THE EFFECT OF CANVA-ASSISTED STAD TYPE COOPERATIVE LEARNING MODEL ON PHYSICS LEARNING OUTCOMES ON THE MAIN MATERIAL OF MOMENTUM AND IMPULSE OF GRADE X MIPA STUDENTS IN THE EVEN SEMESTER OF SMA MULIA PRATAMA MEDAN IN THE 2022/2023 ACADEMIC YEAR

By :
Andika
Universitas Pembangunan

ABSTRACT

This study aims to determine the effect of the STAD type cooperative learning model assisted by Canva on physics recognizing consequences in the situation of momentum and impulse material for the sophistication of X MIPA SMA Mulia Pratama Medan Academic Year 2022/2023. The type of research is a quasi-experimental study. The population is Class X MIPA semester 1 SMA Mulia Pratama Medan Academic Year 2022/2023. The research pattern was taken from general sampling, which consists of training, namely the experimental class of 30 students carrying out the STAD version of learning assisted by Canva, and the control class of 30 students carrying out the Direct education (DI) model. Research notes were obtained using a tool in the form of an essay test which includes 10 questions that have been tested beforehand to see the validity of the questions, reliability, stages of the questions and discriminating power. Based on the results of the study for the experimental class, received an average pretest of 50.50 with a trendy deviation of 9.45 and an average post-test rating of 85.07 with a desired deviation of 6.06. For the splendor of manipulation, the average pretest value became 49.57 with a standard deviation of 9.18 and the average posttest value became 79.89 with a popular deviation of 5.48. both trainings have been declared generally disbursed (obtained L0 Fcount statistical test (two-tailed t test) for $\alpha = 0.05$ and dk 58 obtained tcount < ttable, especially 0.418 < 2.002, this shows that the initial abilities in both classes are the same. Then the two classes were given different treatments and at the end of the learning a post-test was given. From the results of the statistical test of the data (one-tailed t test) obtained tcount> ttable, especially 6.143> 1.671, this final result shows that there is a broad influence of the STAD type cooperative learning model assisted by Canva on physics learning in gaining knowledge about the effects in the problem of calculating the amount of momentum and impulse of class X MIPA students semester I SMA Mulia Pratama Medan 2022/2023 academic year.

1. INTRODUCTION

Education is a conscious effort to gather students through guidance, teaching and/or training activities for their future roles. According to the National Education System Law No. 20 of 2003, training is a conscious and planned effort to create an atmosphere of mastery and familiarity with techniques so that students actively develop their potential to have non-secular spiritual strength, self-control, intelligence, a person with noble character, and the desired abilities by using themselves and society. Training is coaching held in schools as formal educational institutions. Schools are appropriate educational facilities that seek to form individuals who have the ability and skills to ask critical questions to act in an actual global context.

School education is a place where students can learn, develop, and pursue various knowledge, one of which is physics. However, the consequences of the introduction students receive indicate that the objectives of school training are no longer being met. This is evident in the rankings students achieve, particularly in physics. The teaching and mastery of learning

implemented in schools are an effort to improve the quality of national schooling, as schools are a learning tool.

Physics is a branch of Natural Sciences (IPA), specifically the study and analysis of all natural phenomena, events, or phenomena, and the discovery of the mysteries of the universe. Physics is a fascinating academic subject that emphasizes understanding over memorization. According to Gerthsen (2021:7), physics is a theory that attempts to explain natural phenomena as simply as possible and attempts to establish relationships between facts to solve problems and examine the natural phenomena in question.

Based on the researcher's experience during PPL and interviews conducted at SMA Mulia Pratama Medan, interviews conducted with physics teachers and several students of class X MIPA Based on the results of interviews conducted by researchers with physics teachers and students, researchers saw that students still have many weaknesses, especially in acquiring physics knowledge, students often have low physics rankings. This is because the learning that teachers convey often relies on memorization, taking notes and teachers often instruct to pursue learning targets so that students do not understand the material taught at that time more deeply but teachers have new advanced discussion materials, so that when students are given assignments students are not able to complete them correctly and often cheat on friends' assignments, so that most students often get grades below KKM (Minimum Completion Criteria).

Most students stated that physics is a very challenging subject to understand and students also have difficulty understanding the physics formulas that they have to memorize, as a result many students are less motivated to pursue studying physics. based on the results of interviews conducted with physics instructors who stated that the ranking of physics students is still low and many do not meet the KKM where the minimum completion criteria determined by the school is 75. Students often complain about physics lessons because they think physics lessons are very difficult and always use formulas and lots of calculations that make students feel bored so that this can affect student learning achievement.

The following data shows the results of students' physics learning at Mulia Pratama High School, Medan.

Table 1 Physics Learning Outcomes of Mulia Pratama High School

No.	Average	Year	KKM
1	2019/2020	65.00	75
2	2020/2021	60.65	75
3	2021/2022	62.20	75

The data above shows that the quality of students' knowledge of physics is still very low. According to Ningsih et al. (2012:45), teacher-centered learning results in low student learning outcomes.

The lack of interesting methods of delivering physics material and the difficulty of students applying physics subjects in everyday life are the main causes of low student learning outcomes, especially in physics lessons. Considering that physics lessons are one of the important sciences in human life, the quality of physics teaching must be considered at every level of education. One of the problems that is always discussed is the low quality of learning which causes student learning outcomes to decline. One of the problems is that teachers who teach in class carry out monotonous learning in carrying out lessons causing students to be lazy to learn, considering physics lessons very difficult and boring and make them dizzy.

The above problems found by researchers need to be answered, especially by providing special learning treatment before with stronger learning, which can stimulate

hobbies, enthusiasm and booming student learning outcomes, especially in physics learning. The mastery model is carried out so that student learning outcomes increase, especially in physics subjects, especially the STAD (scholar crew success division) cooperative mastery model. This learning version can create active, innovative, innovative and laughter learning for students, this can make learning in the classroom become uninteresting.

Cooperative learning type STAD (Student Team Achievement Division) is Students are grouped in small groups in a team consisting of 4-5 students with different skill levels, expected to collaborate, actively think, formulate problems, think critically, make decisions, be able to develop ideas, seek information from various sources and exchange ideas among group members to find solutions to problems. In this case, each group solves problems suggested by the teacher together. In this learning, the role of the teacher is only to help students facilitate students in the learning process, but students find solutions. However, these objectives cannot be separated from the processes that occur in class situations and must be adjusted to consistent topics.

in line with Slavin in (Suherti and Rohimah 2016: 201) "STAD acquires knowledge of the version is a learning method carried out by using a trainer to create a crew with more than one ability to practice analyzing standards and abilities collectively". in accordance with Rusman (2018) "STAD acquires knowledge of the model is a mastery version in which students are divided into companies that include 4-5 people with exclusive competencies, gender and ethnicity. Based on school learning outcome data or student rankings, the consequences of student recognition are still rather low, namely still below average, especially in physics subjects, this shows the minimum completion standard set by the school, namely 75. therefore in choosing the right learning version must take into account the condition of the students, the coaching material provided, the media used by the teacher must be able to attract the attention of students, but the media provided by the teacher must also be media that is owned and adapted to the conditions of the instructor's students themselves.

Based on the description above, the researcher turned to the study of motivated behavior with the title The Effect of STAD Type Cooperative Learning Assisted by Canva Version on the Effect of Physics Mastery in the Subject of Momentum and Impulse Counting Numbers for the Sophistication of Students of X MIPA Even Semester at SMA Mulia Pratama Medan Academic Year 2022/2023.

2. LITERATURE REVIEW

Physics learning outcomes

Physics is the science that investigates the interactions between small-scale and large-scale natural phenomena (objects) to determine how these phenomena relate to the world as it exists. Therefore, how to methodically study nature is the subject of physics. Learning physics involves the process of discovering and mastering a body of information in the form of facts, concepts, and principles.

The objectives of physics learning include the process of mastering a body of knowledge in the form of facts, concepts, and principles which is a process of discovery. Learning about oneself, the environment, and opportunities for future development that can be utilized in everyday life are all expected to be covered in physics lessons in schools. Education that emphasizes direct experience to build skills that enable children to understand the environment that makes students develop better knowledge (Puskur, 2002:4).

Physics learning outcomes are changes in students' knowledge, understanding, abilities and attitudes resulting from teaching and learning activities of natural phenomena in understanding natural phenomena through observation using basic competencies, both micro and macro, and their interactions.

Achieving these learning outcomes requires time and effort through the use of effective assessment tools that meet the requirements set by various schools, including education. Learning outcomes are the teaching and learning process and the learning objectives.

Canva Media

Canva is one of the most frequently used learning media nowadays and also the most famous online design tool that can help you create designs using various themes, be it graphics for blog articles, company logos, corporate content, funny quotes, client testimonials, or even individual projects such as invitations and greeting cards.

As a technology-based application that provides space for every instructor to learn by utilizing learning materials, namely by using the Canva application, for learning, Canva media offers models with more features to attract students' attention during the learning process. The Canva application provides a platform for graphic design and content publication that operates faster and simpler than other programs. Canva can be used to design images, create films, PowerPoint presentations, infographics, and planners, among others. According to Demarest in the journal Rahmasari, et al. (2021: 166) the Canva application is a free design tool that makes it easy for people to produce high-quality designs.

Understanding the STAD cooperative learning model

In general, learning will be more effective if it is through a teaching method that shows the thinking process, including imagination, intelligence, inquiry and finding problems from their sources. System learning should be advanced by using learning models that have been developed by experts to optimize student learning outcomes, but because model learning can make students more active and curious in learning. physics knowledge, one of which is by using the STAD type of cooperative learning technique. The STAD type of cooperative introduction model is a type of easy introduction system and was developed by Robert Slavin and this version according to him is a good enough version to be carried out by a teacher in the class he teaches. the main motive for using the STAD type of cooperative learning model is to motivate students to help each other in mastering the understanding taught by using the instructor.

Consistent with Slavin (1995: 71), cooperative learning through STAD is a simple model. The instructor divides students into small groups of 4-5 boys and girls, each with unique abilities. Meanwhile, according to Rohani and Ahmad (1995: 64), cooperative learning through STAD is the totality of coaching and introduction activities that begin with planning and end with assessment. This evaluation is followed by observation. Acquaintances are used as a hobby to achieve specific learning targets, lesson plans, offer information, ask questions, assess, and so on.

In conclusion, the use of the STAD type of cooperative learning is a learning process for students so that there is a sense of togetherness in a group that has been divided by the teacher where each group is formed of four or five people with different levels of ability, male/female, different ethnicities but the goal of the group is to achieve maximum learning and solve problems given by the teacher.

This STAD type cooperative learning model has learning phases, namely:

Table 2 Stages of STAD type cooperative learning

Phase	Teacher behavior
segment 1 convey dreams and motivation to students	convey all the wishes to be done while getting to know and inspiring students to learn
phase 2 offer data	presenting information to students with the help of demonstrations

Phase 3 set to view business	provide students with an explanation of how to establish an observation agency and assistance for each agency to make the transition efficiently
Phase 4 Guide the work of the organization and see	manually view organizations as they perform their tasks
segment 5 evaluation	compare the effects of mastery of the material that has been studied or ask the institution to provide the results of the work
Phase 6 supply award	recognize the efforts and learning outcomes of men or women and institutions

Direct learning model

according to Fathurrahman (2015: 167) "the direct learning model is a model that can shape students to study and understand basic skills and obtain statistics". In addition, according to Mashudi (2013: 47) "The DI version is a learning version that is specifically designed to guide students to recognize related to declarative information and highly dependent procedural knowledge that can be taught with a gradual, step-by-step activity pattern. step".

Based on the opinions of the experts above, the researcher concluded that the DI model is a model that does not only require lectures delivered by teachers, but rather a learning model that emphasizes students' mastery of learning concepts in stages and a teacher must have expertise, be active and skilled and also be active in delivering the material.

The steps or syntax of the direct learning model are as follows:

Table 3 steps of Direct Learning

Phase	The role of teachers
Part 1 convey dreams and prepare students	The trainer explains the learning objectives, historical facts about the lesson, its significance in teaching and prepares students for research.
section 2 demonstrate information and talents	The teacher demonstrates in the correct way, or provides information grade by grade.
segment 3 Guiding education	The fiber planning teacher provides guidance in preliminary education
phase 4 check knowledge and offer comments	Check whether students have successfully completed the task and provide feedback.
phase 5 provide the possibility for similar training in addition to implementation	teachers provide opportunities to carry out superior education, with unique attention to applying more complex situations to ordinary life.

3. RESEARCH METHODS

Place and time of research

This research was conducted at Mulia Pratama Medan High School on grade X MIPA students of the 2022/2023 academic year located at Jl. Jahe Raya No.1, Perumnas Simalingkar, Medan Tuntungan District, Medan City, North Sumatra, from June 14 to June 23, 2023.

Population and sample

The population was 60 students of grade X of the even semester of SMA Mulia Pratama Medan in the academic year of 2022/2023, divided into training X MIPA-1 and X MIPA-2. The research sample was total sampling. The research pattern consisted of two classes, namely class X MIPA-1 as an experimental class that was given cooperative treatment of the STAD type using Canva media and class X MIPA-2 as a control class for the splendor of using DI. **Type of research**

This study is a pilot study in which the learning pattern is combined into 2 groups, each group is an experimental class presented in the Canva media learning model supported by the STAD type and a control class given direct learning treatment to learning resources. The purpose of this study is to obtain data on student physical performance and mastery using the STAD type learning technique supported by Canva media with learning materials specifically Momentum and Impulse.

Research variables

1. Independent Variable (X)

independent variables: STAD type cooperative learning model assisted by Canva and DI model.

2. Dependent Variable (Y)

Dependent variable: physics learning outcomes on the main topic of Momentum Impulse, grade X, even semester, SMA Mulia Pratama Medan, academic year 2022/2023.

Research design

Table 4. Research design

Class	Pretest	Treatment	Posts
Experiment	T1	X	T2
Control	T2	Y	T2

Information :

T1 = Pretest

T2 = Poster

X = cooperative type STAD

Y = DI

The instrument used in this observation was an essay-based test consisting of 10 pretest and posttest questions. This instrument has been tested and validated using a validator.

4. RESULTS AND DISCUSSION

It can be seen that the STAD type cooperative learning model assisted by Canva has a significant impact on the consequences of physics learning in the momentum and impulse material of students of X MIPA SMA Mulia Pratama Medan in the 2022/2023 academic year.

First, a pre-test was conducted for the experimental and control classes to determine the prior knowledge of both instructions. The experimental class obtained a median pretest score of 50.50 with a popular deviation of 9.45 and an average publish-check score of 85.07 with a popular deviation of 6.06. For the control class, the average pretest score was 49.57 with a standard deviation of 9.18 and the average posttest score was 79.89 with a mean deviation of 5.48. each subject has been declared normal allocation (obtained L0 Fcount from statistical examination (two-tailed t-test) for $\alpha = 0.05$ and dk 58 obtained tcount < ttable, namely $0.418 < 2.002$, this shows that the initial abilities in both classes are the same. Then the two classes were given different treatments and at the end of the learning were given a post-test. From the results of the statistical test of the data, (one-tailed t-test) obtained tcount > ttable, specifically $6.143 > 1.671$ From these statistics it can be seen that there is a massive influence of the introduction of the STAD version of cooperative learning using Canva media on the overall performance of student mastery.

Table 5. Variation of description of experimental and control pretest values

No	Experimental class		Control	
	Pretest score	Fi	Pretest score	Fi
1	30	1	30	1
2	35	1	35	1
3	40	2	40	3
4	41	3	41	3
5	45	4	45	5
6	50	6	50	3
7	51	2	51	4
8	55	4	55	3
9	60	2	60	4
10	65	5	65	3
∑		30	∑	30
Average		50.50	Average	49.57
Elementary School		9.45	Elementary School	9.18

Table 6. Differences in the description of the experimental and control post-test scores

No	Experimental class		Control class	
	Mark	Frequency	Mark	Frequency
1	72	1	70	1
2	75	2	72	2
3	80	5	75	7
4	83	5	80	12
5	85	7	83	2
6	90	6	85	2
7	95	4	90	4
∑		30	∑	30
Average		85.07	Average	79.83
Elementary School		6.06	Elementary School	5.48

Data analysis requirements test results

Table 7. Checking the normality of research records

No	Data	Group	L_0	L_{table}	Note:
1	Pretest	Experimental class	0.090	0.161	Normal
		Control class	0.087	0.161	Normal
2	Posts	STAD type cooperative learning model assisted by Canva	0.076	0.161	Normal
		Direct learning model	0.012	0.161	Normal

Results of the homogeneity test of pretest and posttest data

Table 8. Homogeneity test of pretest and posttest data

Data	Group	Variance	F_{count}	F_{table}	Conclusion
Pretest	Experimental class	89,224	1,059		
	Control class	84.19			
Posts	Experimental class	52.09			

	Control class	53.71	1.22	1.86	Homogeneous

Learning Outcomes Research Hypothesis

The results of the researcher's hypothesis t-test calculations are as follows:

Table 9. Hypothesis Testing Results

Data	Sample	t_{count}	t_{table}	conclusion
Pretest	Experiment	0.418	2,002	Initial knowledge test is equivalent to
	Control			
Posts	Experiment	6,143	1,671	There is an influence of the STAD type Cooperative Learning Model assisted by Canva on Physics learning outcomes in the main material of Momentum and Impulse for class X MIPA students in the even semester of SMA Mulia Medan in the 2022/2023 academic year.
	control			

The consequences of statistical examination (one-sided t-test) are shown in table 9. obtained tcount = 6.143 and ttable = 1.671, namely tcount > ttable (6.143 > 1.671) can be concluded in general This shows the proposed hypothesis There is an influence of the STAD type cooperative learning model assisted by Canva on the Momentum and Impulse material of class X MIPA students in the even semester of SMA Mulia Medan 2022/2023 academic year.

5. CONCLUSIONS AND SUGGESTIONS

Conclusion

1. The performance of teaching the use of STAD types using Canva media in situations where momentum and impulse are calculated for X MIPA SMA Mulia Pratama Medan in the 2022/2023 academic year averages 85.07.
2. The learning outcomes taught with the help of DI in calculating Momentum and Impulse situations for the sophistication of X MIPA Mulia Pratama Medan Academic Year 2022/2023 averaged 79.83.
3. There is an impact of implementing the use of the STAD-assisted Cooperative learning model assisted by Canva on the consequences of physics learning on questions relying on Momentum and Impulse for the sophistication of X MIPA even semester SMA Mulia Pratama Medan 2022/2023 academic year.

Suggestion

1. This Canva-assisted version of STAD can be used as an opportunity for instructor-led physics instruction. However, its implementation requires proper and thorough planning and coaching to ensure the mastery system runs smoothly and aligns with the knowledge gained from the target.
2. By using the STAD type learning model assisted by Canva, it is hoped that physics teachers can carry out teaching and learning in the classroom in order to improve the quality of student learning.

6. BIBLIOGRAPHY

Arkundato, Artoto. 2007. *Renewal in physics learning* , PT Open University, Jakarta

Arikunto. S. 2013. *Basics of Educational Evaluation* (2nd Edition), Jakarta: Bumi Akasara.

Baharuddin. H, et al. 2012. *Application of the STAD Type Cooperative Learning Model to improve student learning outcomes on subtraction material* . Galang: Physics Research Journal. No. 2354-614 X.

Dimyati & Mudijono. 2013. *Learning and Teaching* . Jakarta: Rineka Cipta.

Fathurrahman, Muhamad. (2015). *Innovative Learning Models* . Jakarta: Ar-Ruzz Media

Hamdani, MA 2011. *Teaching and learning strategies* , Bandung: Pustaka Setia.

Isjoni. 2007. *Cooperative Learning: The Effectiveness of Group Learning* . Bandung: Alfabeta

Isnaniah, Nur. et al. 2022. *The Effect of the STAD Cooperative Learning Model on Physics Learning Outcomes in Sound Waves* . UIN Antasari Journal. Accessed at https://jurnal.uinantasari.ac.id/index.php/alkawnu/index

Monoarfa, Merrisa. Abdul Haling. 2021. *Development of Canva learning media in improving teacher competence* . Makassar State University. ISBN: 978-623-387-015-3. Accessed at https://ojs.unm.ac.id/semnaslpm/article/viewFile/26259/13283

Ramadhani, Asri Sauci. & Alfurgan. 2022. *The Effect of Using the STAD Cooperative Model on Islamic Religious Education Learning Outcomes at SDN 16, Padang City* . Journal of Management and Educational Sciences. Vol. 4, No. 1, February 2022. Accessed at https://ejournal.stitpn.ac.id/index.php/manazhim

Sagala, S.2013 *Concept and Meaning of Learning* , Bandung: Alfabeta.

Slameto, 2012 *Learning and the factors that influence it* , Jakarta: Rineka Cipta.

Slavin, Roberto. 2008. *Cooperative Learning: Theory, Research, and Practice* , Translator: Nurulita Yusron. Bandung: Nusa Media.

Sugiyono. 2017. *Business Research Methods* . Bandung: Alfabeta.

Tampi, Stenly. Et al. 2022. *Implementation of the STAD type cooperative learning model in learning temperature and heat material: an analysis of learning outcomes. Luminous Journal: Scientific research in physics education* . Accessed at https://jurnal.univpgri-palembang.ac.id/index.php/luminous.

Trianto, (2007). *Innovative constructivist-oriented learning models.* Pustaka Prestasi: Jakarta