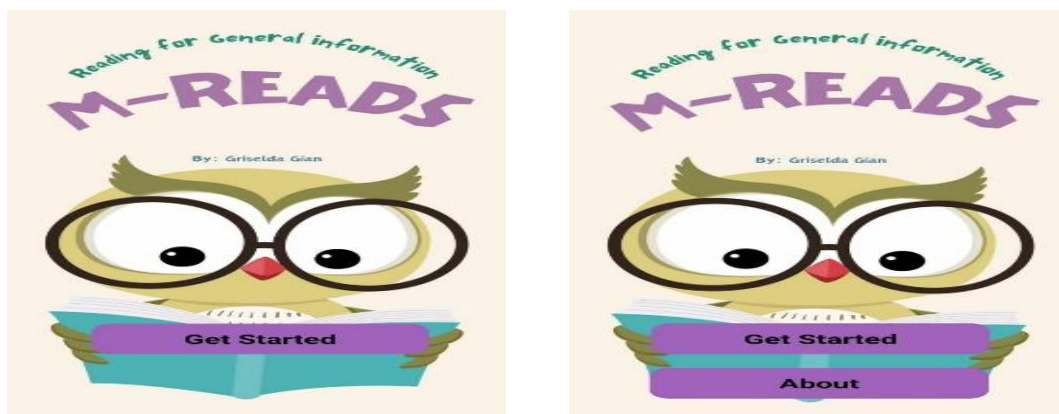


Figure 4. a) before and b) after the "about" button is added to the home screen.

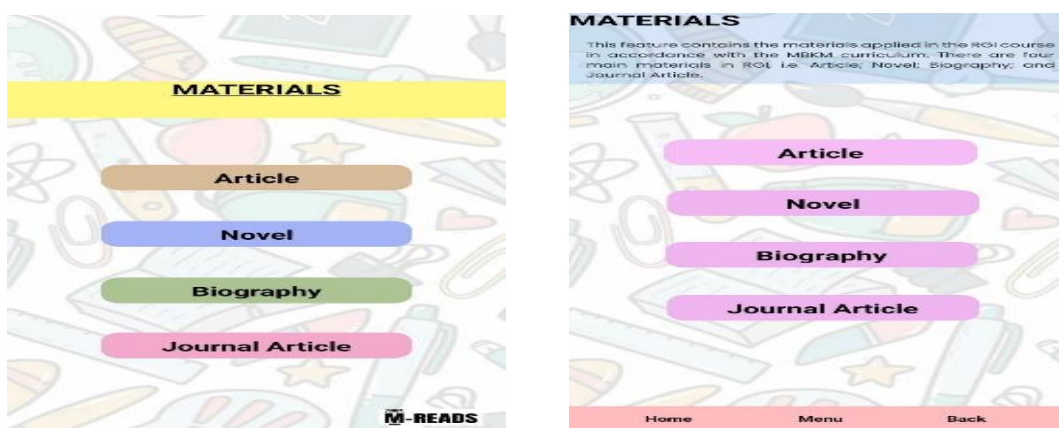


Figure 5. a) before and b) after adding the "instruction" feature in every screen.

Operational Test

In this phase, the researchers tested the feasibility of *M-Reads* on RGI students through operational field testing. Researchers tested 6 RGI classes with a total of 56 students. Each student downloaded and explored the *M-Reads* application. After that, students were asked to respond to their experience using *M-Reads* through the Google Form that had been given. Table 6 shows the results of student responses to the *M-Reads* application.

Table 6 The Results of Student Responses to the M-Reads Application

Indicators	Σx	Σx_i	Percentage	Validity Criteria
The material in the application is easy for me to understand	222	280	79,2	Valid
The examples in the application increase my knowledge of the material.	250	280	89,2	Valid
Instructions for use help me to use the learning resources easily	250	280	89,2	Valid

Indicators	Σx	Σx_i	Percentage	Validity Criteria
The visual appearance of the application makes me interested in following the lesson	228	280	81,4	Valid
The writing is clear and easy to read	240	280	85,7	Valid
The font size and font color are appropriate and interesting to me	239	280	85,3	Valid
The use of language in the story is clear so that it makes it easier for me to understand the material	235	280	83,9	Valid
Total	1664	1960	85	Valid

Considering the various factors used to evaluate the feasibility of the product, *M-Reads* was found to have a score of 85% in terms of user-perceived suitability and attractiveness. The results gathered from the students indicate that the product is viewed as feasible, user-friendly, and supportive of the RGI course. Nevertheless, the results are based on users' perception of the product rather than its impact on their reading ability, which shows the criteria "Valid". It can be known that the *M-Reads* product is suitable for use.

Implementation in R&D has the aim of ensuring that the products that have been developed can be used feasibly in the real world, and can identify further evaluations if improvements are needed. Implementation is also a validation of the results of the development that has been carried out to get direct feedback from users. In this phase, *M-Reads* can be accessed and used by all Android users through their respective smartphones. Users can operate *M-Reads* anytime and anywhere.

3.2 Discussion

There are several theoretical approaches that could be used to explain the positive responses of experts and students to *M-Reads*. First of all, according to Mayer's Cognitive Theory of Multimedia Learning (2014), people can understand the information better if the verbal information is accompanied by the relevant visual content. Therefore, the use of reading texts, images, and vocabulary support in *M-Reads* might contribute to increased comprehension as well as reduced cognitive load. Second, the research results confirm the principles of Mobile-Assisted Language Learning (MALL), which imply the necessity for using mobile technologies to enhance the flexibility of the learning process. With the help of *M-Reads*, learners can practice their reading skills whenever and wherever they want since this mobile application allows them to use reading materials both at school and outside it. Moreover, vocabulary and scoring features in *M-Reads* support the principles of self-regulated learning, which include self-monitoring and self-evaluation. In this way, users can improve their vocabulary skills and evaluate their progress.

The needs assessment was carried out by researchers in R&D. Researchers have identified problems and needs in the process of learning activities for the RGI course; therefore, researchers know what kind of learning media is needed and expected. In the process of identifying problems in the needs assessment process, researchers conducted two kinds of research: literature research and field research. The problem is that it exists in the realm of student literacy, which is in literacy competencies above the minimum standard according to Kemendikbudristek. It is also in line with the challenges and

opportunities that students must face in developing their reading skills by integrating with technology ([Reiber-Kuijpers et al., 2021](#)). Opportunities and challenges will remain in sync if accompanied by a learning environment that is relevant to the curriculum so that it still meets the needs of students ([Muhid et al., 2020](#)). One of the innovations that can be developed in the scope of student learning is mobile applications. Various types of offers about mobile applications in the current millennial era will provide important functions and support the feasibility of student learning ([Babalola & Omolafe, 2022](#); [Irudayasamy et al., 2021](#)).

After doing a needs assessment, the researcher did field research. In this stage, researchers conducted interviews with 1 lecturer and 15 students from semester 3 who had passed the academic reading course. Researchers conducted interviews with students who had graduated from the academic reading course because they would be able to provide an overview of the needs of semester 2 students. The lecturer applied reading skimming, reading scanning, and reading aloud in the learning content because they are very helpful for students in reading learning activities. Then the materials taught in reading learning are Microsoft Office PowerPoint ([Markuningrum, 2021](#)), journal articles ([Akmal et al., 2020](#)), newspapers ([Holmqvist et al., 2003](#)), magazines ([Hull, 1952](#)), websites ([Syakur et al., 2020](#)), books ([Karadeniz & Can, 2015](#)), and Google Scholar ([Siemens et al., 2009](#)), which match the materials that have been compiled in the RPS. In learning reading, the lecturer uses these learning media because they are very easy to access for students, and the lecturer finds it easier to provide feedback when students present their reading assignments. Then, for the media used, the lecturers use books, journals, and also PowerPoint to convey the results of their assignments. In learning to read, there are difficulties, but lecturers also help students learn reading skills. From reading skills learning activities, the lecturers also consider the need for innovations that can support reading learning in the classroom, such as technology that gives an interesting impression in learning activities and applications that add additional features for student learning. The lecturer also recommends and supports the design and development of interactive reading learning-based applications by containing material explanations, practice questions, and features needed to support reading learning.

From the students' point of view, there are various applications and approaches when learning reading skills. Students have learned several types of texts, from descriptive texts to explanatory texts. They are also asked to analyze a text, including grammatical aspects and parts of speech. Then they presented the results of their analysis. The types of learning content taught are the same as those applied by the lecturers. It aims that student can correctly pronounce the vocabulary in academic reading, can receive information in academic reading through skimming, and can quickly receive important information through keywords through scanning techniques.

Planning is carried out after knowing the needs in learning reading skills based on the difficulties of learning academic reading. The first thing to do is instructional design. Instructional design is a way to instruct and structure the design of the application that will be used in learning academic reading. Then, in the MBKM (Merdeka Belajar Kampus Merdeka) teaching module, there are three things: learning outcomes, study materials, and indicators of learning achievement. The general skills include the ability to be innovative in the development of reading, to be able to perform reading, and to demonstrate information and media literacy, as well as the use of technology in formal and informal reading activities on articles, novels, biographies, and journal articles. The special skills include the ability to utilize technology in reading activities and to be able to communicate orally and in writing in English feasibly, empathetically, and politely in the implementation of English learning tasks related to the content of formal and informal reading articles, novels, biographies, and journal articles.

Learning outcomes, study materials, and learning achievement indicators are forms of MBKM teaching modules. Learning outcomes contain mastery of reading content and

steps in developing critical, logical, creative, innovative, and systematic thinking and problem solving, and application of technology in learning to read with formal and informal text types in the form of articles, novels, biographies, and journals. Learning materials include improving reading skills, understanding text content, and developing critical thinking about text content with formal and informal text types of articles, novels, biographies, and journal articles. The learning achievement indicators contain general skills (ability to think innovatively, performance, demonstrating information and media literacy, utilization of technology in reading activities) and special skills (ability to utilize technology feasibly in reading activities and ability to communicate orally and in writing in English as the implementation of English learning tasks related to reading).

The conceptual design of *M-Reads* involves mapping out the features included in the application. *M-Reads* was created through the app creation platform *Thunkable*. Using *Thunkable* is as simple as logging in using each user's email, and they can start creating their app (Joy, 2018). The early product development phase is the initialization of the concept of the product that is transformed into a more concrete and testable product. The resulting product is presented with attractive application features and performance (Mailani et al., 2024).

Based on the results of the validation of the *M-Reads* application that has been carried out, it can be seen that the *M-Reads* application has a high level of validity on each indicator that has been assessed. In the results of media expert validation on the aspect of content quality, there are 7 indicators assessed, 6 of which show a validity percentage of 100%. It shows that *M-Reads* is valid and does not require revision. However, there is 1 indicator, "Clarity of instructions for using learning resources", which only reaches a percentage of 40%. This indicator falls into the invalid category and requires revision to improve the clarity of instructions for users. Considering that the results show a low score in relation to the clarity of instructions, it can be argued that there were problems that the users had in terms of comprehending how to operate within the application. In mobile learning platforms, the provision of clear instructions is critical since it lowers the cognitive load on the learner. The learner can therefore concentrate on the learning processes instead of trying to understand how the application operates.

In the aspect of learning quality, there is 1 indicator, "Easy to use", which obtained a percentage of 60%. This is included in the category of less and requires revision in the "home", "menu", and "back" buttons. While the usability of the application was good, the fairly low score shows that the users faced challenges while using certain functionalities. This shows that ease of use is an important part of mobile application design since complicated navigation can make learners less motivated to learn on their own. Other indicators reached a percentage of 100%, which is very good validity. Overall, the learning quality aspect reached 96%, which indicates that *M-Reads* is valid and can be mostly used without significant revision.

The results of the material expert validation showed that the existing indicators have been assessed to reach a percentage of 80%, which is in the sufficient category. However, there is one indicator, "Clarity of material evaluation", which obtained a score of 60%, which fell into the insufficient category, therefore requiring revision to improve the clarity of evaluation.

Overall, the material expert validation showed that *M-Reads* has great potential as a feasible learning tool based on the majority of indicator results by showing high validity. Some aspects that require revision are the clarity of use instructions on each screen display, ease of use of the application, and clarity of material evaluation. By making revisions to some of these indicators, it can be taken into consideration so that *M-Reads* can be more feasible in supporting the innovative and interesting RGI learning process.

The results of these validations provide practical implications and show that *M-Reads* can be accessed in an educational environment with minor improvements to some of its aspects. Further testing and adaptation of the app are also recommended to ascertain whether it meets the broad and diverse learning needs of RGI. Thus, *M-Reads* has high

potential as an innovative and engaging learning tool that can be useful in improving the quality of learning for RGI students.

The design and development of *M-Reads* has produced a product in the form of a mobile application that has been adjusted to the MBKM curriculum and student needs, namely as a mobile-assisted RGI course. This discussion has compared the findings with previous research. Comparison of this research with the previous research by Habibi and Dehghani (2022), who analyzed the learning needs of grade VIII students in improving reading skills, shows that additional reading materials according to text-based open materials were successfully developed through a development model called Define, Design, Develop, and Disseminate (Four-D Model). Through research and product development, it provided significant results regarding the innovation of learning materials. This is in line with current research in that *M-Reads* also helps mobile-assisted students in RGI courses. However, the difference between Habibi and Dehghani (2022) and the current research is that their research uses prototypes based on developing media reading text, while *M-Reads* research uses OSS, which produces products in the form of applications. The research target used by Habibi and Dehghani (2022) is class VIII in junior high school, while the target of *M-Reads* research is students from semester 2 of the RGI course.

The second comparison between this research and previous research is research from Mustadi et al. (2022), who developed a mobile application as an Android-based learning media focused on 18 teachers and 5 students in elementary schools. This uses descriptive statistical analysis to produce results showing that *Pancalis* is a learning solution in teaching beginners. It is also quite accessible using Android and is easy to use by both teachers and students. *Pancalis* was considered feasible and practical if used by students and teachers. This has also been proven through expert validation. The similarity between *Pancalis* and *M-Reads* is that they both produce products in the form of Android-based applications devoted to reading skills. However, there are some differences: *Pancalis* is targeted at elementary school students, while *M-Reads* is targeted at RGI course students in semester 2.

The comparison of this research with the latest research is from Ahmetovic et al. (2023), who provide an innovative *WordMelodies* development mobile application that supports inclusive literacy skills for primary school students. This mobile application consists of 80 types of reading exercises with different levels of difficulty; therefore, it can be adapted to the abilities of students who access it. *WordMelodies* can be accessed on Android or iOS. This research was conducted by involving 11 visually impaired elementary school students and analyzing user logs from 408 users within 1 year since the mobile application was published. The mobile app was also rated by the participants as easy to access and able to help their reading learning. *WordMelodies* research is similar to *M-Reads* research in that it designs and develops applications for reading skills. However, the difference is that *M-Reads* can only be accessed by Android devices, while *WordMelodies* can be accessed through Android and iOS devices. Their targets are also different: *WordMelodies* was made specifically for blind children, while *M-Reads* is for RGI course students in semester 2.

In operating the test on the RGI course, students can access the application easily. The material in the application can be easily understood. The examples in the app enhance the knowledge of the material. Instructions for use in the application can help learning with open resources easily. Then the visual display is interesting in following the lesson, with clear writing that is easy to read. The size and font color are appropriate and fun, as well as the use of clear language in the story, which makes it easier to understand the material. This received a positive response from students. Therefore, the *M-Reads* product is suitable for use. *M-Reads* can be accessed and used by all Android users through their respective smartphones. Users can operate *M-Reads* anytime and anywhere.

There are several limitations associated with this study. First, the research was carried out in one institution only, which can affect the applicability of the results obtained in other educational settings. Second, the *M-Reads* mobile application was developed only for the Android platform, which reduces the availability of the application for users of other operating systems. Finally, the research was more focused on the expert assessment of the application as well as on the feasibility, usability, and user acceptance of the application by the students themselves than on assessing the learning outcomes. There was no control group used in the study, and there were no measurements of the students' reading skills before and after using the application.

4. CONCLUSION

The *M-Reads* mobile application for the RGI course was successfully designed and developed using the OSS framework via the seven steps of the Borg and Gall Research and Development model. *M-Reads* was found to be feasible and appropriate as an aid for RGI learning on the basis of expert validation and the response of the students. *M-Reads* was evaluated positively in terms of its interface, reading materials, quiz tests, reading techniques, and usability, having an 85% feasibility rating. While this study has provided evidence showing that *M-Reads* can be used in the RGI course, it has relied on experts' evaluation and users' opinion rather than any measurement of actual outcomes of students' learning. Therefore, future studies are recommended to examine the effect of *M-Reads* on the reading comprehension of students in the RGI course through pre-test and post-test designs, as well as creating cross-platform versions of the app including iOS, among others.

The study effectively answered all the research questions raised. First, the study revealed that *M-Reads* was designed to facilitate the Reading for General Information (RGI) course using a structured mobile learning interface which comprises reading materials, quizzes, reading techniques, and easy navigation. Second, the study proved that *M-Reads* could be developed systematically following the seven stages of the Borg and Gall Research and Development model using Open-Source Software (OSS). The expert validation revealed that the application was both feasible and appropriate for use in higher education. Third, the implementation results revealed that *M-Reads* was well received by the students and experts alike, earning an 85% overall feasibility score, thereby making it appropriate to act as a learning tool for the RGI course. In spite of the above results being promising, this study has used more expert validation and users' perception than actual student learning outcome measures. As a result, future studies should concentrate on examining the effectiveness of *M-Reads* in enhancing students' reading comprehension skills using experimental designs like pre- and post-test measures. Further development of the application may also include developing it on other mobile platforms like iOS.

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Authors' Contribution

Griselda Gian Heris Herdina contributed to the conceptualization, research design, development of the *M-Reads* application, data collection, data analysis, interpretation of the findings, and preparation of the manuscript. Nurul Aini and Toyyibah contributed to the methodology and data analysis and provided academic guidance throughout the research process. Debebe Darcho Lota contributed to the review of the manuscript and

provided academic input. Naufal Siddiqi Nasrullah contributed to the literature review and research instrument. All authors contributed to designing the research, conceptualization, developing the M-Reads application, data collection reviewed and approved the final version of the manuscript.

AI Generative Statements

The authors use AI-based tools to help edit and proofread the manuscript. After editing, they still pay attention to the details of the writing to ensure there are no mistakes that could change the meaning.

REFERENCES

- Ahmetovic, D., Bernareggi, C., Leporini, B., & Mascetti, S. (2023). WordMelodies: Supporting the acquisition of literacy skills by children with visual impairment through a mobile app. *ACM Transactions on Accessible Computing*, 16(1), 1–19. <https://doi.org/10.1145/3565029>
- Akbar, S. (2013). Model triprakoro dalam pembelajaran nilai dan karakter kepatuhan untuk sekolah dasar. *Jurnal Ilmu Pendidikan Universitas Negeri Malang*, 19(1), 104025. <https://doi.org/10.17977/jip.v19i1.3762>
- Akmal, S., Dhivah, I., & Mulia, M. (2020). Investigating students' interest on reading journal articles: materials, reasons and strategies. *Studies in English Language and Education*, 7(1), 194–208. <https://doi.org/10.24815/siele.v7i1.15586>
- Arsyad, A. (2002). *Media pembelajaran*. Raja Grafindo Persada.
- Babalola, E. O., & Omolafe, E. V. (2022). Effect of developed mobile application on undergraduates' academic performance in computer science. *ASEAN Journal of Science and Engineering Education*, 2(3), 215–222. <https://doi.org/10.17509/ajsee.v2i3.44833>
- Barghamadi, M. (2020). A critical study of the principles and approaches to needs analysis. *Studies in Educational Management*. 7(1). 1-15 <https://doi.org/10.32038/sem.2020.07.01>
- Burston, J. (2014). MALL: The pedagogical challenges. *Computer Assisted Language Learning*, 27(4), 344–357. <https://doi.org/10.1080/09588221.2014.914539>
- Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An Introduction* (8th ed.). Pearson.
- Grabe, W. (2009). *Reading in a second language: Moving from theory to practice*. Cambridge University Press.
- Habibi, A., & Dehghani, S. (2022). Developing the prototype of text-based learning materials for the teaching of reading skills at the middle schools. *Journal of Language and Literature Studies*, 2(2), 75–87. <https://doi.org/10.36312/jolls.v2i2.760>
- Holmqvist, K., Holsanova, J., Barthelson, M., & Lundqvist, D. (2003). Reading or scanning? a study of newspaper and net paper reading. In *The Mind's Eye* (pp. 657–670). Elsevier. <https://doi.org/10.1016/B978-044451020-4/50035-9>
- Hull, R. E. (1952). Critical magazine reading. *College English*, 14(2), 110–112.
- Hutchinson, T., & Waters, A. (1987). *English for specific purposes: A learning-centred approach*. Cambridge University Press.
- Irudayasamy, J., Uba, S. Y., & Hankins, C. A. (2021). Exploration and exploitation of mobile apps for English language teaching: A critical review. *English Language Teaching*, 14(4), 43–54. <https://doi.org/10.5539/elt.v14n4p43>
- Joy, J. (2018). Review on different types of drag and drop mobile app development platforms. <https://doi.org/10.26438/ijcse/v6i11.864866>
- Karadeniz, A., & Can, R. (2015). A research on book reading habits and media literacy of students at the faculty of education. *Procedia – Social and Behavioral Sciences*, 174, 4058–4067. <https://doi.org/10.1016/j.sbspro.2015.01.1155>

- Kukulka-Hulme, A., & Shield, L. (2008). An overview of mobile assisted language learning: from content delivery to supported collaboration and interaction. *ReCALL*, 20(3), 271–289. <https://doi.org/10.1017/S0958344008000335>
- Kustandi, C., & Sutjipto, B. (2011). *Media pembelajaran: Manual dan Digital*. Ghalia Indonesia.
- Mailani, E., Tarigan, D., & Sitanggang, A. K. (2024). Development of a learning tool using the cooperative integrated reading and composition (CIRC) model based on Thunkable. *QALAMUNA: Jurnal Pendidikan, Sosial, dan Agama*, 16(1), 31–48. <https://doi.org/10.37680/qalamuna.v16i1.3512>
- Markuningrum, S. M. (2021). Increasing the reading interest of class IV students with image media through power point slide on the google meet App. *Social, Humanities, and Educational Studies (SHES): Conference Series*, 4(6), 654–658.
- Mayer, R. E. (2014). Incorporating motivation into multimedia learning. *Learning and Instruction*, 29, 171–173. <https://doi.org/10.1016/j.learninstruc.2013.04.003>
- Menggo, S., Suastra, I. M., Budiarsa, M., & Padmadewi, N. N. (2019). Needs analysis of academic-English speaking material in promoting 21st century skills. *International Journal of Instruction*, 12(2), 739–754. <https://doi.org/10.29333/iji.2019.12247a>
- Mohanty, A., Alam, A., Sarkar, R., & Chaudhury, S. (2021). Design and development of digital game-based learning software for incorporation into school syllabus and curriculum transaction. *Design Engineering*, 8, 4864–4900.
- Muhid, A., Amalia, E. R., Hilaliyah, H., Budiana, N., & Wajdi, M. B. N. (2020). The effect of metacognitive strategies implementation on students' reading comprehension achievement. *International Journal of Instruction*, 13(2), 847–862. <https://doi.org/10.29333/iji.2020.13257a>
- Mustadi, A., Sayekti, O. M., Rochmah, E. N., Zubaidah, E., Sugarsih, S., & Schulze, K. M. (2022). Pancalis: Android-based learning media for early-reading in new normal. *Jurnal Cakrawala Pendidikan*, 41(1), 71–82. <https://doi.org/10.21831/cp.v41i1.45143>
- Persson, V., & Nouri, J. (2018). A systematic review of second language learning with mobile technologies. *International Journal of Emerging Technologies in Learning*, 13(2), 188–210. <https://doi.org/10.3991/ijet.v13i02.8094>
- Reiber-Kuijpers, M., Kral, M., & Meijer, P. (2021). Digital reading in a second or foreign language: A systematic literature review. *Computers & Education*, 163, 104115. <https://doi.org/10.1016/j.compedu.2020.104115>
- Rokhayati, A. (2022). The use of online literature circles to enhance the students' critical reading skills. *Journal of Languages and Language Teaching*, 10(1), 94–101. <https://doi.org/10.33394/jollt.v10i1.4079>
- Siemens, R., Leitch, C., Blake, A., Armstrong, K., & Willinsky, J. (2009). "It may change my understanding of the field": Understanding reading tools for scholars and professional readers. *DHQ: Digital Humanities Quarterly*, 3(4), 1–15. <https://doi.org/10.63744/89yitdctt2eq>
- Susilana, R., & Riyana, C. (2008). *Media pembelajaran: Hakikat, pengembangan, pemanfaatan, dan penilaian*. Wacana Prima.
- Syakur, A., Fanani, Z., & Ahmadi, R. (2020). The effectiveness of reading English learning process based on blended learning through "Absyak" website media in higher education. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, 3(2), 763–772. <https://doi.org/10.33258/birle.v3i2.927>
- Walker, D. F., & Hess, R. D. (1984). *Instructional software: Principles and perspectives for design and use*. Wadsworth.