

Using ECL Media to Improve Information Literacy of Islamic Elementary School Students

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Abstract. This research examines the use of ECL media to improve literacy information of Islamic elementary school students. The method used was repeated pre-experiment without a control class. The research design used was one group pre-test and post-test. Data were analyzed using paired t-test, n-gain calculation, and ANOVA using IBM SPSS Version 25. The results showed an increase in students' information literacy, which was statistically significant at 5% alpha after learning using ECL media. The mean n-gain for the three classes was in the medium category and does not differ in three experimental classes, and more than 90% students responded positively to the teaching using ECL media. Based on the results, ECL media effectively improved students' information literacy. This research will be a new reference to improve the information literacy of elementary school students, especially first graders, for teachers, parents, and students independently.

Keywords: early class literacy media, information literacy, Islamic elementary student

1. Introduction

Indonesian's literacy has increased in recent years. Based on Population Census (SP2020) by Badan Pusat Statistik (BPS) Indonesia in 2020, the percentage of illiterate Indonesians declined to 1.71% (Nugraha & Octavianah, 2020; Suryaman, 2015). It was in contrast to UNESCO's data stating that Indonesia ranked second lowest in terms of World Literacy. Even though the literacy level being high, Indonesians' reading interest of is poor. According to UNESCO, Indonesians' reading interest is alarming: only 0,001%. It means that from 1,000 Indonesians, only one person who often reads. Indonesian children are struggling with literacy skills, and more than half of school graduates are functionally illiterate, as in having poor comprehension (Sari, 2018). The main causes for this phenomenon are lack of access to books the people's low of interest in reading, resulting in an almost non-existent reading culture. These problems affect their ability in accepting and processing information and in turn affect the quality of human resources and increased the risk of unemployment (Graber & Mendoza, 2012).

Indonesian students nowadays can access unlimited knowledge, but it is difficult for them to describe the knowledge they found. In this opinion, educational priority should not only be about the right or wrong answer and students' scores, it should also be on how students manage information, associate arguments, and make conclusions. These indicators are included in information literacy (Martzoukou & Abdi, 2017).

The rapid development of information is an advantage in learning for everyone involved (Piper et al., 2015). In the description of information literacy, students who have information literacy will be able to identify and determine the need for information, seek information, evaluate information, organize information, and communicate information in such a way as to answer and overcome various needs.

Information literacy is defined as the skill to know information needs, including identifying the location to serve users effectively (Mishra & Mishra, 2010). Through information literacy, there will be a transformation in students so that they feel the needs to find, understand, evaluate, and use information in learning to achieve the set goals. Someone who has information literacy not only obtains information but also analyzes the information related to what the information contains, where it comes from, what it is used for, how it is beneficial, how it can be used in daily life, how it can offend other people (Rouse & Nicholas, 2022). It has a significant role in solving problems and other matters, such as improving the quality of learning. In the 21st century, everyone's information literacy must be improved at home, at school, and in the community (Limberg et al., 2012). Information literacy is urgently needed in education. Students need to be equipped with information literacy to support their academic success and quality to be able to compete and adapt to the world with technological developments (Tewell, 2015).

The information literacy standards set by ACRL (Battista et al., 2015; Latham et al., 2019; Reynolds et al., 2016; Sample, 2020) consists of five standards (Iannuzzi, 2000). In this research, they were adapted into four indicators to suit the capabilities of early grade Islamic elementary school students, namely 1) determining the need for information, 2) finding the information needed effectively and efficiently, 3) critically evaluating information sources and combining some information into a knowledge base and value system, 4) using information to achieve certain goals. Each indicator has several goals of ability and learning outcomes; thus, these standards can measure a student's information literacy ability.

1.1. Problem Statement

This research examines the use of ECL media to improve the information literacy of Islamic elementary school students. The main problem in this research is the lack of information literacy in elementary school students in the Industrial Revolution 4.0. It starts from the de-stratification of the phenomenon of students' believing hoax news, spreading it, and even making it a reference for study or life. This research tried to increase students' information literacy so that they are not quickly affected by hoax news. They should be able to analyze and evaluate the information properly because information literacy is essential in this digital era. Without good information literacy, students will easily consume news that is not necessarily true and can impact their social life.

1.2. Related Research

A number of research on the importance of information literacy in elementary school students has been done. A research in Hong Kong primary schools revealed that guidance and proper scaffolding by teachers were required to reinforce information literacy as well as internet and technology skills (Chu et al., 2011; O'Callaghan et al., 2016; Prado & Marzal, 2013).

Another research in Oklahoma, United States, found that providing literacy information instructions considered "good for" elementary school students were not the effective way. One of the effective ways was to provide focused instructions on the learning style and preference of the target population (Brown et al., 2003).

The results of a research in Spain showed that digital teaching competencies could be measured by using literacy information. It started with treating the data to determine the basic information until learning to be able to reply to and solve problems. This is a crucial requirement of the instructive community (Trujillo Torres et al., 2020).

Research by Andersson and Danielsson (2021) and Lee (2014) explained that the domain of information literacy is considered as one of the challenges of the 21st century teachers. This competence allows them to be able to manage, receive, and decide which information is functional and which is not, and to carry out strategies for creating contents when they have found and selected the information.

More research found that media for literacy play an important role to achieve the objectives of learning optimally (Cviko et al., 2013; Gretter & Yadav, 2016; Naila et al., 2021; Sukma et al., 2017). Therefore, the use of media in teaching information literacy is crucial.

However, previous research has not focused on early class literacy (ECL) media to improve students' information literacy skills. Some findings indicated the importance of active participation of lower grade students in improving their information literacy skills using media such as web-based learning in Norway (Hatlevik et al., 2018; Piasta, 2016). Some suggested top-down initiatives for advancing media and information literacy among low-grade students in New Zealand (Feekey et al., 2021; Flewitt et al., 2015). Furthermore, teenagers are at risk of becoming irrelevant to the target group. At least, if we want to embrace the idea of children's rights in the digital era, then children's participation in the design of such interventions should be seen as the end.

Based on the explanation of related research, the novelty in this research is the use of early class literacy (ECL) media to enhance students' information literacy. This research shows the use of ECL media to improve students' information literacy. The ECL media was specifically designed to measure the information literacy of first grade students. This research will be a new reference to improve the literacy of elementary school students, especially first graders, for teachers, parents, and students independently.

1.3. Research Objectives

The purpose of this research is enhancing the information literacy of Islamic elementary school students using ECL media. The expected outcomes were an increase in information literacy so that elementary school students can process, analyze and evaluate all of the information they obtain. In addition, students are expected to be able to criticize and reject all the wrong or hoax information.

2. Theoretical Framework

2.1. Early Class Literacy Media

Early Class Literacy (ECL) media is an innovation to facilitate students in low grades to understand learning materials and improve information literacy (Bennett et al., 2018; Burnett, 2010; Flores-Koulish et al., 2011). ECL media contains knowledge in the form of pleasant learning content without reducing the essence of the main subject (Snow & Matthews, 2016). ECL media used in this research were big books, flashcards, story calendars, and pictures. The variety of media was expected to increase students' interest in learning to improve their learning outcomes, especially information literacy. In total, there were seven units in this ECL media.

References to examples of relevant curriculum competencies can be found in each unit. The topics in the seven units were: 1) What and why of literacy, 2) Big book, 3) Phonological awareness, 4) Reading words, 5) Reading fluency, 6) Reading comprehension, and 7) Writing skills. The contents in all units complemented and strengthened teacher teaching skills and address learning needs as outlined in the 2013 Curriculum, including higher thinking skills such as critical reasoning and understanding.

The Early Class Literacy Media was adapted to suit its use in Islamic elementary schools based on the description above. Adjustments were made to include the present context, adapting to students' character, and planting the Islamic moral values as a characteristic of Islamic schools. According to Piaget's theory, children's age is one of the vital cognitive development stages, where they climb up to four distinct phases in mental development. The golden age is the most effective phase to shape and determine the future (Jehan & Butt, 2015). Elementary students or the age group of 7-11 years are expected to go through the concrete operational stage and take an active role in logical thinking, slowly moving from concrete operational state and becoming better at understanding abstract concepts. This is their first step at creating their view about the world, forming a unique approach to navigate their way in life. Reading is one of the primary methods to improve cognitive functions, and countries with high literacy rates have been scientifically proven to flourish, especially in technology, economy, and social aspects. Therefore, providing a good quality of education, including basic literacy skills, is key to setting a solid foundation for Indonesian children in elementary school.

2.2. Information Literacy

Literacy is the ability to read and write. However, in line with booming technological progress in the recent era, literacy is not only related to reading and writing. Many types of literacy are developed, such as digital and physical literacy. The development of literacy depends on the factor which affects, for example, society, facilities, necessities, and functions. The rapid progress of technology and growth of information that is starting to fall uncontrollable is the forerunner of information literacy.

Educational achievements require students to construct their knowledge. Hence, students have to search, choose, dig and find the information correctly. Constructing knowledge is part of thinking skills. Information literacy is critical to building students' knowledge. According to Piaget (Jehan & Butt, 2015), children between 7 and 11 years old can logically perform concrete operations and reasoning that the reasoning can be applied in the concrete sample. The Neo-Piaget theory emphasizes how children can use their attention, memory, and strategy for processing information (Topçiu & Myftiu, 2015).

Information literacy is a personal ability to interact precisely with information, such as formulating needs, obtaining information, and evaluating information to distribute information according to ethics, laws, and procedures applicable. According to the American Library Association, information literacy is the ability that a person needs to know when the information is needed and how to find, evaluate, and use the information effectively (Igwe & Issa, 2017). According to the Association of College and Research Libraries information literacy is considered a basic need in learning throughout life that is useful for all disciplines and educational levels (Elrod et al., 2012). Parents and teachers need to provide support to children to develop literacy abilities (Cameron et al., 2020; Saracho, 2021).

Information literacy refers to skills that expand from knowing how to utilize computers and obtain data to total reflection on the nature of data itself, its specialized foundation, its social and philosophical setting, and its effect. Information literacy or data proficiency prepares people to carry out extended learning, use basic consideration skills, then sort and assess transparently available data from different sources more viably and effectively. Data proficiency can effectively move improve a person's capacity in communicating thoughts, building a contention or thought, learning new things, and sorting out and distinguishing which data is adjusted and precise and which is not (Gibson & Smith, 2018).

3. Method

3.1. Research Design

This is a repeated pre-experimental research (Earley, 2014) without a control class, which was conducted on three sample classes. Before teaching with the Early Class Literacy (ECL) media, all students were given an information literacy test. After learning using ECL media, the students were given the same test.

3.2. Participant/Respondent

The population of this study was all students aged 6-7 years old in selected elementary schools in 3 cities in the 2021/2022 academic year, with a total of 66 students. The samples of this study were 30 first grade (aged 6-7 years old, male and female) students of Muhammadiyah Islamic Elementary School in 3 cities (Surabaya, Malang, and Lamongan) in Indonesia in the 2021/2022 school year. They were in School A (10 students), School B (10 students), and school C (10 students) at.

3.3. Data Collection

Before collecting research data, the research instruments were prepared. They consisted of (a) teaching tools (lesson plans, learning media or ECL media, and student learning materials); and (b) teaching instruments (information literacy tests and student response questionnaires). To obtain the validity and reliability of the content and constructs of research instruments that met the requirements, validation sheets were given to two experts in the field of language and

information education. The information literacy test questions were based on indicators adopted from Horton (Horton Jr & Keiser, 2008), namely: 1) determining the information needs, 2) finding the information needed effectively and efficiently, 3) critically evaluating information sources and combining information into a knowledge base and value system, 4) using information to achieve certain goals.

3.4. Data Analysis

Before conducting data analysis, it was necessary to define in advance the definition of the effectiveness of the ECL media. ECL media is said to be effective if: (1) there was an increment within the normal score of students' data proficiency after the ECL media learning was carried out, which is statistically significant at 5% alpha, (2) the average level of improvement (mean N-gain) was at least categorized moderate, (3) the mean N-gain was not different for the three experimental classes.

Furthermore, the research data in the form of information literacy test scores and student response questionnaires were analyzed using quantitative descriptive and inferential statistics. The inferential statistics include: paired t-test or Wilcoxon test, n-gain calculation, and analysis of variance (ANOVA) or Kruskal-Wallis' test. Two-tailed paired t-test with was used to determine whether or not there was an increase in students' information literacy scores. The test criteria was to reject H₀ stating that there is no difference in the mean scores of pre-tests and post-test only if the value of sig (p) 0.05. Other than these values, H₀ is accepted. Meanwhile, to find out whether the post-test score was greater than the pre-test scores was that only if the t-count was negative. N-gain calculation was done using the equation: $n\text{-gain} = (\text{post-test score} - \text{pre-test score}) / (\text{maximum score} - \text{pre-test score})$, with the following criteria: (1) if n-gain $\geq .7$ (high), (2) if $.3 < n\text{-gain} < .7$ (medium), and (3) if n-gain $\leq .3$ (low). ANOVA was used to determine whether or not there was a difference in the average level of improvement (n-gain) of information literacy in the three schools. Test criteria: reject H₀ stating that there is no difference in the mean n-gain of the three classes only if the value of sig (p) 0.05. Other than these values, H₀ is accepted. Inferential statistics were carried out with the help of IBM SPSS 25 software.

3.5. Validity and Reliability

The validity and reliability of the content and construct of the research instruments are presented in Table 1.

Table 1. The validity and reliability of research instruments

Learning Tools	Validity	Category	Reliability (%)	Category
Lesson plans	3.95	Very Valid	86%	Reliable
ECL media	3.97	Very Valid	86%	Reliable
Teaching Materials	3.91	Very Valid	86%	Reliable
Test Instruments	3.93	Very Valid	86%	Reliable

Table 1 shows that the teaching tools, include teaching implementation plans, ECL media, student learning materials, and the teaching instruments, all of which are highly valid and reliable, so they were appropriate to be used as learning tools in this research.

4. Findings

4.1. Information Literacy Scores

The data obtained were the initial test scores of students' information literacy (pre-test) and the final test scores (post-test). Pre-test was given to students before the learning began, while the final test was given after the learning was finished. The test instrument for pre-test and post-test was essay questions. The following is a recapitulation of students' information literacy:

Table 2. Results of Students' Information Literacy

School	Student Code	Pre-Test	Post-Test	N-Gain	Category
A	1	55	78	0.51	Medium
	2	50	84	0.68	Medium
	3	60	78	0.45	Medium
	4	65	84	0.54	Medium
	5	45	75	0.55	Medium
	6	60	84	0.60	Medium
	7	55	90	0.78	High
	8	65	90	0.71	High
	9	50	78	0.56	Medium
	10	50	90	0.80	High
B	11	60	90	0.75	High
	12	60	96	0.90	High
	13	55	90	0.78	High
	14	55	85	0.67	Medium
	15	80	96	0.80	High
	16	45	78	0.60	Medium
	17	55	78	0.51	Medium
	18	55	84	0.64	Medium
	19	65	84	0.54	Medium
	20	75	96	0.84	High
C	21	55	84	0.64	Medium
	22	65	90	0.71	High
	23	55	84	0.64	Medium
	24	60	90	0.75	High
	25	35	72	0.57	Medium
	26	55	78	0.51	Medium
	27	40	75	0.58	Medium
	28	45	72	0.49	Medium
	29	65	84	0.54	Medium
	30	40	78	0.63	Medium
AVERAGE		55.83	83.83	0.64	Medium

The students' information literacy was tested using an information literacy test instrument in the form of 10 descriptive questions. Based on the table above, each school experienced an increase in the average value of students' information literacy.

4.2. Statistical Test Result

The homogeneity test in the initial test (pretest) and the final test (posttest) used the Levene test with a significance level of 5% or 0.05 (Eyisi, 2016), meaning that if the result of the significance count was more than 0.05, the data variance was said to be homogeneous. The results of the homogeneity test calculation can be seen in Table 3.

Table 3. Homogeneity Test Results

Variable	Significance	Standard	Data Variance
Pretest	0.071	0.05	Homogenous
Posttest	0.083	0.05	Homogenous

Based on the results in Table 3, it can be seen that the homogeneity tests in the pretest and posttest produce values greater than 0.05 (5%), this indicates that school A, school B, and school C have homogeneous data.

The results of the normality tests on the pretest and posttest scores showed that students' information literacy in school A scored $0.158 > 0.05$, school B scored $0.110 > 0.05$ and school C scored $0.183 > 0.05$. Thus, it can be stated that all the data obtained from the tests, the initial test scores and the final test scores of information literacy were normally distributed. The data is said to be normally distributed if the Kolmogorov-Smirnov value > 0.05 (significance level 5%) (Harper, 2011; Khan, 2014).

The results of the homogeneity and normality test of the two data showed that the data obtained were homogeneous and normally distributed. Then, the paired t-test hypothesis was used to determine the significance of the ECL media. The results of the calculation are as follows.

Table 4. Paired T-Test Results

t-count	Sig. (p)	Description
3.930	0002	There is a significant difference between pretest and posttest

Based on Table 4, calculations using the paired t-test obtained t-count of 3.930 with a significance value of 0.002. So, it can be concluded that the significance value ($0.002 < 0.05$). Thus, it can be stated that there was a significant difference in students' information literacy using ECL media.

Furthermore, the one-way ANOVA test was used to test whether the learning impact was consistent (not different in the three classes) or inconsistent (different in the three classes). The summary results of the ANOVA test is shown in Table 5.

Table 5. Summary of One-way ANOVA Test Results

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.037	2	.019	.364	.696
Within Groups	3.662	72	.051		
Total	3.699	74			

Based on the above results, the data obtained for the F-count value was 0.364 and a significance value of 0.693. In comparison, F table ($3.12 > F$ count (0.364) and sig. ($0.696 > 0.05$). Thus, it can be stated that learning using ECL media was consistent in the three classes.

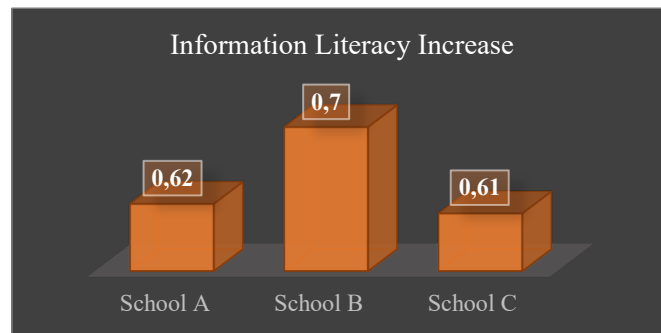


Figure 1. The increase of students' information literacy

5. Discussion

Industrial Revolution 4.0 has had an incredible impact on education. Technological advancements result in the spread of information without limits and filters across the community, even children or students. The Internet has dominated the world nowadays, especially as an impact of the COVID-19 pandemic that made everything done virtually. In addition, current globalizations that offer the world's culture are beginning to change people's mindsets. It can be seen from the many provocative contents, a lot of which are of low quality. With the rise of the various contents, people are often trapped and spread information that is not necessarily true and of low-quality. The spread of factual and false information ultimately tests people's ability to assess useful or useless information. As human beings and products of society, people need information literacy in every aspect of human life (Purwaningtyas, 2018).

The idea of information literacy refers to how a society, characterized by almost boundless access to information in the digital environment, assess the information (Limberg et al., 2012). It will not be easy for those who cannot sort out the information well to compete in this globalized world. The importance of information literacy, especially for Islamic elementary school students, is to classify which information is good or bad, process information correctly, evaluate information sources critically, combine some information into a knowledge base and value system, avoid misleading concepts, and use the information to achieve specific information goals. Information literacy can improve people competence by evaluate, organize and using information wisely (Compton-Lilly, 2013).

School is a strategic area to build the awareness of literacy culture. Addison explained that the elements of information literacy were visual literacy media literacy, computer literacy, digital literacy, and network literacy (Addison & Meyers, 2013). To increase information literacy, several things must be done. First, the environmental conditions must be literacy friendly. The literacy culture must be supported by displaying students' literacy work. Besides that, the students must be able to easily access books and other literature (digital literature) works. Benjamin suggested that librarians and institutions integrated information literacy goals within curriculum development situations (Harris, 2013). The second is to develop a social environment as literate communication and interaction model. The third is to characterize literacy in every lesson. Therefore, the habit of reading and writing can take students on an intelligent measure in accessing and processing information. Ainiyah (2017) argued that if students had information literacy skills, they would have the expertise as lifetime learners (Pattah, 2014).

Teaching tools of information literacy consisted of seven units. Each unit was equipped with students learning material, ECL media, and tests. These tools were developed because it was found that the teachers of Muhammadiyah Elementary School in East Java needed broader knowledge and skills to solve the problems of literacy information their students faced (Harini, 2018). Moreover, they were also built on the critical components of learning to read and introduced various teaching strategies and ideas to support other literacies.

The tools, especially the ECL media, contain the values of Al Islam Muhammadiyah as a characteristic of Muhammadiyah schools. Some adjustments were also made regarding material development, such as several unique features that reflected Al Islam Muhammadiyah

were given through stories, pictures, and videos. Islamic values in the written vocabulary were also given. The materials from this package were developed collaboratively with input from PTMA representatives in East Java and were tested in schools to ensure their suitability and relevance. The materials were then applied to Muhammadiyah Elementary School in 3 East Java cities: Surabaya, Malang, and Lamongan.

Table 2 shows that school A obtained an n-gain value of 0.62 or an increase of 62%, school B obtained an n-gain value of 0.70 or an increase of 70%, and school C obtained an n-gain value of 0.61 or experienced an increase of 61%. The only treatment used in this research was the ECL media. In addition, the ECL media helped students' prior knowledge as the basis for further knowledge of literacy. The teacher's role was to be a facilitator for students to construct their own knowledge through learning. The students were trained to determine the information needs, find the information needed effectively and efficiently, evaluate information sources critically, combine some information into a knowledge base and value system, and use information to achieve certain goals.

The research outcomes, which are supported by Figure 1, indicated that information literacy increased with the use of ECL media. School A increased by 62%, School B increased by 70%, and School C increased 61% for the students' information literacy. In line with research by Mishra & Mishra, the use of appropriate media can improve student literacy (Mishra & Mishra, 2010). The research of Marseno et al. is in line with this result, that information literacy of Indonesian elementary students is still below the level of understanding, so that real action is needed to improve it, including creating an innovative media (Marseno et al., 2014).

Based on the above results, it can be stated that there was an increase in students' information literacy when teachers used ECL media. Following the theory of Vygotsky (1896-1934), which stated that children could construct knowledge when applying the attached world with attention, memory, and strategies for processing and managing information (Topçiu & Myftiu, 2015). This result is supported by Muhajang and Ngwaru that information literacy affected students' learning effectiveness because information literacy activity would encourage students to improve their knowledge (Muhajang & Pangestika, 2018; Ngwaru & Oluga, 2015). In line with this, Virkus (2012) argued that information literacy is the primary key to improve students' knowledge. Information literacy makes students learn independently because they understand the time of information is needed, how to access information efficiently, evaluate accurately, and communicate information in various methods (Virkus, 2012).

6. Conclusion

The results of the validity and reliability of the content and constructs of the research instrument (Table 1) indicated that the information literacy learning tools were valid and reliable, so they were feasible to be used as learning tools. Students' information literacy was tested using a test instrument in the form of 10 descriptive questions using ACRL adapted information literacy indicators. Based on the research findings, the ECL media was effective for improving students' information literacy. This was seen from the results of the recapitulation of students' information literacy using ECL media that each class experienced an increase in the average value of students' information literacy. This was evidenced by the n-gain scores in school A which increased by 0.62 or 62%, school B 0.70 or 70%, and school C 0.61 or 61% (Table 2), so the mean value of n-gain was not different for the three experimental classes. Furthermore, through the paired t-test with homogeneous and normally distributed data (Table 3 and 4), it was stated that there was a significant difference of $0.002 < 0.05$ in students' information literacy using the ECL media which was presented in Table 5. Thus, ECL media was able to improve students' information literacy.

Limitation

This research has limitations that can influence the result. The limitations of this research are as follows:

1. The result of this study is highly dependent on teacher activity in applying steps for using Early Class Literacy (ECL) media.
2. This study was limited only to the discerning increase of information literacy, not other kinds of literacy.
3. This research is limited to early classes in Islamic elementary school, first until the second class in elementary school. However, it can be practiced in Islamic schools and public schools as long as it is still within the scope of the elementary school level.
4. This research has a limitation in the collecting data process. The result is depended on students' paying attention and completing the literacy tasks from the teacher.
5. The conceptual framework used in this study only connects variables estimated to have a relationship with dependent variables, so there are still possibilities for other variables that were not included in the conceptual framework.

Recommendation

Based on the conclusion of the research, recommendations for other researchers, stakeholders, or practitioners of education are as follows:

1. Stakeholders should be concerned about literacy education, especially information literacy, in a structured curriculum.
2. Teachers should use the learning method by considering the improvement of students' information literacy to prepare them for the era of unlimited spread of information.
3. Future researchers should examine and develop Early Class Literacy media from a different point of view. In addition, they should also research information literacy from various perspectives.

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Conflict of Interests

The authors declare that there is no conflict of interest.

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