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Demonstration Learning Methods to Improve Learning Outcomes in the Basic of Building Construction Subjects, Class X Building Construction Modelling Design SMKN 1 Boalemo

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ABSTRACT
One of the goals of learning in Vocational Schools is to fulfill competencies according to the needs of the world of work. Therefore, the teacher must design a learning model that is in accordance with the characteristics of students in the Building Information Modeling Design Department and refers to the 2013 Curriculum. One alternative learning method that can be developed to conform these demands is the demonstration learning method. Learning with the demonstration method indicates a significant increase. This can be seen from the results of the pre-test and post-test assessments in both cycle I and cycle II. From the three stages of the assessment, it was seen that there was an increase in the percentage of completeness and the class average value. The completeness percentages of the three assessments were 19.04%, 47.62% and 80.96% respectively. The class average scores of the three assessments were 58.8, 72.62 and 83.33 respectively. From this process it can be seen that the demonstration learning method is very effectively used to improve learning outcomes. The demonstration method requires more diverse activities from both the teacher and students. The quality of learning is also determined by the supporting teacher who understands the teaching substance, demonstration techniques, interaction/feedback and what is no less important is the motivation given to students.

Keywords: *Demonstration method, Classroom action research, Completeness learning.*

1. INTRODUCTION

In general, the concept of education in schools is a process of learning by students and teaching by teachers so that students can develop their abilities, have intelligence and have good morals or ethics.

Teachers control an important role in education. The teacher has a honorable duty to teach knowledge to students so that educational goals are achieved. In the revolutionary era 4.0 teachers must comply with technological developments till they have learning strategies that are relevant, innovative and attract students' interest.

The secondary school curriculum in Indonesia has undergone several changes. One of the curriculums used is the 2013 curriculum. The concept applied in the 2013 curriculum is that the learning process does not only transfer knowledge from teacher to student, or teacher-centered. But it is a student-centered learning process as a subject who is required to be able to search, process and reconstruct information. The implementation of the 2013 Curriculum at SMK Negeri 1 Boalemo in the performance of learning experienced several obstacles including the Basic of Building Construction Subject.

Basic Building Construction is one of the important subjects and is the basis for construction design in the Department of Building Information Modelling Design. From the information obtained at SMK Negeri 1 Boalemo, these subjects still use conventional learning models. In practice the teacher only uses the lecture method so that the condition of students when learning takes place is still passive. This causes students to get bored quickly and do not pay attention when learning is in progress. The atmosphere in the class became quiet because students were reluctant to ask questions even though they had been given the opportunity to ask

questions. In learning Basic Building Construction at Class X it is still one-way, it is still focused on the teacher rather than the students. This is not in accordance with the learning objectives in Vocational High Schools, which must have competence according to the needs of the world of work. Therefore, the teacher must design a learning model that is in accordance with the characteristics of students in the Building Information Modelling Design Department and refers to the 2013 Curriculum. This is reinforced by statements given by subject teachers that student learning activity is still lacking.

One of the most appropriate learning methods to suitable these demands is the demonstration method. With the demonstration method students can observe, conduct experiments, study the process and then the results, conclude the results and present them for evaluation by the teacher and other students, so they have the courage to express opinions [1][2]. Based on this background, it is necessary to conduct research on the application of demonstration learning methods to improve student learning outcomes in the Basic Building Construction subject for class X DPIB SMK Negeri 1 Boalemo.

2. RESERCH METHOD

This research was conducted at SMKN 1 Boalemo, in class X of the Department of Building Information Modelling Design with 21 students for 2 weeks in February 2021. In this classroom action research (CAR), researchers used 2 cycles with 4 meetings. Each cycle has 2 meetings with details of the first meeting for learning activities and the second meeting for cycle evaluation. One meeting is available 2 x 40 minutes. So, in this action research planned 2 cycles with research procedures, namely: 1) Planning. 2) Actions. 3) Observation. 4) Reflection [3][15].

In this study the data collection techniques carried out by researchers were: 1) Observation, carried out directly by researchers at SMKN 1 Boalemo class X DPIB Department by observing class conditions and observing things in detail starting from the time the learning process took place until the assessment process learning practice. 2) Documentation, used to strengthen observation data and strengthen discussion. 3) Pretest, activities carried out by researchers to determine students' initial abilities in the learning process. 4) Post test, activities carried out by researchers to find out student learning outcomes in lessons that have been delivered through demonstration methods [4][12][13].

After collecting the data, the next step is to analyze the data. Data analysis techniques are carried out gradually and continuously at the end of each learning cycle, to determine the percentage of individual learning completeness, the average value of all students and the percentage of student learning completeness [5][6][14].

To calculate the percentage of learning completeness individually, the following formula is used:

$$KB = \frac{T}{T_t} \times 100\% \quad (1)$$

with:
KB = learning completeness
T = the number of scores obtained by students
Tt = total score sum

To calculate the average value of all students, use the following formula:

$$X = \frac{\sum x}{\sum N} \quad (2)$$

with:
X = average value
ΣX = the sum of all student scores
ΣN = the number of students

To calculate the percentage (P) of classical learning completeness, the following formula is used:

$$P = \frac{completed\ students}{total\ number\ of\ students} \times 100\% \quad (2)$$

3. RESULT AND DISCUSSION

Student learning outcomes in the Basic Building Construction subject before the demonstration learning model for class X DPIB SMK Negeri 1 Boalemo were determined from the first meeting with students, where the researcher gave 20 questions (pre-test) to students.

The pre-test was conducted to determine the level of students' understanding before the implementation of cycle I and cycle II. Students are given a test in the form of a written test [7]. To see the scores obtained by students in the pretest can be seen from the table 1[8].

Table 1. The results of the pre-test student scores.

Absent Num	Score	Information
1	60	Not complete
2	40	Not complete
3	80	Complete
4	45	Not complete
5	55	Not complete
6	55	Not complete
7	40	Not complete
8	80	Complete
9	50	Not complete
10	60	Not complete
11	60	Not complete
12	75	Complete
13	60	Not complete
14	55	Not complete
15	55	Not complete
16	60	Not complete
17	80	Complete
18	60	Not complete

19	55	Not complete
20	50	Not complete
21	60	Not complete
Total score	1235	
Average	58.8	
Completeness	19.05%	

According to Tables 1 and 2 [8], it can be concluded that the classical learning completeness in the initial test (pre-test), which is 19.05%, is still low and has not yet reached the predetermined classical completeness stage, which is 85%.

Table 2. Distribution of pre-test learning outcomes.

Completeness Percentage	Completeness Level	The number of students	Percentage of Students Number	% Cumulative	% Cumulative
>85	Very high	0	0	0	100
71-85	High	4	19.05	19.05	100
56-70	Medium	9	42.86	61.91	80.96
41-55	Low	8	38.1	100	38.1
		21	100		

Based on this, the research stage of cycle I was then carried out to be able to improve student learning outcomes using the demonstration learning method [9]. This learning model is expected to improve student learning outcomes in the Basic Building Construction subject, the subject of roof construction and wooden truss.

3.1. First Cycle

In this classroom action research (CAR), researchers used 2 cycles with 4 meetings. Each cycle has 2 meetings with details of the first meeting for learning activities and the second meeting for cycle evaluation. One meeting is available 2 x 40 minutes.

3.1.1. Planning

The main topics taught to class X DPIB students at SMKN 1 Boalemo are roof construction and wooden trusses. The basic competencies on this subject are truss parts, roof parts and types of joints. The indicators for basic competence are mentioning the types and explaining the functions of the roof construction parts and joints.

Basic of building construction learning using the demonstration method cannot be separated from the Learning Implementation Plan that has been made. The lesson was opened with an explanation of the types of materials used in building construction. Then the teacher asks questions and answers with students about the types of wood construction, the advantages and disadvantages of using wood materials in building construction. Then the teacher shows a miniature wooden roof construction without a roof cover. One part of the construction is a simple wooden truss.

The teacher provides miniature examples of simple roof construction to learn. Then the teacher divides the class into 4 groups, each group consists of 5 people. The teacher provides an opportunity for each group to study the roof construction parts, trusses and joints of the miniatures. The teacher distributes materials and tools for making roof construction.

The teacher observes the learning process, provides as many opportunities as possible for students to be creative and doesn't limit a lot untill that the models made by students become more varied.

3.1.2. Action

The teacher explains that in the miniature roof construction students can observe the roof, trusses and wood joints. The roof consists of purlin, rafters, battens and roof covering. The truss section consists of truss legs, tension beams, pillars, scores and clamps. Then students learn the steps for cutting and assembling miniature roof and trusses. Students with the guidance of the teacher apply the glue joints to the truss frames.

The teacher reminds each group member to share tasks, be more proactive, willing to learn and share knowledge and skills with each other so that they can become a solid team. The teacher also provides corrections, provides opportunities to ask questions and directs so that learning further hones students' talents and interests.

In carrying out the planned action it turned out that not all students could make a complete miniature. There are still many students who do not feel brave enough to try to practice making and assembling wooden materials into miniature roof constructions and trusses.

Table 3. The results of the cycle I student scores.

Absent Num	Score	Information
1	85	Complete
2	65	Not complete
3	90	Complete
4	65	Not complete
5	65	Not complete

6	75	Complete
7	75	Complete
8	85	Complete
9	80	Complete
10	80	Complete
11	85	Complete
12	80	Complete
13	65	Not complete
14	65	Not complete
15	60	Not complete
16	65	Not complete
17	85	Complete
18	65	Not complete
19	65	Not complete
20	60	Not complete
21	65	Not complete
Total score	1525	
Average	72.62	
completeness	47.61%	

Table 4. Distribution of cycle I learning outcomes.

Completeness Percentage	Completeness Level	The number of students	Percentage of Students Number	% Cumulative	% Cumulative
>85	Very high	1	4.76	4.76	100
71-85	High	9	42.86	47.62	95.24
56-70	Medium	11	52.38	100	52.38
41-55	Low	0	0	100	0
		21	100		

3.1.3. Observation

This observation activity was carried out by the researcher with the aim of finding out whether the teaching and learning process was in accordance with what had been formulated in the instructional objectives. As for seeing the completeness of students in cycle I, at the end of the cycle a formative test was held. The success rate in cycle I can be seen in Tables 3 and 4 [8].

From Tables 3 and 4 it can be concluded that the learning completeness in cycle I was 47.62% or classified as moderate. Though, student learning outcomes in cycle I have not been able to reach the classical mastery stage (85%).

3.1.4. Reflection

After the entire learning process in cycle I was completed, the researcher and teacher observers discussed the results of observations to find weaknesses and deficiencies in cycle I. In the implementation of cycle I Subjects of Basic Building Construction, the subject matter of Roof Frame Construction and Wooden Frames obtained the results learning is still not good.

Weaknesses and deficiencies related to researchers: 1) Researchers are lacking in class control. 2) Researchers are less careful in choosing members in each group. 3) Researchers are still unclear about explaining subject. 4) Researchers do not understand the true potential of students. 5) Researchers are still lacking in providing motivation to students [10].

Weaknesses and deficiencies related to students: 1) There are students who scramble when the researcher explains the subject matter. 2) There are students who do not want to work together discussing topic. 3) There are some students who are still afraid or lack the courage to try.

3.2. Second Cycle

Based on the results of learning completeness in cycle I and the results of reflection, the researcher perform action again to improve student learning outcomes on the subject of Roof Construction and Wooden Truss. For this reason, the research was continued in cycle II.

3.2.1. Planning

The researcher makes an alternative action plan that is taken to overcome the problems that are still found in cycle I. The steps are as follows: 1) The teacher learns to go deeper and further explore the application of the demonstration method without ignoring the character of the students. 2) Making a Learning Plan and determining the outline of the steps to be carried out, 3) Changing different groups from cycle I. 4) Designing classroom management. 4) Improve student worksheets. 5) Make tests with improvements to find out student learning outcomes in cycle II. 6) Prepare tools and materials that support the implementation of the learning process.

3.2.2. Action

The teacher provides motivation by announcing students who are active and get a complete score. The teacher gives praise for these things and gives motivation to students whose grades are still lacking.

The teacher returns to explain roof construction materials and wooden trusses better, clearly and in detail at points that are considered lacking. The teacher gives more and varied examples based on the deficiencies in cycle I. The teacher conducts questions and answers so that there is always two-way communication. The teacher also provides opportunities for students to express their opinions and courageous to appear in class. The teacher invites students to courageous to try and not be afraid of being wrong, because mistakes are something natural and understandable in the learning process so that they become more knowledgeable, skilled and even better.

Table 5. The results of the cycle II student scores

Absent Num	Score	Information
1	90	Complete
2	85	Complete
3	95	Complete
4	70	Not complete
5	85	Complete
6	80	Complete
7	85	Complete
8	90	Complete
9	85	Complete
10	85	Complete
11	90	Complete
12	75	Complete
13	70	Not complete
14	80	Complete
15	70	Not complete
16	90	Complete
17	85	Complete
18	90	Complete
19	90	Complete
20	70	Not complete
21	90	Complete
Total score	1750	
Average	83.33	
Completeness	80.96%	

Table 6. Distribution of cycle II learning outcomes.

Completeness Percentage	Completeness Level	The number of students	Percentage of Students Number	% Cumulative	% Cumulative
>85	Very high	8	38.1	38.1	100
71-85	High	9	42.86	80.96	61.91
56-70	Medium	4	19.05	100	19.05
41-55	Low	0	0	100	0
		21	100		

3.2.3. Observation

The use of the demonstration method in cycle I has increased student learning outcomes from 19.05% (pre-test results) to 47.62% even though it has not yet reached individual completeness, whereby 52.38% of students' learning achievement is still below 75. Meanwhile in cycle II there is an increase in the average score so that the completeness score reached 80.96%, for more details can be seen in Tables 5 and 6 [8]. However, student learning outcomes in cycle II have not been able to reach the classical completeness stage (85%).

3.2.3. Reflection

Based on the increase in learning outcomes in cycle II, it shows that the actions taken by the teacher in cycle II have an impact on improving the methods used, class management and a better level of understanding of students. So that to improve student learning outcomes what the teacher must do is master the demonstration method, make an outline and steps for class management, provide motivation, carry out two-way communication and provide reinforcement to students to courageous to try and express opinions [11].

3.3. Discussion

From the results of the study, researchers have made many improvements such as explaining techniques, interactions, demonstration techniques and providing motivation. While students also do many activities such as listening, answering questions and doing practice/demonstrations.

Learning with the demonstration method shows a significant increase. This can be seen from the results of the pre-test and post-test assessments in both cycle I and cycle II. In the pre-test assessment, the number of students who passed was 4 people or 19.04%, while the number of students who did not complete was 17 people or 80.96%, with an average score of 58.8. While the post-test assessment of cycle I, the number of students who passed was 10 people or 47.62%, while the number of students who did not complete was 11 people or 52.38%, with an average score of 72.62. Learning outcomes are improved by conducting cycle II. The number of students who completed was 17 people or 80.96%, the number of

students who did not complete was 4 people or 19.05% with an average score of 83.33.

From the three stages of the assessment, Table 7 [8] shows that there is an increase in the percentage of completeness and the class average value. The completeness percentages of the three assessments were 19.04%, 47.62% and 80.96% respectively. The class average scores of the three assessments were 58.8, 72.62 and 83.33 respectively. From this process it can be seen that the demonstration learning method is very effectively used to improve learning outcomes. The demonstration method requires more diverse activities from both the teacher and students. The quality of learning is also determined by the supporting teacher who understands the topic, demonstration techniques, interaction/feedback and what is no less important is the motivation given to students.

The completeness value at the end of the cycle shows that the learning outcomes have not reached the classical level of 85% completeness. The number of students who have not completed yet must be given special guidance and special attention. Teachers can provide motivation so that students try even more, provide relevant examples and ask if there are difficulties in understanding and demonstrating.

Table 7. Recapitulation of learning outcomes cycles I and II.

Completeness Percentage	Pre-Test		Cycle I		Cycle II	
	Percentage of Students Number	% Cumulative	Percentage of Students Number	% Cumulative	Percentage of Students Number	% Cumulative
>85	0	0	4.76	4.76	38.1	38.1
71-85	19.05	19.05	42.86	47.62	42.86	80.96
56-70	42.86	61.91	52.38	100	19.05	100
41-55	38.1	100	0	100	0	100
Average score	58.8		72.62		83.33	

4. CONCLUSION

Based on the results of class action research on the Basic Building Construction subject, class X DPIB students at SMKN 1 Boalemo can be concluded as follows:

1. The demonstration method most needs to be done in Basic Building Construction subjects, especially the subject of Roof Construction and Wooden Frames, because on this subject student need to make direct observations and carry out practices or demonstrations in order to achieve instructional objectives.
2. The teacher has to understand the application of the demonstration method, understand the topic of subject, provide lots of relevant examples, interactive and communicative, provide opportunities for students to be active, provide feedback on student responses, motivate students and ask for difficulties encountered in carrying out demonstrations.
3. The demonstration method requires a lot of activity for both teachers and students until it further enhances talent, interest in the courage to express opinions, is interesting to follow and not boring for students.

REFERENCES

[1] P. Usman, L. Yahya, N. Bito, B.T. Takaendengan, Efektivitas Pembelajaran Matematika Menggunakan Multimedia Pada Materi Kerucut, Jambura Journal of Mathematics Education, Vol 3, No 2, 2022, pp 100-106.

[2] Nurhayati, S. Fadilah, Mutmainnah Penerapan Metode Demonstrasi Berbantu Media Animasi Software Phet terhadap Hasil Belajar Siswa dalam Materi Listrik Dinamis Kelas X Madrasah Aliyah Negeri 1 Pontianak, Jurnal Pendidikan Fisika dan Aplikasinya Vol 4, No 2, 2014, pp 1-7.

[3] A. Razak, Rumainur, Tingkatkan Hasil Belajar Matematika Pokok Bahasan Operasi Hitung Penjumlahan dan Pengurangan Bilangan Bulat Melalui Alat Peraga Kartu Berwarna "KABE", Mathematics Education Journal, Vol. 4., No. 2, 2022, pp. 84-91.

[4] Y. S. Pasinggi, Peningkatan Hasil Belajar KPK dan FPB melalui Pendekatan Kooperatif Model Jigsaw di V SD, Jurnal Penelitian Pendidikan, Vol. 18, No. 1, 2015, pp. 71-76.

[5] S. Muwarni, Penerapan Model Pembelajaran Discovery Learning untuk Meningkatkan Prestasi Belajar Siswa, Mathematics Education Journal, Vol. 2, No. 1, 2020, pp. 38-45.

[6] S. Zahroh, Penerapan Metode Demonstrasi Untuk Meningkatkan Hasil Belajar PKN Siswa Kelas III SD Negeri 157 Pekanbaru, Jurnal PAJAR

(Pendidikan dan Pengajaran), Vol 2, No 2, 2018, pp 223-233.

[7] Yusridawati, Upaya Peningkatan Hasil Belajar Teks Prosedur melalui Metode Demonstrasi, Jurnal Mitra Pendidikan, Vol 4, No 10, 2020, pp 699-713.

[8] A. Gonibala, Metode Pembelajaran Demonstrasi untuk meningkatkan Hasil Belajar Siswa pada Mata Pelajaran Dasar Konstruksi Bangunan Kelas X DPIB SMKN 1 Boalemo, Skripsi, Universitas Negeri Gorontalo, 2021.

[9] N. Yani, Upaya Meningkatkan Hasil Belajar Siswa dengan Model Pembelajaran Kooperatif Tipe Investigasi Kelompok pada Mata Pelajaran Fiqih Materi Pokok Shalat Jumat di Kelas VII di MTS. Al-Hasanah Medan, Skripsi, Universitas Islam Negeri Sumatera Utara, 2017.

[10] S. S. Putri, M. Japar, R. Bagaskorowati, Increasing Ecoliteracy and Student Creativity in Waste Utilization, International Journal of Evaluation and Research in Education, Vol. 8, No. 2, 2019, pp. 255~264.

[11] N. Karim, R. Roslan, The Impact of Interactive Science Shows on Student's Learning Achievement on Fire and Pressure Science Concept for 9th Grader in Brunei, Jurnal Pendidikan IPA Indonesia, Vol. 9, No. 3, 2020, pp 294-308.

[12] Yusrida, M. Siregar, The Effect of using Demonstration Method on the Students' Achievement in Writing Procedure Text, Journal of English Language Teaching of FSB Unimed, Vol. 1, No. 1, 2012, pp 294-308.

[13] E. Wilany, The Influence of Demonstration Method Towards English Foreign Learners' Speaking Skill, Anglo-Saxon, Vol. 10, No. 2, 2019, pp 186-193.

[14] I. Hajar, M. C. B. Umanailo, R. Umanailo et al, The Effectiveness of Demonstration Method in Learning Poetry for Grade X Students of SMA Negeri Sawa, Proceedings of the 11th Annual International Conference on Industrial Engineering and Operations Management, Singapore, 2021, .http://www.ieomsociety.org/singapore2021/papers/1041.pdf.

[15] A. Firda, The Effect of Demonstration Technique on Students' Writing of Procedure Text, Skripsi, Department of English Education, Faculty of Educational Sciences, Syarif Hidayatullah State Islamic University, 2017.