

MODIFICATION OF PUZZLE PLAY AS MATHEMATICAL LEARNING MEDIA IN LIGHTWEIGHT MENTAL RETARDATION CHILDREN

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Abstrak

Masalah pendidikan untuk Anak Berkebutuhan Khusus (ABK) yang hingga kini masih perlu dipecahkan adalah keberadaan perangkat pembelajaran, dalam hal ini media pembelajaran yang dapat berfungsi sebagai pengantar informasi yang optimal. Terutama untuk ABK, terutama anak-anak dengan keterbelakangan mental yang memiliki hambatan psikologis, intelektual, dan sosial. Berdasarkan pengamatan dan wawancara dengan beberapa guru dan Kepala Sekolah SLB-C Siti Hajar, Kec. Kabupaten Buduran. Sidoarjo, ada cukup banyak media pembelajaran yang tersedia di Institut, tetapi fungsi media tidak dapat dimanfaatkan secara optimal untuk anak-anak dengan kebutuhan khusus. sisi lain adalah kurangnya kreativitas guru kelas dalam menyiapkan media yang sesuai dengan karakteristik siswa. Berdasarkan hal tersebut di atas, Tim Pengembangan Unip FIP PLB bekerja sama dengan Kepala Sekolah SLB-C Siti Hajar, melalui kegiatan pengabdian masyarakat pada tahun ajaran 2016-2017. Bentuk kegiatan ini adalah mengadakan pelatihan (*workshop*) untuk staf pengajar di SLB-C Siti Hajar dalam membuat media pembelajaran yang cocok untuk siswa berkebutuhan khusus. untuk menjadwalkan pelaksanaan kegiatan setiap hari Jumat dan Sabtu. Tema pelatihan (*workshop*) adalah membuat "Modifikasi Game Teka-Teki sebagai media pembelajaran matematika untuk Anak-anak dengan Cacat Perkembangan Ringan di SLB-C Siti Hajar Sidoarjo". Dengan tujuan utama adalah untuk meningkatkan minat dan kemampuan guru kelas dalam membuat media pembelajaran yang memiliki relevansi dari siswa mereka di SLB-C Siti Hajar di Buduran Kabupaten Sidoarjo.

Kata kunci: tunagrahita, puzzle, media, matematika

Abstract

The problem of education for Children with Special Needs which until now still needs to be solved is the existence of a learning device, in this case a learning media that can function as an optimal introduction of information. Especially for ABK especially mentally retarded children who have psychological, intellectual, and social barriers. Based on observations and interviews with several teachers and the Principal of SLB-C Siti Hajar, Kec. Buduran Regency. Sidoarjo, there are quite a lot of learning media available at the Institute, but the function of the media cannot be utilized optimally for children with special needs. the other side is the lack of class teacher creativity in preparing media that is appropriate to the characteristics of the students. Based on the foregoing, the PLB FIP Unesa Development Team cooperated with SLB-C School Principal Siti Hajar, through community service activities in the 2016-2017 school year. The form of these activities is to carry out training (*workshops*) for teaching staff at SLB-C Siti Hajar in making learning media that is suitable for students with special needs. to schedule the implementation of

activities every Friday and Saturday. The theme of the training (workshop) is to make "Modification of Puzzle Games as a medium for learning mathematics for Children with Light Developmental Disabilities in SLB-C Siti Hajar Sidoarjo". With the main objective is to increase the interest and ability of class teachers in making learning media that has relevance from their students in SLB-C Siti Hajar in Buduran Kabupaten Sidoarjo.

Keywords: *mental retardation, puzzle, media, mathematic*

INTRODUCTION

Special Education is education aimed at children who have obstacles, be it physical, intellectual, or social and emotional barriers. One of the children who experience obstacles or commonly called a child with special needs is a mentally retarded child. Children with intellectual disabilities experience obstacles or delays in mental development (intellectual function under his peers his age) accompanied by the inability / lack of ability to learn and to adjust. According to AAMD and PP No. 72 of 1991, mentally retarded children are grouped into three namely, mild retarded children, moderate mentally retarded children, severe retarded children.

The characteristics of instructional media can be seen in terms of the ability to arouse sensory stimuli of sight, hearing, touch, or smell or their compatibility with the level of the learning hierarchy. For practical purposes the characteristics of several types of media that are commonly used in teaching and learning activities. The characteristics of the media can also be seen according to their ability to generate stimulation of all the senses. In this case, knowledge about the characteristics of instructional media is very important for the grouping and selection of media (Arief S. Sadiman, et al, 2006). In the learning process for Children with Special Needs (ABK) especially mentally retarded children are needed Learning media that can help students receive lessons. Therefore teachers must have creativity in the effort to procure learning media that can make it easier for students to accept the lessons delivered.

SLB Siti Hajar Sidoarjo knows the 2015-2016 lessons, overall the number of students with special needs 57 students with specifications , eight (8) deaf children, four (4) blind children, seven (7) children with disabilities, and the most are mild retarded children with a total of 38 students. The number of SLB C Siti Hajar Sidoarjo teachers is 23, with 2 religious teachers, 1 sports teacher, 1 dance trainer, and 19 PLB teachers.

The results of observations of the implementation of the learning process especially classroom teachers for mentally retarded children about the use of Mathematics learning media obtained results as in the following table.

Table 1. Observation Data

CLASS	MEDIA FORM	MEDIA FUNCTION
Class 1	two-dimensional image media (APE) in the form of number cards and pictures	number recognition
Grade 2	two-dimensional image media (APE) in the form of number cards and pictures	number recognition
Grade 3	two-dimensional image media (APE) in the form of number cards and pictures three-dimensional objects (gravel, marbles, beads)	simple number recognition and addition
4th Grade	Three dimensional media (APE) whiteboard LKS	Geometric text and images. Giving assignments
Grade 5	Whiteboard LKS	explain the material and assignments
Grade 6	Whiteboard LKS	explain the material and assignments

The use of media in the learning process in general is an Educational Props (APE) . Learning media in SLB C Siti Hajar are generally not suitable when used as learning aids for mentally retarded children. The results of interviews with classroom teachers, in general, they admit that learning media in institutions are not suitable because intellectual children are difficult to think abstractly. Especially when studying mathematics, the teacher has difficulty in explaining the material in arithmetic operations. Given one characteristic retarded children quickly forget about what he learned without constant practice .

In a meaningful and comprehensive learning process the use of media is an inseparable part. Media that is interesting in conveying subject matter greatly influences the smooth learning process of learning and the interests of mild retarded children. Puzzle that previously only a play disassembly , after being modified to air- change functionality into a medium of learning interesting, effective, and fun. Modification of the puzzle game as a learning medium is very relevant for students with special needs, especially for mentally retarded children who are lightweight (able to educate) .

The Benefits of Learning Media Puzzles as a medium for learning mathematics for students include:

1. Fostering m inat retarded child lightly in mathematics
2. K Capacity of arithmetic and memory retarded children light can be optimized .
3. D ith media puzzle, The material will be packaged into a fun thing because in addition to learning can also be used as a means of playing.

The Benefits of Puzzle Learning Media as a Mathematics learning media for Teachers include:

1. Improve students' cognitive abilities.
2. Improve students fine motor skills.
3. Improve students' social skills.

4. Facilitate the teacher in delivering subject matter.
5. Create a pleasant learning situation.

The target of this activity plan is PLB teachers who teach grades one through six in SLB Siti Hajar Sidoarjo Regency. The focus of the activity is carried out in the form of training to make a puzzle game modification for Mathematics. The number of participants was 20 teachers with the following specifications:

1. The teacher remains at SLB C Siti Hajar Sidoarjo Regency.
2. Especially class teachers who teach grades 1 through grade 6.
3. Form of activities through Training (Work Shop).
4. Activities carried out outside class hours.
5. Every Uuru is able to make a media puzzle modification design for Mathematics.
6. Make modifications to the media puzzle for math lessons tailored to the RPP
7. Make modifications to the media puzzle for math lessons tailored to the RPP.

From the results of this activity the teacher is expected to be able to make learning media for the modification of puzzles for mathematics in accordance with the class he needs. With the implementation of activities in SLB C Siti Hajar Sidoarjo and, it can be used as an effort to overcome the problems of teachers who have difficulty in procuring learning media for mathematics lessons that are appropriate to the characteristics of mild retarded children.

METHODS

The main problem in SLB C Siti Hajar in the learning process, especially for mentally retarded students, is the provision of learning media that has relevance to the level of abilities of mentally retarded children. So far the learning media (APE) in the institution are generally not in accordance with the specific characteristics of mentally retarded students.

To overcome these problems, the TEAM for developing children's education with special needs of PLB-FIP Unesa, entered into a collaborative partnership with the Principal of SLB C Siti Hajar in the form of training or a work shop at a partner institution. The target activity is focused on S LB teachers who teach retarded students, amounting to 20 teachers.

RESULT

A. Products Offered

Bahagai (2010: 13), argues that modification can be interpreted as an effort to make changes by adjustments both in terms of physical material (facilities and equipment) as well as in goals and ways (methods, styles, approaches, rules and assessments).

While *Games Puzzle* is a form of game to rearrange pieces of puzzle that challenge students' creativity and memory more deeply because of the emergence of motivation to always try to solve problems, but still fun because it can be repeated. . Modifications to the puzzle game are carried out in various ways namely from:

Puzzle shape : square

Puzzle size : 25 cm x 25 cm

Number of puzzle houses : 20 pieces

Color puzzle: Can be adjusted, most importantly has an appeal to children with intellectual disabilities.

Puzzle base material : Multi plack (hard plack)

Media Function : As a learning medium for Mathematics calculation operations.

More details can be seen in the Puzzle Game Modification design below;

1. Shape of the Puzzle Game that has not been modified

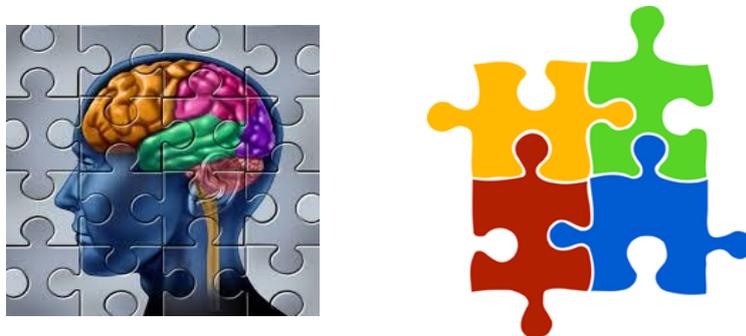
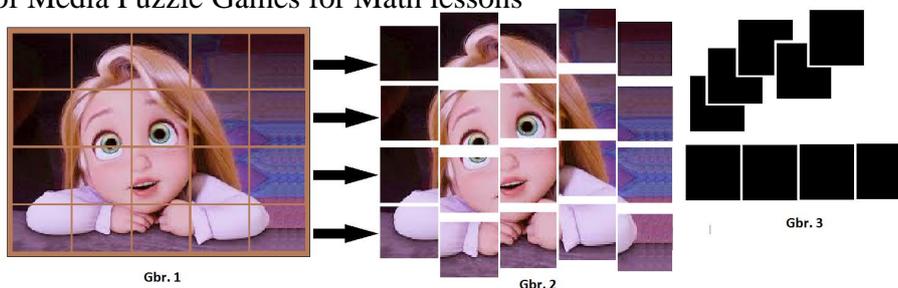


Figure 1. Shape of Puzzle

2. Forms of Media Puzzle Games for Math lessons



Explanation

Gbr. 1. puzzle media that have been arranged

Gbr. 2 Puzzle pieces dismantled

Gbr. 3 The back of the puzzle flake is given numbers/numbers and marks

Figure 2. Form of Media Puzzle

B. Learning Mathematics in Retarded Children Using Puzzle Games.

Understanding mathematics according to Ruseffendi in Heruman (2008: 1) is the language of symbols, deductive science that does not receive inductive proof, the science of regular patterns, and organized structures (ranging from elements that are not defined to elements that are defined, to axioms or postulates, and finally to the argument).

In learning mathematics, puzzle games can be used as a medium to convey learning material. The following explanation of the stages that can be done;

1. Preparation:
 - a. Preparing mathematics subject matter
 - b. Prepare a modified puzzle
 - c. Paste the numbers and symbols of the number operations in accordance with the material to be given .
2. Implementation:
 - a. Introduction of a modified puzzle game
 - b. Introduction to component n- components contained in puzzle media
 - c. Submission of material
 - d. Implementation of games or puzzles sebagai learning media matematika
 - e. Evaluation
3. How to play:
 - a. Children pay attention to the material delivered by the teacher .
 - b. In the demonstration, children are invited to play puzzles that have been modified .
 - c. Children arrange puzzle pieces following instructions and written material on the board.
 - d. As a strengthening of children invited to compete, who can finish first then the child will be given a reward.
 - e. In the correction, the picture of the puzzle arrangement can be matched with the answer key provided, if the picture matches the child's answer is correct, but if the picture has a difference, then the child's answer has an error.

For more details, here's an example of operationalizing Media Puzzle :

EXAMPLE 1 (FOR CLASS 4 TO 6 CLASS)

Mathematics Lessons Calculate Addition and Subtraction Operations

Matter of operation count with the number of 4 questions.

1. $15 + 9 = \dots$ (answer 24)

2. $12 + 13 = \dots\dots$ (answer 25)
3. $14 - 9 = \dots\dots$ (answer 5)
4. $11 - 4 = \dots\dots$ (answer 7)

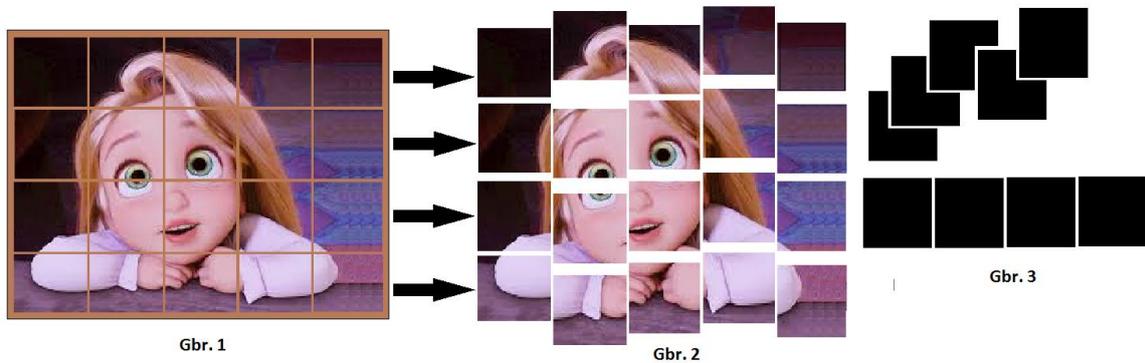


Figure 3. Form of Media Puzzle

Note : top of the puzzle series (first row) where the number one work is done
 : series puzzle series 2, where the second question is done.
 : series puzzle series 3, where the number three questions are made
 : row puzzle series 4, where the work on question number four is

Step 1:

Before working on the problem the teacher must attach the back puzzle pieces with mathematical numbers for the **first problem** . ($15 + 9 = 24$) and so on.



Figure 4. Mathematical puzzle pieces

Step 2:

- a. After all the backs of the puzzle pieces have been attached, the next step is shuffling the puzzle pieces.
- b. Guide children to install puzzle flakes  and  It is recommended that all the rows (4 rows) be marked first as above. If all four rows are installed.

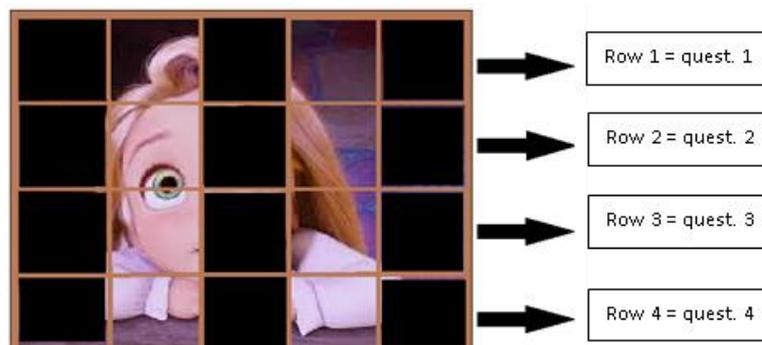


Figure 5. Rows guide

- c. Next, encourage students to install puzzle pieces by answering the questions provided (4 questions). If students answer correctly to the four questions.



Figure 6. Final puzzle

Note:

1. Modified puzzle game as a medium of learning Mathematics as the **KEY ANSWER**.
2. If one answer to the question is **WRONG**, then the student will experience 2 problem errors .
3. This puzzle game modification can be used also for other subjects.

EXAMPLE (FOR CLASS SMALL 1 S / D 3)

Mathematics Course INTRODUCTION TO NUMBERS ROUND 1 TO 5

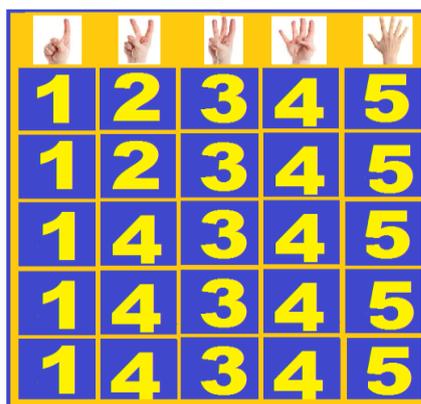


Figure 7. Number Poster

Hint:

1. Unloading puzzle media pieces written in integers 1 to 5
2. Guide students by looking at the hands attached to the puzzle house by imitating.
3. Take puzzle pieces written in number 1, invite students to take puzzle pieces like the teacher does.

4. Place the puzzle piece written with number 1 underneath the hand drawing pointing at number 1, and guide students to do the same thing.
5. Repeat continuously until students know and understand integers.

C. Work Procedure

The method of the activity will be carried out at SLB-C Siti Hajar Buduran Regency. Sidoarjo for 4 days, every Saturday with the following procedure plan ;

1. First Day (Saturday 1)

Session I : Pretest

Session II : Interactive lecture and discussion about Modification of Puzzle Games as a Mathematics Learning Media for Children with Light Developmental Impairments.

Session III : Training on making media " Modification of Puzzle Games as a Mathematics Learning Media for Children with Light Developmental Disabilities. "

2. Second Day (Saturday 2)

The practice of making media " Modification of the Puzzle Game as a Mathematics Learning Media for Children with Light Developmental Disabilities. " .

3. Third Day (Saturday 3)

The practice of making media " Modification of Puzzle Games as a Learning Media for Mathematics for Children with Light Developmental Disabilities. "

4. Fourth Sunday (Saturday 4)

Monitoring " Early Detection of Child Growth and Development in the Framework of ABK Identification", is carried out if in the practice session found any deviation of growth and development of students, which according to the procedure requires re-monitoring. The monitoring period is two weeks after the practice session for early detection of child growth and development in the context of identifying ABK.

DISCUSSIONS

Community Service is the experience of science, technology, and art which is carried out by institutions in an institutionalized and direct manner to the community to contribute to the creation of a just and prosperous Indonesian society based on Pancasila and to improve the mission and function of higher education .

The Pp M Unes a activity has several objectives : (1) Developing human resources towards the creation of human development, (2) Developing the community towards the creation of a learning society, (3) Increasing the social sensitivity of the academic and student staff towards problems that arise in the community, and (4) Developing an education system that is relevant to the needs of the community and development.

To achieve these objectives, the principles adopted in the implementation of Pp M activities are: (1) Institutional, in the sense of practicing science and technology directly to the public on behalf of tertiary institutions, (2) Scientific knowledge and scientific charity , in the sense of every Pp activity M must be based on the scientific method, (3) Cooperation, in the sense of being imbued with a family spirit and mutual cooperation, (4) Sustainability, in the sense that Pp M is carried out continuously so that it shows tangible results, and (5) Eukukuk and development in meaning Pp M activities aimed at developing the potential of the community to be able to be independent.

Based on these objectives and principles, programs developed by research and community service institutions (LP P M) Unesa are: (1) Education to the community, (2) Service to the community, (3) Regional development, (4) K aji acts (action research), (5) K uliah real work (CCN), (6) P Developing and application of research results (program vucer), (7) P rogram entrepreneurship, and (8) P Strengthening cooperation with relevant agencies .

During June to September 2015, the IbM team carried out several activities, namely: (1) *brainstorming* the IbM team to agree on material to be given during training, (2) coordinating the IbM team to complete PowerPoint material for training, (3) coordinating the IbM team to complete the instrument to be trained on SLB-C teacher Siti Hajar Kab , Sidoarjo, and (4) coordination with partners regarding the implementation of training or workshops . Coordination with partners has not yet reached the final, because there is no agreement when the implementation is the finalization of puzzle learning media and its application to students in the process of learning Mathematics in class.

CONCLUSION

The implementation of IbM Training made learning media for puzzle modification for mathematics in accordance with the class which had reached 75%, which had carried out material preparation, instrument preparation, coordination with partners , and the implementation of Work shop on Day 2 (two) .

Suggestions to the IbM implementation team that the team is expected to be more focused to immediately complete the IbM according to the specified targets and outputs.

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