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- Taboo Words (*Haba Geutham*) As A Morals In Language and Psychological Effect in Pidie Community
Vera Wardani and Nuraiza 1-19
- Analysis of Student Needs for *Context*-Based Teaching Materials and Creativity to Improve Science Literacy of Elementary School Students
Rahmani, Maulidar, Ali Mustadi, and Anwar Senen 20-32
- Disaster Logistics *Management* as an Educational Foundation for Disaster Logistics Managers
Yeni Rimadeni, Nasrullah, Afdhal, Berwi Fazri Pamudi. Munazar, Arnisam and Erdi Surya 33-49
- Children Motoric Development Through Variety of Greetings
Taat Kurnita Yeniningsih, Nelvi Maulid, Hayati, Aida Fitri, Israwati, Dani Sukma Agus Setiawan and M. Syukri Azwar Lubis 50-61
- Competency Analysis of Student Coqnitve in Learning in Elementary Schools
Fita Nelyza, Dwi Putri Rejeki, Fatimah, 62-73
- Actualization the Trilogy of Education Values in the Family: A Empiric Study of the Community of Banda Aceh City
Darwin 74-87
- The Impact of Covid-19 Pandemic on Adolescence Learning Behavior in Indonesia
Syiva Fitria and Dedy Surya 87-97
- Analysis of Student's Creativity Value and Process Skills through Learning Strategies Guided Inquiry
Muchsini and Hamdi 98-108
- The Analysis of Learning Outcomes through Problem-Based Learning Model Approach On Circle Materials
Muhamad Saleh, Uli Lastriani, Rifaatul Mahmuzah, Heri Kurnia and Aklimawati 110-125
- Provide Student Knowledge About How Response On Growth Of Vetiver Seeds (*Vetiveria zizanioides*) In Saline Soil To Ascorbic Acid on Field Practice Learning of Plant Physiology
Aisar Novita, Suwandi Saragih, Efrida Lubis, Abdul Rahman Cemda, Fitria, Rini Susanti, Silvia Nora, Arie Hapsani Hasan Basri and Merlyn Mariana 126-138
- Computer Adaptive Test Development To Assess Students' Psychology
Phan Thi Thu Nguyet and Muslem Daud 139-149



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Analysis of Student Needs for Context-Based Teaching Materials and Creativity to Improve Science Literacy of Elementary School Students

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Abstract

Teaching materials are one of the important components needed in the learning process. With the appropriate teaching materials, it is hoped that it can help the smooth running of learning activities. Science is a compulsory subject for elementary school students. Science contains all things related to nature. Teaching materials that have been used in learning activities are teaching materials made by the government. The purpose of this study was to determine the needs of students for context-based teaching materials and creativity to improve the scientific literacy of elementary school students. The research subjects were students from several elementary schools in Peukan Bada District, 25 students were used as the source of interview data. Data were collected using interviews and open questionnaires for students. The research data were analyzed descriptively qualitatively. Based on the research data, it can be concluded that it is necessary to develop context-based teaching materials and creativity. Context and creativity-based teaching materials were chosen because they can facilitate students to learn, both with educators and independently. Context-based teaching materials and creativity are teaching materials that are packaged in a comprehensive and schematic manner. This study is also part of a study on the development of teaching materials on the topic of human and animal organism.

Keywords: students need, creativity, scientific literacy

INTRUDUCTION

Entering the 21st century, the development of knowledge and technology certainly requires challenges of its own, both in today's education and work world. Therefore, education needs to prepare the current generation with skills, both soft skills and hard skills at every level of education, from elementary to tertiary levels. Important skills in the 21st century are relevant to the four pillars of life which include learning to know, learning to do, learning to be and learning to live together. The four principles each contain specific skills that need to be empowered in learning activities (Zubaidah, 2016).

All these skills are actually accommodated in the 2013 curriculum which is a thematic-integrative curriculum and aims to encourage students to be better able to observe, ask, reason, and communicate the knowledge obtained or known after learning to produce a generation ready to face the future (Permendikbud, 2013).

Education is one of the important aspects that will determine the quality of life of a person and a nation (Nurmasyitah & Mislinawati, 2016). One of the ways to measure the quality of education and human resources of a country is through the ability of scientific literacy. Holbrook (2009) states that scientific literacy means respect for science by increasing learning components in oneself so that they can contribute to the social environment. Scientific literacy according to the OECD (2010) is the ability to use scientific knowledge, identify questions and draw evidence based on conclusions to be able to understand and help make inferences about nature and changes to nature due to human activities.

Scientific literacy is a major competency in preparing a generation capable of using science and information science to interact with life's challenges (OECD, 2013). Science literacy is considered to be the root of progressive change in science education (Sadler & Zadler, 2009). According to Witte (2003), PISA (Program for International Student Assessment) defines scientific literacy as the ability to use scientific knowledge, identify problems and draw conclusions based on evidence, in order to understand and make decisions about nature and changes that occur in nature as a result of human. The government defines scientific literacy as a generic skill that reflects people's understanding of events in the environment and natural phenomena, as well as other things related to life. This is why scientific literacy does not only belong to students in school, but also to people outside of school (Permanasari, 2011).

Scientific literacy is divided into three dimensions, namely: content (science knowledge), process (science competence), and context (science application) (OECD, 2010). Science content refers to the key concepts needed to understand natural phenomena and the changes that occur in the environment caused by human activities. In this case, PISA generally limits the scope of science content to only knowledge that is the material of the school science curriculum, but includes knowledge that can be obtained through other sources. The scientific process refers to the process that involves students when answering a question or solving a problem, such as analyzing and explaining evidence and describing conclusions. This includes recognizing the types of questions that science can solve or not, recognizing something that can be used for a scientific investigation, and recognizing conclusions that are in accordance with existing evidence. The scientific context refers to conditions in everyday life and becomes a reference for the application of understanding scientific concepts.

Education experts in developed countries agree that scientific literacy is very important to be developed from an early age in educational institutions. Laugksch (2000: 37) argues that the development of scientific literacy is very important because it can contribute to social and economic life, and is used to improve decisions at the community and personal level. The same thing was also expressed by the National Science Teacher Association (2003: 14) that the importance of having scientific literacy is to be able to use scientific concepts, process skills, and values in making decisions related to other people and their environment. Shaw, et. al (2014: 623) explains that the understanding of the importance of scientific literacy can be formed in learning by being accompanied by teachers.

The achievement of scientific literacy skills can be seen through the results of an international survey of students' reading, math and science levels, namely TIMSS (Trends in International Mathematics and Science Study), PISA (Program for International Student Assessment) and PILRS (Progress in Literacy Reading Study. TIMSS survey results) 2011 and PISA 2012 show that the average science achievement score of class VIII Indonesian students is significantly below the international average and is generally at the lowest stage (Low International Benchmark). The 2015 PISA survey found that Indonesia obtained an average score of 403 with the order of 63 out of 72 countries (OECD, 2017: 5). These results show that Indonesia has experienced an increase in value but is still below the international average (is <500).

The achievement of this average score illustrates that the average scientific ability of Indonesian students has only reached the ability to explore as far as basic facts, but they are not yet able to communicate and relate that ability to various science topics, let alone apply complex and abstract concepts (Toharudin , et al., 2011: 23). Indonesian students are only able to answer basic concepts with a memorization process and are unable to answer questions that require reasoning and analysis in the field of science (Setiawan, et al., 2014: 25).

The description above shows the importance of a person to have scientific literacy. Therefore, it is necessary to have benchmarks for someone who is literate in science. A program that supports the evaluation of scientific literacy, namely PISA, is an assessment system initiated by the Organization for Economic Cooperation and Development (OECD). PISA has evaluated the education systems of 72 countries around the world. Every three years, students aged 15 years are randomly selected to take a test of three basic competencies, namely reading, mathematics and science (Kemendikbud, 2016). From the results of the 2015 PISA tests and evaluations, the performance of Indonesian students is still low. The average achievement scores of Indonesian students for science, reading, and mathematics ranked 62, 61 and 63 out of 69 countries evaluated. Indonesia's ranking and average score is not much different from the results of previous PISA tests and surveys in 2012 which were also in the low material mastery group (Iswadi, 2015). This is also supported by research by Ardianto & Rubini (2014) from the results of a study on students 'scientific literacy showing that students' scientific literacy achievements have not shown satisfactory results. Students' scientific literacy achievement is quite low, with an average of 30% for all aspects, consisting of 29% for content, 30% for process, and 31% for attitudes.

According to Kurnia, et al. (2014) the low ability of students' scientific literacy is influenced by several factors, including the curriculum and education system, the choice of learning methods and models, learning facilities and facilities and learning resources. One of the learning resources that can be applied to support student learning activities in class is teaching materials. Teaching materials are tools to convey messages to students which are used by teachers in the learning process. Teaching materials make it easier for teachers to deliver learning materials. Prastowo (2012) describes that the purpose of preparing teaching materials is to help and facilitate students in learning through various

forms, as well as increase interest in learning activities. In fact, so far the teaching materials used by teachers in learning are still not optimal. One of the proofs of this is from the results of Simamora's (2016) research that teachers still rarely develop their own teaching materials and even never. This happens because there are so many ready-to-use teaching materials that teachers feel they are not obliged to develop teaching materials that can be used in accordance with the learning objectives. In fact, one of the competencies a teacher needs to have is developing teaching materials (Sungkono, 2009).

Teaching materials are an important part of learning activities. The teaching material itself is a set of learning tools or tools that contain learning materials, methods, limitations and ways of evaluating which are designed systematically and attractively in order to achieve the expected competencies (Widodo, 2008: 1). In teaching materials there are learning messages, both specific and general in nature that can be used for learning purposes (Mulyasa, 2006: 96). Teaching materials can be used by teachers to convey messages to be conveyed to students so that learning objectives can be achieved (Carey, 2009: 230). If the teacher uses good teaching materials, the learning that runs in the classroom also runs more optimally. If learning takes place optimally, the learning objectives will be easier to achieve. This teaching material, can be in the form of printed teaching materials or other forms according to the needs in class.

The results of preliminary observations shown teachers only rely on student textbooks. This illustrates that teachers have not been creative and innovative to make teaching materials. This certainly affects scientific literacy. Based on the results of observations, student textbooks do not lead to students being able to learn independently and actively, so students need other teaching materials such as context-based teaching materials and creativity so that students can learn actively on their own.

The development of context-based learning materials on human and animal organs has not been found in many student references / handbooks. Whereas context-based teaching materials are highly expected in the development of content standards in the 2013 Curriculum. Materials related to everyday life are very useful for students to connect the material studied with everyday life. Sometimes students do not understand the benefits of the lessons they learn only learning but not connected in the real world. This is what can make it difficult for students to understand academic concepts, especially in science subjects.

Learning material presented through the context of students' lives will help find meaning in the learning process, so that learning will be more meaningful and fun. Based on the description above, a context-based teaching material and creativity are needed as learning resources that must be provided by schools. Thus this study entitled "Analysis of Student Needs for Context-Based Teaching Materials and Creativity to Improve Science Literacy of Elementary School Students. The formulation of the problem of this research is how is the student's need for context-based teaching materials and creativity to improve the scientific literacy of elementary school students? With the aim of research to determine the needs of students for context-based teaching materials and creativity to improve the scientific literacy of elementary school students. This is done in order to obtain concrete data to create teaching materials according to the needs and characteristics of students in order to achieve the objectives of science lessons.

RESEARCH METHODS

This research is a descriptive qualitative research with a survey method, where information is collected from a large group of people with the aim of describing various aspects such as: knowledge, attitudes, beliefs, abilities of the population, information data obtained from asking questions. This research was conducted in April-May 2019 at Peukan Bada Aceh Besar Elementary School.

The data sources of the research were all students consisting of several elementary schools in Peukan Bada District, SDN 1 Peukan Bada, SDN 2 Peukan Bada, SDN Lam Awee, SDN Lam Geue and SDN Lamteh, with a purposive sampling approach, thus the total data sources in this study amounted to 25 students.

Data collection techniques by interview and questionnaire. Open interviews and questionnaires are used to obtain data about teaching materials that have been used by students, the needs of teaching materials desired by students and to find out the material needed by students. The research data were analyzed descriptively qualitatively. According to Trianto (2010), the percentage of student responses is defined as the proportion of students who choose each alternative answer to each question item divided by the number of students multiplied by one hundred percent.

RESEARCH RESULT

There are several main points of research results that form the basis for the development of context-based and creativity-based teaching materials including (1) the results of previous research literature studies on the importance of teaching materials development, (2) the results of literature studies on elementary science learning curriculum and (3) field study results. related to teachers' views on the values of scientific literacy, as well as the constraints of teachers in implementing science learning. Research by Rusilowati (2014) on the analysis of teaching materials in terms of scientific literacy content found that the profile of scientific literacy contained in theme books still tends to emphasize scientific knowledge, namely presenting facts, concepts, principles, laws, hypotheses, theories, models and questions that ask students to recall knowledge or information. The recommendations, especially for book writers, are to add content to the category of investigation of the nature of science, science as a way of thinking, the interaction between science, technology and society in order to train students to think creatively.

Research by Hastuti, Sunarno and Sukarmin (2014) concluded that the teaching materials developed were successfully applied in a junior high school in Central Java Province. The recommendation was put forward that the material about heat, changes in physical form of matter as well as energy and its changes have the potential to be studied in an integrated manner using the appropriate theme. Research by Palayaswati, Masykuri and Prayitno (2015) on the development of an inquiry-based integrated science module concluded that the inquiry-based integrated science module that has been developed can actually train students' social attitudes, especially honesty and thoroughness. Recommendations were given that appropriate and relevant themes should be determined so that the module can be developed and implemented properly according to its function.

Based on the results of a literature study on the 2013 curriculum, especially in the science curriculum, there were 50 basic competencies (KD) consisting of 25 basic competencies of knowledge and 25 basic competencies for skills. The entire KD is really arranged coherently in each class, both class VI, class V and class VI. It's just that based on the analysis of the 2013 curriculum student books, the materials between KDs are still presented separately. Such conditions have a great opportunity for integration between relevant KDs with the help of themes, so that an integrated science learning can be realized.

The results of the field study in the form of interviews with classroom teachers consisted of the following main points. (1) character values are an important thing for teachers to instill or familiarize students with because they involve the expectations of society for graduates who are not only intelligent but also have character. It is not easy to insert character education between lessons, especially if it is only delivered orally.

There must be certain learning activities that can provide a nurturant effect for habituating student behavior that reflects character values. The teacher's obstacle is related to the inculcation of student character values, namely the lack of learning materials possessed by activities that can help students actualize character values. (2) Regarding scientific literacy, it is conveyed by the teacher that one of the sources that can be used to develop scientific literacy is the 2013 curriculum student books. However, for teaching teachers, one book is not enough. It must be added with other books and it would be even better if there were certain teaching materials that were relevant to class conditions and contained more content that could train students' scientific literacy. (3) Regarding the 2013 curriculum which emphasizes context and creativity, the class teacher says that not every teaching, context can be done in class. Many factors cause these constraints, one of which is because not all activities in student books / teacher books can be done and the incomplete teaching materials made by the teacher. In theory, if there are adequate context-based teaching materials for certain materials, then the context planting should be done as often as possible.

The following is the percentage of students' needs analysis questionnaire acquisition of context-based teaching materials and creativity of students at Peukan Bada Aceh Besar Elementary School on the material of human and animal organs.

Tabel 1

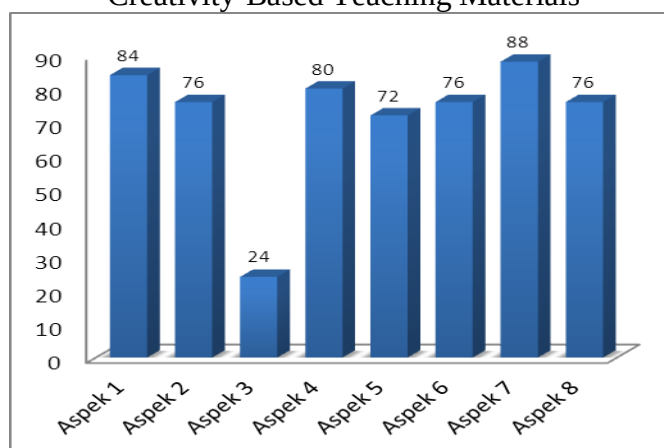
The percentage of students' needs analysis questionnaire acquisition of context-based and creativity-based teaching materials

N	Statement	Yes	No
1.	Are you enthusiastic about learning science?	84%	16%
2.	Are you having difficulty studying the human and animal organ movement material?	76 %	24 %
3.	Do you have any textbooks or other handbooks on human and animal organ materials?	24 %	76 %
4.	Are you looking for other materials besides the books provided at school to help you understand the material of human and animal organs. For example; the internet, magazines or other books?	80 %	20 %
5.	Do you have difficulty understanding human and animal organs (rabbits, birds, fish, snails, grasshoppers, butterflies and dragonflies)?	72 %	28 %

6.	If the presentation in teaching materials is dominated by original images. Is it helpful for you to understand the human and animal organs (rabbits, birds, fish, snails, grasshoppers, butterflies and dragonflies)?	76 %	24 %
7.	Do you need alternative teaching materials that can be used	88 %	12 %
8.	to study the organs of movement of humans and animals (rabbits, birds, fish, snails, grasshoppers, butterflies and dragonflies)?	76 %	24 %

The percentage of students' needs analysis questionnaires obtained for context and creativity-based teaching materials which are presented in the following diagram:

Figure 3.1 Percentage of Student Needs for Context-Based and Creativity-Based Teaching Materials



The percentage of students who enjoy participating in science learning is 84%. The percentage of difficulty in studying human and animal movement organ material is 76%. In the third aspect, related to the availability of teaching materials for human and animal movement organs, the answer is 24% yes, so it can be seen that those who do not have other textbooks are around 76%. The need for other learning resources 80% answered yes and 20% answered no. In the fifth aspect, 72% of students said that they had difficulty understanding human organs, rabbits, birds, fish, snails, grasshoppers, butterflies and dragonflies. In the sixth aspect, the need for original pictures of students' answers dominates the need for 76%. In the seventh aspect, students' needs for alternative teaching materials with a yes answer are 88% of students. In the last aspect related to the original pictorial teaching materials that will be developed the percentage of answers is yes 76% means that they need other teaching materials that will support the learning process. The results of data analysis indicate that students need alternative teaching materials that can be used in learning that can support student needs. Alternative teaching materials that can be used are context-based teaching materials and creativity in the material of human and animal movement organs which aim to clarify the organ of movement in humans, rabbits, birds, fish, snails, grasshoppers, butterflies and dragonflies, so it needs to be

illustrated in the form of real, namely in the form of original image display, so that students can receive information clearly.

DISCUSSION

Descriptive data obtained from the results of literature studies and field studies show that context-based teaching materials and creativity are indispensable, in addition to making it easier for teachers to implement context-based learning, also to instill character values in students in learning and to improve students' scientific literacy. The results of previous research on science teaching materials and the success of science teaching materials developed and applied by a number of classes show that science teaching materials are really needed to complete compulsory books and handbooks and to support learning tools owned by teachers. This is supported by the statement of Daryanto (2013) which states that modules are teaching materials that are packaged in a comprehensive and systematic manner, containing a set of learning experiences designed to help students master specific learning objectives. This means that when a learning module has been created by a teacher, the learning process will be more effective and the learning objectives will be achieved well.

It is said so because logically, when a teacher compiles supporting teaching materials in the form of modules, things such as class conditions, available learning facilities and the conditions of the students they supervise will be the basis and consideration in compiling modules in addition to considering aspects of instructional objectives. Even though from the content point of view, text books tend to be more adequate than modules or teaching materials developed by teachers, but often some parts of the contents of the books are not used or are not used in learning. The reason could be because the content of the book is material on a topic that is not taught in the class concerned, is not relevant to the basic competencies in the curriculum, or the contents of the book are in the form of experimental instructions but cannot be implemented because the tools and materials instructed are not available at all school.

Especially if the learning process is carried out not only to master a number of basic competencies, but there are other higher goals such as inculcating character values in students 'social attitudes and increasing students' scientific literacy, textbooks may not necessarily fulfill this, but teaching materials or modules developed by a teacher with high potential can meet these objectives because the module is specifically designed by the teacher to achieve the intended goal. So basically, even though the 2013 curriculum has a mandatory handbook that contains a number of activity instructions, teachers still have to use additional teaching materials that are more specific and in accordance with the conditions of the class and students.

If you look at the 2013 curriculum for science subjects, both based on basic knowledge and skills, tend to be separated between the basic competency of knowledge with one another when presented in textbooks. In fact, this condition is an opportunity for a teacher to do creativity in learning, where the form of creativity in question is to strive for science learning, which initially still seems partial, becomes truly integrated. Other things that support are the sequence of basic competency knowledge in elementary science subjects which are actually sorted from grade IV to grade VI and the freedom for teachers to develop indicators of learning achievement. The development of teaching materials in the form of modules

is an effort to realize a truly integrated science learning, whether it is carried out by teachers or by researchers.

Teaching materials that have real elements (context) will have a special attraction for students, the presence of images can become the center of student attention and encourage interest in reading, studying the material, and do not cause boredom and make it easier to understand the material. The pictures listed are in accordance with the content of the material. This is in line with the opinion that images can attract students' attention so that it fosters interest in learning and clarifies the content of the material and can strengthen memory power. Therefore, learning science requires visualization to increase student understanding. This understanding will be more useful if students build their own concepts (Alfendri et al.:2018).

Based on the results of interviews with students, the teacher still uses ready-to-use teaching materials available in bookstores. Students want additional innovations / books as a handbook that explains in detail about the material of human and animal organs. The books used so far only explain in general terms, for example about invertebrates, only one example of invertebrates is included in the teaching material and also cartoon images are not original pictures. Students are sometimes confused to understand it because the clarity of the picture on the topic, the teacher only explains with a lecture, so it greatly affects students' understanding and they also have difficulty imagining the original form of the picture because there are some animals that have never been seen. Then students are required to memorize the described motion organs without showing their original image / form.

This is what makes students overwhelmed and bored to read. Science lessons, especially the material of human and animal organs, need a real form so that students can get to know firsthand the shape of the organ of movement of these animals. This form can be in the form of an image that can display the authenticity of the animal so that students do not merely memorize the material being taught.

Students hope that the teaching materials used are able to provide understanding to students and contain interesting content, foster interest and motivate so they don't feel bored. Like the use of original images in teaching materials, meaning that these images can help students understand the material and stimulate the brain and deepen the material. The image must be real, meaning that it is in accordance with the original form such as colors and shapes so that students can equate with the actual environmental conditions.

Based on the questionnaire distributed to students, it was obtained data that students wanted teaching materials that were developed by the teacher using language that was easily understood by students, concise, and had practice questions. The percentage of teaching materials desired by students 88% of students want alternative teaching materials. Teaching materials are very necessary in learning as a guide for students and teachers in carrying out learning activities. Teaching materials have a different character from reference books in general.

The preparation of teaching materials is tailored to the curriculum, written and designed based on the needs of students, using communicative language, referring to the

competencies that must be achieved, structured for the instructional process and has a feedback mechanism from students. In general, it can be said that textbooks can develop the potential of students to become independent learners. The development of teaching materials refers to the development of Borg and Gall which includes the following stages: 1) Preliminary Study, 2) Development, and 3) Product testing.

The use of teaching materials in learning can provide benefits to students. There are several advantages of using teaching materials, namely: 1). Make students participate creatively and think analytically when they are involved in learning, 2). The concepts learned using teaching materials become clearer to students because these concepts are taught through learning activities, 3). encourage a systematic integration of various sources in a learning experience, 4). become actively involved in improvisation, work principles are learned and in this way students acquire problem-solving skills, attitudes and scientific knowledge needed in solving scientific and technological problems (Akani, 2016).

CONCLUSION

Based on the research data, it can be concluded that it is necessary to develop context-based teaching materials and creativity. Context and creativity-based teaching materials were chosen because they can facilitate students to learn, both with educators and independently. Context-based teaching materials and creativity are teaching materials that are packaged in a comprehensive and schematic manner. This study is also part of a study on the development of teaching materials on the topic of Human and Animal Organism.

Recommendation and Acknowledgement

Based on the results of needs analysis research, here are some recommendation that researchers can convey, among others: Because the results of the analysis indicate the need for context-based teaching materials and creativity that can be used by students, it is time for teachers to innovate and develop creative material content according to student needs for learning science does not seem theoretical but can provide insight contextually according to conditions in the field. Furthermore, the results of this research may be continued at the development and implementation stages. It is necessary that in the future the government proposes these various student needs in local and central government programs so that students' literacy skills can develop properly.

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