International Journal on Emerging Mathematics Education (IJEME)
Vol. 6, No. 2, September 2022, pp. 141-148
P-ISSN: 2549-4996, E-ISSN: 2548-5806, DOI: http://dx.doi.org/10.12928/ijeme.v6i2.20913

Lasswell Communication Model to Improve Students' Mathematical Concepts Understanding Ability

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Abstract

This research aimed to discover the difference in the increase of students' mathematical concepts understanding using Lasswell communication model and conventional model. This was quasi-experimental research. Data were collected through a test of mathematical concepts understanding. The sample of this research was Public High School 4, where class X.1 and class X. 2 as an experiment and control class respectively. Inferential statistics was used to analyze the data. The findings showed that the increase of average of students' mathematical concepts understanding ability of experimental class was 0.733, while in the control class was 0.550. Furthermore, the results of the analysis of the t-test with significance level were 5%, showed that t score>T-table, meaning H0 was rejected. The conclusion was that there was a difference in the increment of students' mathematical concepts understanding using Lasswell Communication model and conventional model. Therefore, increasing the students' ability of mathematical concepts understanding using the Lasswell Communication Model was better than the conventional model.

Keywords: Understanding, Lasswell Communications, Models High School Students.

How to Cite: Lena, M. S., Netriwati, Suryanita, I., Khairat, F., & Efendi, U. P. (2022). Lasswell Communication Model to Improve Students' Mathematical Concepts Understanding Ability. *International Journal on Emerging Mathematics Education, 6*(2), 141-148. http://dx.doi.org/10.12928/ijeme.v6i2.20913

INTRODUCTION

Mathematics is usually a scourge for students. The main challenge for students is the difficulty in understanding the logic and formulas in order to use them in various mathematical problems (Yeni, 2015). When studying mathematics, it must be remembered that studying mathematics means understanding the concept of every question that is asked. Although some formulas must be remembered in mathematics, the essence of mathematics is understandable. If there is no understanding of the basic concepts, there is a less possibility that someone can memorize various math formulas. Understanding concepts is the main asset in mastering mathematics (Sagala, 2008). Because every material in mathematics is always related to the next material which therefore will be easier to understand the questions which have been asked. Therefore, an understanding of mathematical concepts is needed. After understanding mathematical concepts, students will recognize that they are going to learn the next material and with this recognition students can solve various mathematics problems easier.

The fundamental reason for students' lack of understanding of mathematical concepts in mathematical learning is caused by many factors. The influencing factors can come from teachers, students, environment and/or infrastructure such as learning strategies (Siswono & Lastiningsih, 2007). The dominant position of the teacher in the class causes the students to be passive because the ability of students to express their opinions decreases, they even feel embarrassed to ask questions about the material which they do not understand (Sanjaya, 2007). These problems can result in students' lack of

Received June 15, 2021; Revised December 22, 2022; Accepted January 24, 2023

understanding of mathematical concepts. Learning strategies are very important for teachers to use in teaching, because they can improve students' understanding of mathematical concepts (Sagala, 2008).

One of the main objectives of mathematics teaching and learning is mathematical concepts understanding. Therefore, students should understand mathematical concepts. Simon (2017) defines a mathematical concept as the result of meditative conception, learned expectation supported by the student's activity. Mathematical concepts understandability is the student's ability to re-articulate a concept, such as an example and a non-example of that concept and implement the formulation of problem-solving (Sapienza, Iyer, & Veenstra, 2015; Yuliani & Saragih, 2015). The National Council of Teachers of Mathematics revealed that student's mathematical concepts understanding is shown by the ability of students to: 1) Define the concept spoken and written, 2) Determine an example and a non-example, 3) Use symbolization, diagrams and models to present a formulation, 4) Get to know the varied meanings and interpretations of the concept, 5) Determine characteristics of a concept and know the terms that specify a concept, 6) Analyze the concepts (Karim, 2011).

However, research showed that students mathematical concepts understanding at high school was still low because students were less encouraged to develop their thinking ability (Darmayanti & Sadia, 2013). On the other hand, students still have problems in understanding mathematical concepts (Bernard & Senjayawati, 2019). Furthermore, a research exposed that some students from grade ten in Africa were lacking mathematical concepts understanding (Essien, 2011). In addition, many students had difficulty in understanding mathematical concepts; they were not able to redefine the lesson in their own language as well as to differentiate between an example and a non-example of a concept due to the inappropriate learning model used by the teacher (Murizal, Yarman, & Yerizon, 2012). Hence, teachers must be able to select appropriate learning models for the students so that they can involve actively in the process of learning and evolve their abilities of Mathematical concepts understanding.

Several studies were conducted on the Lasswell Communication Model. For example, research conducted by Rini and Hakim (2016) which adopted Harold Lasswell Communication Model. The purpose of this reserch was to determine the causes of inaccurate reporting time. Therefore, using Lasswell Communication Model showed an increase timeliness for PPI forms to IPCN in report submission. Another study was conducted by Handayani (2015), the results showed that the Lasswell communication model improved teacher professionalism because communication took place in two directions and there was an interest from both parties, even negotiations or compromises occurred. Therefore, Lasswell Communication Model is appropriate to be applied in the teaching and learning Mathematics because it has a positive guiding implication for the recognition of efficient communication (Lingling, 2021). This research provided new insight to teaching Mathematics especially in trigonometry material.

Many studies had been conducted in mathematical concept understanding (Andreas, Maria, & Theodosia, 2015; Khoida, 2016; Murizal et al., 2012; Simon, 2017). However, a little has been known about using the Lasswell Communication Model in improving students' mathematical concepts understanding. Therefore, this is an interesting topic to investigate. Lasswell Communication Model is a learning model that emphasizes how communication occurs in the learning process. By utilizing this model, the student is able to define the concept. The advantages of Lasswell communications model are straightforward which is also suitable for any type of communication, and uncomplicated concept effect whilst the disadvantage of this model is that not all communication obtains feedback smoothly (Netriwati, 2018). According to Lasswell Model, there are elements in communication, in which communication begins from a speaker (who) delivered his message (says what) by using the medium (in which channel) to audiences (to whom) and will cause an effect (with what effect) to the audience (Abazari & Brojeni, 2017). The elements of Lasswell communication model is shown in figure 1 (Sapienza et al., 2015):

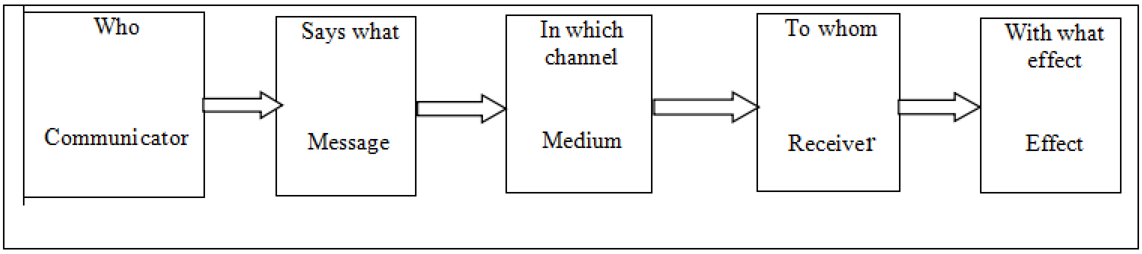

Figure 1. Elements of Lasswell Communications Model

In the communication between teachers and students, the teacher as a communicator must have material to delivery to the students through appropriate media. Furthermore, the effects that occur in students after receiving materials from the teacher are changes in attitude, increased knowledge, and others. Table 1 presents learning steps using Lasswell Communication Model (Khoida, 2016):

Table 1. Steps Lasswell Communications model

Component	Phase	Teacher activity	Student activity
Who?	The main role of the teacher is to build a conducive and fun learning condition so that students be able to achieve learning objectives thoroughly.	1. Digging prior knowledge of students associated with the material to be taught. 2. Motivating students to be proactive in the learning process. 3. Giving positive responses to students.	1. Dig out their prior Knowledge and connect with the material to be studied. 2. Active in the learning process. 3. Listen to the response given by the teacher.
Says What?	Delivered materials should relate to the learning objectives to be achieved	1. Delivers the standard of competences, basic competences, indicators and learning objectives to the students. 2. Links learning materials to real life and the benefits for students. 3. Gives questions related to the material and students' daily life 4. Guides students who find difficulty in solving the questions.	1. Examine the standard of competences, basic competences, indicators and learning objectives conveyed by teachers. 2. Relate learning materials that they will learn with their learning experience in daily life 3. Do an assignment 4. Ask the teacher when having difficulties in doing the assignment.
In Which Channel?	Build students '' interest with the media both directly and indirectly (behavior).	1. Delivers the core material by using alternative learning strategies and media which are appropriate to the material. 2. Varies the learning activities to	1. Listen and follow the core subjects Well. 2. Present their work.

		attract the students' attention / interest.	
To Whom?	Students as Learners are the main subject in the learning process (audience).	1. Engages students in the learning process 2. Provides guidance to students who have problems in learning 3. Gives opportunities for students to take part actively in the class.	1. Asks questions when they have problems. 2. Do an assignment. 3. Take part actively in the learning process.
With What Effect?	Evaluate the learning outcomes.	1.Conducts test at each meeting 2. Gives a post-test at the end of this research to evaluate student understanding after getting treatment Lasswell model. 3. Gives additional tasks or homework.	1. Do the test independently / groups. 2. Do the post-test. 3. Do an additional task or homework given by the teacher.

Conventional learning is a learning model that was conducted in the face-to-face interaction between teacher and students in the classroom. Teachers initiate discussions in the classroom and focus entirely on understanding the content in the textbooks (Li, 2016). This learning model has tended to focus on remote learning and drills in the texts. In addition, the traditional assessment is carried out with paper and pencil test that takes one correct answer, and steps in the conventional learning mostly begin with explaining the material, doing exercise, and giving homework (Wayan & Nyoman, 2016).

This study aimed to discover the difference in the increment of students' Mathematical concepts understanding by application of Lasswell Communication Model and conventional model. The research question was that "are there differences in the increment of students' Mathematical concepts understanding by employing Lasswell Communication Model and conventional learning model?".

RESEARCH METHOD

This qualitative research employed an experiment method with pretest and post-test control group design. The population of this quasi-experiment research was 17 public senior high schools in Bandar Lampung. The sample of the research was selected trough a cluster random sampling technique. Public Senior High School 4 was chosen as a sample where class X.1 and X.2 were experimental and control classes respectively. Data were collected through a test in which the students were asked to answer 5 questions in essay form. Beforehand, the instrument of this research was tried out to the students out of the sample to determine the validity, reliability, difficulty and distinguishing features of the questions. Furthermore, obtained data were analyzed using inferential statistics.

RESULTS AND DISCUSSION

The material taught in this research was trigonometry, then to gather data for hypothesis testing, the authors applied the Lasswell Communication Model in trigonometry material for 4 meetings. In this study, the authors gave students a pretest and posttest which were carried out at the first and the last meeting. Pretest and posttest were given to students in the form of an essay to determine is there an increment in the students mathematical concepts understand ability. Prior the learning process was carried out; the author gave a pretest on the trigonometry material to see the students' initial abilities.

Furthermore, at the first meeting of the learning process in the experimental class, the teacher greeted the students. Then the teacher gave the order to pray. After that, the teacher checked the attendance of the students. Furthermore, the teacher conveyed the learning objectives and reviewed the material that had been studied at the previous meeting. Then the students were divided into several groups with various abilities, gender, skin color, and ethnicity. The teacher then determined the group leader to make learning easier. The teacher explained the learning material using learning media to make it easier for students to understand. The teacher always allowed students to ask questions actively if they did not understand the material, and students were given individual or group assignments. Each group member was responsible for their learning outcomes. Each representative group presented the results of their group discussion. After that, the teacher and the students concluded today's learning meeting. The teacher gave students homework about today's material. Finally, the teacher closed the learning activities.

The obstacle faced at the first meeting was that students were not familiar with new learning methods that the teacher used as it was the first time for the students using this learning model, this results were the same with the research results conducted by (Yukselturk & Bulut, 2007) when the teacher applied the new learning model in the classroom. the researcher gave treatment gradually to the experimental class so that students were accustomed to the Lasswell Communication Model. Another obstacle was noisy classroom, which resulted in the class being less conducive for learning. The teacher minimized the noise that occurred in the classroom by giving understanding and giving a little assertiveness to students.

At the second meeting, the teacher still used the Lasswell Communication Model in teaching students. The obstacles faced at the second meeting were that students were still not familiar with the Lasswell Communication Model, some students made noise during the learning process. The use of time was appropriate based on the lesson plan, but it was not efficient enough to solve the questions and to present the results of the students' answers. Several students chatted during the learning process. Students had not studied before the meeting, and they did not pay attention when one of the students conveyed the results of their group work. These results were the same with the research conducted by Yukselturk and Bulut (2007) when teacher employed the new method in the classroom. However, at the third meeting, the obstacles faced were quite reduced, students were getting used to Lasswell Communication Model.

At the fourth meeting, the obstacles faced by the teacher at the last meeting were almost gone. Students who often make noise in class became very enthusiastic about taking part in learning. Finally, the teacher gave an award to the group who could answer all questions well to motivate students to do better in the next lesson.

Once the data both from the experimental and the control classes were collected, then normality and homogeneity tests were conducted. The description of the data of the pretest of students' mathematical concepts understanding on trigonometry material are summarized in the Table 2.

Table 2. Data Description of Pretest of Mathematical Concept Understanding

Group	x-max	x-min	Tendency Size Central			Size Variance Group	
			$\bar{X}$	M0	me	R	sd
Experiment	60	5	39.71	45	40	55	12.94
Control	60	5	38.85	35	40	55	11.82

Data Analysis Pretest

Table 3. Hypothesis Test of Prestest

Group	Average	Variance	T	t table	Decision
Experiment	39.71428571	167.5630252	0.28923	1.99547	H0 is Accepte d
Control	38.85714286	139.8319328			

Data Description Post-test Results

The description of the result data of post-test comprehension ability of students' mathematical concepts in trigonometry material are summarized in the Table 4.

Table 4. Data Description of Post-test of Mathemathical Concept

Group	x-max	x-min	Tendency size Central			Size Group	Variance
			X	M0	Me	R	sd
Experiment	95	65	83	80 and 85	85	30	9
Control	90	50	71.42	75 and 80	75	40	11

Data Analysis of Post-test

Hypothesis testing used the t-test to know if there is any difference in upgrading students' understanding of mathematical concepts; it was displayed in Table 5.

Table 5. Hypothesis Test Results of Post-test

Group	Average	Variance	t	t-table	Decision
Experiment	82.85714286	81.30252101	4,66476	1.99547	H0 is rejected
Control	71.42857143	128.7815126			

Based on the hypothesis test of the post-test, the ability to understand mathematical concepts in trigonometry material can be seen that t = 4,66476> Table = 1.99547, this means that the level of significance α = 0.05 H0 is rejected. The conclusion is that the students' ability of mathematical concepts understanding increases using Lasswell Communications Model than those using conventional learning models.

Description of Data N-Gain

Improving the data of students' understanding of mathematical concepts in trigonometry material are summarized in Table 6.

Table 6. Data Description of N-gain of Mathemathical Concept Training Capabilities

Group	x-max	x-min	Tendency size Central			Size Group	Variance
			X	M0	me	R	sd
Experiment	0.88889	0.57143	.7331	0.69231	0.72727	0.01746	0.09 636
Control	0.77778	0.38462	.5502	0.58333, 0.46154 and 0.63636	0.54545	0.39316	.110 6

N-gain data analysis

Table 7. Hypothesis Test of N-gain

Group	Average	Variance	t	t_{table}	Decision
Experiment	0.702398276	0.005540705	9.36394	1.99547	H0 is rejected
Control	0.52047	0.00767			

The analysis of the post-test revealed that there was an increment in the ability of students' mathematical concepts understanding at the experimental class. It was better than the control class, this was due to several factors: 1) Students at the experimental class were more comfortable with learning because learning was conducted in the model of heterogeneous groups. So that students who have low ability in understanding mathematical concepts were encouraged and assisted by students with high ability, 2) Students in experiment class were more prepared in the learning process for the Lasswell Communications Model emphasized to study first before going to school.

This study was relevant to the previous study, the research has done by Khoida, the results showed that students who were being taught by Lasswell Communication Model were better than students who used conventional learning models (Khoida, 2016). Another research was conducted and the findings revealed that teaching students using innovative learning models was better than using the conventional learning model in mathematics (Afrilianto, 2012). According to two previous studies that have been described above, it is said that students who had been taught by Lasswell Communications Model were better than those who had been taught by the conventional learning model. In this study, the authors proved that Lasswell Communications Model can improve students' learning outcomes and the ability to understand mathematical concepts.

CONCLUSION

The National Mathematics Teacher Council revealed that students' mathematical concepts understanding is shown by the student's ability to: 1) Define oral and written concepts, 2) Determine examples and non-examples, 3) Use symbolization, diagrams and models to present formulation, 3) Change the form of presentations to other forms. This quasi-experimental research was conducted with a population of 17 SMA in Bandar Lampung. Data collection was carried out through tests where students were asked to answer 5 questions in the form of an essay.

Based on the post-test of the hypothesis test, the ability to understand mathematical concepts on trigonometry material can be seen that t = 4,66476> Table = 1.99547, this means that the level of significance $\alpha = 0.05$ H0 is rejected. The conclusion is that with the use of the Lasswell communication model, students' ability to understand mathematical concepts increases compared to students who use conventional learning models. There were differences in the improvement of students' mathematical concepts understanding by using the application of the Lasswell Communication Model and the Conventional Model. Increasing the ability of students to understand mathematical concepts by applying the Lasswell Communication Model is better than the conventional model. Therefore, for further research, it was suggested to conduct comparative studies on teaching Mathematics using Lassweel Communication Model and another model.

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