C1_CP_Pancalis_Android-based_learning_media.pdf

by Ali Mustadi

Pancalis: Android-based learning media for early-reading in new normal

Ali Mustadi[1*], Octavian Muning Sayekti[1], Evy Nur Rochmah[1], Enny Zubaidah[1], Septia Sugiarsih[1], Kordula Mechthild Schulze[2]
[1]Universitas Negeri Yogyakarta, [2]University of Münster
*Corresponding Author: ali_mustadi@uny.ac.id

ABSTRACT

Early-reading is an essential skill which is needed to be accelerated through application-based media. This study aims to develop Pancalis as a medium for the online teaching of early-reading. This study used the Research and Development (R&D) approach using the ADDIE model. The subjects were two experts as well as 18 teachers and five students of elementary schools. They were established using the purposive sampling technique. The data collection technique used questionnaires and scales. The data analysis used descriptive statistics. The results show that: 1) at the analysis stage through literature study, it can be concluded that Pancalis as an Android-based application is an alternative learning media for the teaching of early-reading; while the result of field study shows teachers and students need learning media for early reading that can accommodate distance learning; 2) at the design stage, the Pancalis as an android-based application for early-reading has been produced; 3) while at the end of the development stage, an assessment was carried out through an expert validation scale and it was found that the Pancalis is very suitable for teaching of early-reading; while the practicality response questionnaire of teachers and students shows that Pancalis is very practical to use.

Keywords: android, learning media, early-reading, elementary school, students

INTRODUCTION

Reading is the beginning of a wealth of knowledge. This is in accordance with the opinion (Abdurahmad, 2012) that reading is the beginning that must be mastered by students because through reading students will learn other sciences. The success of a student in mastering learning materials at school is largely determined by his or her reading skills (Washburn, 2016). Based on the research conducted by (Cromley et al., 2010), reading comprehension is closely related to all academic achievements. The better the reading comprehension, the better the understanding in all disciplines that require reading comprehension. These data clearly show the benefits of reading. Reading is an activation process that should be carried out continuously and repeatedly on complex texts to achieve three stages of understanding: literal, inferential, and evaluative knowledge. This statement follows the opinion of (Sisson & Sisson, 2012). From the beginning, students must be given a mature provision of this reading skill.

There are three basic component terms of the reading process, namely: recording, decoding, and meaning. Recording refers to words and sentences, which are then associated with their sounds according to the writing system used, while the decoding process refers to the process of translating graphic sequences into words (Tjoe, 2013). The meaning process is the process of understanding meaning that takes place from the level of understanding, interpreting, creating, and evaluating understanding. The recording and decoding process takes place in lower grade students, while meaning making is more emphasized in high grade students (Rahim, 2007).

Reading skills are acquired by students after they acquire spoken language in the family environment. The acquisition of reading skills is different from the mastery of the two previously mentioned skills. Acquiring reading skills requires more effort than acquiring the two skills do. In addition, reading and writing skills are also affected by the level of intelligence (Perfetti et al., 2008)

Paying attention to the level of difficulty of teaching to read will provide teachers with provisions for the teaching of reading to their students. This implies that boys and girls must be accustomed to reading even before they begin elementary school. Reading skills should be introduced to them from an early age or when they are 5-6 years old. Then, when they enter elementary school, reading skills are the ability that they must possess (Levy et al., 2006). This means that students must be skilled at reading when they are in grades 1 and 2 of elementary school.

Learning to read in early grades is called early reading and writing skills. The faster students can read, the greater their opportunity to understand the meaning of the subjects in school. As a skill that underlies the next skill, the early reading skill must be given a special attention by the teacher. Teaching reading in elementary school is divided into two stages, namely early reading, and advanced reading. Early reading taught in grades 1 and 2 has a very important role. Students who are not able to read well will have difficulty participating in learning activities and in capturing and understanding the information presented through various textbooks, suggested reading materials, and other written learning resources. Likewise, in learning evaluation, for example mid-semester examination or end-of-semester examination, reading skill is very important. The students who are not fluent in reading will have difficulty in responding to the questions given by the teacher. As a result, their test results are below the minimum mastery level.

The teaching of early reading should be packaged in an interesting and fun way. For children who have difficulty in reading and writing, learning that is packaged in a boring and tense manner will influence their reading fluency (Vanbecelaere et al., 2020), especially during the current Covid-19 pandemic. Many students feel bored and unable to understand the lessons delivered by their teacher. Teachers must have their own way of teaching to read and write to beginners. Based on observations and interviews conducted by researchers with elementary school teachers in the city of Yogyakarta, the problem in the field when teaching early reading and writing in the era of the Covid-19 pandemic is that teachers have difficulty developing students' reading skills because usually teaching is done face to face, unlike it is in the current online teaching. If students still have difficulties, the explanation will be given directly by the teacher, who explains where the difficulty is and how to overcome it. However, during the current Covid-19 pandemic, face-to-face contact will be very limited. Teachers and students cannot freely meet to discuss early reading lessons.

The conditions in the field that have been described above show clearly that early reading teaching carried out with a distance learning system requires appropriate learning media. The learning media is expected to be able to answer the concerns of students, teachers, and parents of students. The development of information and communication technology (ICT) in the last few decades has progressed very rapidly in line with the development of telecommunication technology, including computer networks and cellular telephones. Various supporting technologies and applications have also been developed as an effort to support and facilitate the activities of human and organizational life, including teaching and learning activities in the world of education (Donnelly et al., 2011). One of the media that can be used to solve these problems is an Android application-based learning media. Android application-based media has characteristics that they are flexible, easy to access, and have various functions that help in everyday life (Bano et al., 2018). The characteristics of the Android-based application media show that they are very suitable to be used for distance learning as it is today, when distance learning requires a medium that is flexible and has easy access.

The purposes of this study are to describe the needs related to early reading media, to develop a decent Pancalis application for teaching reading to beginners, and to reveal the feasibility of the developed Pancalis application based on expert validation and practical

responses of teachers and students. Through this research, it is expected that learning media in the form of Pancalis would be appropriate for early reading for elementary school students.

METHOD

This research uses the research and development (R&D) method. Research and development is a research method to develop and test products. In addition to developing and testing products, this research is used to discover new knowledge regarding fundamental phenomena, as well as educational practices. The research uses a research model adapted from the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) development model. This research is the first-year research of the planned two-year research, and in this first year, the research stage reaches the development stage.

The subjects of this study are two experts as well as 18 teachers and five students of 15 elementary schools in Bantul Regency, Sleman Regency, and Yogyakarta City. The subjects were established using the purposive sampling technique, with the consideration that the teachers and students are from the schools that have a good internet connection. The data collection used a needs analysis questionnaire, an expert validation scale, and a practicality response questionnaire. The data collection instrument used a needs analysis questionnaire, a product validation scale by material experts and media experts, and a product practicality response questionnaire by teachers and students. The data analysis technique used the descriptive statistical analysis techniques.

The analysis stage in this research is the stage to find out what media is needed and whether the subject really needs the media. There are two stages in the analysis: literature study and field study of need analysis. Literature study is carried out by collecting relevant research and sources and reviewing concepts in the early reading materials. While needs analysis is carried out by meeting with the subjects directly and distributing questionnaires of teaching media needs. The subjects in this stage are 15 teachers of elementary schools. The Design stage is the stage in designing the conceptual design of the Pancalis application. The conceptual design developed is based on literature study and field study of need analysis, then the best and most appropriate learning experience design is made for students. The Development stage is the stage of developing the content and presentation of language in the Pancalis application. At this stage, the material for the Pancalis application was developed for the achievement of the teaching of early reading according to the design on the storyboard. Then the product was validated by two experts, namely material experts, and media experts. After that, the product practicality response test was carried out involving three teachers and five students at elementary school.

FINDING AND DISCUSSION

Findings

The development of Pancalis as a media of early reading applications for elementary school students needs to be preceded by observing the condition of the learning media used and the user's needs for early reading learning media. This is done to assure that the developed application can meet the users' needs. There are five stages of development that have been carried out, namely: analysis, design, development, implementation, and evaluation. This study is the first year of two, and the focus is on the stage of analysis, design, and development.

The result of the analysis stage

The *Analysis* stage is conducted to determine the condition of the media for the teaching of early reading skills to year-one students of elementary school. This phase was conducted in two ways, literature study and field study.

Literature study is carried out by exploring theoretical perspective and relevant reserches regarding the effective strategies in teaching to early reading which can accomodate the distance learning in the new normal era. And this activity comes to the conclusion that *Pancalis (Pandai Membaca dan Menulis* = fluency in reading and writing) as an Android-based application

becomes an alternative learning media that can be used for the teaching of early reading to elementary school students.

In addition, field study is conducted by using a questionnaire of need analysis. It shows that there are difficuties and problems in teaching to early reading and lack of teaching media used. Besides, teachers and students also need Android-based learning media for early reading that can accommodate distance learning. There are three findings of field study: first, *difficulties in teaching early reading*. Reading skills are the skills that must be mastered by early grade students. Through reading activities, students will learn other sciences. This is the background of the importance of mastering early reading skills in the early grades. Before the pandemic, early reading teaching was carried out face-to-face so that teachers could provide direct guidance. However, during the pandemic, like the current situation, early reading teaching is carried out online. This makes the teaching a little constrained. Based on the results of interviews with NA (an interviewee), currently teachers have difficulty in providing early reading assistance to their students. Online teaching which has the characteristics of distance and time constraints will greatly affect the teaching of early reading skills. CPW, another interviewee, also expressed the same thing. This limitation of teacher assistance was finally overcome by involving parents in teaching early reading. But not all parents are ready to accompany their children, ready in terms of time and skills to provide their children with early reading guidance.

The same condition was experienced by students. They still found it difficult to master reading skills. Moreover, the current grade 1 elementary school students are the product of 1.5-year online schooling. The results of the interviews conducted with several parents in three schools show that they also conveyed the same thing about the difficulties experienced by their children in following early reading lessons. MY, who is the student's guardian, revealed that when studying from home, her child still had difficulty reading words that had consonant letters. Likewise, SR, another parent, said that when at home, her child easily got bored when learning to early reading.

Second, *teaching media used*. Observations made in the teaching-learning process show how the teaching media was used. Observations were made on teaching early reading at three elementary schools (SD's), namely SD Muhammadiyah Kretek, SD Muhammadiyah Ambarbinangun, and SD Muhammadiyah Mantaran. The observations aimed to reveal the condition of the media used by the teacher in teaching early reading to students. Based on the results of the observations, teachers use power-point and video media in teaching. In addition, several times the teacher used teaching materials in the form of books or handouts developed by the school. During this online teaching period, there were also teachers who used Google meet or Zoom media to carry out early reading lessons. Through this activity, the teacher wanted to know the early reading ability of each student.

Based on the results of the interviews with several teachers of grade 1 students of elementary schools, it was concluded that teachers had used instructional media in practicing early reading skills. However, the media used by the teacher did not use an Android-based application. Therefore, Android-based learning media is needed to support early reading skills.

Third, *the need of Android application-based learning media*. In relation to the users' needs for early reading applications, the data show that students and teachers need pre-reading applications to help the teaching-learning processes of reading for grade 1 students, whether used in face-to-face or online teaching and learning. Based on the results of the interviews with 16 teachers of elementary schools in Bantul and Sleman, 81% of teachers said that distance learning reduced the mastery of early reading skills.

The problem of decreasing mastery of early reading skills can be overcome in several ways, including presenting appropriate teaching media. In this case, the teaching media that is identical to the Alpha generation students and current teaching is the Android application-based teaching media. Based on the needs analysis, it was found that 98% of teachers stated the need for teaching media for early reading based on Android applications. As many as 85.7% of respondents expected that the developed media would present video materials. As many as 77.1% expected that the media contained materials for early reading skills and as many as 67% expected an interactive game-based evaluation.

A total of 78.9% of respondents wanted interesting images that could support the material in the application. This was realized by presenting pictures of teachers and students in the application so that students became more interested. Furthermore, 85.7% of teachers suggested that the application be given a video. In this case, it was realized by providing a video of the song *ABC* which is downloaded from the YouTube link. As many as 63.2% of teachers wanted the application to be developed would be filled with sound and music to clarify the materials. In the application, this was realized by using the teacher's voice when giving instructions to students and providing material explanation. Furthermore, as many as 63.25 teachers expected that the application to be developed was based on the contextual approach. This was realized by presenting materials and practice questions that were close to the real world of grade 1 students of elementary school. Then, 47.5% of teachers wanted the application to be developed was in accordance with Curriculum 2013. The application was then designed based on Curriculum 2013 by realizing a theme that follows the theme in Curriculum 2013, namely *Myself* Theme and four Sub-themes with the following details: Sub-theme 1 *Me and My New Friend*, Sub-theme 2 *My Body*, Sub-theme 3 *I Take Care of My Body*, and Sub-theme 4 *I'm Special*.

The results of the interviews with teachers as users were used as the basis for developing early reading applications. The goal was that the early reading application could meet the needs of users, both students and teachers. The data on the need for early reading applications for teaching grade 1 students of elementary school were obtained through interviews. Two teachers, NA and MIR, stated that the application-based learning media for teaching to read was very necessary because with this media students would be more interested, and the class would be fun so that the teaching materials delivered would be easy to understand. The same thing was stated by MY, the guardian of grade 1 student, who stated the same thing that teaching applications were needed in teaching so that students were more active and interested because the application would make the atmosphere of learning to read would be fun and not boring.

Of the several learning media that have been used by teachers in the three schools, none of them have used Android application-based learning media. In fact, this media is very suitable for distance learning and can be accessed via gadgets. The application also supports interactive learning between students and learning media. Elementary school students who are the alpha generation will certainly feel happy and enthusiastic about the presence of the early reading application.

The result of design and development

The Pancalis application was developed using the Adobe Flash program, starting from a conceptual design based on the results of a literature study and field study, then proceeding with making flowcharts and storyboards that contain display plans, animations, graphics, narration and music. The next step was to develop the storyboard into an Android-based application, and this stage was the 'develop' stage. In this case, Pancalis was assisted by using the Adobe Flash program. It consists of five main menus, namely: cover/opener, user manual, main menu display, materials, evaluation, and developer profile.

Main menu	User manual	Evaluation	Materials

Figure 1. Product Display

The Pancalis media products are then validated by media experts and material experts, and practicality test results from teachers and students. The results of the feasibility test from media and material experts and practicality test results from teachers and students are described below. First, *media expert validation*. This assessment intends to see whether or not the media is feasible to be implemented to students. The results and analysis of the media expert validation can be seen in Figure 2.
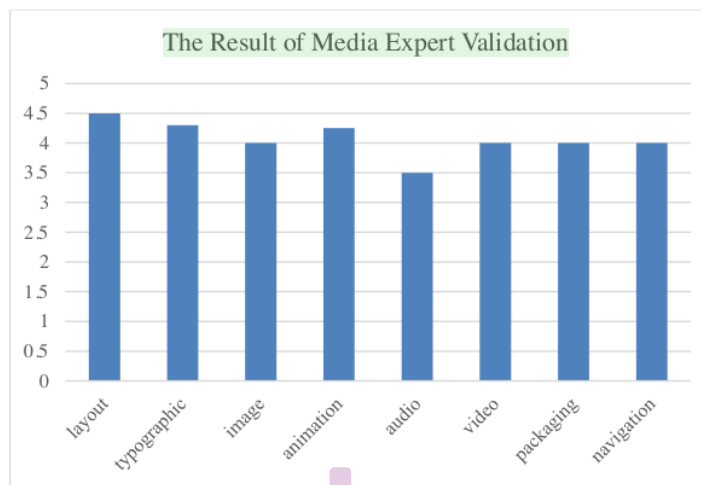

Figure 2. Result of Media Expert Assessment

The result of media expert validation in Figure 2 shows that the early reading application has a fairly high value in terms of media quality. From the layout aspect, it has a score of 4.5; the typographic aspect has a score of 4.3; the image aspect has a score of 4; the animation aspect has a score of 4.25; the audio aspect has a score of 3.5; the video aspect has a score of 4; the packaging aspect has a score of 4; the use aspect has a score of 4; and the navigation aspect has a score of 4. The average score is 4.5.

Second, *material expert assessment*. The Pancalis application also needs to be assessed in terms of its materials. There are three aspects that are assessed, namely learning aspects, content aspects, and language aspects. The results and analysis of the material expert validation can be seen in Figure 3.
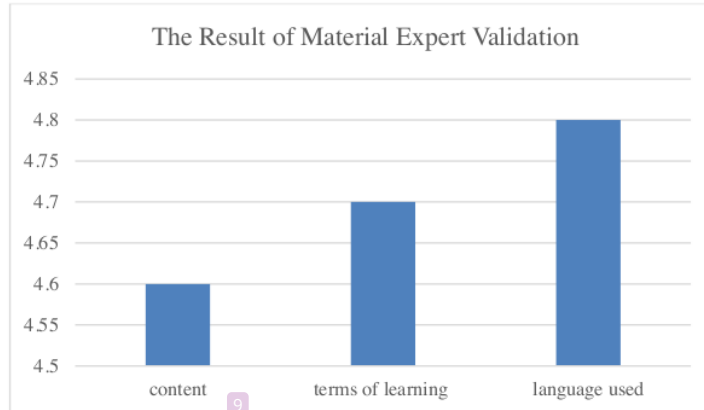
Figure 3. Results of Material Expert Validation

The result of material expert validation in Figure 3 shows that the early reading application has a quite high score. In terms of content, it has an average score of 4.6; in terms of learning it has an average score of 4.7; while in terms of the aspect of the language used, it has an average score of 4.8. The overall average score is 4.7.

Third, *practicality test results from teachers and students*. After the feasibility test from media and material experts, the next step was to carry out a practicality test. This test involved three teachers and five students of elementary schools in Sleman, Bantul, and Yogyakarta City. The practicality scale focuses on three main aspects that affect the practicality of web-based learning media, namely (1) media attractiveness, (2) content suitability, and (3) media quality. Media attractiveness is related to the visual or appearance of the early reading application. The media design is considered very good so that it is able to attract interest or foster students' learning motivation in early reading. The content suitability is related to the suitability of the content or media material with the curriculum. The appropriate content will make it easier for students to understand the material being taught and avoid confusion or misunderstanding of concepts. Media quality relates to instructions, ease of use or access, and time efficiency of use. Clear instructions will make it easier for students to use the learning media. The results of the practicality test can be seen in Figure 4 below:
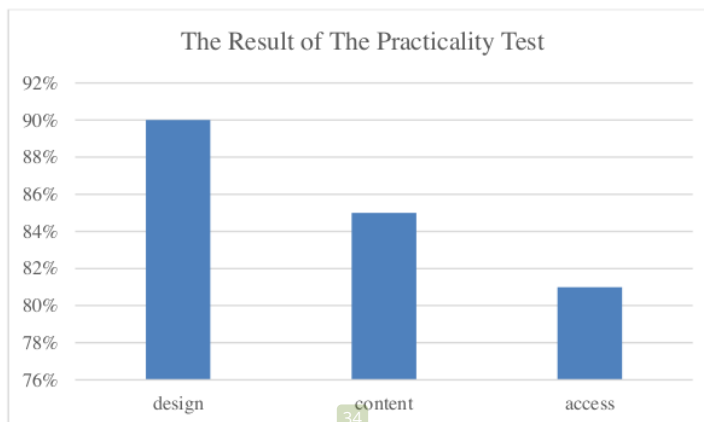

Figure 4. Results of the Practicality Test

The result of the practicality test in Figure 4 shows that the Pancalis application has a high value, as follows: the design aspect has a percentage gain of 90%, which means the learning media

has a very good design; the content aspect has a percentage gain of 85%, which means the learning media has very good content; and the access aspect has a percentage gain of 81%, which means that the learning media has very good ease of access.

Discussion

The results of the study show that research data include three stages, namely analysis, design, and development in the context of developing early reading applications. The discussion of these three things is as follows.

Need analysis in teaching early reading

There are three findings of need analysis in teaching early reading. First, *difficulties in teaching early reading*. Based on the results of the preliminary study that has been described above, it can be seen that learning to read online is very influential to the mastery of students' reading skills. The results of the interviews with elementary school teachers in Sleman Regency, Yogyakarta City, and Bantul Regency show that distance learning that has been applied so far has reduced the students' mastery of early reading skills. As many as 81% of respondents said that distance learning had a very big influence on mastering early reading skills, let alone that the current grade 1 students are products of distance learning during the previous year. The introduction to early reading skills, which students usually get when they are in kindergarten, has also not been maximal, and it will also have an impact on their early reading skills, which they should have mastered when they were in grade 1 of elementary school. Actually, when the teaching-learning process is face-to-face, this is not a big problem for teachers and students because teachers can provide intensive early reading assistance, but what is currently happening is different. Considering the Covid-19 pandemic, which is still massive and even increasing significantly, schools are reluctant to manage face-to-face teaching.

The role of teachers as teachers and educators can actually be replaced by parents at home. According to Ki Hadjar Dewantara's educational trilogy theory, education is not only the responsibility of teachers in schools, but also the responsibility of parents at home and the community in the surrounding environment (Dewantara, 2011). However, this theory has not been applied in general, meaning that when parents do not have the provisions on how to teach good early reading, it will certainly have an impact on the mastery of their children's early reading skills (Aprilia, 2021); (Dilamsari & Hendratno, 2021). In addition, in terms of time to teach their children during this pandemic, not all parents work from home. There are parents who still have to work in their offices or workplaces and tend to find it difficult to supervise their children studying at home.

The data obtained in the interviews show that so far students lack motivation in learning. This is different when they learn face-to-face. Their motivation is higher when teaching is face-to-face. In terms of concentration, it is also different. In face-to-face teaching, the teacher will easily teach students to focus and concentrate on learning. However, when studying at home, students receive many distractions. For example, in zoom teaching-learning activities, students' concentration is not more than 20 minutes and after that they will think about other things and some even leave the zoom class to do other activities. Teachers have tried to implement a variety of learning activities, but students tend to feel bored and less enthusiastic. In addition, teachers also have difficulty monitoring the development of students' reading skills. Likewise, in terms of infrastructure owned by students, they have constraints including the Internet network constraints, Internet quota, and even limited devices.

Second, *Learning media used*. During distance teaching, the teacher uses several learning media that are used to carry out early reading activities. Based on the survey, which was conducted at elementary schools in Bantul Regency, Sleman Regency, and Yogyakarta City, it was found that teachers had been using quite a variety of learning media, including the power points, videos - both made by teachers and downloaded from YouTube, zoom, and early reading practice books. Learning media is a tool that can help convey information from teachers to students (Nurani & Mahendra, 2019). The presence of learning media will have an effect on the success of learning. It is said (Supriyono, 2018) that the presence of the media will arouse student interest in learning.

When distance teaching is in the era of the Covid-19 pandemic, teachers are required to utilize learning media that utilize technology (İbrahim et al., 2021). In this pandemic era, teachers are required to be more creative. From surveys and interviews conducted by researchers, it was found that teachers were creative and innovative enough in providing students with learning media. Video teaching media is the most widely used by elementary school teachers to carry out early reading lessons. As many as 23.8% of teachers choose video learning media to carry out early reading lessons. Video is one of the media that is favored by teachers and students both when learning is online and offline. Another learning media that is often used by teachers is the early reading practice book. This book is given by the teacher to students to study at home with their parents. Another learning media is the zoom application or *Google meet*. This application is used by the teacher to reveal the mastery of the early reading ability of each student. Through zoom and Google meet applications, teachers understand where each student's difficulties lie. None of the early reading media used by the teacher in teaching early reading is an Android-based early reading application.

Third, *the needs of Android application-based learning media*. Based on the results of the study, the teaching of early reading still has several obstacles, especially related to how to make innovation and learning variations when teaching is online. When teaching is online like it is today, teachers are required to be more creative and innovative in teaching. When studying from home, students tend to get bored quickly. This of course requires teachers to design interesting and fun learning. One of them is by presenting a variety of learning media.

The teaching of early reading is the foundation for other teaching (Schaefer & Kotzé, 2019). Early reading skills should be mastered by students when they are in grade 1. However, during the pandemic like the current one, teachers have difficulty monitoring students' reading abilities. Teachers need to use learning media which are IT-based and easy to use by students. So far, teachers have used various learning media to support early reading activities, including PPT, learning videos, books, zoom applications, and Google meet. However, of all the learning media used by the teachers, none of them is an Android-based early reading application.

In the era of the Industrial Revolution 4.0 nowadays, the existence of Android or gadgets is very close to the world of children. Devices can be used to support learning (Saputra et al., 2021). The use of gadgets can also be implemented into early reading activities. One of them is the development of a product in the form of an early reading application. The application is based on Android, making it easier for students to use it anywhere and anytime. Furthermore, technology that is integrated with learning can increase students' learning motivation (Puspitarini & Hanif, 2019). The results of observations and interviews with the teacher show that so far the teachers have never used an early reading application. The teachers wanted an early reading application based on Curriculum 2013 applying the contextual approach. This is because the existing pre-reading applications have not been adapted to Curriculum 2013. This means that the existing applications are more general and not specifically for grade 1 elementary school students. In addition, they also wanted that the applications were designed by integrating images, videos, materials, and proportional practice questions. The existence of games will also add to the attractiveness of the application.

The applications are also developed by paying attention to student interaction. Do not let students just be spectators without them trying to do something to measure their reading ability. In other words, the developed application must be fun and interesting for students. Learning that is integrated with games will attract students more. According to the research conducted by Ozernov, integrating games will improve understanding and mastery of learning materials (Ozernov-Palchik, 2017).

The feasibility of the Pancalis application

The Pancalis application was developed using the *Adobe Flash* program. In its development, validation was carried out through judgment of experts, namely material experts and media experts, to assess the feasibility of learning media. In product validity, items could be maintained, deleted, or revised based on the assessment (Binti Jusoh et al., 2018). The validation

of material experts and media experts was carried out to get suggestions and assessments of the developed early reading application.

The developed Pancalis application is adapted to the basic competencies in Curriculum 2013 and the contextual approach. Curriculum 2013 and the contextual approach are used as the basis for the development because this application is expected to provide supports to teachers and students as an alternative to distance learning media. Curriculum 2013 is the curriculum that is currently used, while the contextual approach is chosen so that students are able to connect learning with real situations at school so that it will be more meaningful. Apart from the material aspect, the language aspect is no less important. The use of language that is in accordance with the development of grade 1 elementary school students is also very important in the development of Pancalis. The language presented at Pancalis is simple, easy to understand, and concise (Owens, 2012).

In the current era of the Industrial Revolution 4.0, learning is more directed at how technology and education go hand in hand (Baker, 2019). Moreover, the students we are currently facing are Generation Z and Generation Alpha students. The identical feature of the two generations is that they are very close to technology. They are very interested in and easily familiar with various technologies (Adriyanto et al., 2021). In addition, grade 1 students of elementary school are averagely 6-8 years old and are still happy with the world of play. Based on these grounds, this early reading application was developed by incorporating elements of word games to make it more interesting for students as users.

The practicality of the Pancalis application

The Pancalis application was developed according to the needs of the field. The application was developed to answer the challenges of the 21st century teaching and learning and the needs for distance learning during the current pandemic. The 21st century teaching and learning requires the use of technology (Fitriyana et al., 2020); (Makawawa et al., 2021). Distance learning, of course, requires learning media that are practical and can be used by students even though they are separated by distance. The Pancalis application answers the problem of the lack of distance learning media because Pancalis can be used by students even though it is not accompanied by a teacher directly. Students can learn to read independently at home.

The Pancalis application is an Android-based learning media and can be easily downloaded by users. Once downloaded, the application can be directly used for the teaching and learning of early reading. The design of Pancalis is made attractively adapted to the characteristics of grade 1 elementary school students. The attractiveness of the design is manifested in the presentation of the material equipped with videos, images, sound effects, reading simulations, and games to compose letter puzzles and word scrambles.

The menus presented in the application also vary, namely: 1) instructions for use; 2) material; 3) evaluation questions; and 4) developer profile. The research product in the form of an early reading application is expected to be an alternative media that can be used for distance teaching and learning. The user manual contains navigation instructions, basic competencies, and learning objectives that will make it easier for users before using Pancalis. The materials menu contains a simulation of early reading with a global method. The material presented is comprehensive in one theme and four sub-themes in accordance with Curriculum 2013. The last menu is a question consisting of 10 interactive multiple-choice questions so that it is interesting for users.

CONCLUSION

Based on the results and discussion of the study, the conclusions are: The result of the needs analysis shows that 85.7% of respondents expect that the developed media will present video material. As many as 77.1% expect that the media contains materials for early reading skills and as many as 67% expect an interactive game-based evaluation. Their needs are interactive media which can be used independently and have an attraction for students to be more motivated in

learning to read at the early stage; The product of this study is in the form of Android-based *Pancalis* (good at reading and writing). Android-based learning media developed with Adobe flash application program in the form of interactive and innovative multimedia for early reading; The results of product feasibility validation by the material expert obtained a score of 4.7, which means that the developed application is very feasible and the results of product feasibility validation by media expert with a score of 4.5 which means that the developed application is very feasible. So that the product in the form of the Pancalis application is suitable for use in early reading teaching and learning in the early grades of elementary school; The results of the product practicality test through teacher and student responses obtained a score of 90%, which means that the developed application is very good in terms of the design aspect; 85%, which means that the developed application is very good in terms of the content aspect; and 81%, which means that the developed application is very good in terms of the ease of access aspect. Therefore, the developed Pancalis application is practical for the teaching and learning of early reading.

REFERENCES

Abdurahmad, M. (2012). *Anak berkesulitan belajar*. Rineka Cipta.

Adriyanto, A. R., Santosa, I., Syarief, A., & Irfansyah. (2021). Design and multimedia learning principles on MOOC Indonesia. Cakrawala Pendidikan, 40(1), 92–106. https://doi.org/10.21831/cp.v40i1.34699

Aprilia, I. U. (2021). Analisis kesulitan membaca permulaan siswa kelas I. Jurnal Penelitian Dan Pengembangan Pendidikan, 5(2), 227–233.

Baker, S. F. (2019). The writing performance of elementary students using a digital writing application: Results of a teacher–librarian collaboration. Interactive Technology and Smart Education, 16(4), 343–362. https://doi.org/10.1108/ITSE-08-2018-0057

Bano, M., Zowghi, D., Kearney, M., Schuck, S., & Aubusson, P. (2018). Mobile learning for science and mathematics school education: A systematic review of empirical evidence. Computers & Education, 121, 30–58. https://doi.org/10.1016/J.COMPEDU.2018.02.006

Binti Jusoh, Z., Zubairi, A. M., & Badrasawi, K. J. I. (2018). Validity evidence using expert judgment: A study of using item congruence involving expert judgements for evidence for validity of a reading test. Al-Shajarah, Special Issue: EDUCATION, 307–320.

Cromley, J. G., Snyder-Hogan, L. E., & Luciw-Dubas, U. A. (2010). Cognitive activities in complex science text and diagrams. Contemporary Educational Psychology, 35(1), 59–74. https://doi.org/10.1016/j.cedpsych.2009.10.002

Dewantara, K. H. (2011). Karya Ki Hadjar Dewantara bagian pertama pendidikan. Majelis Luhur Tamansiswa.

Dilamsari, D. P., & Hendratno. (2021). Identifikasi kesulitan membaca permulaan siswa sekolah dasar pada era pembelajaran daring di wilayah Kecamatan Driyorejo. JPGSD, 9(5), 2308–2318.

Donnelly, D., McGarr, O., & O'Reilly, J. (2011). A framework for teachers' integration of ICT into their classroom practice. Computers and Education, 57(2), 1469–1483. https://doi.org/10.1016/j.compedu.2011.02.014

Fitriyana, N., Wiyarsi, A., Ikhsan, J., & Sugiyarto, K. H. (2020). Android-based-game and blended learning in chemistry: Effect on students' self-efficacy and achievement. Cakrawala Pendidikan, 39(3), 507–521. https://doi.org/10.21831/cp.v39i3.28335

İbrahim, A., Gozum, C., & Demir, Ö. (2021). Technological pedagogical content knowledge self-confidence of prospective pre-school teachers for Science Education during the COVID-19 period: A structural equational modelling conditions of the creative commons attribution

license (CC BY-NC-ND). International Journal of Curriculum and Instruction, 13(1), 712–742.

Levy, B. A., Gong, Z., Hessels, S., Evans, M. A., & Jared, D. (2006). Understanding print: Early reading development and the contributions of home literacy experiences. Journal of Experimental Child Psychology, 93(1), 63–93. https://doi.org/10.1016/j.jecp.2005.07.003

Makawawa, J. C., Mustadi, A., Septriwanto, J. Van, Sampouw, F., & Najoan, R. A. . (2021). Primary school teachers perception of technological pedagogical content knowledge in online learning due to Covid 19. Jurnal Prima Edukasia, 9(1), 86–96. https://doi.org/10.21831/jpe.v9i1.35245

Nurani, R. Z., & Mahendra, H. H. (2019). Use of big book learning media to improve students' beginning reading skills in primary schools. Mimbar Sekolah Dasar, 6(3), 330–340. https://doi.org/10.17509/mimbar-sd.v6i3.22893

Owens, R. (2012). Language development: An introduction. In Topics in Language Disorders (Vol. 11, Issue 1).

Ozernov-Palchik, O. (2017). Longitudinal stability of pre-reading skill profiles of kindergarten children: Implications for early screening and theories of reading. Developmental Science, 20(5). https://doi.org/10.1111/desc.12471

Perfetti, C. A., Landi, N., & Oakhill, J. (2008). The acquisition of reading comprehension skill. In The Science of Reading: A Handbook (pp. 227–247). John Wiley and Sons. https://doi.org/10.1002/9780470757642.ch13

Puspitarini, Y. D., & Hanif, M. (2019). Using learning media to increase learning motivation in elementary school. Anatolian Journal of Education, 4(2), 53–60. https://doi.org/10.29333/aje.2019.426a

Rahim, F. (2007). Dasar Pengajaran membaca di sekolah. Bumi Aksara.

Saputra, D., Gürbüz, B., & Haryani, H. (2021). Android-based animation for chemical elements and experiments as an interactive learning media. Journal of Science Learning, 4(2), 185–191. https://doi.org/10.17509/jsl.v4i2.28787

Schaefer, M., & Kotzé, J. (2019). Early reading skills related to grade 1 English second language literacy in rural South African schools. South African Journal of Childhood Education, 9(1), 1–13. https://doi.org/10.4102/sajce.v9i1.644

Sisson, D., & Sisson, B. (2012). Close reading in elementary schools bringing readers and texts together. In Routledge. Routledge. https://doi.org/10.1002/TRTR.01117

Supriyono. (2018). Pentingnya media pembelajaran untuk meningkatkan minat belajar siswa SD. Edustream: Jurnal Pendidikan Dasar, II(1), 43–48.

Tjoe, J. L. (2013). Peningkatan kemampuan membaca permulaan melalui pemanfaatan multimedia. Jurnal Pendidikan Usia D*ini*, 7(1), 17–48.

Vanbecelaere, S., Van den Berghe, K., Cornillie, F., Sasanguie, D., Reynvoet, B., & Depaepe, F. (2020). The effects of two digital educational games on cognitive and non-cognitive math and reading outcomes. *Computers and Education*, 143, 103680. https://doi.org/10.1016/j.compedu.2019.103680

Washburn, E. (2016). Preservice teacher knowledge of basic language constructs in Canada, England, New Zealand, and the USA. *Annals of Dyslexia*, 66(1), 7–26. https://doi.org/10.1007/s11881-015-0115-x

C1_CP_Pancalis_Android-based_learning_media.pdf

7 www.journal.uniku.ac.id
Internet Source
<1 %

8 Beta Wulan Febriana, Ravah Darenlivana, Lina Fauzi'ah. "Developing of syche learning media based fun learning on hydrocarbon compound material", AIP Publishing, 2021
Publication
<1 %

9 Farida, N Supriadi, N Kurniawati. "Developing Student Worksheet Assisted with Geogebra on Derivative Materials", Journal of Physics: Conference Series, 2019
Publication
<1 %

10 thesis.binus.ac.id
Internet Source
<1 %

11 M K Nais, K H Sugiyarto, J Ikhsan. "Virtual chemistry laboratory (virtual chem-lab): potential experimental media in hybrid learning", Journal of Physics: Conference Series, 2019
Publication
<1 %

12 journal.umsu.ac.id
Internet Source
<1 %

13 "Developing Mobile Learning Media for Arabic Language Instruction at Islamic Senior High School in Lampung Indonesia", International Journal of Recent Technology and Engineering, 2019
<1 %

14 Asrizal, Desnita, Y Darvina. "Analysis of validity and practicality test of physics enrichment e-book based on CTL and enviromental factor", Journal of Physics: Conference Series, 2021
Publication

<1 %

15 fkip.ummetro.ac.id
Internet Source

<1 %

16 download.atlantis-press.com
Internet Source

<1 %

17 ojs.uniska-bjm.ac.id
Internet Source

<1 %

18 Jayaluxmi Naidoo. "Teaching and Learning in the 21st Century", Brill, 2021
Publication

<1 %

19 Submitted to Universitas Islam Lamongan
Student Paper

<1 %

20 Arda Purnama Putra, Sutansi Sutansi, Bambang Budi Wiyono, Iqlima Pratiwi, Rina Sari. "Attractiveness of Instructional Media Based on Android for Learning in Elementary School", 2021 5th International Conference on Digital Technology in Education, 2021
Publication

<1 %

21 garuda.ristekdikti.go.id
Internet Source

<1 %

22 D R Wulandari, T H W Handayani. "Android application innovation as the indonesian basic spices learning media", Journal of Physics: Conference Series, 2021
Publication

<1 %

23 P Sudira, D Santoso, N Fajaryati, P Utami. " Incorporating the 21 Century Skills in The Development of Learning Media for Analog Electronics II Practicum ", Journal of Physics: Conference Series, 2018
Publication

<1 %

24 ojs.unm.ac.id
Internet Source

<1 %

25 Akbar Nasrum, Herlina Herlina. "Developing of Calculus Teaching Materials Based on Audiovisual", Infinity Journal, 2019
Publication

<1 %

26 ERIC.ed.gov
Internet Source

<1 %

27 Fitra Delita. "The Challenges of E-Learning Implementation During the Covid-19 Pandemic in Senior High School", Journal of Digital Learning and Education, 2021
Publication

<1 %

28 Risci Ayu Rahmanita, Ni Made Ratminingsih, Putu Adi Krisna Juniarta. "Developing an Android-Based English Reading Material for the Eighth Grade Students in Mtsn Karangasem", The Art of Teaching English as a Foreign Language, 2021
Publication

<1 %

29 Siti Komariah Nurlela, A S Pratiwi, Rahmat Permana, M F Nugraha, B Hendrawan, Mujiarto, Milah Nurkamilah. "Development of kite number learning media help adobe flash cs6 on the concept of place number values in elementary school 2 Singaparna", Journal of Physics: Conference Series, 2020
Publication

<1 %

30 Submitted to Universitas Negeri Manado
Student Paper

<1 %

31 d.researchbib.com
Internet Source

<1 %

32 ejournal.iainkendari.ac.id
Internet Source

<1 %

33 journal.unj.ac.id
Internet Source

<1 %

34 mafiadoc.com
Internet Source

<1 %

35 www.ieomsociety.org

Internet Source

<1 %

36 www.jet.org.za
Internet Source

<1 %

37 www.neliti.com
Internet Source

<1 %

38 hdl.handle.net
Internet Source

<1 %

39 Amirudin Amirudin, Setuju Setuju.
"Development of multimedia-based learning
media interactive on a subject of cooling
systems in Vocational School of Industry
Yogyakarta", TAMAN VOKASI, 2018
Publication

<1 %

40 Muhamad Afandi, Zulela MS, Amos Neolaka.
"Analysis of Elementary School Teachers'
Work Discipline at UPTD Education in
Banyumanik, Semarang City", MATEC Web of
Conferences, 2018
Publication

<1 %

41 Hamzah Hamzah, Desi Sukenti, Syahraini
Tambak, Wisudatul Ummi Tanjung.
"Overcoming self-confidence of Islamic
religious education students: The influence of
personal learning model", Journal of
Education and Learning (EduLearn), 2020
Publication

<1 %

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	On		

C1_CP_Pancalis_Android-based_learning_media.pdf

FINAL GRADE

/100

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12