

Contextual Teaching and Learning Method Media Props Cube 3D for Building Projection Images

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ARTICLE INFO

Article history

Received Aug 21, 2022

Revised Oct 26, 2022

Accepted Jan 5, 2023

Keywords

3D Cube Teaching Aids

Contextual Teaching and learning

Projected Images

ABSTRACT

The time of teaching the construction of utility building educators had difficulty. Most of the students have difficulty in translating three-dimensional (3D) images into two-dimensional (2D) images. Learning media is needed to deal with these difficulties. Learning media that can encourage and guide students' thinking skills. The purpose of this study is to determine students' understanding in translating three-dimensional images into two-dimensional images. The method used is classroom action research.) with two stages or cycles. The first cycle knows the initial concept of students' difficulties, while the second cycle of learning uses three-dimensional cube media and tests to determine students' understanding. This study was applied to class XI DPIB3 SMK N 1 Mojokerto with 32 students. Data were analyzed using the Rasch Model. The results of the study using the contextual method of 3D cube props obtained quite good results, improving a good teaching process can improve understanding of drawing two-dimensional projections. The principle of this projection image is used for bestek drawings, working drawings and other drawings on building works. Drawings at the planning and implementation stages in building projects.

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Introduction

When carrying out teaching and learning activities in class XI DPIB 1 SMKN 1 Mojokerto, semester 1 of the 2021-2022 academic year, some students still fail to achieve learning objectives in basic competencies (KD) presenting the requirements for building projection drawings. After the teacher explains how to draw projections building and giving a question to be drawn immediately, it turns out that students do not understand. As a follow-up, the author conducted Classroom Action Research using the Contextual Teaching learning model and Learning media props to improve students' understanding in presenting projected images. What makes a student smart? We think that intelligence is built in the womb. But now research on the brain tells us that intelligence grows because of experiences that shape the brain. When students' experiences enable them to find meaning in academic lessons. These lessons neural pathways in their brains and the brain stores those lessons. The teacher naturally builds connections. Building linkages to find meaning is the main key of the contextual teaching and learning system.

Contextual Approach or Contextual Teaching and Learning (CTL) is a learning concept that helps teachers relate the material being taught to students' real-world situations and encourages students to make connections between their knowledge and its application in their lives as family and community members. Contextual learning with questioning, learning community, and reflection components, is good for improving the quality of learning outcomes (Ajat, 2019). Meaningful learning through CTL will be more focused if it has a clear conceptual framework or procedure (Hilyah, 2020). For all intents and purposes, this study believes that it is not only necessary to teaching analytical methods that aim to efficiently extract contextual-based insights from multiple educational and informational datasets recorded in SET (Kingsley et al, 2021). contextual learning so that it can be used as an approach used at the university level to improve the mathematical critical thinking skills (MCTA) of elementary school teacher education students (PGSD) (Kurniati et al, 2012). Academic experiments recommending lecturers to conduct intensive training in the process of writing planning, evaluation of reference sources, and development of strategy-based essays prove that this research shows that contextual teaching and learning effects can be used in helping students improve their academic writing skills (Madjid et al, 2017). Teachers should use learning methods that make students not only memorize but are more likely to understand, so that students' thinking processes in processing information/knowledge (Ektin et al, 2019). Vocational students can link between mathematics subject matter in schools with real life (Diah, 2012) Contextual Teaching and Learning methods to stimulate and increase students' creativity in creating ceramic ornament motifs (Ening, 2021). There are differences in student learning outcomes between classes

as using the Contextual Teaching and Learning learning model with classes using a direct learning model (Efi, 2020). Creative thinking requires students to think at a higher level (Ayu et al, 2017). The animation media is stated to be very good and feasible to be applied in CTL model-oriented learning on the basic competencies of earth construction work procedures (Stella, 2019). PAI learning outcomes using the CTL method are better (Nuri, 2017). Helping students in making it easier to understand a learning concept in the subject of automation of public relations governance and protocols because of its realistic characteristics (Danu, (2021). Using varied methods and media to generate student motivation (Atisatul et al, 2020) It is possible to improve students' critical thinking skills (Fahmi, 2021). More effective than using conventional learning models (Arifin et al, 2020). Can be used as a new innovation in learning to complete the results student learning (Agung, 2017). That the learning outcomes of class students who use the CTL learning model are higher than classes that still use conventional learning models (Syarkawi, 2018). Using modules and the use of CTL learning models in teaching and learning activities has proven to be very effective and l sieve is used (Ardi, 2021).

Media mockups in the subject of drawing building construction are carried out very well (Ayu, 2018) (Kingsley el al, 2021). Contextual learning so that it can be used as an approach used at the university level to improve the mathematical critical thinking skills (MCTA) of elementary school teacher education students (PGSD) (Yaya et al, 2012). Academic experiments recommending lecturers to conduct intensive training in the process of writing planning, evaluation of reference sources, and development of strategy-based essays prove that this research shows that contextual teaching and learning effects can be used in helping students improve their academic writing skills (Madjid, 2017). Teachers should use learning methods that make students not only memorize but are more likely to understand, so that students' thinking processes in processing information/knowledge (Ektin, 2019). Vocational students can link between mathematics subject matter in schools with real life (Diah, 2012) Contextual Teaching and Learning methods to stimulate and increase students' creativity in creating ceramic ornament motifs (Ening, 2021). There are differences in student learning outcomes between classes as using the Contextual Teaching and Learning learning model with classes using a direct learning model (Efi, 2020). Creative thinking requires students to think at a higher level (Ayu et al, 2017). The animation media is stated to be very good and feasible to be applied in CTL model-oriented learning on the basic competencies of earth construction work procedures (Stella, 2019). PAI learning outcomes using the CTL method are better (Nuri, 2017). Helping students in making it easier to understand a learning concept in the subject of automation of public relations governance and protocols because of its realistic characteristics (Danu, 2021). Using varied methods and media to generate student motivation

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The advantages of the contextual teaching and learning method include, learning becomes more meaningful and real. Students are more required to be able to capture the relationship between learning experiences at school and real life. Learning is more productive and able to foster concept strengthening to students because the CTL method adheres to the flow of constructivism. Students are expected to learn to understand not memorize. Lack of contextual teaching and learning methods, among others, the teacher no longer acts as an information center, but more intensively guides and manages the class as a team that works together to find students' new knowledge and skills. Students are given the opportunity to find and apply their own ideas, the teacher takes and gives time for students to think critically. Students use strategies in learning to improve learning abilities.

This teaching aid students can draw the geometry of objects (3 dimensions) using the orthographic projection method (European System Projection). Orthogonal projection is a method of drawing 3-dimensional objects into 2-dimensional shapes that shown on figure 1 example of props cube 3D. This teaching aid explains the fields of orthography (European system). Specifications Props a small cube with a size of 20x20x20 cm which each side is given a picture: sand, gravel, stone, wood, tiles and bricks. This small cube is again wrapped in a large plastic cube like glass, the size of a large cube is 50 x 50 x 50 cm. Then we make for the three-plane X.Y and Z-axis openings of the same size as a large cube 50 x50 x50 cm. If stretched to form the X and Y coordinate axes. Where one end of the Y after being replaced by Z and one end of the X after being replaced by the Z axis. The Z-Z sides are discarded to become models of orthographic planes (European system).

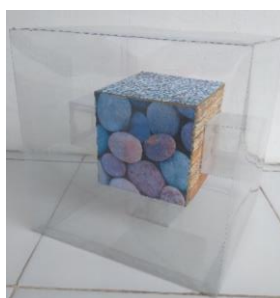


Fig 1: Props Cube 3D

Projection images are the basis for drawing techniques to express the shape and size of an object or objects. The projection images studied are orthogonal projection images which are often used in making working drawings. Projection drawing functions to get the actual line size, to create actual shapes and to create working drawings. In general, a projection image requires three directions of view, namely the top view, the front view and the right or left side view in figure 2 is the the example of projection result. Students find it easier to remember or build relationships with projected image problems, where shapes and sizes are expressed in technical drawing with Contextual Teaching and Learning methods of teaching aids. Students can solve projected image problems with higher order thinking skills (HOT). Thinking skills that apply processing in remembering activities, restating or referring back to existing images. Higher order thinking skills can support the ability of each student to be a solution for each other and the surrounding environment.



Fig 2: Projection Result

Method

The research was carried out at SMKN 1 Mojokerto with the subject of class XI DPIB odd semester for the academic year 2020-2021. Two-cycle research using classroom action research model includes planning, action, observation and reflection. So the design method is flexible according to the context, The cycle steps are two stages and each stage is analyzed. Student jobsheets, teacher and student observation sheets and student learning outcomes tests were used as research instruments. Furthermore, the data was processed using two-sample data analysis techniques.

Result and Discussion

Action Planning and Action Implementation Cycle I

The initial activities carried out are compiling learning tools, syllabus and assessment tools. The

teacher provides material with a direct instruction approach, the instructions are given according to the indicators, with the aim of learning students can draw projections from the front view, side view and top view of the object 3. Dimensions of cognitive evaluation and psychomotor results in students not understanding how to draw the European system orthographic projection method less than optimal. From the reliability of the outfit students, 0.83 indicates that in this study the student data is reliable. The items show 0.91 indicating that the questions given are reliable. For Validity 1, the raw variance value explained by measures is 0.78%, so it can be said that the item given is appropriate to measure the understanding of drawing 2D projections and the results of Unexplned variance in 1st contrast of 10% indicate that the instrument is not yet valid. Less than 5% read less valid. From these results the suitability between the dimensions and the statement needs to be reviewed or corrected.

For student abilities Students who have a higher ability in providing answers to items number 15, 18, 20, 25 and 3 agree. while students who have moderate abilities are 17, 10, 23, 21, and 9. Meanwhile, students with moderate abilities or less are numbered 13, 14, 19, 2, 22, 26, 27, 28, 29, 30, 31, 6, 8, 12, 24, 32, 5, and 4. And students with very low abilities are numbered 16, and 7. The results of the item validity table can be read in the INFIT column, MNSQ must not be less than 0.5-1.5. Item number 10, 14, 15, 16, 3 and 23 maximum measure 0.46 or 0.5 items are said to be valid. Item number 2, 7, 13, 17, 18, 19, 20, 21, 22 is written minimum measure means the question is not valid. The results of the item validity table are read in the OUTFIT column, ZSTD valid values cannot be less than -2.00 to +2.00. Read items or items 1,24,11, 2, 7, 13, 17, 18, 19, 20, 21 and 22 with a value of more than -2.00 to +2.00, then the item is said to be invalid. The results of the PTMEASURAL column table are valid if they are not less than 0.4 to 0.86. Reads 1,24,11, 2, 7, 13, 17, 18, 19, 20, 21 and 22 less than 0.4 to 0.86 then the item is invalid and there is shown on figure 3.

Based on the research on item analysis and student ability analysis, it is necessary for the second cycle to determine the criteria for success in improving students' understanding of basic competencies in presenting the requirements of building projection drawings. By using the contextual teaching method of 3D cube props. To get accurate data, the teacher examines collecting notes which include preparation, implementation, research and evaluation sheets.

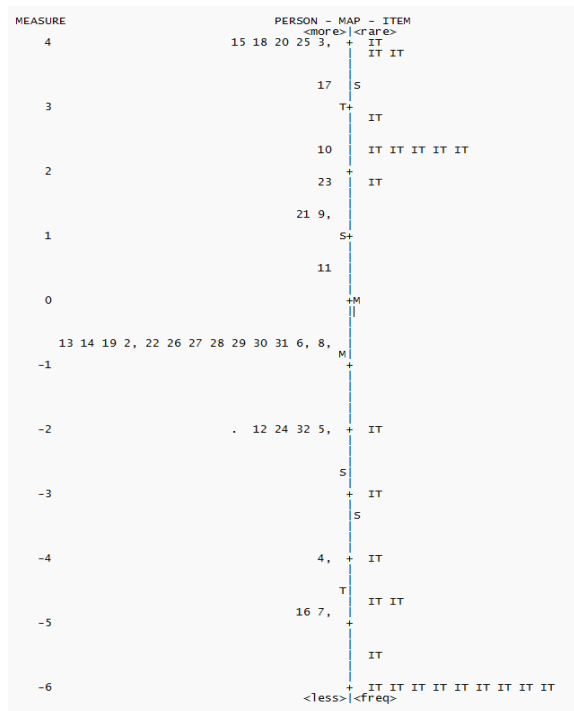


Fig 3: Cycle I Student Abilities

Action Planning and Action Implementation Cycle II

In cycle II, the researcher started the activity by explaining the Contextual Teaching and Learning model of the 3D cube teaching aid to the students. Using the 3D cube teaching aids, the teacher re-explains the projected image of the building, the teacher explains how to draw the top view, front view and side view of the building. Students are allowed to ask questions and the teacher answers questions. After finishing the teacher evaluates the results of the student's work by giving the value of the student's picture. In the second cycle, the procedure for implementing the action was the same as in the first cycle, only in the second cycle, the students in addition to drawing projections were also given a cognitive test on projected images.

Students who have a higher ability in providing answers to the approval of item number 2 people. while students who have moderate ability are 29 people. Meanwhile, students who are capable of below moderate or less are only one person. The results of the observations in cycle I and cycle II stated that the results of the observations showed in figure 4 that there was an increase in understanding using the Contextual method of 3D cube teaching aids in the subject of drawing projected building projections for class XI DPIB 3 SMKN 1 Mojokerto. Contextual Teaching and Learning method, students understand better by using the Contextual Teaching and Learning method of 3D cube props.

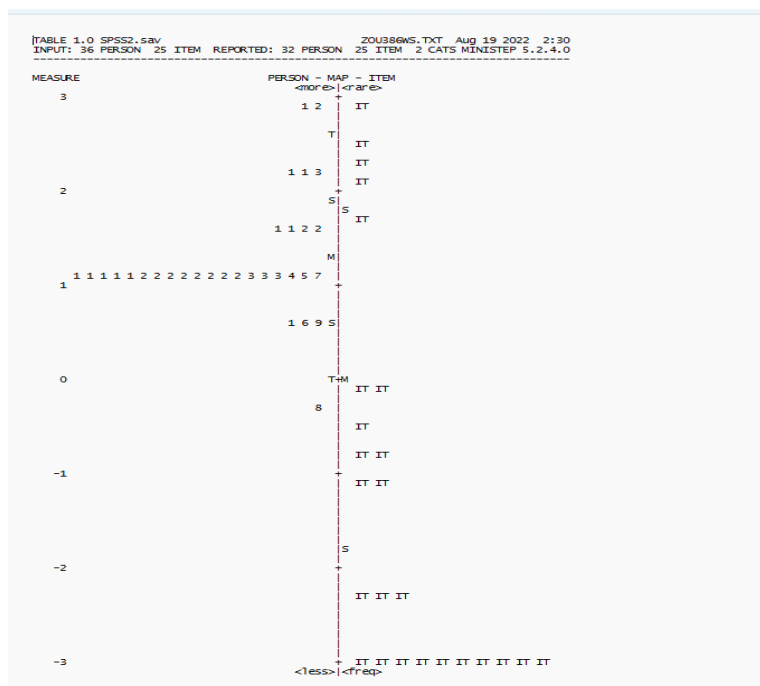


Fig 4: Cycle II Student Abilities

Conclusion

The reason for using the Contextual Teaching method and learning media for the 3D cube is because students really need a real explanation from the teacher of this subject, because it is a new teaching material. The limited sources of available teaching materials, the difficulty of understanding using other methods, saving time, costs and equipment are also reasons that the Contextual Teaching and learning methods of 3D cube props have power and effectiveness in learning.

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