The Effectiveness of Critical Literacy Based Digital Learning Material (CL-DLM) to Increase Students' Higher Order Thinking Skills at Elementary School

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ABSTRACT

This research aimed to develop Thematic critical literacy based digital teacing materials (TCL-DLM) to increase students' higher order thinking skills at elementary school. This research is a research development with a 4-D model (define, design, develop, and dissemination). Data collection techniques were carried out through teaching material validation sheets, teacher response questionnaires, student response questionnaires, learning implementation observation sheets and tests of higher order thinking skills. The data obtained were analyzed descriptive quantitative. The results of the study show that: 1) The results of the needs analysis are that thematic learning is still limited to the use of teaching materials in the form of theme books and electronic books that have been prepared by the government so that it is necessary to develop practical and effective teaching materials. The students' higher order thinking skills based on pretest dominated in medium category (51.85%). 2) The development of these teaching materials uses the Four-D teaching material development procedure from Thiagarajan which consists of the defining, designing, developing, and disseminating stages, 3) Thematic critical literacy based digital learning material (TCL-DLM) have met the validity criteria, because the results of validation from material experts and the learning design of teaching materials is in the very valid category (M = 3,82), 4) Thematic critical literacy based digital learning material (TCL-DLM) is in the effective category because there is an increase in the results of tests of higher-order thinking skills after the application of Thematic critical literacy based digital learning material (TCL-DLM) in class VI students of SD Telkom Makassar. Postest category dominated in very good category (81.48%). In addition, teachers and students expressed a positive response. 5) Thematic critical literacy based digital learning material (TCL-DLM) is also in the practical category because it has been well implemented which includes the criteria of ease of use, time efficiency and very practical benefits. The recommendation of this research is Thematic critical literacy based digital learning material (TCL-DLM), needs more developed both in terms of material and features of digital teaching materials and more interesting so students' higher-order thinking skills can be better.

INTRODUCTION

Optimizing higher order thinking skills is a focus to be developed in the learning process from elementary school to university in recent years. Higher order thinking skills and literacy are two things that are necessary for success in undergoing the 21st Century learning process. Higher order thinking skills are a crucial component for every individual to have to solve new problems in the 21st century [1]. The process to train and develop higher order thinking skills (HOTS) can be done since elementary school (SD). After graduating from elementary school, students are expected to have adequate thinking skills. The Competency Standards for Elementary and Secondary Education Graduates state that elementary school graduates are expected to have creative, productive, critical, independent, collaborative, and communicative thinking and acting skills through a scientific approach in accordance with the child's developmental stage that is relevant to the given task [2]. For this reason, it is very appropriate to say that higher order thinking skills should be developed at the elementary school level through a learning process designed by the teacher.

Higher order thinking skills receive special attention from one of the international study institutions that examines students' cognitive abilities in mathematics and science. The institution is called The Trends For International Mathematics and Science Study (TIMSS). TIMSS data shows Indonesian students rank very low in abilities (1) to understand complex information, (2) theory, analysis and problem solving, (3) use of tools, procedures and problem solving and (4) conduct investigations [3]. The next data is the PISA report which was just released, Tuesday, December 3 2019, Indonesia's reading score is ranked 72 out of 77 countries, then the math score is ranked 72 out of 78 countries, and the science score is ranked 70 out of 78 countries [4]. Both show the low level of higher order thinking skills of Indonesian students.

On the other hand, the learning process that is oriented towards developing students' higher order thinking skills in elementary schools has not been maximized. Several studies show that students' higher order thinking skills in primary schools are still relatively low. Learning practices that occur in schools, especially in elementary schools, have not yet fully implemented learning principles that allow the development of students' higher-order thinking skills [5]. Learning carried out in schools today still revolves around learning that is charged with remembering or memorizing and simple understanding [6]. This is due to the lack of maximum understanding of teachers on how to improve students' higher order thinking skills both in terms of problem solving and activities that can measure students' higher order thinking skills [7].

Another study on the 2013 Curriculum pilot project elementary school in Semarang City showed that students' higher-order thinking skills were still in the poor category [5]. This can be seen from the student's achievement on each HOTS indicator. The ability to classify and induce students is at a sufficient level. While the ability of deduction, error analysis, perspective analysis, decision making, experience, problem solving, discovery that students have are at a low level. . This means that the implementation and development of higher order thinking skills (HOTS) in elementary school students needs to be further improved.

Teachers as the frontline in the implementation of the learning process, must try to develop learning that can train students to have higher-order thinking skills. It aims to improve students' reasoning abilities to answer more complicated questions and solve more complicated problems both in the school environment and in everyday life. Students who have high-order thinking skills enable them to convey argumentative, logical and confident ideas both orally, in writing and even reflected in their actions [8].

In addition to higher order thinking skills, literacy skills are also important things to be trained and developed in elementary schools. Currently, literacy means not limited to the ability to read and write. In a new perspective, literacy has a broad meaning. Literacy is an ability to read, understand, interpret and solve various problems of human life in various dimensions [9]. Literacy as the basis for developing effective and productive learning enables students to be skilled in finding and processing information that is needed in a science-based life in the 21st century. Furthermore, it is said that critical literacy is the ability to empower literacy and critical thinking skills in uncovering hidden phenomena or facts that represent inequality in various dimensions of human life [10]. As with higher order thinking skills, the literacy skills of elementary school students in Indonesia are still a concern. This can be seen from some of the data presented by international bodies that examine children's literacy abilities. The results of the international study on reading and literacy (PIRLS) show that more than 95% of Indonesian students in grade IV SD are only able to reach the intermediate level . The World Bank report no. 16369-IND (Education in Indonesia from Crisis to Recovery) mentions the level of reading in grade VI Elementary schools in Indonesia were only able to score 51.7. This score is below the Philippines (52.6) , Thailand (65.1), and Singapore (74.0) [1].

Based on these facts, appropriate solutions are needed to develop critical literacy skills and high-order thinking skills of elementary school students. One of them is by confronting students in a problem that they have not encountered before, to encourage and stimulate their thinking skills. This process can be done through reading texts with a critical literacy approach. The critical literacy approach will develop students' ability to think and evaluate the text they read and lead them to understand the implied meaning of the text itself [2], [3].

One of the learning tools that has an important role in developing student competencies, especially critical literacy skills and students' higher order thinking skills is teaching materials. The quality of learning depends on the quality of the teaching materials presented so that it has an impact on the quality of the ability of elementary school students' resources [4]. Thus, teaching materials have an effective influence in increasing students' activities and learning outcomes

Teaching materials that lead students to carry out activities that trigger critical attitudes about phenomena in the surrounding environment are still minimal. This was stated that the thematic teaching materials for the 2013 curriculum in elementary schools have not bridged students to respond critically to phenomena. Likewise, stated that the dominant teacher only uses teacher books and student books as teaching materials/learning resources. Teachers also do not have the skills to develop teaching materials independently, let alone digital ones [5], [6].

In line with the rapid development of technology, it has a great impact on learning, including the development of teaching materials. Currently, teaching materials are not only limited to printed sheets of paper (which are commonly called printed teaching materials), but teaching materials can be developed by utilizing existing technology. The preparation of digital teaching materials is a necessity in the era of Industrial Revolution 4.0 as it is today. Teachers should be more creative in developing teaching materials. Because at this time students tend to be familiar with using digital devices and spend more time with technology or digital devices that they have which are commonly called digital natives . Students with digital native characters it will be easier to learn by using technology. They will be interested in teaching materials that can be accessed using digital devices such as smartphones Changing learning styles in students is a big challenge for teachers. This must be balanced with changes in teaching methods and the provision of teaching materials used by teachers in the classroom so that learning activities can run effectively and learning outcomes can be achieved as expected. Furthermore, it is emphasized that ideally teachers have the ability to develop teaching materials that can be accessed through digital devices. Teaching materials used by teachers should present several types of media (text, images, audio, animation, and video), and provide flexibility for students to interact with the material in the teaching materials [6]

This study aims to 1) analyze the needs of teaching materials to develop students' higher order thinking skills in elementary schools, 2) develop thematic critical literacy based digital learning material to develop higher order thinking skills in elementary schools, 3) test the validity of critical literacy based thematic digital learning material to develop higher order thinking skills of elementary school students, 4) test the practicality of critical literacy based thematic digital learning material to develop higher order thinking skills of elementary school students and 5) test the effectiveness of

critical literacy based thematic digital learning material to develop higher order thinking skills elementary school students.

RESEARCH METHODE

This research is a research development with a 4-D model (define, design, develop, and dissemination). Data collection techniques were carried out through teaching material validation sheets, teacher response questionnaires, student response questionnaires, learning implementation observation sheets and tests of higher order thinking skills. The data obtained were analyzed descriptive quantitative.

RESULT AND DISCUSSION

The Need for Thematic Critical Literacy Based Digital Learning Material (TCL-DLM) Development in Elementary Schools

The process of developing literacy-based thematic digital teaching materials was developed in stages to adapt to Thiagarajan's Four-D development model which consists of four stages, namely define, design, develop, and disseminate. The discussion of developing prototypes of thematic digital teaching materials based on critical literacy is described below.

The activities carried out are initial analysis, analysis of student needs, concept analysis, task analysis, and specification of learning objectives. Needs assessment is a part of curriculum development and is normally required before a syllabus can be developed for thematic teaching [7]. Based on some of the activities carried out at the defining stage it was found that in general students had difficulty understanding the material in thematic teaching materials currently used in learning so that teaching materials were needed that were more interesting, interactive and easily understood by students. So what is needed is teaching materials in digital form. The result of students' pretest of higher order thingking skills also still needs to be encouraged. It's still dominated with medium category.

Tabel 1.
Reseult of Students' Pretes of Higher Order Thingking Skills

Ability Level	Frekuency	Persentage	Category
85-100	-	-	Very Good
68-84	13	48.15	Good
51-67	14	51.85	Medium
34-50	-	-	Low
Total	**27**	**100**	

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The data shows that students' higher order thinking skills are dominant in the medium category.The findings faced by most of the sixth grade students at SD Telkom Makassar are in line with the findings of the research results written by Dina et al (2022) in an article entitled "Development of Interactive Digital Modules on Flat Building Space Materials For Class IV Students". The article was published in an international journal entitled Elementary School Volume 9 (2022) 115 – 120.

The use of technology and information in the field of education is suitable for use, so that learning is student centered. The role of technology and information in education is an important role, because technology will continue to grow and develop rapidly. The rapid development of technology has a great influence on the world of education. The encouragement that teachers demand to do learning is like digital literacy. The use of digital technology in learning is defined as a system that encourages learning that is active, innovative, and creative, and allows for long-distance communication between teachers and students or vice versa. However, based on the results of observations made by researchers, there is still a lack of use of module variations in learning. The learning carried out only uses makeshift learning module materials

The discussion taken in the article is the importance of using technology in learning that can assist teachers in creating active, innovative and creative learning. However, based on several observations it was found that the use of various learning modules was still limited in learning.

These findings discuss the problems faced by students in the learning process in class. Teaching materials used by teachers have not fully assisted students in learning. So it is necessary to develop teaching materials that are more challenging for students in learning. The teacher as the main example in the class is also expected to be able to utilize various learning resources and choose and utilize technology in appropriate learning for students.

In addition, at the definition stage, curriculum analysis is also carried out to determine basic competencies (KD) that match the characteristics of the teaching materials being developed. The basic competencies adaptation chosen is in Theme 4 Sub-theme 3 with Indonesian content, namely basic competencies 3.2 Exploring the contents of scientific explanation texts that are heard and read and basic competencies 4.2 Presenting the results of extracting information from scientific explanation texts orally, in writing, and visual by using standard vocabulary and effective sentences. As for Civics, namely basic competencies 3.2 Examining the social, cultural and economic diversity of society and basic competencies 4.2 Promoting the benefits of social, cultural and economic diversity.

The design of critical literacy-based thematic digital teaching materials in this study includes: selection of types of teaching materials, selection of learning

media/resources, and development of prototype drafts of teaching materials. The digital teaching materials in this study focus on a combination of videos, images, text and colors, which are relevant and able to stimulate students to carry out activities that lead to increased higher-order thinking skills.

Furthermore, the development of a prototype draft of literacy-based thematic digital teaching materials contains front pages, competency achievement indicators, learning objectives, learning materials, and student assignments. The cover page of the teaching material is the first page that contains the identity or description of the guidebook for the use of thematic digital teaching materials based on critical literacy for sixth grade elementary school students by using an attractive visual blend of video, image and text colors and sound with the use of a customized articulate storyline application.

In addition, this digital teaching material integrates a critical literacy approach namely problematization, cultural discussion and social action which is integrated into the three main activities in the teaching material. namely Teliti Video, Teliti Materi and Teliti Bermain

Teliti Video activity provides an opportunity for students to watch 2 videos about economic diversity. Next, let's examine the material. In this section students listen to material about explanatory text and social inequality. Finally, let's examine playing. This activity gives students the opportunity to take quizzes related to the material studied in the previous section.

Development of Thematic Critical Literacy Based Digital Learning Material (TCL-DLM)

This development stage aims to produce teaching materials that have been revised, so that they are suitable for use in research or being tested. The findings in this development stage are the results of expert validation showing that thematic critical literacy based digital learning material (TCL-DLM) are feasible to be tested in thematic learning because they meet the criteria for both the design and the material presented in these teaching materials.

Based on the analysis of the results of expert validation data on teaching materials, it can be concluded that critical literacy-based thematic digital teaching materials are in the very valid category (3.5) because the average value of all criteria is M = 3.82. Furthermore, to determine the level of reliability of data from two validators on the same aspect, the authors conducted an analysis of the agreement test using the equation proposed by Borich (2011). The results of the agreement test showed that the Percentage of agreement (PA) was 83.33 (R ≥0.75). So it is concluded that the material that thematic critical literacy based digital learning material (TCL-DLM) is reliable.

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teaching materials are in the very valid category (3.5). Because the average value of all criteria is M = 3.6. Furthermore, to determine the level of reliability of data from two validators on the same aspect, the authors conducted an analysis of the agreement test using the equation proposed by Borich (2011). The results of the agreement test showed that the Percentage of agreement (PA) was 78.57 (.(R) ≥0.75). So it is concluded that the design of that thematic critical literacy based digital learning material (TCL-DLM)is reliable

This thematic digital teaching material was developed to contain activities based on a student-centered learning approach through activities presented in teaching materials in the form of videos, text accompanied by dubbing, and evaluation in the form of interactive games. Students centered learning is based on a constructivism philosophy, namely a belief that learning is building (to construct) one's own knowledge. Each student builds his own knowledge based on experience and active interaction with the material presented in this teaching material in the form of a video containing social problems that exist in the context of student life.

This is in accordance with the theories described earlier, including the theory of Jean Piaget and Leu Vygotski who put forward six characteristics of learning, one of which is that students build their own understanding of an object and are very dependent on the understanding they already have during the learning process. Thus the formation of knowledge is in the students themselves, students must be active during learning activities, actively think, develop concepts, and give meaning to the things being studied.

Thematic critical literacy based digital learning material (TCL-DLM) are urgently needed in the learning process. Especially now that learning is done online or remotely. Critical literacy-based thematic digital teaching materials really help students understand the material and make it easier for students to practice both at school and at home. In the learning process using critical literacy-based thematic digital teaching materials, researchers found obstacles to critical literacy-based thematic digital teaching materials that had been developed when used by children. The obstacles found by researchers are related not all students want to practice the contents of the material in a form of practice. This requires quite detailed guidance which does not only rely on the content of the material and videos contained in critical literacy-based thematic digital teaching materials but also explained by the teacher. It can be concluded that teaching materials are only tools that can help a teacher and students in the learning process. However, communication between students and students is also needed. Especially during the learning process.

In the observational data table above, it can be seen that the management of learning using thematic digital teaching materials based on critical literacy is at an average percentage of 3.78 (3.5 ≤ M ≤ 4.0) which indicates that all components observed

in the management of thematic learning with using thematic digital teaching materials based on critical literacy is in the very high implementation category. Furthermore, the results of the agreement test show that the Percentage of agreement (PA) is 83.33 (.(R) ≥0.75). So it is concluded that the material in digital teaching materials based on critical literacy is reliable.

The advantage of this critical literacy-based digital thematic is that students easily learn independently. Critical literacy-based thematic digital teaching materials can also be used in the learning process in the classroom and outside the classroom. The application is also very easy and can be accessed via an Android owned by each student. In general, this critical literacy-based thematic digital teaching material preserves a collection of books based on technological assistance to make it easier for students to understand the content of the material and to save time. This means that critical literacy-based thematic digital materials are not only about the development of the digital era but are a new style in finding sources of convenience to add insight and knowledge possessed by students.

The development of thematic digital teaching materials based on critical literacy is very useful for teachers who are aware of the importance of learning. The teacher easily explains the contents of the material by presenting explanations in the form of pictures, videos and animations. Based on the results of the data obtained by researchers in the field, it shows that teaching materials in digital form are easier to understand than teaching materials in printed form. This is based on a statement made by one of the students that "teaching materials in digital form are more meaningful and can be used for a relatively long time according to the material to be taught". Based on this statement it can be concluded that there is a comparison between printed teaching materials and digital teaching materials. There is also significant increase of students' higher order thinking skills after learning using the digital learning material. It can be seen in the following data

Tabel 2.
Result of Students' Postest of Higher Order Thingking Skills

Ability Level	Frekuency	Persentage	Category
85-100	22	81.48	Very Good
68-84	5	18.52	Good
51-67	-	-	Medium
34-50	-	-	Low
Total	**27**	**100**	

The results of the analysis show that the average pretest value is 32.85, posttest is 48.48 and the N-gain value = 0.71. or categorized as an increase in score is high. So from these results it can be concluded that the use of thematic digital teaching materials

based on critical literacy is effective in improving students' higher order thinking skills. Thus it can be concluded that the development of digital teaching materials based on critical literacy in class VI of SD Telkom Makassar has met the criteria for effectiveness

In addition, critical literacy-based thematic digital teaching materials are based on three main activities that reflect a critical literacy approach, namely problematization through video and text, cultural discussions with the help of student activity sheets (LKPD) in groups and social action by making creative presentation materials to show solutions. given by each group based on the problems that have been identified.

Digital learning material (DLM) offer a wide range of educational opportunities that could not be achieved in traditional face to-face forms of learning and instruction. DLM enhance efciency of teaching and ofer more diversified learning experiences without limitations of time, space and place [8].

CONCLUSION

Based on the research result, it can be conclude that: 1) The results of the needs analysis are that thematic learning is still limited to the use of teaching materials in the form of theme books and electronic books that have been prepared by the government so that it is necessary to develop practical and effective teaching materials. 2) The development of these teaching materials uses the Four-D teaching material development procedure from Thiagarajan which consists of the defining, designing, developing, and disseminating stages, 3) Thematic critical literacy based digital learning material (TCL-DLM) have met the validity criteria, because the results of validation from material experts and the learning design of teaching materials is in the very valid category, 4) Thematic critical literacy based digital learning material (TCL-DLM) is in the effective category because there is an increase in the results of tests of higher-order thinking skills after the application of Thematic critical literacy based digital learning material (TCL-DLM) in class VI students of SD Telkom Makassar. In addition, teachers and students expressed a positive response. 5) Thematic critical literacy based digital learning material (TCL-DLM) is also in the practical category because it has been well implemented which includes the criteria of ease of use, time efficiency and very practical benefits. The recommendation of this research is Thematic critical literacy based digital learning material (TCL-DLM), needs more developed both in terms of material and features of digital teaching materials and more interesting so students' higher-order thinking skills can be better.

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