Development and Design of Cooperative Contextual Reconstruction Oriented Science Learning (KOKO) for Students with Special Needs

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Abstract

Limited science learning for students with special needs where these students need more active learning compared to normal students, especially in science learning. Therefore, this study reconstructs science learning for students with special needs with KOKO's cooperative contextual approach. The purpose of this study is to produce science learning oriented to cooperative contextual reconstruction (KOKO) for students with special needs. The research is a development research with an ADDIE design, but in this research it is only at the development stage. The population of this study is all students with special needs in special schools in South Bengkulu and North Bengkulu. The research instruments are in the form of a validation questionnaire for material and media experts, a questionnaire on teachers' responses to the reconstruction of the developed learning, observation sheets and posttest questions to describe the structure of students' knowledge and science literacy. Data collection was carried out by providing validation questionnaires to material and media experts, providing teacher response questionnaires, making observations and giving posttest questions. Data analysis uses quantitative data analysis with descriptive statistics which are then narrated qualitatively. The results of the research resulted in KOKO learning design products covering five stages, namely theme determination, contextual orientation, learning activities, evaluation, reflection and follow-up. The results of the product feasibility analysis showed an average validation result with a score of 0.85 in the very feasible category.

Keywords: Reconstruction, science learning, contextual, Cooperative, and Students with Special Needs.

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INTRODUCTION

Based on the 1945 Constitution, article 31 paragraph 1 reveals that every citizen has the right to education. The article makes the basis that education is not limited in terms of economy, health, physical or mental. The government openly guarantees that education is for all citizens without exception. This is reinforced by article 31 paragraph 2 which reveals that every citizen is obliged to attend basic education and the government is obliged to finance it. Based on these two articles, a conclusion can be drawn that basically the government is obliged to guarantee education for all Indonesian people. Education is not only focused on people who have normal physical conditions, but also needs attention to people who have limited physical conditions or can be called special needs. Education for children with special needs in Indonesia is generally carried out separately, namely in public and private schools for normal condition students and public and private schools for special needs students. Schools for children with special needs are carried out in special schools spread across every city and district in Indonesia. Indirectly, the government has committed to providing education in accordance with the 1945 Law article 31 paragraphs 1 and 2.

Based on the regulation of the State Minister of Women's Empowerment and Child Protection of the Republic of Indonesia Number 10 of 2011 concerning the Policy for Handling Children with Special Needs, it is explained that Children with Special Needs are children who experience limitations / extraordinary both physical, mental-intellectual, social, and emotional which have a significant influence on the process of growth and development compared to other children their age. Children with special needs can be interpreted as a condition where students who have different conditions both in physical, mental, intellectual, social and emotional aspects compared to children their age. According to the American Association on Mental Deficiency, children are disorders that include intellectual, mental, physical, social and emotional functions that show obstacles in adaptive behavior. Based on these two definitions, it is clear that children with special needs are intellectual, mental, physical, social and emotional dysfunctions that cause students to experience developmental delays. The consequences of their deafness can hinder the intelligence of deaf children (Bimrew Sendekie Belay, 2022). Children with special needs acquire knowledge and learning skills in extraordinary schools both public and private.

Bengkulu Province is a province in Indonesia that provides education for students with special needs. Based on statistical data from the Ministry of Education and Culture in 2016, Bengkulu Province has approximately 15 extraordinary schools consisting of 12 public schools and 3 private schools spread across the city regency area. The implementation of education and learning is carried out according to the curriculum set by the ministry of education and culture. One of the learning materials applied in extraordinary schools is science learning materials. The results of observations and interviews with several teachers in one of the state special schools in the cities of Bengkulu, South Bengkulu and Kaur revealed that science learning materials were conceptual and thematic, as well as limited teaching materials that could provide reinforcement in science for students with special needs.

Science learning carried out in some extraordinary schools is more focused in the form of phenomena and games that are delivered gradually and not directly towards concepts. This is due to intellectual, mental, physical, social and emotional limitations that cannot be forced to accept the content as a whole. This statement is in line with several previous research results, including Irsyadi and Nugroho (2015), revealing that the provision of educational games, limb recognition, and number recognition can make students with intellectual disabilities interested in learning and easily understand the content of the material. Furthermore, Arum and Prasetyo (2019) revealed that learning media in the form of puzzle games and also local wisdom play an important role in the process of introducing and developing science in children with special needs. Students with intellectual disabilities in particular indirectly have different science literacy characteristics from students in general. Based on this, it is hoped that science learning in extraordinary schools can make it easier for SLB students to receive learning that is applied directly through phenomena in the daily environment that are in accordance with the abilities of students with special needs.

The results of previous studies conducted by researchers show the need to reconstruct science learning materials in order to describe the sequence of material and the depth of concepts for each level of education. Reconstruction of Science Learning, Reconstruction of Science Learning is interpreted as a method used in preparing contextually by considering the concepts of students and scientists.

According to Nursaadah, et al (2018) revealed that there are three stages in the learning reconstruction process, namely: 1) Analyzing science content; 2) Investigating students' conceptions to clarify a scientific concept in a student's perspective; 3) Develop a learning sequence.

The irregularity of the order of the material, the depth of the material, and the cognitive level causes science learning in children with special needs to tend to be thematic and contextual. Learning in children with special needs does not necessarily always focus on science content. However, science learning is needed that can provide concepts through a contextual and cooperative approach as an effort to improve mental, intellectual, attitude, social and emotional students with special needs. Contextual learning is more related to the relationship between the material learned by students and practical uses in everyday life. Students are directed to learn through "experiencing" not "memorization. Cooperative learning prioritizes cooperation among students to achieve learning objectives. Cooperative learning uses the concept of learning in groups as a joint effort to solve problems / problems as an effort to construct the knowledge possessed by students. One of the simplest models of Cooperative Learning involves students actively learning in a group setting in problem solving and having a sense of responsibility towards their own learning as well as that of others (Getter and Rowe, 2008). Furthermore, Lie (2008) revealed the Think Pair Share learning model commonly used in all subjects and for all levels of early childhood.

Based on this, it is important to conduct research that integrates science learning oriented to cooperative contextual reconstruction (KOKO) for students with special needs to support and assist the learning process for students with special needs who generally have limitations in cognitive, social and behavioral so that through KOKO-oriented science learning, it is hoped that students with special needs can achieve learning goals and help in understanding knowledge especially the learning of science so as to help in their daily and social lives.

METHOD

Research is a development research with ADDIE design (Analysis, Design, Develop, Implementation and Evaluation). However, this research is only carried out until the development stage. The population of this study was all students with special needs in special schools in the districts of North Bengku and South Bengkulu. Research instruments in the form of material and media expert validation questionnaires, teacher response questionnaires to developed learning reconstructions, observation sheets and posttest questions to describe the structure of students' knowledge and science literacy. Data collection was carried out by providing validation questionnaires to material and media experts, providing teacher response questionnaires, making observations and giving posttest questions. Data analysis uses quantitative data analysis with descriptive statistics which are then narrated qualitatively

RESULT AND DISCUSSION

The research was carried out in two places, namely at the Faculty of Teacher Training and Education, University of Bengkulu and two Special Schools in North Bengkulu and South Bengkulu. Research is a development research with ADDIE design (*analyze.design, development, implementation, evaluation*). The study has started from July 2022 to the present in September 2022. The study was conducted on the category of Mentally Impaired Students at two school levels, namely Elementary School and Junior High School. At the elementary school level, classes VII and VIII are selected. The research stage is still at the *development stage.*The results of activities at each stage of research are described as follows.

1. *Analyze* (Analisis)

The analysis stage is a stage of researchers who examine aspects that become the urgency of the need for the development of learning reconstruction products. Aspects of the study on analytical aspects: core competencies (IC) and basic competencies (KD), Content Structure, and learning design reconstruction needs. The results of activities at the analysis stage are represented as follows.

A. Core Competency (IC) and Basic Competency (KD) Analysis

The analysis of KI and KD was carried out by taking into account the characteristics of the curriculum used in the science learning process at the Outer Liasa School at the SDLB and SMPLB levels in the Intellectual Impairment category. Based on observations and interviews with teachers in schools, information was obtained that the curriculum used was the 2013 curriculum. The analysis of KI and KD is based on several data

including learning syllabus, learning characteristics, suitability and order of material. The characteristics of science learning in SLB are more thematic and oriented towards basic understanding, skills and attitudes of students.

At the School extraordinary competence of spiritual, social attitudes, skills and knowledge is formulated in an integrated manner on competence of knowledge and skills. The analysis of KI and KD used in the research stage was determined based on the chosen theme, namely **animal and plant diversity, as well as alternative energy sources.** Analysis of KI and KD in the development of learning design reconstruction is represented in Table 1 Below:

Table 1 Analysis of KI and KD for SLB Science learning at each level

No.	Aspect	Ladder		Analysis
		SDLB	SMPLB	
1	KI	KI 3 (Knowledge) Understanding factual knowledge by observing KI 4 (Skills) Presenting factual knowledge in clear and logical language (lissan/written/sign) in aesthetic works	KI 3 (Knowledge) Understanding factual knowledge by observing KI 4 (Skills) Presenting factual knowledge in clear and logical language (lissan/written/sign) in aesthetic works	1. KI in the aspect of Knowledge at the elementary and junior high school levels tends to be the same, namely Understanding factual knowledge by observing and statements that show curiosity in the learning process 2. IP in the aspect of Skills Presenting factual knowledge in language (lissan/written/sign) that is clear and logical in aesthetic works 3. KI in the attitude aspect is not specific in separate competencies, but is integrated in the aspect of knowledge and skills
2	KI	KD 3.1 Recognize the anatomy and habitats of animals and plants, and the characteristics of solid, liquid and gaseous bodies KD 3.2 Identifying changes in size and identifying animals that are beneficial to humans KD 3.3 Identifying changes in solid, liquid and gaseous properties and their substance forms KD 3.4 Identifying plant size changes and identifying plants intended for humans	KD 3.1 Describe the anatomy and life cycle of animals and plants and changes in substance form KD 3.2 Examining animal size changes and identifying animals that are beneficial to humans KD 3.3 Describe alternative energy sources in daily life KD 3.4 Examining plant size changes and identifying plants that are beneficial to humans	Based on the theme "animal and plant diversity, as well as alternative energy sources" At the elementary level, KD focuses on the identification of anatomy, size changes in animals and plants as well as the characteristics of solid, liquid and gaseous bodies. At the junior high school level, it is improved to be more specific in describing and analyzing anatomy, size changes in animals and plants as well as the characteristics of solid, liquid and gaseous bodies.

Based on Table 1 related to KI and KD, there is an increase in the cognitive level of knowledge of elementary to junior high school students categorized at the C1 and C2 cognitive levels in the aspects of recognizing, identifying and studying. Science learning in students with intellectual disabilities is thematic and oriented to integrated knowledge and skills of social competence and student attitudes.

B. Content Structure Analysis

1. Analisis *Literature*

Literature and reference studies used are related to material studies and studies of learning models and methods used. The theoretical first study is the 1945 Constitution article 31 paragraphs 1 and 2 which reveal that every citizen has the right to education. The article makes the basis that education is not limited in terms of economy, health, physical or mental. The government openly guarantees that education is for all citizens without exception. The second theory is **that students with** disabilities / children with special needs are students with disabilities. Based on Law No. 8 of 2016 in article 1 paragraph 1 Students with Disabilities are defined as students Students who experience physical, intellectual, mental, and/or sensory limitations for a long time who in interacting with the environment may experience obstacles and difficulties to participate fully and effectively with other citizens based on equal rights. Children with Special Needs consist of Mentally Impaired, Deaf, Disabled, Speech Impaired, Blind and Visually Impaired.

The third theoretical study is Reconstruction of Science Learning, Reconstruction of Science Learning is interpreted as a method used in preparing contextually by considering the concepts of students and scientists. According to Nursaadah, et al (2018) revealed that there are three stages in the learning reconstruction process, namely: 1) Analyzing science content; 2) Investigating students' conceptions to clarify a scientific concept in a student's perspective; 3) Develop a learning sequence.

The Fourth Theoretical Study on Contextual and Cooperative Learning. Contextual learning is more related to the relationship between the material learned by students and practical uses in everyday life. Students are directed to learn through "experiencing" not "memorization. **Contextual uses in research include phenomena of factual phenomena related to animals, plants and alternative energy sources**.

Cooperative learning prioritizes cooperation among students to achieve learning objectives. Cooperative learning uses the concept of learning in groups as a joint effort to solve problems / problems as an effort to construct the knowledge possessed by students. The type of cooperative learning used is the cooperative learning model *Think Pair Share*. One of the simplest models of Cooperative Learning involves students actively learning in a group setting in problem solving and having a sense of responsibility towards their own learning as well as that of others (Getter and Rowe, 2008). Furthermore, Lie (2008) **revealed the *Think Pair Share* (TPS) learning model commonly used in all subjects and for all levels of early childhood**. The stages of the TPS model in summary include *Thinking*, *Pairing* and *Sharing*. The TPS model is a type of cooperative learning designed to influence student interaction patterns in the learning process (Trianto, 2009).

The fifth theoretical study is scientific literacy and knowledge structure. Science literacy is expressed as knowledge and scientific skills to be able to identify questions, acquire new knowledge, explain scientific phenomena, and Drawing conclusions based on facts, understanding the characteristics of science, awareness of how science and technology shape the natural, intellectual, and cultural environment, and willingness to engage and care about science-related issues. Next, the Theory of the structure of knowledge.

Sabella and Redish (2007) expressed the term knowledge structure as a scheme or description of knowledge possessed by students in dealing with certain problems. The structure of knowledge that students have generally depends on the cues or information understood and how the information is interpreted. These cues can be explored through a question or statement using the relevant characteristics of a concept being studied. It aims to activate knowledge structures that will help students in changing concepts.

2. *Elementary Teks*

Elementary text is done through the collection of material from various sources, essential concepts in the form of texts from various sources related to the diversity of animals, plants and alternative energy sources. The synthesis of matter from several sources is further identified and rearranged by relating the phenomena of Factual phenomena related to animals, plants and alternative energy sources in the form of Discourse Analysis. After obtaining discourse analysis data, the next stage is Didactic Reduction. Didactic Reduction is used to reduce the level of difficulty of understanding the material, so that basic texts are obtained in the form of material that is easier for students of extraordinary schools to understand. Didactic reduction emphasizes more explanation of material that is not too theoretical, but emphasis on explaining examples of phenomena in the form of pictures and factual in accordance with what students often see in everyday life. The result of didactic reduction is the basic text for the content and context on the theme of diversity of animals, plants and alternative energy sources

in the form of proportions used as the basis for the development of learning model reconstruction designs.

The context and content that is in proportion as an example is the diversity of turtle animals. In the context of turtles, students are directed to identify and explain turtle morphology, types and patterns of turtle behavior. In the context of plant diversity, examples of plants around students are given that have benefits as medicinal plants. Students are directed to an explanation of plant anatomy, types and benefits of plants around students. In the context of alternative energy sources, students are given examples of alternative energy sources from vegetable and fruit waste, as well as the use of various solutions that can determine the existence of energy phenomena in them.

3. Text Construction

The stages of text construction in the process of developing a science learning reconstruction design begin with the creation of *a learning design outline*. This *outline* contains the order of presentation of learning materials that function to determine and direct the stages of the science learning implementation process for students with disabilities. In the construction process, it is carried out by including materials that have been reduced in the form of material proportions into the KOKO (Cooperative Contextual Cooperation) learning design that is developed. The construction process is carried out by paying attention to the design, objectives and themes of science learning themes for students with disabilities. The combination of material and factual phenomena in the reconstructed learning design serves to provide a more specific and easy-to-understand explanation of the material that is in accordance with the study of scientific theory. The result of the text construction is a text in the form of material in the KOKO learning design that is in accordance with theories related to the diversity of animals, plants and alternative energy sources. In accordance with the opinion (Sugiartini, Dantes, & Candiasa, 2015) that the contextual learning approach expects students to be able to learn in real situations in the student's environment so that students acquire to form a new concept that is useful for their lives. Learning with the context of students' daily lives in contextual learning.

4. Needs Analysis of Reconstruction of Developed Learning

Before compiling a learning design that is constructed in addition to the context and content of the learning material, it is necessary to identify how the science learning process is carried out in the classroom. This is because children with special needs need a separate pattern according to their individual needs. Deaf children have low cognition because they have difficulty communicating even though they use sign language so that their absorption is slow to understand the lesson during the teaching process (Agung, Khoirunisa, & Suryaningsih, 2022). According to (Saputri & Wangid, 2013) there are three environments that must be considered in the learning of SLB students, namely the visual, sound, and tactile environment. The three environments must be conducive when learning takes place. The identification process is carried out through observation activities. Science learning observation includes three indicators, namely social interaction, communication and behavior. Observations were carried out in two schools, namely SLB N North Bengkulu and SLB N South Bengkulu with a total sample of 50 students. In SLB N North Bengkulu, there were 25 students who were observed with 16 students at the elementary level and 9 students at the junior high school level. SLB N Bengkulu Selatan has 25 students with details of 15 students at the elementary level and 10 students at the junior high school level. The results of the observation are represented as follows.

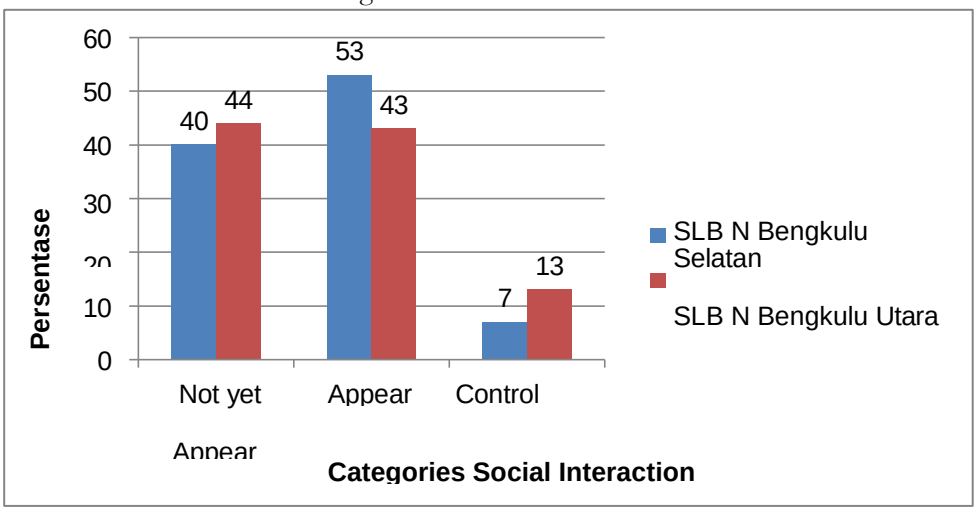
a. Social Interaction

Observation of students' social interaction during the science learning process in class includes twelve activity items categorized into three categories, namely Not yet appeared, appeared, and have mastered. The percentages of the three indicators of social interaction are represented in Tables 2 and 1 below:

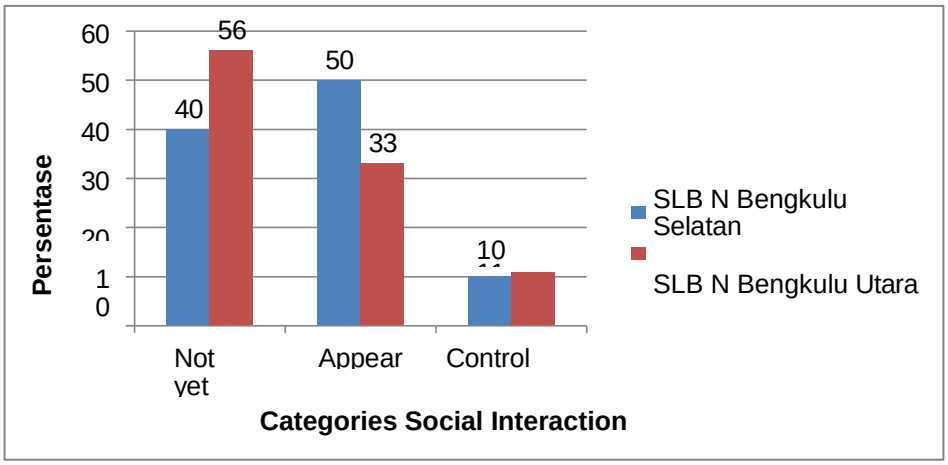
Table 2 percentage of student social interaction in science learning

No	Jenjang	Sekolah		% Category		
				Not yet Appear	Appear	Control
1	SD LB	SLB Selatan	Bengkulu	40	53	7
			SLB Bengkulu North	44	43	13
2	SMP LB	SLB Selatan	Bengkulu	40	50	10
			SLB Bengkulu North	56	33	11

The percentage representation of the category of social interaction of students in science learning is represented in the following graph.



Graph 1 Category of Social Interaction of SLB to Elementary School Studens



Graph 2 Social Interaction Category of Junior High School Students

Based on tables and graphs of social interaction, it shows that there is a continuity between social interaction at the elementary and junior high levels in each school. In the science learning process, it is explicitly seen that there has been social interaction at the elementary and junior high school levels, although it has not been maximized. Social interaction can be seen from students' facial expressions in responding to teachers and students in the learning process. Interaction can be seen from some students having conversations and sharing in several ways such as lending stationery to their friends and paying attention to their friends who have not finished doing assignments.

b. Comunication

Observations on aspects of student communication during the science learning process in class include ten activity items categorized into three categories, namely Not yet appeared, appeared, and have mastered. The percentages of the three indicators of social interaction are represented in Table 3 and Figure 3 below.

Table 3. Comunication

No	Grade	Affiliate	% Category		
			Not yet Appear	Appear	Control
1	SDLB	SLB Bengkulu Selatan	40	53	7
		SLB Bengkulu North	44	43	13
2	SMP LB	SLB Bengkulu Selatan	40	50	10
		SLB Bengkulu North	56	33	11

The percentage representation of student communication categories in science learning is represented in the following graph.

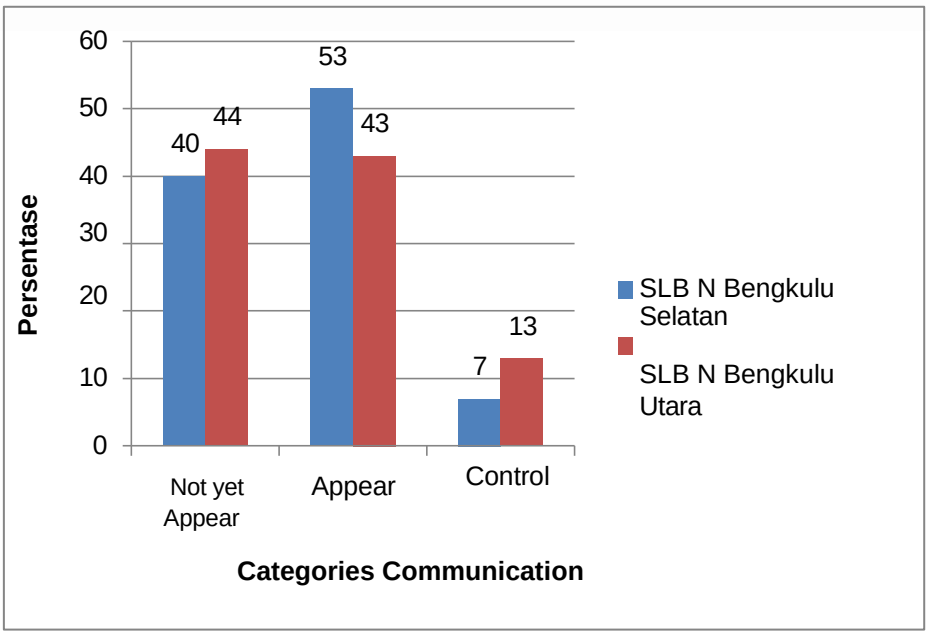


Figure 3 Communication Category of SLB Students at Elementary Level

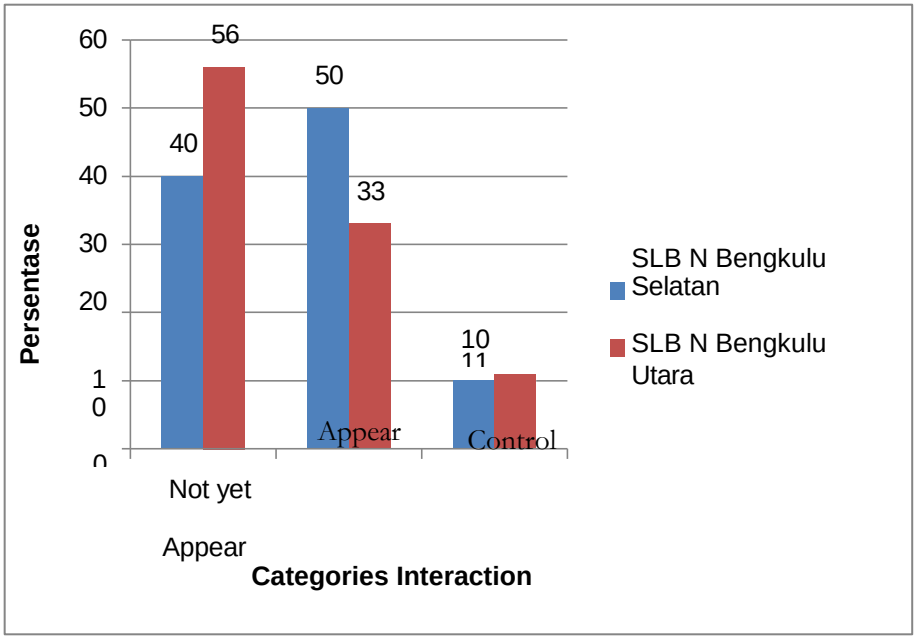


Figure 4 Communication Category of Junior High School Students

Based on Table 3 and graphs 3 and 4 on communication shows that there is a continuity between communication and social interaction at the elementary and junior high levels in each school. In the science learning process, it is explicitly seen that good communication is related to how social interaction is both between students and teachers, as well as students with students at the elementary and junior high levels. The communication process can be seen from the facial expressions of students in speaking using words and body language in following the learning process. Communication can be seen from some students doing self-expression such as signs of understanding, being angry and saying thank you. In line with the opinion (Permatasari, Degeng, & Adi, 2019) that deaf children function and prioritize their sense of sight to receive messages and process messages from the outside than their sense of hearing, so they tend to have difficulty communicating.

c. Behaviour

Observations on aspects of student behavior during the science learning process in class include thirteen activity items categorized into three categories, namely Rare, Sometimes, and Often. The percentages of the three indicators of social interaction are represented in Table 4 and Figure 5 below

Table 4 Percentage of Behavior Categories of SLB Students at the Elementary and Junior High School Levels

No	Jenjang	School	% Category		
			Infrequently	Kadang-Kadang	Often
1	SDLB	SLB Bengkulu Selatan	53	40	7
		SLB Bengkulu North	50	37	13
2	SMP LB	SLB Bengkulu Selatan	60	30	10
		SLB Bengkulu North	56	33	11

The percentage representation of behavioral categories in science learning is represented in the following graph.

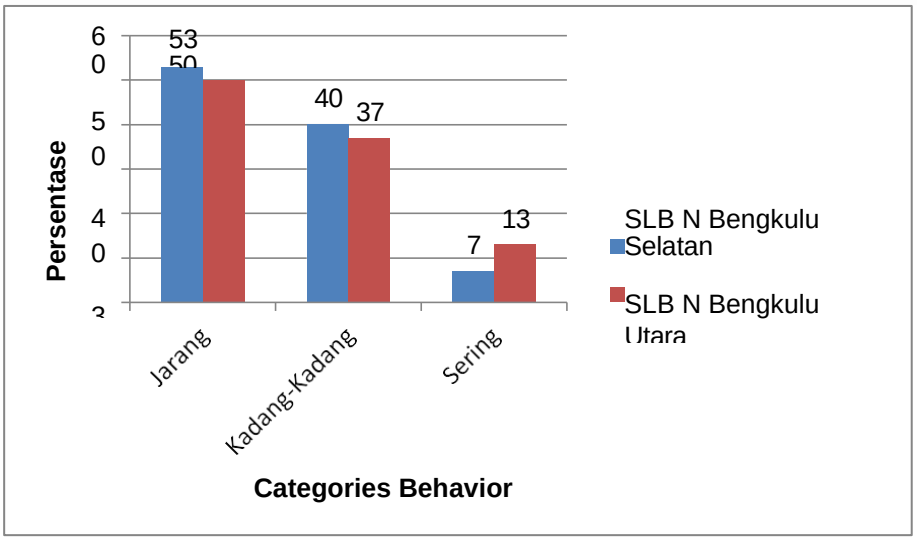


Figure 5 Categories of Behavior of SLB Students at the Elementary Level

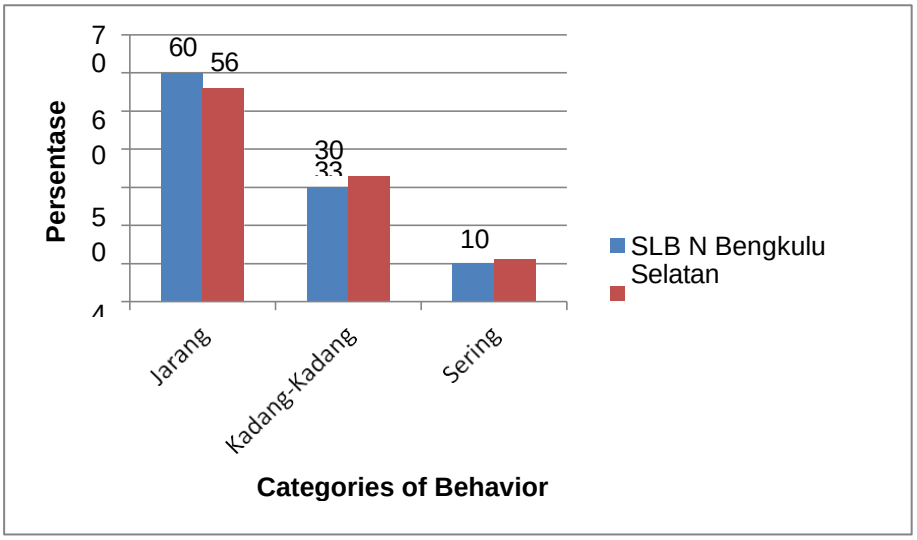


Figure 6 Category of Junior High School Student Behavior

Based on Tables 4 and 5 and 6 regarding student behavior during the learning process. Based on this representation, there was 1 student who showed different behavior from other peers at the elementary and junior high levels. The behavior seen from there are students who often play with the object they are holding while looking exaggeratedly. According to (Fajrie & Masfuah, 2018) SLB students must be provided with appropriate services and education through interesting science learning using media that suits the needs and characteristics of SDLB students so that they have the same abilities as normal students. In addition to these behaviors, there are students who laugh themselves, interspersed and sometimes repeat certain movements. Scientific behavior that must be possessed by SLB students is no less important in the science learning process, one of these behaviors can be shown through students' considerable curiosity about a certain object (Nurwahidah, 2017).

2. *Design*

At the design stage, researchers compile products based on the results of needs analysis which includes analysis of core and basic competencies based on the curriculum used, content analysis based on *literature*, and analysis of the science learning process. The learning design that is prepared includes five stages, namely: **determination of themes, orientation of context (facts and phenomena), learning activities, evaluation, and reflection and follow-up.** The determination of the theme is developed based on the analysis of the curriculum used by including analysis of basic and core competencies, as well as analysis of attitudes, skills and cognitive levels used. At the contextual orientation stage, it is studied based on facts and scientific phenomena that exist in the environment, technology and society related to students with special needs with intellectual disabilities. The stages of learning activities consist of three stages, namely introduction, core, and closing. At the evaluation stage, more emphasis is placed on the description of attitudes, skills and knowledge that support students' *life skills and soft skills*. The reflection and follow-up stage emphasizes strengthening the models, methods, materials and media carried out at the next meeting. The stages of the developed learning design are represented in Figure 7 below.

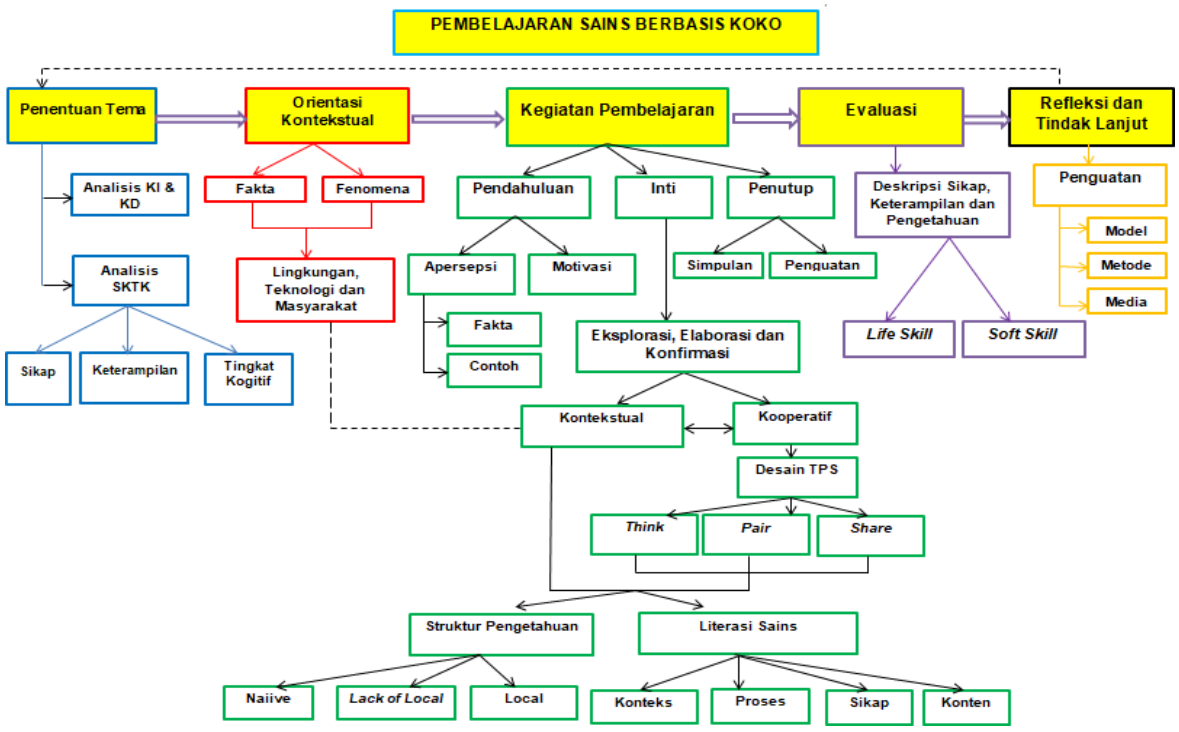


Figure 7 KOKO-Based Learning Design

Based on Figure 7 above, it shows that the first stage carried out is thematic **determination** based on the description of the curriculum used in the two schools, namely SLB N, North Bengkulu and South Bengkulu. The results of interviews with the two principals obtained information that the curriculum used was the 2013 curriculum which described the core and basic competencies of learning in SLB both at the elementary and junior high school levels. The results of the KI and KD analysis obtained an illustration that at the elementary level basic competencies are limited to analyzing and identifying. At the junior high school level, it is limited to studying, identifying and describing. Furthermore, an analysis was carried out on the attitudes, skills and cognitive levels possessed by students with intellectual disabilities. The theme chosen based on the reconstruction and analysis results of KI and KD is **"Diversity of Animals, Plants and Alternative Energy Sources"**

In the second stage it is related to contextual orientation. Contextual orientation is the identification of any contexts related to the theme of diversity of animals, plants and alternative energy sources. The context of the context is related to science-related facts and phenomena and is close to students' lives. **The third stage is learning activities**. Learning activities are carried out through three stages, namely introduction, core and closing. The preliminary stage contains apperception and motivation activities. Apperception relates to students' initial conceptions related to facts and scientific phenomena related to students' daily lives. For example, have you ever seen a turtle, what kind of color the turtle is. Furthermore, in the form of motivation related to the importance of the material taught. Core activities are exploration, elaboration, and confirmation related to collaborative contextual learning with Think Pair *Share-type cooperative learning*. In the closing activity in the form of conclusions and reinforcement reinforcement that leads to the meaningfulness of learning and the importance of the material that has been taught. The results of learning activities are directed at measuring and describing the structure of students' knowledge and science literacy. The knowledge structure of students is categorized in *naïve coherence, lack of local coherence*

and *local coherence*. The description of students' science literacy is described in four categories: context, process, attitude and content.

The fourth stage of activity is the evaluation stage. The evaluation stage is related to the evaluation process of all learning activities that obtain an overview of attitudes, skills and knowledge. This picture certainly leads to the *life skills* and *soft skills of* students with intellectual disabilities. **In Stage five regarding reflection and follow-up.** The reflection and follow-up stage is related to identifying the strengths and weaknesses of the learning process which leads to strengthening the context of the material in the form of models, methods and learning media used in the science learning process.

3. *Development*

The development phase aims to produce reconstructed science learning design products based on contextual and cooperative learning approaches on the theme of animal, plant and alternative energy source diversity. At the development stage **, feasibility tests / validation of learning designs are carried out to expert validators**. The validation stage of learning design by four validators who have expertise in developing learning designs based on material characteristics has been developed. Learning design validation aims to determine the feasibility of learning designs that have been prepared at the analysis and design stage. Expert validators include three science education experts and 2 psychology experts.

Eligibility aspects assessed include content feasibility, presentation eligibility and language eligibility. Aspects of content feasibility include: Relevance (three question items), Supporting learning activities (Eight question items), and Accuracy (six question items). Linguistic aspects include: Direct (three question items), Communicative (two question items), Dialogical and Interactive (two question items), Suitability of student development levels (two question items), Alignment and cohesiveness of mindset flow (two question items), and Use of symbol or icon terms (one statement item). Aspects of presentation include: Presentation techniques (four question items) and presentation support (four question items). Based on the expert validation sheet questionnaire, there are a total of 37 questions validated by experts in the appropriate field.

The validation test is carried out by looking at the considerations of experts (validators) in accordance with their fields, both in terms of learning design and material characteristics. The validation step is carried out using questionnaires, so that it will be easier to find out the advantages and disadvantages of the learning design developed. The validation results from the 1st learning design expert obtained a percentage of 82% with a very decent category. The 2nd expert obtained a percentage of 85% with a very decent category. The 3rd expert obtained a percentage of 82% and the 4th expert obtained a percentage, 91% is very feasible. The overall analysis of validation results based on the four validators obtained an average percentage of 85% with the very category proper. Based on the results of the four validators, the learning design developed is very feasible to be implemented in learning activities. The percentage results obtained have not reached one hundred percent, so it is necessary to revise in accordance with validator comments and suggestions at the product revision stage before being tested in measuring the structure of knowledge and science literacy of students with intellectual disabilities at the LB elementary and LB junior high school levels. In the material aspect, based on data from the four experts, data were obtained respectively: 85%, 88%, 86% and 89
% with an average percentage of 87% or 0.87 with very decent category. These results indicate that the material in the design developed is appropriate for developmental and cognitive stages for students with intellectual disabilities in learning science.

CONCLUSION

Based on the analysis of KI and KD shows that at the elementary level, basic competencies in science learning include the stages of studying and identifying. At the junior high school level, basic competencies include the stages of studying, identifying and describing. The results of the reconstruction of learning materials obtained the theme of diversity of animals, plants and alternative energy sources. Analysis

of the learning process obtains percentage data on social interaction indicators that tend to be the same as communication indicators with the largest categories already appearing. In the behavioral aspect, most students have good behavior in the learning process. KOKO learning design includes five stages, namely theme determination, contextual orientation, learning activities, evaluation, reflection and follow-up. Based on the results of the feasibility analysis, total validation results were obtained with an average of 0.85 with a very feasible category.

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