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Worksheets Development Context-Based Upcycling Waste and Ecoprint to Improve Mental Retardation Student's Mathematical Proficiency Skills

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Abstract: This study aims to develop geometry worksheets with the context of upcycling inorganic waste with ecoprint that meet the criteria of validity, practicality, and effectiveness to improve the mathematical proficiency abilities mathematical proficiency skill of mentally retardation students. This study uses the R&D type with the ADDIE (Analyze, Design, Development, Implementation, Evaluation) development model. The subjects in this study were mentally retarded students at one of the special education schools in Berbah sub-district, Sleman Regency, Yogyakarta. The instruments used in this study were validation instruments, student responses, mathematical proficiency tests, and observation and interview guidelines. Based on the validity test, the worksheet contained the good category of mathematical material with an average score of 96 and perfect in terms of media with an average score of 55.5. From these results, the worksheet developed can be stated to meet the validity criteria for teaching material. Meanwhile, regarding student responses, the worksheet contained the perfect category with an average score of 97.66 or the mean the worksheet developed can be stated to meet the criteria of practicality for teaching material. In this study, the effectiveness of the worksheet is known by comparing the average results of the pretest and posttest scores. The mean increase from 41 to 78 means that the worksheet is included in the effective category used to improve the mathematical proficiency of mentally retarded students.

Keywords: worksheet; mathematical proficiency; mental retardation.

INTRODUCTION

Law Number 20 of 2003, Article 5 paragraphs 1-2, stipulates that the same services in obtaining quality education are provided to disabilities with physical, emotional, mental, intellectual, and social disorders. Meanwhile, according to Permendikbud Number 157 of 2014 Article 4 paragraph 1, one of the children with cognitive problems and intellectual disabilities who also has the right to receive the same services is the mentally retarded. The characteristics of mentally retarded children are weak memory, unable to pay attention to something seriously and for a long time, and an IQ <70 (Ambarwati & Darmawel, 2020). Even with mild mental retardation, they are still able to learn, although children can develop social and communication skills during preschool, they still have sensorimotor disorders and have intellectual abilities that are only equivalent to normal children aged 9-13 years (Susatya, et al, 2022). Mentally retarded children are also characterized by limited intelligence and incompetence in social interaction (Widiastuti, 2019). The limitations of mentally retarded children result in difficulties in improving their learning, especially in the field of education such as completing assignments (Bakhtiar, 2022; Faisah et al., 2023). To help mentally retarded students complete their tasks, it is necessary to provide assignment guidelines. Assignment guidelines can be in the form of worksheets (Sholehah et al., 2023).

Worksheets in learning can make students understand concepts sequentially, and increase student involvement in learning (Fitriyani et al., 2023). The usefulness of worksheets can encourage students to be more active, creative and direct students in finding concepts (Khikmiyah, 2021). Worksheets help students with intellectual disabilities according to the characteristics of intellectual disabilities such as incompetence in social interaction (Hartati & Azizah, 2019). The abilities of students with intellectual disabilities can be improved through group assignments and many activities with direct experience (Hasanah, 2020; Datryliana, 2023).

The characteristics of people with intellectual disabilities who have difficulty remembering have implications for learning models related to their daily lives (Mutaali, 2023). In addition to difficulty remembering, difficulties for people with disabilities in learning are also linked to their understanding of abstract materials such as mathematics (Indriyani et al., 2020). Several studies have shown that intellectual disabilities have obstacles in learning mathematics so the mathematical abilities of students with intellectual disabilities are lacking. This condition is in line with preliminary research results at one of the special education schools in Berbah sub-district, Sleman Regency, Yogyakarta. In this school, conceptual geometry level understanding is low in distinguishing geometric nets. In addition, teachers said that students still have difficulty adjusting procedures to mathematical problems that must be solved, especially the material on cube and cuboid geometry. Based on the interview results, students have difficulty explaining or giving reasons for what they do. Thus, the interview results show that mathematical proficiency are still low.

Low mathematical abilities require learning that provides direct experience like projects or real activities (Himmah et al., 2021). Meanwhile, based on the results of interviews with teachers and students, it is known that the learning model in this school is still centered on the teacher (expository model), and teaching materials for mentally retarded students are still limited. Low mathematical proficiency requires learning that provides direct experience such as projects or real activities (Himmah et al., 2021). Meanwhile, based on the results of interviews with teachers and students, it is known that the learning model in this school is still centered on the teacher (expository model), and teaching materials for mentally retarded students are still limited. The learning model in schools that are still predominantly teacher-centered often presents limitations on student's active, critical, and creative involvement in the learning process. On the other hand, the limited teaching materials used by mentally retarded students also limit opportunities to relate abstract mathematical concept learning with real-life contexts that students often encounter. With a relevant learning model that integrates real problems around students into the learning process, it will help mentally retarded students who have weak memories to obtain more meaningful learning. One of the problems around students that is often encountered and urgent to be resolved is the problem of handling inorganic waste. This problem can be integrated into interesting mathematics learning contexts for students, especially geometry problems (nets of cubes and cuboids).

Data from the Ministry of Environment and Forestry in 2023 shows that in Indonesia, inorganic waste that is not recycled is dominated by paper waste (64.38%), plastic waste (15.73%), metal waste (6.83%), textile waste (6.57%), and glass waste (6.46%). Therefore, it is necessary to handle waste using local wisdom resources by various parties, including schools. At the special education schools, in Berbah sub-district, Sleman Regency, actual problems integration and local wisdom resources into the context of geometry are not yet done by teachers. The lack of integration of geometry learning with actual problems causes mentally retarded students to have difficulty developing their mathematical proficiency skills (Herlina & Juandi, 2022). Upcycling, and reusing plastic and paper to make geometric handicraft products (with nets of cubes and cuboids) from waste with an eco-print nuance can help actual problems such as the environmental crisis due to inorganic waste. Therefore, this study will develop the teaching material as a geometry material worksheet based on the Project-based learning (PjBL) model in the context of upcycling inorganic waste using ecoprint. This study aims to develop geometry worksheets with the context of upcycling inorganic waste with ecoprint that meet the criteria of validity, practicality, and effectiveness to improve the mathematical proficiency abilities mathematical proficiency skill of mentally retardation students.

METHOD

In this study, the type of research used is research and development (R&D), and the model used is ADDIE (Analyze, Design, Development, Implementation, Evaluation). The ADDIE model was chosen because it can be a systematic guideline for developing learning tools and can create products that are developed appropriately and effectively (Harefa et al., 2023; Kurnia et al., 2019). In this study, the type of research used is research and development (R&D), and the model used is ADDIE (Analyze, Design, Development, Implementation, Evaluation). The ADDIE model was chosen because it can be a systematic guideline for developing learning tools and creating products that are developed appropriately and effectively (Harefa et al., 2023; Kurnia et al., 2019). The selection of the ADDIE model is also based on the ADDIE model which is designed to address problems resulting from gaps in students' knowledge and skills. In addition, this model involves a series of generative stages that integrate concepts and theories into a specific context (Andriyani, 2023). The research stages follow the steps as shown in Figure 1 below.

Figure 1. The ADDIE Model Stages

(1) Analysis

In the analysis stage, the researcher identified potential gap causes between learning outcomes and theories, concepts, or other problems related to learning cubes and cuboid nets. This identification was carried out based on the experiences, preferences, and tendencies of mentally retarded students during the learning process. The researcher also reviewed the data sources needed for development, including the curriculum used, cube and cuboid materials, teacher learning models, teacher teaching materials, and the characteristics of mentally retarded students who would be users of the research and development products. To understand the characteristics of mentally retarded students at the research location, the researcher conducted a written test in two classes to measure the mathematical proficiency of mentally retarded students in geometry learning presented through the context of real problems.

(2) Design

In the design stage, the researcher develops product designs based on the previous analysis of results. This process begins with selected teaching materials worksheets that integrate the context of upcycling inorganic waste with ecoprint into learning cube and cuboid nets. Then, the researcher creates an initial design of the worksheet by compiling a diagram of the relationship between assignment activities on the worksheet, the syntax of the PjBL model, and five aspects of mathematical proficiency skills (conceptual understanding, procedural fluency, strategic comptence, adaptive reasoning, and productive disposition).

(3) Development

In the development stage, researchers created an initial prototype worksheet. This prototype included the development of test instruments, validation questionnaires, and student response questionnaires, which were then validated by evaluation experts. The worksheet prototype was also validated by experts in the field of learning media and the content of learning materials. Furthermore, the researcher revised the prototype based on advice from the validators in each field. After the revision, the worksheet was declared valid and ready to be implemented.

(4) Implementation

In the implementation stage, the researcher developed concrete steps to implement the developed learning model and worksheet. The researcher tested the worksheet on two classes of 11th and 12th-grade Senior High School students at one of the special education schools in Berbah sub-district, Sleman Regency. The implementation was conducted for five meetings, followed by the distribution of questionnaires to measure the responses of students as product users as a basis for assessing the practicality of the worksheet that had been developed.

(5) Evaluation

Evaluation is conducted through qualitative and quantitative data analysis. In the early stages of development, needs analysis is conducted by processing quantitative data from test results to identify student characteristics in mathematical proficiency skills through contextual tests. Validation results at the development stage and implementation stage are also analyzed to improve the product. Input, suggestions, and criticisms from experts are analyzed as qualitative data and used as the basis for gradual revisions to improve the worksheet quality. In addition, quantitative analysis of the results of the validation questionnaire and student responses is conducted to assess the feasibility of the worksheet in terms of validity and practicality. This entire evaluation process aims to ensure the feasibility of the final product in terms of content, design, and ease of use.

The subjects used in this study were three 11th and 12th-grade Senior High School students at one of the special education schools in Berbah sub-district, Sleman Regency, Yogyakarta. Data collection techniques conduct of test and non-test methods in questionnaires to validate worksheet and student response questionnaires. The data analysis technique used was in the form of qualitative and quantitative data analysis. Quantitative data analysis was carried out by calculating the mean score of students' mathematical proficiency test results also counted the mean validation score and the mean student response questionnaire score results, which was then followed by converting the mean score into the validity and practicality category, which refers to the validity and practicality criteria

guidelines on Linkert scales (Widoyoko, 2018). The product is said to reach validity and practicality standards if it reaches the minimum "Good" criteria.

FINDING AND DISCUSSION

Finding(s)

a) Analysis

In the curriculum and material analysis stage, the researcher conducted interviews with teachers and analyzed the curriculum used at one of the special education schools in the Berbah sub-district, Sleman Regency, Yogyakarta. Based on the results of interviews with teachers, it is known that the curriculum used is the Merdeka curriculum which has been adjusted to the characteristics and needs of students. In addition, the results of the interviews also showed that the time allocation for delivering material per week is 2 x 40 minutes or equivalent to 1 meeting per week. This allocation causes problems for mentally retarded students who have limitations in remembering and understanding abstract materials such as mathematics. In addition to conducting interviews, the researcher also gave students a test on cube and cuboid shapes. The test aims to determine the mistakes made by students in solving problems of spatial shapes on cube and cuboid material, especially in determining their nets. The results of the test show that students can solve problems, but when solving they still make mistakes. Students still have difficulty in determining and distinguishing certain nets.

Based on the results of interviews with mathematics teachers, it was found that the teaching materials used by teachers were still textbooks for general children in basic junior high schools. Where the textbooks contain long texts, collections of formulas, and collections of questions that haven't been adjusted to the characteristics of mentally retarded students. The textbooks also don't contain interesting pictures, provide less interaction with students, are still monotonous, ánd not directly involve students in solving problems. Thus, mentally retarded students have difficulty learning the material about recognizing cube and cuboid geometry nets. Therefore, teaching materials are needed that do not only contain long texts, collections of formulas, and collections of questions, but something that attracts the attention of mentally retarded students such as worksheets that can directly involve students in solving them.

Another problem related to the results of the analysis of learning situations and conditions is the problem of teacher learning models which are still centered on the teacher. The learning model in schools that still focuses on teachers (with an expository model) often limits students' active, critical, and creative involvement in the learning process. In addition, the limited teaching materials available for mentally retarded students also reduce the opportunity to connect abstract mathematical concept learning with real-life contexts that are familiar to them. Need to implement relevant learning models and integrate real problems from the surrounding environment into the learning process, so mentally retarded students who have weak memories can gain a more meaningful learning experience. In this case, the real problem that is often met by students and requires immediate handling is the management of inorganic waste. Inorganic waste management that can be done by upcycling the waste into various handicrafts can be used as an interesting context in learning mathematics, especially in geometry materials such as cube and cuboid nets.

The results of interviews conducted by the researcher with the teacher also show that in the learning process, mentally retarded students still experience difficulties in solving contextual problems. Mentally retarded students are also less able to understand concepts, and less skilled in using procedures, formulating and solving problems, evaluating, and

concluding the results of problem-solving. Furthermore, the researcher gave a written test containing indicators of mathematical proficiency to explore this student's skill problem. The test results showed that the mathematical proficiency of mentally retarded students is still relatively low. With the characteristics possessed by mentally retarded students, students are not used to finding concepts, are not used to abstracting, and are not used to determining the right steps to solve problems. This condition is reinforced by evidence of the results of the initial test of the achievement of the mathematical proficiency aspect obtained from giving five test questions illustrated in Table 1 below.

Table 1. Initial Test Results for Achievement of Mathematical Proficiency Aspects

Question Items	Mathematical Proficiency Aspects	Respondents			Mean	Maximum Ideal	Percentage (%)
		R-1	*R-2*	*R-3*			
1	Conceptual Understanding	2	0	1	1	2	50
2	Procedural Fluency	2	2	2	2	6	33
3	Strategic Comptence	2	1	1	1.33	3	44
4	Adaptive Reasoning	2	2	2	2	6	33
5	Productive Disposition	9	9	6	8	18	44
	Total Score	*17*	*14*	*12*		*35*	
	Result Score	**48,57**	**40**	**34,29**		**100**	

Based on Table 1 above, it can be seen that the results of the respondents'/students' mathematical proficiency ability test are still low or below the learning completion achievement standard (score = 66) with each student's score being 48.57; 40; and 34.29. The percentage of each aspect of mathematical proficiency also shows achievement results that are still less than 55%, namely the Conceptual Understanding aspect of 50%, the Procedural Fluency aspect of 33%, the Strategic Competence aspect of 44%, the Adaptive Reasoning aspect of 33%, and the Productive Disposition aspect of 44%. Considering the low mathematical proficiency of mentally retarded students in learning geometric nets of cubes and cuboids, and the limited provision of teaching materials that are oriented towards improving these abilities. It is necessary to develop teaching materials containing assignment guidelines in geometry material based on learning models with direct experience in the context of students' daily problems. Therefore, in this study, geometry worksheets will be developed with the context of upcycling inorganic waste using an ecoprint that meets the criteria of validity, practicality, and effectiveness to improve the mathematical proficiency of mentally retarded students.

b) Design

At this stage, the researcher created a design according to the results obtained in the previous analysis stage. The developed worksheet contains the context of upcycling inorganic waste with ecoprint which will be linked to the material of cube and cuboid geometric nets. The worksheet also loads the syntax of the PjBL model which each syntax is oriented to achieve the aspect of mathematical proficiency. In the worksheet, students will get a task to complete a project. Their task is to manufacture all kinds of handicrafts in cuboids or cubes from used cardboard waste, starting with making various cube and cuboid nets according to the handicraft chosen by the student. Students can choose handicrafts in the form of tissue holders, classic cupboard miniatures, charity boxes, or cutlery boxes. Later, students were asked to decorate the handicraft with ecoprint batik cloth that uses local Yogyakarta wisdom leaves such as gayam leaves, kepel leaves, and banyan leaves. In designing the worksheet, the researcher refers to the worksheet template which contains a

cover at the beginning of the worksheet, project assignment activities in the core section, and a developer profile in the closing section. Fully, the worksheet design is done using the help of the Canva application to display various colors that students' attention attracts as users.

c) Development

This stage begins by assessing the feasibility of the research instruments used: product validation questionnaire instruments from the media and material aspects, student response questionnaires, and mathematical proficiency test questions. Validation of the contents of the four instruments was carried out through expert judgment or grid review, focusing on the instrument's suitability with research objectives. Based on the results of expert judgment, the four instruments were declared valid. Then, the researcher validated the feasibility of the product in terms of material and media aspects using validation instruments. The results of the validation of the material aspect are presented in Figure 2 and Table 2 below.

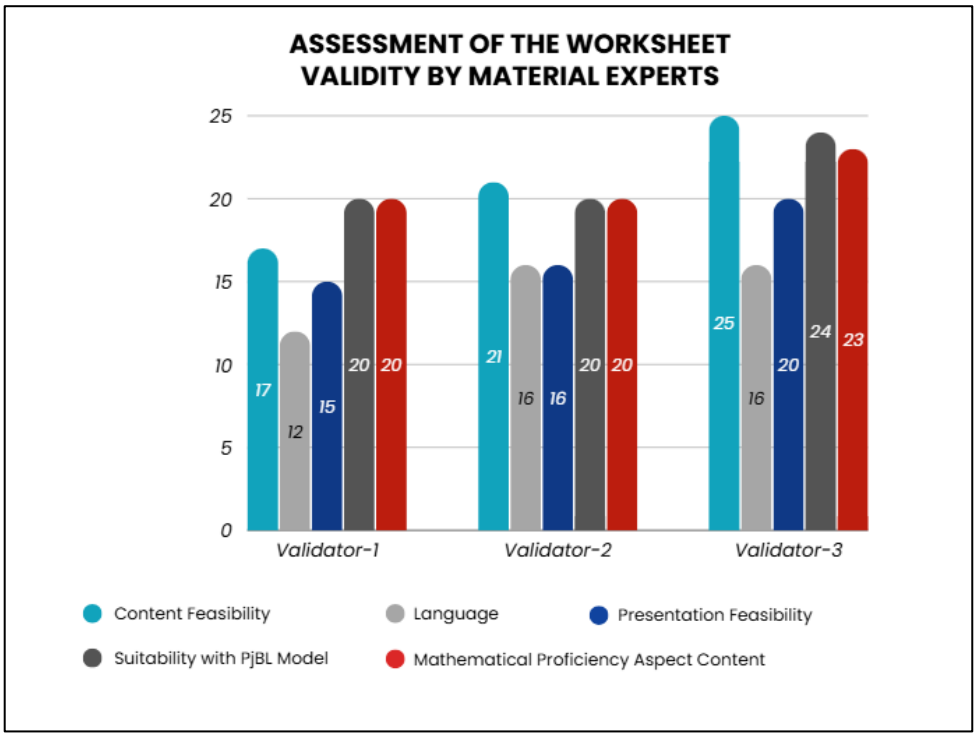


Figure 2. Detail of the Assessment Results by Material Validators

Table 2. Assessment Score of Worksheet Validity by Material Validators

Component	Validator-1	Validator-2	Validator-3
Total Score	*84*	*93*	*108*
Mean total		**95**	

Based on the results of the validation of material experts, it is known that the total score of the validator of material-1 is 84 with the criteria of "Good", the total score of the validator of material-2 is 93 with "Good" criteria, while the total score of the validator of material-3 is 108 with "Excellent" criteria. The mean total of the three material validators is 95 with the "Good" criteria. Thus, it can be concluded that the worksheet developed has achieved the validity category of a product from the material aspect. The assessment of the validity of learning media by validator is presented in Figure 3 and Table 3 below.

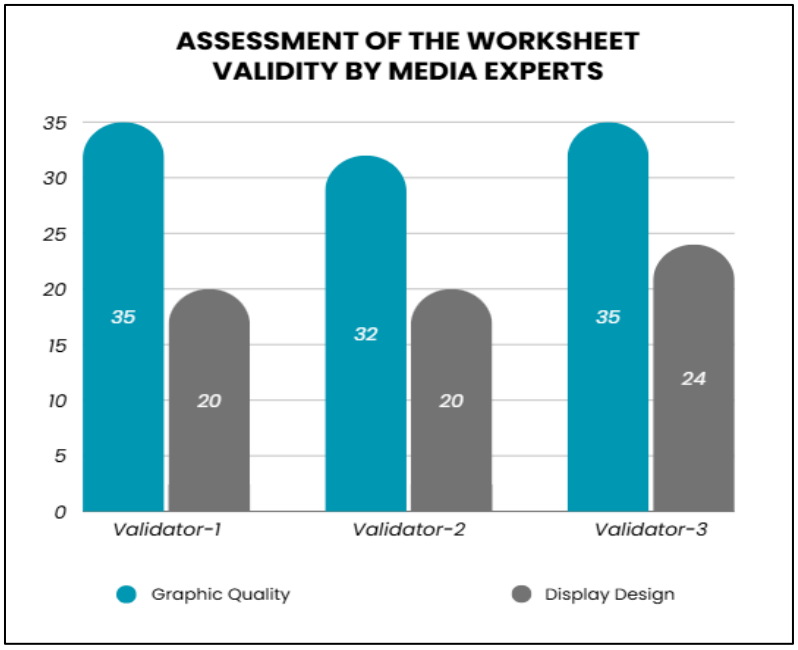


Figure 3. Detail of the Assessment Results by Media Validators

Table 3. Assessment Score of Worksheet Validity by Media Validators

Component	Validator-1	Validator-2	Validator-3
Total Score	*55*	*52*	*59*
Mean total		**55,33**	

Based on the results of the validation of media experts, it is known that the total score of the validator of material-1 is 55 with the criteria of "Excellent", the total score of the validator of material-2 is 52 with "Good" criteria, while the total score of the validator of material-3 is 59 with "Excellent" criteria. The mean total of the three material validators is 55,33 with the "Excellent" criteria. Thus, it can be concluded that the worksheet developed has achieved the validity category of a product from the media aspect. Regarding material and media aspects, it can be supposed that the worksheet in the context of upcycling inorganic waste with Ecoprint developed in this research has reached the validity criteria of a development product.

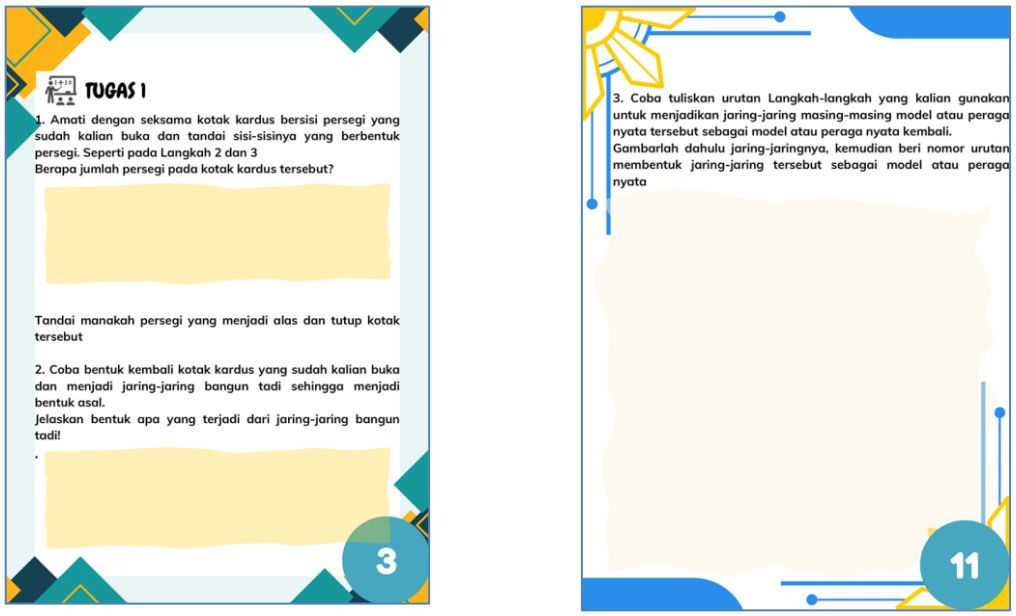
d) Implementation

The researcher conducted worksheet implementation for two classes and based on implementation results, it was found that the worksheet being developed reached the "Excellent" criteria with a mean total of the respondens is 87, 66. Therefore, we can conclude that students' assessments of worksheet developed in this research reach the practicality category of learning material. All of students give excellent impression regarding using these worksheet. Here are some examples of worksheet usage activities at the implementation stage.

1) Asking questions and making plans

At the beginning of the lesson, the teacher presents problems in the form of questions accompanied by various possible solution choices. After that, the teacher asks students to choose the solution they will use or to make a specific project design. In this case, learning begins with identifying square and rectangular shapes in used cardboard provided by the

teacher. The cardboard is opened to form geometric nets. The results of student identification must be written on the worksheet. In addition to identifying plane shapes in used cardboard objects, the problems posed by the teacher are also in the form of making real objects around students (such as tissue boxes, charity boxes, cutlery boxes, etc.) by designing cube or cuboid nets from used cardboard. The assignment instructions are included in the worksheet, such as the assignment example in Figure 4 (a)-(b) below.



(a) Identifying Shapes Assignment (b) Assignment of Making Design Plan

Figure 4. The Assignment Instruction of Worksheet

2) Preparation of procedures and project monitoring

After designing the steps to complete the project, the teacher guides students to prepare a project implementation schedule. During implementation, the teacher monitors the implementation project and provides guidance. In the project schedule, students arrange various activities during the problem-solving process until the project results are finished. Examples of instructions and students answer related to problem-solving activities are contained in the worksheet as in Figure 5 and various activities during the project completion process are illustrated in Figure 6 (a)-(b).

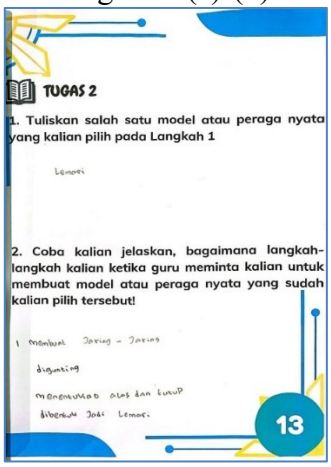


Figure 5. Instructions and Students Answer Related To Problem-Solving Activities

(a) Measurement of Nets of Cuboid-Shaped Object

(b) Inorganic Waste Processing with Ecoprint

Figure 6. Various Activities in the Project Completion Process

3) Conducting assessment

The last task for students is to present their project designs and results in front of the class to get assessments from friends and teachers.

e) Evaluation

In the evaluation stage, the researcher evaluated the results obtained from each stage of development starting from the analysis of the results of the mathematical proficiency test of mentally retarded students to the validation results at the development stage. The researcher revised the worksheet several times, both in terms of material and media. However, based on student assessments of the worksheet, it was considered excellent, as indicated by high appreciation and enthusiasm for the worksheet user. After implementation, the researcher gave a written test to see whether there was an increase in students' mathematical proficiency after using the worksheet. The results of the students' mathematical proficiency test will be compared with the results of the written test which was also given before the implementation of the worksheet. The results of the written test conducted before (pretest) and after (posttest) the implementation of the worksheet showed an increase in the mathematical proficiency of mentally retarded students, which is illustrated by the mean student scores increasing as illustrated in Figure 7.

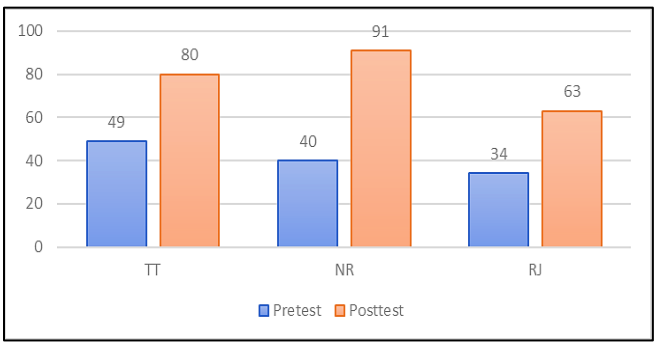


Figure 7. Increasing Student Mathematical Proficiency Skills

Overall, the mean mathematical proficiency score of students increased from 41 to 78. This means that the worksheets developed are included in the effective category for improving the mathematical proficiency skills of mentally retarded students.

Discussion(s)

The results of the study indicate that the worksheets created can meet the requirements that are valid for use in terms of material and media adjusted with the characteristics of mentally retarded students. The validity of the worksheets developed is in line with the needs of mentally retarded students who have low mathematical proficiency and are intellectual. According to Hutajulu et al., (2019), students' low mathematical proficiency is caused by the implementation of teacher's conventional learning and the lack of teaching material. In addition, other factors that influence are low student interest because mentally retarded students have limitations in remembering abstract information (Harahap, 2018).

The research results also show that the worksheets created have met the practical requirements, proving students learn activities that are not boring and actively participate in the lesson. Based on interviews with students, students didn't use teaching materials or handbooks in previous learning. Students only pay attention and take notes when the teacher explains in front. Given the limitations of mentally retarded students who have difficulty remembering and focusing, this can affect their interest in-class learning. Even though, according to Negeri et al. (2023), if teachers use assignment guidelines such as worksheets, mentally retarded students will be helped to learn abstract concepts, and it can increase learning motivation.

In addition to being valid and practical, worksheets containing cube and cuboid material with the PjBL model are also effective for use in this learning. This is proven by increasing the test results of the mathematical proficiency of mentally retarded students in geometry learning. So, in line with that, there is a difference in the mean achievement of pretest and posttest scores of mathematical proficiency of mentally retarded students, namely the average posttest score > average pretest score. The fulfillment of valid, practical, and effective criteria on the worksheet indicates that the worksheet is suitable for use as Nieveen said (1999). According to him, the teaching materials are considered quality if they meet three criteria: validity, practicality, and effectiveness.

Referring to the results of the initial mathematical proficiency test, it can be seen that mentally retarded students are not used to answering questions with certain strategies and procedures, and are not yet able to explain the answers to statements correctly. This is in line with the opinion of Sarla et al., (2023) that mentally retarded students face obstacles in solving mathematics problems, such as forgetfulness and bad or unstructured work habits. After knowing the initial condition of mentally retarded students in mathematical proficiency, the researcher then provided a worksheet that orientated the reach of the mathematical proficiency aspect. Worksheets are developed according to the needs and special characteristics of mentally retarded students and are based on the PjBL model. The PjBL model provides opportunities for students with intellectual disabilities to learn actively by involving them in projects designed based on real situations, such as making miniature cube-shaped spatial figures using simple materials from the surrounding environment such as used cardboard. With this learning model, students can understand the spatial figure's concept practically through exploration processes, manipulation, and problem-solving, not only theoretically.

The context of everyday problems, such as making cube-shaped or cuboid-shaped handicrafts from used boxes, can make it easier for students to relate mathematical concepts to real life that they often encounter. This is important because students with intellectual disabilities have weak memories and require repeated reinforcement through concrete and meaningful activities. This is the advantage of the PjBL model as an alternative learning model it allows students with intellectual disabilities to develop other skills, such as collaboration, communication, motor skills, and other important skills to support their autonomy. By focusing on interesting and relevant projects, students with intellectual disabilities can be more motivated to learn, thereby significantly increasing their understanding of mathematical concepts, especially spatial figures. Therefore, the application of PjBL based on everyday problems in learning mathematics for mentally retarded students is a strategic approach to help students obtain learning that is more meaningful, applicable, and relevant to their lives.

The developed worksheet contains the syntax of the PjBL model that guides students in providing direct experience in completing projects. If students have found it difficult to solve geometric problems related to geometric space nets because they only imagine or without any tools, then this project-based learning is believed to help them obtain concrete illustrations of geometric space nets. Mentally retarded students find it easier to remember the types of cube and cuboid nets after they work on a handicraft project by processing inorganic waste. This also supports the idea that when learning can provide direct and meaningful experiences through the products made, it can improve the learning outcomes of mentally retarded students (Azizah et al., 2023). This proves that it is important to choose the right learning model to achieve student learning success and teacher teaching effectiveness in the classroom as conveyed by Andriyani et al. (2020). Moreover, in facing the challenges of the 21st century, teachers must be drivers of change who can inspire their students and continue to innovate to create meaningful learning (Andriyani, et al., 2022).

CONCLUSION

The Worksheet in the context of upcycling inorganic waste with ecoprint as a support device for teaching material can be said to reach the validity category based on the results of the product feasibility as indicated by the fulfillment of the "Good" and Excellent" criteria in the aspect of material and media. The practicality of the worksheet is also shown by the fulfillment of the "Excellent" criteria regarding student responses. Therefore, a worksheet is proven helpful for cube and cuboid geometry net learning which was previously difficult for mentally retarded students to imagine. Based on the evaluation result, the mean mathematical proficiency score of students increased from 41 to 78. This means that the worksheets developed are also included in the effective category for improving the mathematical proficiency skills of mentally retarded students through learning with meaningful experience. With this worksheet implementation, students with mentally retarded can develop other skills, such as collaboration, communication, motoric skills, and other important skills to support their autonomy.

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