Learning Material Development Based on Wetland Environment OK

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Learning Material Development Based on Wetland Environmentt o Improve Student's Industrial Revolution 4.0 Skills and Multiple I ntelligence

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Abstract

The problem with this study is the unavailability of teaching material s which is containing high order thinking skills and multiple intellige nce improvement based on local wisdom. While the development of h igh order thinking skills and multiple intelligence becomes one of the great goals that are expected to geta productive future generation. T he purpose of this study are (1) Produce the innovative textbook whic h is containing high order thinking skills and multiple intelligence, (2) this study want toknow effectiveness of learning materials based on local wisdom to improve high order thinking skills and multiple in telligence. This study use research and development methods that wi ll developproducts in the form of teaching materials and textbooks c ontaining high order thinking skills and multiple intelligence improv ement based on local wisdom. The research design refers to the Borg & Gall design which consists of 10 steps. The result mentioned that t hematic textbooks containing high order thinking skills and multiple intelligence based on local wisdom deserve tobe used, have effecti veness for the fifth grade of elementary school based on evaluation fr om the material draft expert, media expert, language expert and field test. Based on the results, it can be concluded that there is a significa nt difference between the results of the experimental class post test a nd the control class post test scores.

Keywords
learning materials; high order thinking skills; multiple intell igence; local wisdom, elemen tary school

I. Introduction

The important of industrial revolution 4.0 skills push every country to concern on develop ment of human resources. In the face of such challenges, human resources must have the higher order thinking skills. In the future, human resources have big challenges, they musthave high qu ality ability to process information, have critical thinking, can communicate wellto other person s and to collaboration with other (Agusta & Noorhapizah, 2020; Suriansyah et al., 2021). Beside that skills, there are 4 basic skills that students must have in the face of thatfuture challenge, they are Critical Thinking, Creativity, Communication and Collaboration (Dong & Huang, 2020; Pus pitasari et al, 2017; Sholiah et al., 2020).

Reflecting on the important skills to be owned by the next generation on industrial revoluti on 4.0, it's time to bring learning activity based on thinking skills, we called as high order thinkin g skills that human resources must have in the future. The first thinking skill is critical thinking. I t can help next generation to think rationally in can solve every problems and give their win sol utions or alternative to break every problem, it meand that critical

thinking skill need to be develop from elementary education period (Ardiyanti & Winarti, 2017; Mahmoud & Alaraj, 2019; Tendrita et al., 2016).

A professional teacher was required and make best planning to present their expertise before the class. One of those skills is the ability to deliver information to students. To be able to deliver effective learning, teachers need to prepare teaching materials that integrate the strategies and the innovative instructional models. In order to achieve the objectives of learning, each teacher is required to have the ability to make and prepare teaching materials in accordance with the requirements for the purpose of learning and to incorporate the strategic tools of learning that will be applied (Agusta & Sa, 2021; Noorhapizah et al., 2021; Tendrita et al., 2016). Teachers' needs to develop a teaching material that contain industrial revolution 4.0 skills. Therefore, it is important for teachers to design systematically teaching materials that are consistent with the vision to improve students' ability to explore knowledge independently and to develop their thinking skills with every way. The compiled teaching material should be mindful of the presence of appropriate strategies and models to realize learning processes necessary to develop the students' potential.

The need for developing learning material to facilitate skills-oriented learning processes in the era of the industrial revolution 4.0 and students' multiple intelligences is supported by previous research conducted by Agusta & Noorhapizah that 71.23% of State Elementary School teachers in Banjarmasin City do not know how the concepts and achievement of higher-order thinking skills in the form of critical thinking skills, creative, logical and problem-solving. Furthermore, the same research also revealed that the learning process carried out in the classroom, namely 82.35% of public elementary school teachers in Banjarmasin City had never packaged learning by integrating critical, creative, logical and problem-solving thinking skills. The cause of the facts that occurred is that one of the teachers was never provided with in-depth knowledge of higher-order thinking skills and there were no teaching materials that lead to higher-order thinking skills that made it easier for teachers to carry out the learning process expected in the era of the industrial revolution 4.0 (Agusta & Noorhapizah, 2020; Agusta & Sa, 2021). The learning process in one elementary school in Banjarmasin is still knowledge transfer and has not developed student creativity. The same thing was also stated by Suriansyah, Agusta & Setiawan that elementary schools in the city of Banjarmasin still have not developed student independence in learning (Suriansyah et al., 2021). A similar condition was also stated by Noorhapizah, Agusta & Pratiwi that the learning process at elementary school in Banjarmasin still makes the cognitive domain the main demand (Noorhapizah et al., 2021).

Development is a systematic and continuous effort made to realize something that is aspired. Development is a change towards improvement. Changes towards improvement require the mobilization of all human resources and reason to realize what is aspired. In addition, development is also very dependent on the availability of natural resource wealth. The availability of natural resources is one of the keys to economic growth in an area. (Shah, M. et al. 2020)

The results of preliminary observations by researchers in the field starting from March 06 to 28, 2021, found 122 of 150 teachers in Banjarmasin City were still using the lesson plans that were prepared only without paying attention to the achievement of students' higher-order thinking skills in both the design of learning activities and evaluation. 103 of the 150 teachers surveyed have never done learning with a variety of learning models. Specifically, researchers conducted interviews about teachers' knowledge of students' high order thinking skills, 135 persons stated that they did not know in detail and had never developed such high order thinking skills on the learning process using learning models that lead to the development of each student's skills.

Other problem is mentioned that low quality of learning is caused by teacher's ability to prepare learning activity with an innovative, creative, effective, fun and based on 21st-century skills. Teachers are still comfortable with the practical learning process of using even a simple learning activity without using an instructional model on learning activity that can motivate students to learn and potentially develop the students' ability. While the use of the instructional model can lead to an educational objective by giving the experience of democratic individuality and fostering students' scientific and social attitudes by using society as learning resources. Furthermore Agusta, Setyosari & Sa'dijah mentioned that learning process on elementary school in Banjarmasin city is still a transfer of knowledge and has not developed a student's creativity (Agusta et al., 2018). The same problem was stated by Noorhapizah, Agusta and Pratiwi that elementary school in a Banjarmasin city still has not develop the student independence in learning (Noorhapizah et al., 2021).

The results of the latest interviews conducted on April 11 to 22 on 378 respondents involving elementary school teacher education students to explore data in 13 districts and cities. The survey data show that of 378 respondents who developed linguistic intelligence-based learning only 35 respondents, only 47 respondents developed musical intelligence-based learning, only 87 respondents developed mathematical logic-based learning, respondents who developed visual-intelligence-based learning only 63 people developed spatial intelligence-based learning, only 63 respondents developed kinesthetic intelligence-based learning, only 31 respondents developed interpersonal intelligence-based learning, only 53 respondents developed naturalist intelligence-based learning, and only 47 respondents developed interpersonal intelligence-based learning (survey in 13 districts and cities in South Kalimantan, 2021).

To solve the problems and achieve the goals of curriculum 2013, we must improve quality of lesson plan and learning materials that is used by teacher to determining the key success of curriculum 2013. Our curriculum 2013 make design of learning on elementary school with integrative thematic based learning and use textbooks in every theme. Thematic integrative is a learning approach that integrates various competencies from various subjects into various themes. Each theme consists of 4 subthemes, each subtheme consists of 6 learning. A key characteristic of curriculum 2013 is that there is no learning unit, but the learning charge is combined into one learning that integrates two to three teaching. The themes arranged in student study textbooks are drawn from the daily and environmental conditions around the students.

Based on textbook observations in elementary schools, it has not contain high order thinking skills. Based on the observations made by researchers in 20 elementary schools representing the school in North Banjarmasin Subdistrict, the results show that learning activities have not develop high order thinking skills yet. This is because teachers do not have such deep knowledge to make lesson plan based on critical thinking and creative thinking skills, the teaching materials used are only teachers' books and student books. Additionally, learning process that is carried out without using an instructional model that integrates the development of high order thinking skills. Furthermore, it is noted that some teachers has less knowledge and perception of books that are provided by the government. Some teachers consider the book to be the only source for study and not take the initiative to seek more supplement material from other source. (source : Observation of a 20 elementary school area in North Banjarmasin sub-district in May 2021).

Based on the formulation of problems, the purpose of this research and development is as follows : create and produce learning material based on wetland environment for fourth grade elementary school and describe the effectiveness and appropriateness learning material to improve students' industrial revolution 4.0 skills and multiple intelligence.

II. Research Method

This study use research and development method because it will develop teaching matearials containing industrial revolution 4.0 skills and multiple intelligence improvement based on local wisdom theme 4 "Berbagai Pekerjaan di Sekitarku" on fourth grade of elementary school.

Based on Borg & Gall (1983: 775) research and development (R&D) in education covering ten steps. The steps are (1) research and information collecting; (2) planning; (3) develop preliminary form of product; (4) Preliminary field testing; (5) main product revision; (6) main field testing; (7) operational product revision; (8) operational field testing; (9) final product revision; dan (10) dissemination and implementation.

III. Result and Discussion

The results of first product research and development are generally research done at the initial product divided into three stages of data collection, planning and development of product drafts. The result of the exposition of each stage is as follows:

3.1. Research and Data Collection

Data collection begins by conducting interviews with teachers and principals. In an effort to strengthen the results obtained through interviews and questionnaires, class teacher and fifth-grade students on perceptions of critical thinking and creative thinking skills. The interview subject suggested that until now they had not figured out the details of what these skills were, how to observe their development and how to evaluate them. Add to this a lack of knowledge about the indicator of attainment of these three skills as the basis for developing learning strategies. "It is absolutely essential to introduce critical thinking skills, creative thinking skills, and logical thinking skills to teachers, so as to include custom-oriented teaching activities. If necessary, teach materials already contain components of critical and creative thinking" (source: interview on April 14th 2021).

The spread of the questionnaire is done to determine the perceptions of the principal, teachers, and students to critical and creative thinking skills. There are three statements indicators found in the questionnaire and teacher: the perceptions of the principal and the teacher of student activity in critical and creative thinking skills; A teacher's perception of lessons is critical thinking and creative thinking skills and a teacher's perception of a teacher's critical thinking and creative thinking skills. This indicator is set out in 25 questions. For the student's questionnaire are three statement indicators: the student's perception of critical thinking and creative thinking skills; A student's perception of critical thinking and creative thinking skills and a student's perception of critical thinking and creative thinking skills. This indicator is framed into 25 questions. The results obtained from the conversion of all perception questionnaires distributed are as follows:

Table 1. The results from the teacher and student questionnaires

No	Questionnaires	Score Interval	Score	Category
1	Teacher	30	B	Good
2	Students	400	B	Good

From the table above we can explain that the score obtained from the teacher's questionnaire was 30, after conversion it turned out the predicate was "enough". The student questionnaires result got scored 400 predicate scores and the predicate was quite good.

3.2. Preparation of Learning Materials that improve student industrial revolution 4.0 skills and Multiple Intelligence

1. The Preparation Stage

This stage contains a heading to learning, this activity contains explanations that can be used for both teachers and students in preparing what will be found in the learning process. Here is an example of the preparation section on textbook :

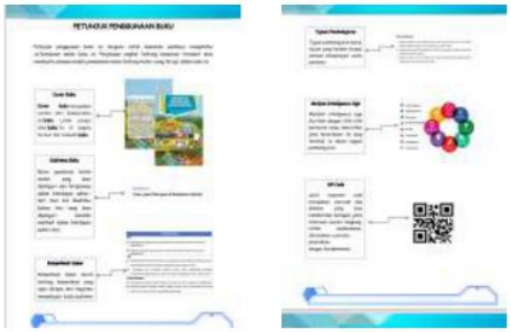

Figure 1. *Example of preparation section*

2. Activities that High Order Thinking Skills

In this activity, students are invited to observe and absorb information in a text that is equipped with various data and realities in everyday life. In this section, students will reveal various facts associated with the experiences of their daily lives. Students are asked to apply what is in the teaching material to their daily lives and to dig at what problems are available in information and to dig at solutions to the problems. High order thinking skill consists of extracting information by locating veracity or facts, producing interpretation, analysis, evaluation, and inference, as well as exposure using evidence and setting the best criteria for making decisions:

Figure 2. *Example of high order thinking skills activity section*

3. Activities that Contain Multiple Intelligence and Local Wisdom

The thought activity contains the development of student's multiple intelligence consist of linguistic intelligence, musical intelligence, logical mathematic, visual-intelligence, spatial intelligence, kinesthetic intelligence, interpersonal intelligence, naturalist intelligence. Beside that, the content of learning material based on local wisdom like art, culture, plant, fruit and many more.

Figure 3. *Example of multiple intelligence activity section*

3.3. Expert Assessment

Before the product is piloted, this textbook was first evaluated and validated by materials experts, media experts, and book design specialists. The validation is carried out to determine the propriety of teaching materials. Teaching materials can be tested when deemed feasible by experts. The learning material expert assessment contains an appraisal of the content eligibility, presentation and language in the learning material. Here are material assessment results taught by materials experts:

Table 2. Learning Materials Content Appropriateness Assessment Result

No	Criteria	Score	Predicate	Category
1	Content eligibility	80	A	Very Good
2	Presentation eligibility	81	A	Very Good
3	Language	80	A	Very Good
	Average	80,3	A	Very Good

The material content assessment by learning materials experts 80,3 with the category very good. The learning material assessment contains an assessment of content eligibility, presentation eligibility and language. The expert give the score start from 80, it means that content on the learning material neatly arranged and have a coherent hierarchy. Beside that, the presentation eligibility get category very good, it means that the presentation of learning material consist of text, picture, lay out and colour is very interest for elementary school students. The language also get very good criteria, because the researcher have designed the learning material with the simple language that can make student easy to understand the text or the information.

After that, the evaluation of teaching products from the media aspect by learning media expert. Based on learning media experts, the design of the text receives several notes of which the front should be improved illustrations and texts, the back cover for the design to be refined and unpacked with too much design, the colourability of books should be consistent and tendency to make the reader feel comfortable, the font size should not be too small. After the researcher made a revision based on the input of media experts, the results of the evaluation of media experts obtained the following score:

Table 3. Learning Materials Media Appropriateness Assessment Result

No	Criteria	Score	Predicate	Category
1	Text design	84	A	Very Good
2	Illustration design	82	A	Very Good
3	Color	83	A	Very Good
	Average	83	A	Very Good

After that, the evaluation of learning activity based on industrial revolution 4.0 skills. The skills development expert assessment contains the learning activity that can improve student's skills like critical thinking, creative thinking, problem solving, collaboration and communication. After the researcher made a revision based on the skills development experts, the results of learning material from the skills development expert as follows:

Table 4. Skill Development Assessment Result

No	Criteria	Score	Predicate	Category
1	Critical thinking	81	A	Very Good
2	Creative thinking	81	A	Very Good
3	Problem solving	82	A	Very Good
4	Collaboration	85	A	Very Good
5	Communication	84	A	Very Good
	Average	82,6	A	Very Good

After that, the evaluation of learning activity based on multiple intelligence. The multiple intelligence development expert assessment contains the learning activity that can improve student's linguistic intelligence, musical intelligence, logical mathematic, visual-intelligence, spatial intelligence, kinesthetic intelligence, interpersonal intelligence, naturalist intelligence. After the researcher made a revision based on the multiple intelligence development experts, the results of learning material from the multiple intelligence development expert as follows :

Table 5. Skill Development Assessment Result

No	Criteria	Score	Predicate	Category
1	Linguistic intelligence	80	A	Very Good
2	Musical intelligence	84	A	Very Good
3	Logical mathematic	83	A	Very Good
4	Visual-intelligence	85	A	Very Good
5	Spatial intelligence	81	A	Very Good
6	Kinesthetic intelligence	82	A	Very Good
7	Interpersonal intelligence	82	A	Very Good
8	Naturalist intelligence	82	A	Very Good
	Average	82,3	A	Very Good

All experts stated that this teaching material had a high level of validity with a very good category. teaching materials are ready to be tested to get input from principals, teachers and elementary school students. Here are the test results from preliminary field test result

Table 6. Preliminary field trial results

No	Subject	Score	Category (KKM 65)
1.	ARD	67	Complete
2.	SNS	68	Complete

3.	DT	80	Complete
4.	MKT	79	Complete
5.	SHL	73	Complete
6.	SAT	72	Complete

Based on the table above it is known that students' highest scores were obtained on test using the industrial revolution skills evaluation is 80 and lowest scores earned is 67. Student is stated to be completed because it has reached a designated KKM that is 65. The average of learning result while testing the preliminary field is 73. Based on such results, learning material containing local wisdom to developing industrial revolution 4.0 skills and multipple intelligence are deemed viable and thus a thematic textbook can be used for a major field test.

The learning material on this research is an idea to overcome learning problems during the COVID-19 pandemic. Even though this country is still in a state of a virus outbreak, learning in schools cannot be sacrificed. The learning process must continue, either in the form of knowledge transfer or skill development. The learning material based on local wisdom is an alternative solution to develop student skills even though learning is only carried out from home. This learning material is designed for student's learning use technology. Technology that we use on this blended learning is platform for learning like google meet, zoom meeting, whatsApp, and google classroom that is never use on the learning process before. student Beside that, we use the android application that we designed as learning media. We called the application as BARAMIAN Students can access the learning media on their gadget or laptop. This is in line with the results of research by Agusta & Sa'dijah (2021) Noorhapizah, Agusta, and Pratiwi (2021) that the learning process must run optimally even though conditions require teachers and students to interact online from their respective homes (Agusta & Noorhapizah, 2020; Agusta & Sa, 2021).

The development of the learning material on this research is carried out based on the demand to produce elementary school graduates who can think at a higher level. Higher-order thinking skills have an impact on students' ability to think deeply and consider various problem solutions quickly, precisely, and accurately (Aizikovitsh-Udi & Amit, 2011; Duran, 2016; Facione, 2015; Metro, 2015). Students who are trained to think at a higher level will have speed and accuracy in solving problems, able to argue or communicate with various points of view to solve problems (Firdaus & Wilujeng, 2018; Novikasari, n.d.; Suriansyah et al., 2021; Tanjung & Nababan, 2018).

This learning material is also an alternative solution to develop student skills that can be used by teachers as a reference because according to research by Noorhapizah, Agusta, and Pratiwi (2021) most teachers still have not mastered the concept of skills that must be developed in elementary school students and have not been able to package learning content those skills (Noorhapizah et al., 2021). The development learning material is based on the demand to produce elementary school graduates who have multiple intelligences. We use the wetland environment on every part of learning material. This is consistent with the wetland environment condition on Banjarmasin that daily students encounter. We also use the local wisdom on the learning material that's close to the daily life of the students. The local wisdom that we use on the learning material like fruit, animals, culture, story, song, dance, food, tribal house and community norms. This learning material is the part of social science education.

The activity on the learning material consist of Analysis and Observation, wondering observation result, Analysis of the result, and Making experiments outdoor can also develop problem-solving skills. This is in line with previous research which states that problem-solving skills can be developed by asking questions or allowing students to make questions

from observations (Laely et al., 2020; Patmawati, 2011), providing opportunities for students to explore problems that are happening from observations (Mulyadi et al., 2016; Oktaviani, A.N., Nugroho, 2015), opens students' horizons using concrete and diverse objects (Laely et al., 2020), uses the surrounding environment as an object of observation (Tendrita et al., 2016), involves students providing arguments to answer various questions (Firdausi & Asikin, 2018; Widiastuti & Putri, 2018).

In addition, the learning material development consist of task product creation activity will familiarize students to acquire their knowledge as research states through solving problems by utilizing the surrounding environment learning or outdoor learning (Agusta et al., 2018; Aizikovitsh-Udi & Amit, 2011; Maria et al., 2021) Through this activity, in addition to having creative abilities, students will also have scientific literacy skills that are in line with research by Nursofah, Rahayuni, Vieira, and Tenreiro that natural learning outside the classroom can improve science and literacy of elementary school students (Nursofah et al., 2018; Rahayuni, 2016; Vieira & Tenreiro-vieira, 2016).

Other skills developed in this learning material are logical thinking and analytical thinking skills. One of the learning steps that can develop these two skills is Analysis and observation. In this activity, the teacher will provide learning content that is more specific to exploring environmental issues related to the South Kalimantan area. Students will be asked to analyze what will happen if the problem is left unchecked, thus students are trained to reason about the possibilities that will occur so that analytical thinking skills begin (Husein et al., 2017; Lapitan et al., 2021). Then students and groups will discuss the best solution for the problem being discussed. Furthermore, students will be directed to analyze what will happen if the solution is applied. This activity will train students' logical thinking skills (Irawan et al., 2016; Muhassanah et al., 2014).

The learning material on this research is designed with every stage will exercise student's multiple intelligence like linguistic, musical, logical mathematic, visual-spatial, kinesthetic, interpersonal, intrapersonal, naturalist, and existentialist intelligence. The intelligence that must be developed since elementary school age is Linguistic, Musical, Logical-Mathematical, Visual-Spatial, Kinesthetic, Naturalist, and Interpersonal.

The intelligence that is developed further is interpersonal. This intelligence is related to a person's ability to understand, interact, and cooperate with others. The learning steps taken to improve this intelligence are Work Together and Unity on Role Play. In the work Together step, students will be directed to negotiate with friends in groups. Negotiation is a follow-up activity from observing and asking questions that have been raised in Auditory activities. Negotiations started with the teacher distributing number cards with different problems. The cards were given in the What's App application group in pictures. This activity will also train students' independence in learning so that self-confidence grows (Abenti, 2020; Jayaseely, 2020; Mahmoud & Alaraj, 2019; Pérez et al., 2021). Students will try to recognize the character of each group member and respect any differences of opinion (Abenti, 2020; Jayaseely, 2020; Mahmoud & Alaraj, 2019; Pérez et al., 2021).

IV. Conclusion

Based on research and development results, it may be concluded that thematic textbooks contain local wisdom to improve industrial revolution 4.0 skills and multiple intelligence for fourth grade elementary school in accordance with the components of learning material, media, design, skills development and multiple intelligence development. The results of research and development could be detailed as follows:

- Thematic textbooks which is containing industrial revolution 4.0 skills and multiple intelligence skills based on local wisdom is ready to be used for elementary school on fourth grade. According to materials, however, the thematic text with industrial revolution 4.0 skills and multiple intelligence get predicate A and "very good" category.
- Thematic textbooks which is containing industrial revolution 4.0 skills and multiple intelligence based on local wisdom is ready to be used for fifth grade elementary school. According to media experts, thematic textbooks industrial revolution 4.0 skills and multiple intelligence based local wisdom get predicate A and "very good" category.
- Thematic textbooks which is containing with industrial revolution 4.0 skills and multiple intelligence based on local wisdom that resulted is effective to use for fifth grade elementary school students. This is all attested to by a sig. (tailed) that is 0.024 < 0.05. Thus, h_0 is rejected and the approved h_1 or the results of the experimental class are better than the posttest control class. The posttest test class experiment (73.9333) is greater than the posttest control class (67.7600). Based on these results, it can be concluded that there is a significant difference between the results of the experimental class posttest and the control posttest scores. Based on the study results, the average availability of the study results has taken an upswing in the pre-test and posttest scores. The results of the different tests between the control class and the experiment class show that there is a significant difference between the learning results between the control class learners and the study of experimental class learners.
- Thematic textbooks which is containing with critical thinking and creative thinking skills based on local wisdom get excellent responses from users, they are teachers and students. This is evidenced by teachers' questionnaire which is get total score 149 with criteria "very good" and from the questionnaire's responses total scored total of 636 with criteria "very good". It means that the textbook is appropriately applied.

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