Conference Paper

My Writing: An E-LEA-Based Android Application to Develop Kindergarten Children's Early Literacy

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Abstract

My Writing is a tool that preschool children can use to improve their reading and writing skills, which can be used both at school and at home. This tool was developed based on the Language Experience Approach (LEA) and is in the form of an Android application designed for children. It is used to help children understand that the spoken language can be altered into the written one and still retains its meaning. 10 teachers were included in this study and data were collected from teacher opinions and assessments. The findings showed that My Writing is an effective application for developing literacy in young children, and that it is easy to use by children and parents, making it simple for teachers to assess children's literacy skills while they study at home.

Keywords: Language Experience Approach (LEA), Digital LEA, E-LEA, My Writing, early reading and writing

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1. Introduction

Indonesia's education system has undergone several changes from time to time prior to the industrial revolution. The pre-industrial era was marked by the dominance of the use of human labor without the aid of machines. The era of industrial revolution 1.0 in the 17th to 18th centuries marked as the beginning of the use of machines to serve human needs, one of which was the use of steam engines. Factories producing essential needs from food, clothing, to even shelter began to appear within Indonesian society. The mid-18th century saw the emergence of electric power to aid production in the so-called industrial revolution 2.0 era. The digital information that appeared in the industrial revolution 3.0 has made many community service activities more effective and economical. The development of technological devices such as computers, the internet, and smartphones marked the emergence of the industrial revolution 3.0 which occurred from 1960 to 2010. The combination of machines and humans, although sometimes dominated more by machines, is a distinctive characteristic found in the industrial revolution 4.0. This period has been changing the system of human life in

numerous fields including education. Education that integrates technology in learning is part of the phenomenon of the industrial revolution 4.0 [3].

The field of education needs to follow the development of the industrial revolution 4.0. It can be started by revising the curriculum, increasing student competencies, and using digital literacy in the learning process. Children learn not only from teachers but also from various sources. They can seek knowledge through the technology available around them. Lessons from teachers and even parents can easily be replaced by video contents available on YouTube or even articles on the internet. Learning opportunities that can be obtained from unlimited sources are now being promoted through a new educational policy called Merdeka Belajar (Freedom to Learn). Children are free to learn and seek information from various sources on the internet. This new trend has gained its momentum during the COVID-19 pandemic that has been occurring since the beginning of 2020, requiring children to study from home to prevent its spread [22, 23]. The question that then arises is how is the development of the LEA to the digitization stage based on a review of previous research results? Can e-lea, My Writing be used by teachers to stimulate early literacy in children?

2. Related Works/Literature Review

2.1. The use of technology and the development of early literacy

More than 1.5 million journal articles in Google Scholar show the link between technology and children's early literacy. One of them is Tracey & Young's research [12] that investigated kindergarten children who experienced delays in literacy development. Through the Worterford Early Reading level 1 program, children were included in provided activities for 15 minutes a day for 10 months. The results showed that children who did activities with a software experienced an increase in literacy skills than those who did not use it. The Waterford early reading program consisted of computer-based play activities containing games and songs to enrich children's literacy.

Belo, et.al stated that there are three types of technology that can be used in the classroom for early literacy development, namely software, the internet, and the multimedia center [7]. The quality of the software here consists of four aspects: problem-solving orientation, sustainable development, playfulness, and incorporation of new technologies. The internet can be used by teachers as an educational tool to teach children. They can suggest children to download an educational application. The multimedia technology center contains educational programs that can be used by children to

help them doing activities such as writing, drawing, listening, reading, copying objects and coloring.

Based on some of these research results, it is safe to say that technology plays an important role in helping children develop their literacy skills. Indeed, there is a heated debate among researchers about whether technology should be taught to children. For example, research by Alghamdi found that technology has a negative effect on children's development both in their personal lives, interpersonal relationships, and health [1]. Mustafaoğlu, et al. also said that technology, both traditional technology (such as television) and modern technology (smartphones, tablets, and computers) raises a number of problems related to child development, obesity, physical inactivity, and sleep quality [8]. Considering the positive and negative effects of technology on children, Blackwell, et al. [2] and American Pediatric [10] then argue that the use of technology in children must follow the rules, that is, children under 2 years old are not allowed to use technology while for those who are over that age, their use should be limited. Thus, it can be said that screen time for children is allowed but with the main purpose of developing their literacy.

2.2. LEA

LEA is a language learning approach that helps students become more aware of the connection between spoken language and written language. The LEA was first developed in 1963 for Maori- and English-speaking children in 1964 and 1965 and was successful for all language learners of all ages [23]. LEA is an approach that integrates the teaching of reading with other children's language skills, namely listening, speaking, and writing that are related to children's personal ideas and experiences. LEA is based on the theory that children learn to read more easily if they can read sounds as well as the language they speak. In this approach, children dictate stories about their experiences and the teacher writes down what the children say. LEA is the most appropriate strategy to facilitate children so that they can develop their language skills contextually. LEA connects visual, oral, and direct communication experiences [6].

LEA is carried out through four steps [9]. At the first step, the teacher and the children discuss the children's experiences with certain objects, for example the experience of taking a school field trip, or experiences of doing activities with family at home. The teacher discusses with their students about what they observed and how they felt when experiencing the event. At this step, children understand their feelings and experiences through oral vocabulary before they develop their language skills. At the second step,

the children pour their ideas on a sheet of paper in the form of a drawing. Then the teacher helps them record their statements on the drawing paper. The children pay attention to the teacher who are writing down the spoken language. They see the relationship between the spoken words and the written ones. At the third step, the teacher reads the children's writing. The teacher gives an example of reading fluently in front of the children. Then the children read it over and over again with the help of the teacher until the written form becomes familiar to them. At the final step, the children learn to compose specific words from their writing and also develop decoding, phonically, and structural analysis skills with the help of the teacher. The children can also learn to write words which are dictated to them. These LEA steps help children to recognize written language through spoken language. This approach is an especially appropriate approach used for children. They will realize that all the languages used for oral communication can also be written. But the drawback of this approach is that it requires a teacher or an adult to present a form of written communication to children. The COVID-19 pandemic has transformed learning from offline to online. The presence of teacher in the process of learning to write is then replaced by the students' parents. The problem is that not all parents are aware of and have the time to accompany their children learning to write and read. Therefore, there needs to be a touch of technology in LEA [13]. The increasing number of applications that can help children to introduce letters and teach reading makes LEA no longer of interest for children and teachers to develop early reading and writing skills.

2.3. Digital LEA

Technology can no longer be separated from learning for children in the era of the industrial revolution. Labbo et al. in 2007 developed a digital form of LEA. She said in her article that digital LEA is the development of LEA in digital form. The steps of learning with the Digital LEA are in principle the same as the general steps of the LEA. There are only slight differences in the several steps. Digital LEA contains four steps, namely 1) setting up the experience, 2) photographing the experience, 3) composing a multimedia photo essay or story, 4) engaging in follow-up activities [6].

The first step in digital LEA is that teachers and children together choose an experiential stimulus, which is done through the provision of advice from the teacher. This stimulus includes providing suggestions for a location for children to observe, discussing together the children's expectations from their observations of that location, collecting material in the form of photos or images that you want to observe, and deciding the

duration of this activity. Teachers and children make decisions on what photos to take, who will be photographed, when and in what activities the photos are taken, whether to take candid or staged photos, and how many photos to take. At the second step, the children prepare for the photo shoot. The teacher takes pictures of children doing various activities using a digital camera. At the third step, children upload their photos into a creative software, see and review their experiences in photos, discuss and choose the best photos about which they tell a story, and then put the photos on the story board. The children then compiled stories from their experiences. Next, the teacher writes the children's stories on photographs (or the children themselves write their own stories with the help of their teacher). The teacher (or computer voice if applicable) reads the text. The children decide whether to revise their writing on the screen. They can provide other multimedia effects in the story (e.g., music, sound effects, and animation). They can also record their own voice in the story. At the fourth step, children interact with multimedia results. They can read together the multimedia story on screen, such as reading aloud, active listening, and changing character of the voice and so on. The teacher can print out children's stories to introduce reading at the word level and support their fluency. Stories can be stored on a computer or printed as material for review or as material for reading practice or for reading media in class.

The digital LEA is a way of marrying the LEA approaches to technology. Unlike the traditional LEA, the digital LEA takes the form of software that must be installed on a computer device. It has several drawbacks if it is to be used at home, one of which is that not all families have computers at home. Second, the teacher still has to accompany the children to determine the target objects that will be discussed and developed in the form of spoken language towards written language. Third, it takes time to install program, and not all computers support it. These deficiencies encourage the development of My Writing as an Android application that users (parents / teachers) can install to be used as a medium for improving early reading and writing skills.

3. Material & Methodology

The research method used is the development research method by Thiagarajan. This paper is a development research stage by Thiagarajan with 4D stages, namely define, design, develop, and disseminate. At the define stage, we conducted an assessment of 10 teachers in the form of online interviews with google meet, to find various problems faced in the classroom during teaching during the pandemic. At this stage also, we then decided to choose one of the early literacy problems of children to be the focus of

development. Then we discussed with the teacher about the targets and goals expected from this development. We carried out the design stage by examining the best way for children to develop their literacy from various literature reviews. We found LEA to be a simple but meaningful way of impacting children's literacy advancement. We examine the theory from the research results that become our design development journey. We develop our designs in the form of design designs and software development is in the develop stage. We need to review users, here our users are teachers who will then share them with parents and then use them by children. We then gathered the teachers in a FGD to do a trial run and discuss our tool. The teacher gives an assessment of our tool, and we revise it accordingly. Dissemination is the final stage of our research which is to publish our research product in a journal like we do in this article.

4. Results and Discussion

4.1. E-LEA in My Writing

My Writing is an application developed based on the language experience approach (LEA) which aims to stimulate children's literacy. E-LEA has two main features namely My Library and My Writing. My Library is a space that contains different types of electronic books for children. Children's reading and writing skills need to be improved through book reading activities. This feature was developed based on a study involving reading electronic books in class to support children's writing skills [5]. This feature contains images that are equipped with writing (e.g., e-books) and with voice. This feature was developed in the hope that children have the experience of reading books and have the imagination to create a story to write based on the book [11].

My Writing is a feature directed at the second step of implementing LEA, which is to express children's ideas through pictures. This step is in accordance with the research [4] which supports LEA as one of the right approaches to improve children's writing skills, which is done by seeing, saying, and writing. Using this feature, children can explore various colors and drawing tools to express their ideas. After finishing their drawing, the children can save it and continue to the next step, which is telling the picture. In addition to drawing, children are also given choices on how to express their ideas through the photo. They can take photo files from the gallery or take pictures of objects directly.

Telling a story based on the picture is the next step after children pour their ideas into a picture. The child is asked to tell a story based on the picture. In the Record Your Story feature, the machine will record the children's verbal language and convert it into

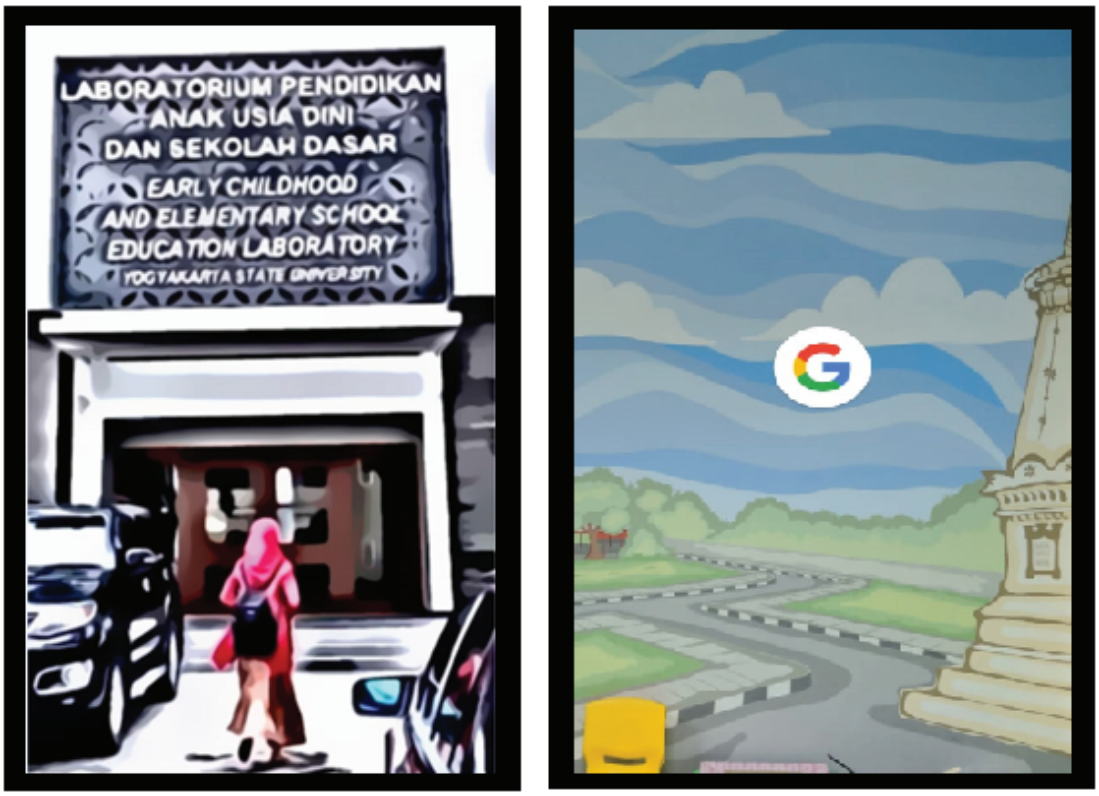

Figure 1: Homepage of E-LEA

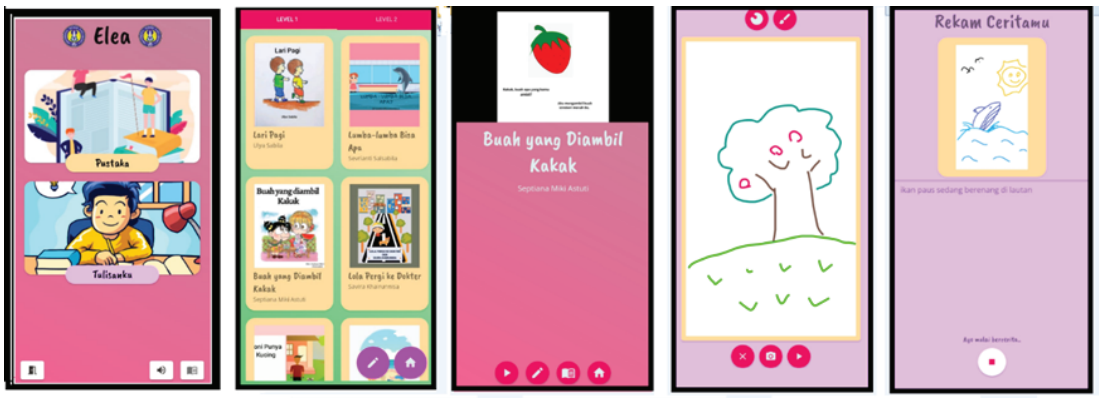

Figure 2: Features in E-LEA

a written language. In LEA or Digital LEA, this step is carried out with assistance from adults/teachers, but in E-LEA, this step is carried out by machines that can change the speech to text. Children can listen to the story again while reading the text that has been written in the Record Your Story feature.

The final step of E-LEA is that after the children have finished recording the voice, they can save the story in the application and/or share the story with others (parents or teachers) through social media platforms. If the results of the story are stored in the application, the story becomes a stored project which can be edited or developed at

any time. Children can also create drawings and text for new projects, without having to change existing projects.

Table 1: The Differences between LEA, Digital LEA, and E-LEA

Steps	LEA	Digital LEA [2]	E-LEA Research model
Step 1	•Discussing children's experiences	•The teacher provides experiential stimulation (Example) •The teacher and children discuss the photos to be taken.	•The children listen to stories from electronic story books (giving stimulation)
Step 2	•The children express their ideas (in the form of drawing and writing) •The teacher changes the children's oral stories into a written form. •The children see the teacher's writing	•The children prepare for a photo shoot. •The teacher takes pictures of the children.	•The children express their ideas (in the form of drawings and writing or photographs). •The children upload their drawings, writings or photos to the application. •The children recorded their stories orally. •The machine converts the children's spoken language into a text which is then put on their work. •The children see the tool for writing on his work.
Step 3	•The teacher reads the children's writing. •The children follow the teacher in reading the story several times until they can memorize it.	•The children choose a digital photo about which they will tell a story. •The children compose the story. •The teacher/children write the children's stories on screen. •The teacher/machine reads out the text of the story. •The children revise the story and add accessories in the form of sound, effects, pictures, animation, etc. to the story. •The children add their voice to the text.	•The children listen to the sound of the text that has been written by clicking on the speaker icon for several times until they memorize what is written. •The children modify their work by adding voices, sound effects, and pictures.
Step 4	•The children rewrite the text with the help of the teacher.	•The children read their work by repeating the voice, changing the character of the voice, etc. •The teacher can print children's stories or save them to use when re-reading.	•The children reread their work. •The children save their work in the project features for later reading.

Based on these steps, E-LEA is different from LEA and Digital LEA in terms of whether or not adult assistance is needed when learning to read and write (see Table 1). The presence of an adult is replaced by a machine that helps children write the results of their verbal stories into the written form. The written form can also be combined with

sound, as if being recited by the teacher. E-LEA is expected to help children learn to read and write based on their oral experiences naturally and independently.

4.2. Teachers' Perspectives on e-LEA

Based on the results of our discussion with 10 teachers in the FGD, we found that the teachers were very interested in the development of the tool we created. They are very excited to share the application with parents and stimulate children. Some teachers said that this tool helps reduce teacher attendance because there is a speech to text facility in this application. Books that are provided to help build children's experiences are also provided and are very interesting for children because they have audio. This facility helps children who are not yet able to read, listen to and understand the story. The teacher also believes that one of the facilities in this tool makes it easier for teachers to document the results of the child's learning process in the form of a video that parents can share directly with the teacher. However, based on trials conducted by the teachers, there is a drawback, namely that this application can only be used on Android with at least 4 RAM to be able to read and run all the facilities that have been provided. Meanwhile, at the time of discussion and testing, there were some teachers who did not have the qualified android facilities to run the application.

4.3. Discussion

LEA is very appropriate to use in the learning process of children because language skills can be developed based on their experiences [14-21]. They learn language in a contextual manner, thereby accelerating their level of understanding and their ability to combine their oral and written expressions. This method is rarely used by the teachers because of the limited information that they have. Another method of learning is the drill method, which introduces letters by thickening the dots to form certain letters (tracing). It has become a favorite method among teachers to teach children to read and write, although it has many drawbacks as well as advantages. Sometimes children do not really know the letters that are being bolded, they do not even realize that the letters in bold can also be read and contain messages. LEA is a method that combines the spoken language of communication with the language of written communication contextually.

Learning without a teacher is not always good, especially for children. They still have to be accompanied and guided continuously to acquire various concepts of knowledge and values of life. E-LEA is not educating children in an andragogical way; it sticks with

pedagogy. Andragogy is an education for adults because it is done independently. Pedagogy is suitable for education for children because it provides guidance and reinforcement from adults. E-LEA as a tool to facilitate children learning to read and write at home should still involve the teacher in providing instructional assistance in children's learning. Independently, children can explore these media and teachers can use it as a way to obtain data on the development of children's reading and writing skills. Learning without a teacher is not impossible for young children if the tools used for learning are easy and safe for them to use independently.

The involvement of technology in children's learning has become a target for educational development in the industrial revolution. There must still be a touch of technology to channel children's needs for technology even though the need for this technology, especially for children, must be limited. Education is not a field that closes the possibility of children not knowing technology. On the contrary, education should help children to be literate and wise in using technology. E-LEA helps teachers in schools to be able to use the appropriate tools for the online learning process while introducing technology to children. Even so, the use of technology should still be under the guidance of their parents.

5. Conclusion

This study shows that product development for learning can be done through reviewing existing problems and reviewing theories and results of previous research that can support the development of children's teaching material products. The development of technology-based teaching materials allows for various methods or other approaches to support children's early literacy. Nevertheless, the use of technology needs to be watched out for children. Teachers need to limit the use of this tool and direct parents to assist children in carrying out learning activities using this tool. The needs for using technology in learning vary from one child to another because some children are not allowed to use mobile phones (Android) for too long. So, My Writing can be an effective tool as long as we consider its possible drawbacks which can be identified through a discussion between teachers and parents. It is better for parents to continue to accompany children but at the same time limit their children's exploration with this tool so that it does not have a negative impact on children's physical and social development. The ease of use of this tool helps teachers to check children's literacy development. The results of e-lea products can also be used as interesting documents that can be shared with several people. It is necessary to do further research on the effects of using

this tool for some time and whether this tool can still be used during the offline learning period. In addition, further research in the product development of this tool is necessary to do a product development design that is tailored to the android that users have with various types and capacities.

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