



**THE EFFECT OF PALAR -ASSISTED MID ON STUDENTS'  
MATHEMATICAL COMMUNICATION ABILITY AND SELF  
CONFIDENCE**

**Zalmira Aidina Barus<sup>1</sup>, Tanti Jumaisyaroh Siregar<sup>2</sup>**

<sup>1</sup> Pendidikan Matematika Fakultas Ilmu Tarbiyah dan Keguruan  
UIN Sumatera Utara Medan

Email: [zalmirabarus2000@gmail.com](mailto:zalmirabarus2000@gmail.com)

<sup>2</sup> Pendidikan Matematika Fakultas Ilmu Tarbiyah dan Keguruan  
UIN Sumatera Utara Medan

Email: [tantijumaisyaroh@uinsu.ac.id](mailto:tantijumaisyaroh@uinsu.ac.id)

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**Abstract**

*This study aims to determine the effect of the Meaningful Instructional Design learning model assisted by PALAR Media on students' mathematical communication skills and self-confidence. The method used by the researcher is a quantitative research method, with a quasi-experimental research model with a Pretest-Posttest Control Group Design research design. The data collection technique used is a test of mathematical communication skill and a self-confidence questionnaire. Data analysis techniques used are normality test, homogeneity, and t-test. The results of the research are: (1) there is an effect of the PALAR media-assisted Meaningful Instructional Design learning model on students' mathematical communication skills; (2) there is an influence of the PALAR media-assisted Meaningful Instructional Design learning model on students' self-confidence.*

**Keywords:** *Mathematics Communication Skills, Self Confidence, Meaningful Instructional Design, PALAR*

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**INTRODUCTION**

Ability communication is ability who must owned by every students. Ability communication student this is wrong one point important in learning mathematics. Ability communication math that is capacity for communicate thought math with image, table, line, or media who different for explain problem math and delivered with language math in process teaching and learning math (Yusra & Saragih, 2017). Opinion another delivered by (Rohid et al., 2019) who declare ability communication math is ability for reveal ideas math, understand, rate or respond ideas math and use term, notation, and symbol for serve ide. (Nurlaila et al., 2018) declare that communication math is way for reveal a idea math by verbal or is written in shape image, algebra and diagrams. Based on definition above can we conclude that ability communication math is a ability student in convey something who know it through event dialogue or relationship who happened in learning, where contains about material math who studied student, for example is concept, formula, or strategy solution a problem.

The form of students' mathematical communication studied in this study is written mathematical communication skills. This is because writing is one way to form mathematical communication skills. Writing can also include disclosing what students have and have not understood. In this study, the researcher took the indicators used as a source of perspective in this study, specifically as follows: (1) The ability to state problems, ordinary events and pictures in mathematical language and make mathematical models of an event, then, perform calculations or solutions mathematical problems completely and correctly (Mathematical Expression), (2) The ability to describe or introduce objects, pictures, or original graphics in mathematical thinking (Drawing), and (3) The ability to re-express a part of mathematical events in their own language (writing) (Hendriana et al., 2018).

Mathematical communication becomes a standard that must be developed in learning mathematics. This is because this mathematical communication ability stimulates students' ability to develop ideas and knowledge in finding mathematical concepts being studied (Dewi et al., 2020). As we know students' mathematical communication is currently decreasing given that for the past 2 years students have studied online. This online learning occurs due to the Covid-19 pandemic that has hit the world. The existence of online learning further reduces the level of student communication. This can be seen based on the researcher's observations of class VII students in the odd semester of the 2021 academic year by giving a mathematical communication ability test to 30 students at SMP PAB 3 Saentis regarding algebraic material. Based on the tests given, it is known that students who have difficulty stating problems, ordinary events and pictures in mathematical language and making mathematical models of an event, then, performing calculations or solving mathematical problems completely and correctly there are 19 people (63.3%), There are 18 people (60%), who have not been able to re-express a mathematical description in their own language, there are 21 people (70%). This shows that students' mathematical communication skills in learning are still very low. This condition is in line with the opinion of other researchers such as (Murtafiah et al., 2021) which states that students' mathematical communication skills are still low.

Writer estimate that low ability communication math every student this due to lack taste trust myself (*self confident*) student moment learning. (Purnomo and Wahyudi, 2020) declare that exist attachment between ability communication math s who owned student with *self confident*. Condition this in line with result from TIMSS and PISA in (Salam, 2017) mention "ability" communication math student still was on category who low. This in cause by some factor, wrong only one *self confident* (belief myself).

*Self confident* is trust who owned individual in grabbed success and competence, sure top ability about myself and can face situation in all around (Andini et al., 2018). Opinion another delivered by (Tanjung and Amelia, 2017) declare that trust myself is confidence top ability myself alone so in act don't too worry, feel free for do things who fit wish and in charge answer top his deed, polite in interact with person, have encouragement achievement and can know excess and lack myself alone. Until can we conclude *self confident* is attitude positive a individual feel sure with competence who owned in variety situation. As for perspective indicator *self confident* participant educate who used by researcher that is indicator who put forward by (Hendriana, et al., 2018) in the book that is as next : (a) Believe against ability myself, (b) Act independent in took decision, (c) Have concept myself who positive, (d) Dare reveal opinion. in relation with education math, in particular, research have show that trust myself student in learning math is thing who important, as success or failure student in learning math generally in line with level trust myself them in math (Ciftcy & Yildiz, 2019). Believe myself refers to on strength and ability someone for do a task (Moneva & Tribunalo, 2021). Believe myself is problem who enough essential in world education. This can we know based on interview researcher with teacher and some participant educate in Middle school PAB 3 Saentis is known that mostly student moment learning last don't do communication, good to teacher and to his friend. Besides that, from questionnaire trust my self student who is given to 30 participant educate class VII in Middle school PAB 3 Saentis, stated that 17 person student (56.6%) haven't i believe on ability alone, 20 person (66.6%) haven't can act independent in take decision, 14 person (46.6%) haven't have concept myself who positive, and 18 person (60%) haven't dare reveal opinion. Result that in line with (Zainuddin & Perera, 2019) who declare student don't sure will ability so cheated. Though on basically student have study material who have exposed, and don't excited moment follow learning in class.

Ability communication math and *self confident* student who still low this caused by some factor among them is model learning who boring and don't effective who where process learning just one direction that is centered on a teacher. Where teacher give material ago direct give. So cause in process learning communication between student and teacher still less good (Noviyana et al., 2020). Besides that (Wigati, 2019) too declare that bored student moment learning due to educator don't use media learning who interesting and look monotonous. Above who cause ability communication math and *self confident* student getting low.

For increase ability communication math and *self confident* student this teacher need do alternative change good from model learning and usage media in learning. Process learning in class must designed by creative and innovative. Teacher should apply model learning who made situation class more conducive for support process learning (Suarsana, 2018). Teacher must apply model learning who support creation situation study math who positive and fun. Model learning who is considered right for this that is model learning *Meaningful Instructional Design*. *Meaningful Instructional Design* is model learning with design means who meaningfulness study and effectiveness with way made skeleton work-activity by conceptual cognitive-constructive (Lestari & Yudhanegara, 2015). (Mandagi, 2020) explain that *Cooperative Meaningful Instructional Design (C-MID)* is model learning who emphasize meaningfulness in study and effectiveness with way made skeleton work activity by conceptual cognitive constructivist and have syntax learning; (a) *lead-in*, (b) *reconstruction* and (c) *production*. Until can we conclude that *Meaningful Instructional Design* is a skeleton work who built by conceptual with master concepts math, because is linked with on concepts relevan who exist instructure cognitive someone with effectiveness and meaningfulness study. Where syntax learning is (a) *lead-in*, (b) *reconstruction* and, (c) *production*.

Besides model learning usage media is thing who must noticed by a teacher. Media important as bridge liaison learning more interesting and don't is boring. Media here can is all tool physical who can serve message and stimulate participant educate for study (Hasan, 2021). Wrong one media who used who can support learning is multimedia Interactive. Multimedia interactive who used in research this is video learning simple entitled Smart Study Algebra (PALAR). Usage media that with model *Meaningful Instructional Design* can maximize study means as who meant from model *Meaningful Instructional Design* that. Participants educate can understand contents more means with use approach learning who oriented on a problem. This agree with (Madewi et al., 2020) who declare usage media interactive who is video learning can help process learning in overcome exist difference ability who owned student on moment understand material lesson. Activities student when study with use video learning by independent made student more understand material with made summary with good so will influence ability student in thing communication math (Yuniar et al., 2018). Existence result research above made researcher give conclusion that media too will increase *self confident* student because student already was pushed in communicate moment study.

Exist some research earlier who support related implementation model learning *Meaningful Instructional Design*, of them researched by (Yuliani & Pratiwi, 2020) where result research is model learning *Meaningful Instructional Design* this can increase result study cognitive students. Research more delivered by (Komariyah et al., 2017) where result research declare that usage model learning C-MID more good for increase ability communication math student than use model learning. However haven't exist who discuss by simultaneously about ability communication math and *self confident* student with model learning *Meaningful Instructional Design* help Media PALAR. Then from that researcher was pushed by independent for do it research about Influence Model Learning *Meaningful Instructional Design* Helped Media PALAR Against Ability Communication Math and *Self Confidence* Students.

Study this need researched remember importance ability communication math and *self confident* student in process learning. Result research this can become reference and source reading for all audience especially energy education. Besides that research this can made educator for motivate myself and trying created atmosphere learning who active, creative, innovative with collaborative. As for goal from research is for know influence application pen model learning *Meaningful Instructional Design* help media PALAR against ability communication math and *self confident* a student.

## **METHODS**

Method who used by researcher is method research quantitative, with model research experiment pseudo (*quasi*). With design research *Pretest-Posttest Control Group Design*. In research this involve sample as much two group, where one group got treatment called with class experiment and one group more become class control. Group class experiment get learning math with model learning *Meaningful Instructional Design* help media PALAR while group class control get learning math like normal that is with model conventional without help media. Activities first on research this is with give *pretest* is test ability communication math and charging questionnaire *Self Confidence* with goal for know ability early communication math and level trust myself early student good on class experiment and class control.

Variable free in research this is model learning *Meaningful Instructional Design* help media PALAR and variable tied up is ability communication math and *self confident* students. Population in research this is s student class VII school PAB 3 Saentis lesson 2021/2022 semester odd. While take sample selected by random, that is technique take *cluster random sampling*. Sample who was chosen on research this is student class VII-1 as much 30 person who made as class and student class VII-3 as much 30 person who made as class control.

Technique collection data that is with give test ability communication math is *pretest* and *posttest* who consists from 5 question description ability communication mathematical, material Algebra and questionnaire *self confident* before and after treatment who consists from 25 statement. As for stages technique analysis data, of them; (1) Test normality, aim test what value *posttest* student come from from population distributed normal or not. (2) Test Homogeneity, Test homogeneity aim for know similarities two class research. (3) Test Hypothesis, test hypothesis done after test normality and test homogeneity fulfilled distributed normal and is homogeneous. Test hypothesis in research this use test *Independent Sample t Test* or called with t-test.

## **RESULT AND DISCUSSION**

### **Result**

Implementation research this in school PAB 3 Saentis. Result research quantitative in research this is score ability communication math and *Self Confidence* student who earned from result *pretest post-test*. Next is summary analysis data result research.

**Table 1. Description Data *Pretest-Posttest* Ability Communication Math**

Class	<i>Pretest</i>		<i>Post-test</i>	
	<i>Mean</i>	<i>Std. Deviation</i>	<i>Mean</i>	<i>Std. Deviation</i>
Experiment	42,67	15,128	81,50	10,840
Control	40,50	15,666	62,00	11,934

Based on table 1, average score *pretest* ability communication math student on group experiment with group control don't far away different. This conclude that average ability communication math student class experiment with class control is almost the same. However after gave it treatment have difference big from average result *post-test* second class. Where average class experiment more height compared class control. As for difference value average between second class reach 19.5.

**Table 2. Description Data *Pretest-Posttest Self Confidence***

Class	<i>Pretest</i>		<i>Post-test</i>	
	<i>Mean</i>	<i>Std. Deviation</i>	<i>Mean</i>	<i>Std. Deviation</i>
Experiment	61,57	8,541	84,10	8,102
Control	60,80	6,248	71,47	7,749

Furthermore, on table 2 can seen average score questionnaire *pretest self confident* student class experiment with class control don't far away different, average almost the same. However after is given treatment look difference big average score questionnaire *post-test self confident* student class experiment with class control. As for difference value average between second group is 12.63.

Before testing hypothesis, over first done test normality and test homogeneity. Test normality sheet *pretest* and *post-test* really important because aim for know that data distribute normal or don't. Next result test normality test ability communication math and questionnaire *self confident* :

**Table 3 . Result Test Normality Class Experiment and Class Control**

Test	Class	<i>Tests of Normality</i>					
		<i>Kolmogorov-Smirnov<sup>a</sup></i>			<i>Shapiro-Wilk</i>		
		<i>Statistic</i>	<i>df</i>	<i>Sig.</i>	<i>Statistic</i>	<i>df</i>	<i>Sig.</i>
Communication Math	<i>Post-test</i> Eksperimen	,155	30	,64	,931	30	,052
	<i>Post-test</i> Kontrol	,149	30	,89	,949	30	1,155
<i>Self Confidence</i>	<i>Post-test</i> Eksperimen	,117	30	,200*	,959	30	1,285
	<i>Post-test</i> Kontrol	,102	30	,200*	,977	30	1,738

\*. *This is a lower bound of the true significance*  
*a. Lilliefors Significance Correction*

From data who exposed above we can know that test ability communication math and *self confident* student on class experiment and control distributed normal. This can seen from result sig data more from 0.05.

After done test normality and data already distributed normal, next done test homogeneity who work for know that data who earned is homogeneous or don't. Next result test homogeneity test ability communication math and questionnaire *self confident* :

Table 4. Test Homogeneity Class Experiment and Class Control

Test	Tests of Homogeneity of Variance				
	Levene Statistic	df1	df2	Sig.	
Communication Math	Based on Mean	,321	1	58	,573
	Based on Median	,521	1	58	,473
	Based on Median and with adjusted df	,521	1	58,000	,473
	Based on trimmed Lmean	,323	1	58	,572
Self Confidence	Based on Mean	,251	1	58	,618
	Based on Median	,192	1	58	,663
	Based on Median and with adjusted df	,192	1	57,992	,663
	Based on trimmed Lmean	,251	1	58	,618

From data in top can we know that test ability communication math and questionnaire *self confident* student is homogeneous, due to result sig more from 0.05. After data pass test normality and test homogeneity, new do it tes. Test hypothesis researcher use test *Independent Sample T-Test* or test t. Test t this addressed for see influence ability communication math and *self confident* student who was taught with model *Meaningful Instructional Design* help media PALAR. Next is result test hypothesis research this.

Table 5. Result Testing Hypothesis

Dependent Variable	Leven test		t-test for Equality	
	F	Sig	T	Sig (2-tailed)
Communication Math	,321	,573	6,625	,000
Self Confidence	,251	,618	6,188	,000

From table above we know that result t count test ability communication math is 6,625 and questionnaire *self confident* is as big as 6,188. Based on level 5% (0.05) value t table data research is 1,697. Then can concluded that value t count for test ability communication math and *self confident* student more big than t table then  $H_a$  accepted. Besides that the result can seen from *Sig (2 tailed)* is 0.000 more small from 0.05 so  $H_a$  accepted. Until can concluded that exist influence *Model Meaningful Instructional Design* Helped Media PALAR against ability communication math and *self confident* students. This too supported by difference *mean* result ability communication math and *self confident* student who was taught with learning *Meaningful Instructional Design* help media PALAR with learning direct. Where, average (*mean*) ability communication math and *self confident* student more height moment apply model *Meaningful Instructional Design* help media PALAR in learning.

## **Discussion**

Based on result research above, wrong one factor who most influential against ability communication math and *self confident* student is model learning and support media learning. Existence model learning who good and support media learning will created environment study whom good. special in research this used model learning *Meaningful Instructional Design*, where model this applied on class. Started from division group, ago is given problem is experience in world real shaped video learning. Then student think productive for information from experience. Then teacher explain material who contained in problem experience real. Next student in finish question who is given by a teacher. Next them show result work them. Hal here who can develop cause trust myself student who steady. Until maximize ability communication math every students.

As for research who have done can we see that result *pretest* and *posttest* question ability communication math and questionnaire *self confident* student show that application model learning *Meaningful Instructional Design* more height compared with model learning. This in line with research who done by (Komariyah et al., 2017) where result research declare that usage model learning C-MID more good for increase ability communication math student than use model learning conventional.

Based on result test questionnaire who done starts and at the end have difference. Level trust myself student experienced increase. Increase *self confident* student this caused by emergence excited student in process learning who means and productive. (Purnama & Fadli, 2020) declare that *Meaningful Instructional Design* is model learning (*instructions*) that is put experience study them with the experience then in apperception to in shape real and brought groove who productive. Until student don't just understand theory just but can created thing new from concept who in understand. With so appear excited student in carry out learning. So declare have influence model learning *Meaningful Instructional Design* help media PALAR against ability communication math and *self confident* student.

## **CONCLUSIONS AND SUGGESTIONS**

Based on result research who implemented, concluded that : (1) have influence model learning *Meaningful Instructional Design* help media PALAR against ability communication math students. This strengthened with was found difference average between second class. Value average class experiment more height than class control. (2) have influence model learning *Meaningful Instructional Design* help media PALAR against *self confident* students. This can seen from result questionnaire who declare class experiment have average who more height than class control. Based on result research and discussion, researcher suggest every teacher modify learning interesting interested student so bring up excited study, good from media learning both and model learning or thing more who refers to in repair process learning.

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