DEVELOPMENT OF ONLINE-BASED TWO STAY TWO STRAY LEARNING METHODS TO IMPROVE STUDENT LEARNING ACHIEVEMENT AND MOTIVATION

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Abstract

Since the Covid-19 outbreak, the learning implementation has shifted from offline to online. This transition causes students to have difficulty participating in learning, especially actively participating in the online learning process. One of the causes of this is the low learning motivation of students, teachers lack innovation in online learning methods. The objective of this study is to develop an alternative online learning method during the Covid-19 outbreak in the form of the online-based Two Stay Two Stray method. This is a Research and Development using the ADDIE model. The results show that the validity of the lesson plan is at an average value of 3.54, while the validity of the learning model in the expert validation and pilot tests is at an average value of 3.46 and 3.14. The results of the research show that the empirically developed method has proven to be an effective and valid learning method that enhances student comprehension and motivation.

INTRODUCTION

Cooperative learning is one focus of educational development today (Loh & Ang, 2020; Xue & Lingling, 2018). This is due to the superior characteristics of cooperative learning in the constructivist knowledge of students (Amornsinlaphachai, 2015; Ramsook, 2019). Furthermore, through cooperative learning, students are stimulated to actively participate in the learning process, both individually and in groups (Casey & Quennerstedt, 2020; Isjoni, 2017). The teacher no longer plays a critical function withinside the learning process, but students play a dominant role in learning activities (Abramczyk & Jurkowski, 2020; Tran et al., 2019). This will have a positive impact on students to be more useful in society,

especially to develop along with the changing times in the 21st century (Isjoni, 2017; Silva et al., 2022).

Since the Covid-19 outbreak in early 2020, learning has shifted from offline to online (Di Pietro et al., 2020; Ghounane, 2022; Nabilah et al., 2022; Trisnawati et al., 2021). Learning transitions from face-to-face to the majority of lectures through Zoom Meetings or Google Meet (Munir et al., 2021; Nehe, 2021; Noviana et al., 2020; Serhan, 2020). This transition resulted in students having difficulty participating in learning, especially actively participating in the online learning process (Djidu et al., 2021). These difficulties range from difficulty understanding concepts explained online, and too many assignments, to resource factors such as internet connection to limited device conditions (Yuzulia, 2021; Zalat et al., 2021). This makes cooperative learning difficult to implement optimally.

One of the causes of this is the low learning motivation of students (Browning et al., 2021; Zaitun et al., 2021). The findings of previous research show that students who carry out online learning tend to be less motivated, which is shown by the enthusiasm and ambition to add new knowledge to a minimum and results in low student achievement (Gustiani, 2020; Zaitun et al., 2021). Students only come to online classes and observe or listen to explanations with various reliable devices, while teachers lack innovation in online learning (Al-Kumaim et al., 2021; Irwan et al., 2022; Zaitun et al., 2021). Students also tend not to be proactive in teaching and learning activities which result in low enthusiasm for student learning.

One effort that can be improved is the optimization of cooperative learning as the results of previous research (Hosseini et al., 2017; Silalahi & Hutauruk, 2020). Several researchers concluded that there was a positive impact from implementing cooperative learning during the pandemic, with concrete actions in the form of the teacher not dominating the class and becoming a facilitator in the learning process and increasing student activity in class (Dahlan et al., 2022; Silalahi & Hutauruk, 2020). The existence of cooperative learning in theory can increase student motivation and student activity (Tran et al., 2019). One form of cooperative learning model is the Two Stay Two Stray method. This offline activity is effective in increasing student activity and motivation (Firman et al., 2020; Huda et al., 2020; Rijal & Rohaniyah, 2020). However, so far the Two Stay Two Stray method has not been implemented in online learning.

Based on the above description, this research seeks to contribute to the creation of learning methods in accordance with cooperative learning principles in the form of online learning methods. The purpose of this study is to develop alternative learning methods that can be used during the Covid-19 pandemic. The developed learning method is the online-based Two Stay Two Stray method that can be implemented online through an online chat messaging application such as WhatsApp. The developed method is expected to be an efficacious learning method that enhances students' motivation to learn and achieve.

LITERATURE REVIEW

Motivation to Learn

Motivation to learn is one of the most important resources that determine the direction, intensity, and determination of student behavior in the teaching-learning process (Koyuncuoğlu, 2020). Motivation is the change in arousal within an individual that stimulates, terminates, and rewards cognitive processes for prioritizing and enforcing primary desires (Roshandel et al., 2018).

Based on studies of previous studies, there are two kinds of motivation, namely extrinsic and intrinsic motivation. Extrinsic motivation refers to doing something because of its value which a person believes will increase their performance (Uğur, 2018). Extrinsic motivation is the motivation that arises outside of work, for example (a) reward orientation that accentuates extrinsic rewards, (b) external orientation that accentuates comparison with others (Liu et al., 2020).

Intrinsic motivation is the inner strength that motivates students to be involved in academic activities because they are interested in learning and they also enjoy the learning process (Adamma et al., 2018). An activity is said to be intrinsically motivated when an individual is motivated to pursue the activity for their own benefit because the interest in pursuing that activity cannot be separated from the activity (Woolley & Fishbach, 2018).

Cooperative Learning Model

Cooperative learning is a type of learning method in which educators divide students into small groups and work together to learn academic content (Tran et al., 2019). Cooperative learning is an educational method that organizes classroom activities into social and academic learning experiences, with an emphasis on structuring positive interdependence and student engagement to work together to complete assignments together toward learning goals (Zhou, 2017). The necessary characteristics for effective cooperative learning are positive interdependence, direct verbal communication, personal responsibility, social skills, group participation, and appropriate grouping (Jacob, 2020). These benefits of cooperative learning are represented by students achieving higher levels of attainment, increased memory skills, increased educational task time, understanding of basic general concepts, and their mastery to develop the ability to apply what they learn (Algani & Alhaija, 2021).

Conventional Two Stay Two Stray learning method

The Two Stay Two Stray learning method is a cooperative learning method that involves group work and allows students the opportunity to express the results of collaboration (Handayani et al., 2018). The advantage of this method is that the cooperation carried out by students is that it allows collaboration with other groups (Hasibuan & Mansurdin, 2021).

The Two Stay Two Stray method is useful in developing students' collaborative skills because students are given the opportunity to communicate with group members and focus on activeness and critical thinking skills (Wolo et al., 2017). In addition, with the Two Stay Two Stray method, students' interest in learning can be increased and an active and fun learning atmosphere can be formed (Hasibuan & Mansurdin, 2021).

The basic syntax of the conventional Two Stay Two Stray method which is implemented offline (Wolo et al., 2017) is as follows. Students are divided into numerous groups. The teacher gives assignments to each group regarding the discussion of a learning topic. Students work collaboratively in original groups of four.

When finished, two people from each student group leave the group to visit the other student group. Two people who stay in the group are in charge of sharing the results of cooperation with guests. Guests return to their original group. The groups discuss the results of each work. Each group presents the results of their work. In the end, the teacher gives feedback.

METHODOLOGY

Research Design

This study is an R&D by adopting the ADDIE model includes Analysis, Design, Development, Implementation, and Evaluation (Aldoobie, 2015; Göksu et al., 2017).

Population and Sample

This study involved a number of samples from the Informatics Engineering student population who are programming the Multimedia Systems course in 2021.

Research Instruments

The research instruments include (1) exam sheets to measure student mastery; and (2) a closed questionnaire with 4 Likert scales to measure student motivation (Joshi et al., 2015).

Data Collection

The research was carried out in 2021 with data collected on: (1) tests; and (2) questionnaires. The test is used to quantify the students' understanding who are taught using the online-based Two Stay Two Stray method. The questionnaire is used to measure the validity of the method and measure student motivation with 4 Likert scales.

Data Analysis

The effectiveness of the online-based Two Stay Two Stray method was measured using a test. The analysis of the test results was carried out using a posttest-only control group in two sample groups, namely: (1) the experimental group which was taught by the online-based Two Stay Two Stray method; and (2) the control group which was taught by conventional teaching methods. Data were analyzed using IBM SPSS Statistics 25 with an independent sample t-test at 5% significance. The effect of the use of the Two Stay Two Stray method on understanding and motivation will be concluded if sig ≤ 5% (Spiegel & Stephens, 2008).

FINDINGS AND DISCUSSION

Step 1: Analysis

Problem excavation performed during the analysis phase shows that since the Covid-19 outbreak in early 2020, the implementation of learning for the Multimedia Systems course has shifted from offline to online which has made it difficult for students to follow the lesson. This makes teaching and learning activities less than optimal and the learning enthusiasm of students becomes low.

The solution to this problem is the development of alternative online learning methods that can be used during the outbreak in the form of the online-based Two Stay Two Stray method. The methods developed in the Multimedia Systems course are intended to measure the effectuality.

Step 2: Design

The design of the online-based Two Stay Two Stray learning method developed comes from the conventional Two Stay Two Stray syntax. The designed Two Stay Two Stray method was carried out online through WhatsApp chat. This makes the online-based Two Stay Two Stray method unique compared to the conventional Two Stay Two Stray method which is characterized by its implementation via online chat messaging such as WhatsApp chat.

The resulting design syntax for the Two Stay Two Stray method is as follows. A chat group containing all students is created by the lecturer, called the main group. Students are divided into several groups consisting of 4 people. Each group is collected in one group chat.

The lecturer gives assignments to each group regarding the discussion of a learning topic. Students work together in groups online. When finished, two people from each group leave the group to visit another group chat group. The two people who stay in the group are in charge of sharing the results of collaboration with guests online in the group chat. The guest

returns to the original group chat group. The group discusses the results of each other's work in the group chat. Each group presents their work. Lecturers provide feedback. At the end of learning, students are required to make a report on the implementation of learning.

Step 3: Development

The syntax of the online-based Two Stay Two Stray was developed in the Multimedia Systems course, on Audio-Based Media material. The results at this stage are (1) online-based Two Stay Two Stray syntax; and (2) teaching materials and lesson plans.

The syntax of the online-based Two Stay Two Stray method is as follows. First, the lecturer created a WhatsApp group called "SisMulmed Room" containing students in the Multimedia Systems course. Then, students were divided into 10 groups of 4 people. Each group gathered in a group chat and the lecturer provided material that must be discussed in the group for 30 minutes. Groups 1 - 3 got topics of the sound wave, sound amplitude, wave period, and sound frequency. Whilst groups 4 - 6 had topics of sound noise, sound velocity, sound sampling, and sample Nyquist. Groups 7 – 10 got conversion of analog to digital, and conversion of digital to analog.

In groups, they need to decide on two people who act as a host and 2-3 other people who act as guests. The instructions for students who act as hosts are:

a. The student's role is as the host of a group that acts as an expert on the appropriate theme that students discussed in the previous step.
b. The student's task is to invite guests to the group's WhatsApp group and present material from the host's discussion to guest students who visit the host group.
c. Students are allowed to share group answers with guests or provide explanations in groups regarding material according to the theme of the host group or are allowed in other creative ways as long as it is carried out online.
d. If the guest asks a question, then the host student is expected to answer the question.

Students who act as guests should take the role of students as guests to other groups, and the task of the guest is to hunt for materials from other groups. After the material or explanation is given by the host, the guest students respond to the host in the form of questions or statements, at least 1 per guest group. In this case, the guest is required to take screenshots of conversations on WhatsApp while students are visiting (starting from being invited, given material, conducting questions and answers, and leaving the host group). When finished, guest students return to their original groups. Guest students share the results of material hunting that have been done by guest students with their friends in the original group. After that, the lecturer provides feedback. At the end of learning, students should make a report on the implementation of learning.

Expert validation was performed to determine the validity of the method design product. The follow-up of validation results takes the form of modification of the method design if an improvement is proposed such as an improvement of the online-based Two Stay Two Stray.
A trial use was conducted to determine the feasibility of the online-based Two Stay Two Stray method with Informatics Engineering study program students as test objects. The trial design was used in small groups with a pilot test (Aldoobie, 2015). Method design revisions were made to improve the online-based Two Stay Two Stray as feedback from the trial questionnaire. The results of validation questionnaires from each expert and trial are shown in Table 1 and Table 2.

Table 1. Lesson plan validation result

No.	Aspect	Mean Score Expert Validation
1.	Clarity of course identity	4.00
2.	Instructional achievement	3.50
3.	Instructional objectives	3.50
4.	Material	3.50
5.	Instructional scenario	3.25
6.	Evaluation	3.50
Average		3.54

Tabel 1 shows lesson plan validation results with aspects (1) clarity of course identity values in the range of 3.01 to 4.00; (2) instructional achievement values in the range of 3.01 to 4.00; (3) instructional objectives values in the range of 3.01 to 4.00; (4) material values in the range of 3.01 to 4.00; (5) instructional scenario values in the range of 3.01 to 4.00; and (6) evaluation values in the range of 3.01 to 4.00. This shows that the lesson plan is at a very good and valid level. Therefore, lesson plans can be used to teach with the online-based Two Stay Two Stray method in a feasible manner.

Table 2. Learning model validation result

No.	Aspect	Mean Score	
		Expert Validation	Pilot Test
1.	Syntax	3.38	3.02
2.	Social system	3.50	3.24
3.	Principles of reaction	3.50	3.05
4.	Suppot system	3.50	3.25
5.	Instructional and nurturant effect	3.43	3.16
Average		3.46	3.14

Table 2 shows the learning model validation result with aspect: (1) syntax values in the range of 3.01 to 4.00; (2) social system values in the range of 3.01 to 4.00; (3) principles of reaction values in the range of 3.01 to 4.00; (4) support system values in the range of 3.01 to 4.00; and (5) instructional and nurturant effect values in the range of 3.01 to 4.00. This shows that the method design is very good and feasible.

Although the method design is claimed to be very good and does not need to be modified, improvement is still needed to develop a better method design. Several revisions were made including the addition of the course learning achievement derived from the graduate learning outcome of the study program and the improvement of the performance evaluation rubric.

Step 4: Implementation

The Implementation stage is characterized by the application of learning methods in the class. This stage involved 98 students with details: (1) 49 students were taught using the online-based Two Stay Two Stray method and (2) 49 students were taught using conventional methods through lectures at Zoom meetings. Tests and measurements of motivation are carried out for each group of students and the results of these stages will be analyzed using an independent sample t-test. There are two hypotheses that can be made, including testing for differences in (1) mastery of understanding; and (2) student motivation. The first hypothesis is as follows.

H_{o1} : $\mu_{scoreconventional} = \mu_{scoretwostaytwostray}$
Mastery of understanding of students taught by the online-based Two Stay Two Stray method was not significantly different from those taught by the conventional method.

H_{a1} : $\mu_{scoreconventional} \neq \mu_{scoretwostaytwostray}$
Mastery of understanding of students taught by the online-based Two Stay Two Stray method was significantly different from those taught by the conventional method.

The second hypothesis is as follows.

H_{o2} : $\mu_{motivationconventional} = \mu_{motivationtwostaytwostray}$
Motivation of students taught by the online-based Two Stay Two Stray method was not significantly different from those taught by the conventional method.

H_{a2} : $\mu_{motivationconventional} \neq \mu_{motivationtwostaytwostray}$
Motivation of students taught by the online-based Two Stay Two Stray method was significantly different from those taught by the conventional method.

A screenshot of the implementation of online-based Two Stay Two Stray learning (experimental group) is shown in Figure 1.

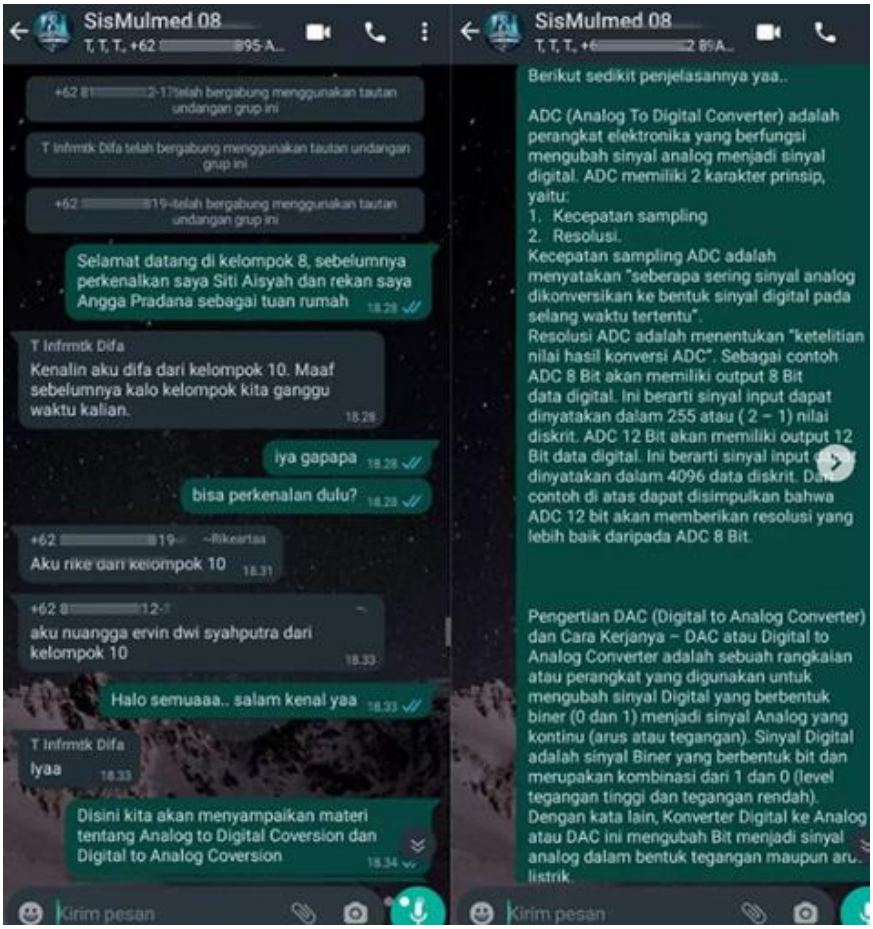

Figure 1. Footage of the Implementation of the Online-Based Two Stay Two Stray Method

Screenshots of the implementation of learning with the conventional method (control group) are shown in Figure 2.

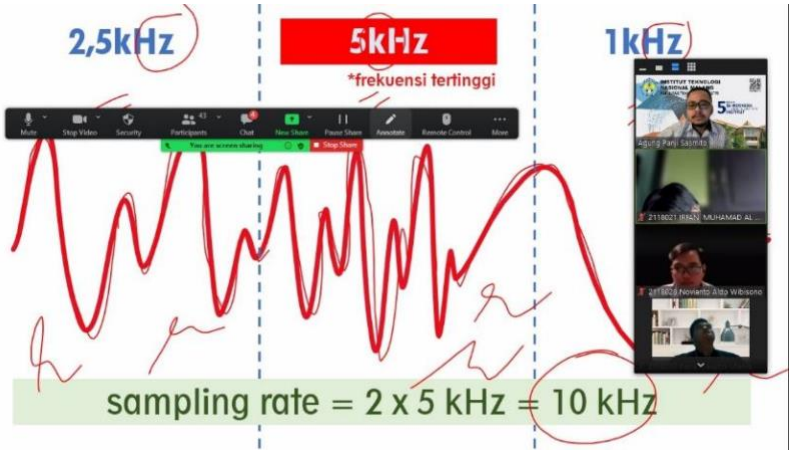

Figure 2. Footage of Zoom Meeting Implementation of Conventional Methods

The summary of the different tests related to students' mastery of understanding is shown in Table 3.

Table 3. Summary of t-test in mastery of understanding

No.	Group	Sample Size	Standard Deviaton	Mean	t-test for Equality of Means		
					t	df	sig
1.	control group (conventional)	49	8.059	61.92	11.033	96	0,000
2.	experimental group (Two Stay Two Stray)	49	8.110	79.94			

A sig value of 0.000 makes H_{o1} rejected. This means that there is a significant difference between the understanding of students who are taught using online-based Two Stay Two Stray and those who are taught using conventional methods. Based on Table 3, it is known that the average score of students taught using the online-based Two Stay Two Stray method is higher than that of students in the control group. This shows the effectiveness of the online-based Two Stay Two Stray method regarding students' mastery of understanding. The summary of the different tests related to students' motivation is shown in Table 4.

Table 4. Summary of t-test in motivation

No.	Group	Sample Size	Standard Deviaton	Mean	t-test for Equality of Means		
					t	df	sig
1.	control group (conventional)	49	6.407	75.22	12.934	96	0,000
2.	experimental group (Two Stay Two Stray)	49	5.491	90.82			

A sig value of 0.000 makes H_{o2} rejected. This means that there is a significant difference between the students' motivation who are taught using online-based Two Stay Two Stray and those who are taught using conventional methods. Based on Table 3, it is known that the average score of students taught using the online-based Two Stay Two Stray method is higher than that of students in the control group. This shows the effectiveness of the online-based Two Stay Two Stray method regarding students' motivation. The results in Tables 3 and 4 are consistent with some findings from previous studies indicating that the use of collaborative approaches can increase motivation (Bećirović et al., 2022; Namaziandost et al., 2019) as well as student understanding (Bećirović et al., 2022; Rabgay, 2018; Yaduvanshi & Singh, 2018).

Step 5: Evaluation

Based on the steps that have been carried out previously, it is known that the online-based Two Stay Two Stray method has been successfully produced. This method has 10 syntaxes and has been validated by experts and has been tested through pilot tests. The resulting method was successfully applied to online learning which was marked by the average score of students' mastery of understanding and motivation taught by the online-based Two Stay Two Stray method higher than the conventional method.

Based on the steps that have been carried out, it is known that the studies carried out are only limited to increasing students' mastery of understanding and motivation. In the future it is hoped that not only these things will be considered, but also other learning aspects such as students' metacognitive aspects, locus of control possessed by students and educators, as well as self-efficacy that is expected to be possessed by each student. This is based on a review of previous research results which state that these three aspects have a significant effect on students' mastery of understanding (Ambarita et al., 2022; Sasmito et al., 2020; Takndare & Yulita, 2019; Verma & Bhandari, 2022) and motivation (AL-Baddareen et al., 2015; Alfaiz et al., 2021; Bala, 2020).

CONCLUSIONS

With the ADDIE model, the online-based Two Stay Two Stray learning method can be developed according to the syntax in the findings and discussion points. This syntax is a development of the conventional Two Stay Two Stray method to be online based through an online chat messaging application. The learning method has also gone through the pilot test and expert validation stages so that the online-based Two Stay Two Stray method can be used as a valid learning method. In addition, the online-based Two Stay Two Stray method can be easily applied in online learning.

The method design that has been developed empirically is proven to be used as a valid and effective cooperative learning method in increasing student understanding and motivation regarding learning material. The existence of student interactivity and fun activities can increase student motivation in studying and learning. This contributes related to cooperative learning methods that can increase student motivation and understanding.

The learning process which only involves a small sample of 2 classes is something that needs attention for further research. This also includes the non-fulfilment of other learning aspects as explained in the Evaluation stage. Therefore, further research can consider a wider sample and the integration of learning aspects.

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