The effectiveness of Realistic Problem-Based Learning Model Development Toward Communication Skills and Mathematical Disposition of Vocational High School Student

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distract. The effectiveness of stabletic problem-based Institute 128, a collections of couldest present based bearing (1978), a noded to sected reconsistent continuous continuous that and mathematical disposition of vocational high relocal stations. For this purpose, it is used 2×2 factorial resourch design. The sample is determined by two stages of resulting compiling technique. Even this research, it is found that I company scattages. From the security, as from that if there is difference of mathematical consumination skills of vecational light school endows faved on mathematical disposition level (high, lee); 2) there is difference of mathematical communication skills of vecational high school students based on harming model (Realistic Model PRI, Conventional): (6) there is no interaction between learning model with mademotical disposition on the mathematical communication ability of vacational high school students.

Keywords Academ Model PHL communication. distribut

1. Demonstrow

The quality of education in Indosesia, among others, nor be observed from the level of methometical mentary possessed by the insteads. From the results of an international survey conducted by Trend in Hatherenties and Science Study (TIMSS) in 2011, it was found that the markey level of mathematics stalls of Interestina students in stall for satisfactory. Therefore, there is a needs to improve the reastery of mathematical separation in every level of education in Indonesia, including in vocational high schools (SMK)

In SME, materialies includes in computary subject pump as it is a tool means to master other fields in science including the areas of experties, which is chosen by the students who study is vocational high schools, in addition, according to National Counce of Teacher of Mathematic NCTM (100%) [1] metherarises has a large contribution in the achievement of life skells, such as problem arising ability, reasoning and proof ability, interconnection ability (connecting). the ability to communicate ideas (in communication); and the shriny to represent (representation). NCTM (2000) [1] states that the above shifting are skills that are needed by enclasts in this century because it supports students to adapt to where the

audiets live, work and in heir community. This is in line with the openion of Barson (1997)[2] that senior-recational-school graduates also have to master recotional scheel graduates also have to master mathematics, it addition to the area of expertise that they have stacked. So, it is not surprising that one of the goals of ascutional education in developed countries like the United litates (US) is to profeee graduates with good mathodella.

In a preliminary study that is done in one of Vocational is school (SMIC) in Padang, it is found that mathematics is a subject that is less interested by the students to study tended to distinguish nuthonation with soluted to their orea of the proficiency in SMK. The massin is that selectors do not realize that mathematics contributes mostly in colving overvolvy problems, melating the areas of their professions. But they surely, in addition, from narrows that have been concluded with SME students, it is obtained a description that the expensions of mathematics. harring in the previous education level left a bad supression for the students themselves. Mathematics is: dways identified with complex calculations a tense leaving or incomment and amount of tasks given. Mathematics learning is obtained as less meaningful for recommend audients in sultime, those conditions make nathematics become a less prioritized subject for vocational

Maurichile, utill about mothemates harming in SMK, [3] found that teachers of SMK in some provinces in Indonesia generally had difficulties in implementing contextual and nalistic learning and in schiering learning achievement concrete metheranical cotheir respective classes. It is also found in SMK of Padana that learning is will contened on the teachers and the students are still difficult to answer the questions about the nathamatical communication skills provided by the teacher. Students have not been able to communicate their tokes in he Sen of symbols, reading graphs to giving explanations en wetten answers.

These situations can cartainly be associated with TIMSS tescench conducted in 2011. One aspect that is measured in natheristical communication within hi is found that the Commented (422) Photodobia

Consessation (KES) Flore delvis it are almost per to market

achievements of Indonesian students have not achieved satisfactory results. Informin is at 38th tanks among 63 countries. The average difficulty experienced by students is not being able to turnilate the questions into tables and alternates, as shown in Figure 1.

In this study, only 28% of Indonesian students are oble to answar the quotions connectly, while the international average is 48%. Compared to other counting, the ability of Indonesian students is translate problems into language or mathematical ideas in the form of shagrants or graphs is still below the surrous (FIMSS, 2001)314.

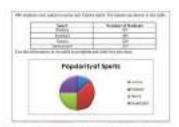


Fig. 1. Dazuf TMSS Communican Problems (2016)

The cause of the lack of nuthernatical communication among stations in the lack of postesion of opportunities for students in communicate from these. As a result, teacher ready fastes he madern ineas in solving much problems. Turnusic (2008(8)) argues the giving opportunities and bissioning to student's allows intuin solving proteins to also in askinosing to student's about many solving proteins to a key in askinosing nothernatical communication skills. In an effect to develop students' mathematical communication skills, backers used to confernat students or most inour. This giving students the opportunity to communicate, their ideas in survivag their exciting problems (Samaruso, 2011(6), and Permana, 2014 (27)).

The peor ability is mathematical communication results in students' difficulty while solving mathematical problems encountered in overview life. This difficulty positions mathematics into a orbital life. This difficulty positions mathematics into a orbital method by enclosis. When students are exposed to mathematics, the attitudes of the students are lock of confidence mathematical life, and we appreciation of mathematics. If a triviales chows are called methodation dispositions. A arthonomical disposition is defined as an affraction and appreciation of mathematics, a tendency in think and act positively, including edifferentialized, turnoity personance, orthonorum in learning personal publishes. Realist, withing to share with others and reflectively in math artivoses. (Wordon's 2008/7E, A live mathematical disposition trial neak in a lock of appreciation of the mathematics of mathematics is overpide life.

A mathematical disposition is said to be good if the students are interest toward problems as a challenge and a volve themselves directly a finding or solving the radiomatics problems. Mathematical dispositions can be obser 13 when students solve mathematics problems. They are confident diagram, interested, and have Bendis thinking to explore various alternative solutions as problems. The learning

process is perceived by the melanic when adving the shallenge Student's mathematical disposition on devolt 25 when they learn other supects of competence, IRL. Thus an be concluded that if mathematical communication skills developed than student's mathematical disposition will also develop. The Improvement of communication skills and notheratical disposition of vacational endents can be isolisted by preparing mathematics forming well. Learning with classical patterns often provides mustiofactory conditions and learning rescornes, lecause it does not provide sufficient space for students, making students more passive by simply hearing explanations from teachers. As a sult the students do not mayter mathematical concepts and lack the opportunity to do reinvention (Abd., 2004) [9], and lummino (1993) [11]). Problem solving monel with the correct situation (confestual problem) should become a labiti for taschers in SMK (tested on Jermanlikeas No. 41 see 2007 [12] and Permerlikhed to: 22 of 2006 [17]. fluxed on the exposure of the above problems, serious afforts aromanical to address 24 various problems that exist One of them as by applying Problem Based Learning Model 6°51; with feature Materianics Education (RME), According to Arendo (1971) [14]; Hell, is a model of learning where studies [22] o arthority problems with the advantum to compile studients own knowledge, discolor inquiry and high-level thinking dills, develop self-rehance and self-confidence. They needed in in accordance with the sharasteristics of the existing problems. Irobline solving and contextual problems are the hallmark of PSE. Model This model also strongly emphasizes the element of unneverk that strongly supports students to improve their communication skills.

Due of saming approaches specifically designed for methometric in Realistic Mathematics Education (BME) approach The approach instated by Freadhurthal (1970) is an approach that emphasizes analoustic mathematical proceeding skills discussing and collaborating, negating with desonates so that students can find from own and overstually see math to solve positions both milwishnally and in proceed 100.

Realistic mathematics adminion (RME) approach begins with the time of realistic problems or problems that inc. he magned by stakens to drive their toward the process of mathematication. This approach also his characteristics that are positive commissation problems and mathematical depositions described previously.

PRI. model and RME approach have some similarities, such as a sing sual problem connectual) and can be imagined by the statistics, and familiarize student to communicate on the form of discussion, argumentation, or in within form. From the integraces of PRI, model with RME approach, it is developed as learning model called Reading PRI. Model. Reading PRI. Amed. Reading proposed to improve communication distribution and mathematical disposition of receiving high school statistics. These does the advocacy exploration, this paper in located on the effectiveness of the development Realistic Model PRI. on Mathematics Learning in Younford High School (SMIK).

II. Веньмен Митюою ост-

This research feetined on the effectiveness of PIII. Scalintic Model of mathematical communication skylls and

Coveranted (K13) Photo-Aritic photo-reduct to all

realterestical disposition of viscotional states. This research was a development research by u. 7. Pompusched (2013) [13] commissing of 3 phases, namely. It publishment phase, 21 probatiging & development phase and 3) measurement phase, was

This research tank plane from the hogostering of August 2017 artif the and of Ospher 2017. To be able to achieve the expected research objectives, then this research was designed by using 2 - 2 factorial design.

The determination of subjects was conducted by the technique of two stages tandom sampling. Stages I was carried out by a purposity scenpling that was by choosing schools that studied outner materials omatris) in the curron semester but not at the same time, otherwise it was expected that the school has a close beatine, in order to tachtitle the implementation of research. By this stage, the selected schools are closs XI of SMKN 4 Palang and Class XI of SMKN 8 Palang. The time school learned pastric (SMKN 4 Palang) was then positioned as the first tree, white SMKN 8 Undang selected as the secondarial.

After throwing places for the execution of the research, then the stages II (copplying random nampling technique for the population, which was established to both schools) was certical cost. To know the normality, the homogeneity and the capacity of test average, in the population, fitatistical Product and Service feetros. (SPSS) software was used to the other, the population was instead and homogeneous as well so had the come average, so that it allowed to determine an experimental class and a central class in addition, the road maps II poissed that in SMK 4 Package, then XI Accounting A as control class and Close XI Accounting B as experimental class. Meanwrit 19 SMKN 8 Package, then Krys Testal I was shown as an experimental class and Krys Testal I was accounted that in SMK 19 and 19 as a control class.

Took for both ochools more hold in first mortings. The experimental class was funded with the developed model. Building 1981, model with a system committing of 7 phases.

1) presentation of realistic problems 2) understanding and problem softring 3) processes of missistens 4) presentation of work and reflection 5 of incompany and and concepts of Exercising and 7) closing evaluation. While the fearning in the control class was done by the usual learning strategy, the same as done before

Two instantents were used to see the effectiveness of Rossiste PRI. Model, sursely 1) the test designed in accordance with preferring mitherantical communication ability indicates assi 2). Questionnaire Disposition scale Before using both instruments, firstly, the instruments were validated in 5 experts. Afterwards the instruments were revised in accordance with the input of the experts and finally the instruments were used as a trial to XMEN 1 SLMBAR. The benefit of this trial term to obtain a trialy qualified nontunent in this study.

The results of the misd for both test (soven problems of mathematical communication skills) and questionates of mathematical dispersions were described as followings.

1. Test of mathematical communication skills

The test results showed that all items were railed where the validity was determined by Statistical Treduct and Service Selection (SPS) software (the Product Moment Correlation formula showed all values of x 0.5). All there due had significant differences consisting of problems with earsy moderate and difficult indexes. The reliability was determined by the formula Alpha Cambach, which gave plability value $n_1 = 0.004$ with extents pertained high. All of those rouths confirmed that the test of medicentoical communication skills that have been graphered was appropriate to use in this endi-

I. Questionners of mathematical disposition

The ability of methomatical disposition was measured by using a disposition scale specifications which is associating or 40 distinguish that measured sholeses insured to not methomatically. The indicators contained in the disposition scale work: If confident in amount problems, 2) flexible in doing methomatics work. If trially determined at solving mathematics problems, 4) pressuring high particularly on everything about mathematics. and 5) sitle so think self-entirely in mathematics. The scale of this mathematics. The scale of this mathematics. The scale of this mathematics is the self-entirely in mathematics. The scale of this mathematics is the scale flow consisting of 5 response categories. Straight signer (SS), Agrice 15). Double (B), Disagree (TS), and Strongly Designee (SS).

The disposition scale that was conducted in SMKN I ULMINAR and resulted in 3 learns of declaration, learning 35 intersect items, which all of them were valid (t_{min} h_{inte}) and mosting the high obsolutive appears

Data Analysis of Mathematical-Communication-Skills's Some of SMK Stadouts.

Some of SMS, Stations.

The network given by attained in the test of mathematical communication which were succeed by using soming relative whom 23 is indication toward specifically developed for stations mathematical communication shifts. The results of the communication feel were formed to determine the first communication of the consequence and from converted into qualitative flam to determine the category of students ability. The category of students enables another action of the communication shifts was shown in Table 1.

TUBLES. STERNING COMMON SOLD CHICAGO

Markey still (*14	Profeste	Louisef Effections
16 - unit; 160	Very good	Veryillation
N - see 1.86	Clevel	Etherer.
40 - sees; 78	Soldster	Distrement
35 Floore (188)	. foot	Levelium
saver cl5	Very poer	Nasdance

b. Data Analysis of Student's Mathematical Disposition.

Sorres obtained from the disposition under which were given in the students must be interpreted obviously. To find it ruit, it calegorization process can be done remarkedly by a filing descriptive shifts in investing days 4 on scale scene. The congruention was hard on the assumption that the nilpart acre in the grasp was in estimate of the subject score in the grasp was in estimate of the subject score in the population in which the indipart score is the population in which the indipart score is the population as which the indipart score is the population was meanable distributed (Azeria, 2016) 1171. The

estigney of mathematical disposition was shown by Tuble II.

TABLE II. Carmery Montance at Personnel.

Source	Category.
Suore - 10Th	You Lea
60% ≤ Sunce - 70%	Low
Total Special Services	Assessed
BITS Chart I NYs.	High
Sorg ir 99%	Very High Transport (2013)

e. Hypothesia Ecotog Azolycia Tachnique mith Funktiold Design

Thy pothesis testing analysis had the purpose to leaf the hypothesis to find out the effectiveness of Bankuto PHI. Model is the field of experiments with factorial design where the use of factorial design allowed the interaction of the components of independent variables and bound.

TABLETIC PAYRODIC RESIDENT DISSET

Learning Model Mathematics objection	Braffott Minht Hill. (N.)	Hald (S)
High dosture receil disposition (V)	300	Xm-
his authorizant disposition (No	X/%	20%

Internation.

- X₁Y₂ reallernation consumption ability of the students who had high eatherstical disposition by using Radistic PEL Model
- N.Y. reathership communication ability of the students who had high mathematical disposition by using conventional learning model.
- N₁Y₂ | reatheration communication ability of students who had loss mathematical disposition with development of Realistic World PBL
- X₂Y₂ mathematical communication obliny of statems who lad low arothemetical disposition by using conveniend fearing model.

After that, the effectiveness test was done to test the main effect of the hypothosis and the interaction effect of the hypothosis. Each of the main effects and the interaction of hypothosis effects in well in their data analysis techniques were described as follows: 1) Main effect hypothosis:

- a) Hi. There was no difference in nothernotical communication ability between students (sught by PRL Halliste Model and indicate taught by conventional horming model.
 - There was a difference in morbinstical communication ability between students taught by PBL Realistic Model and students taught by conventional fearing model

- H₀ These was no difference in nutlematical communication skells between students who had high markersolval dispositions with low mathematical dispositions
- 18. There was a difference in the ability of mathematical communication between students who had high multiconnectal disposition skells and students who had a low multiconnectal disposition
- 2) Hypothetical interaction effect.
- i) H_e: There was no interaction effect between learning model with multimatical disposition on closents. nothenotical communication ability
- 1) III. There was an intruction effect between learning model and mathematical disposition on students' motherament ability.

For the purpose of hypothesis testing with flutorial design regaring data to be categorized into two parts (high imposition and low disposition), then the categorization process was done by using Cat off point, as shown in Table VI below.

TABLETY DROYCOMORGONOS FOR THE PERPENSION DROWN THE PERPENSION OF THE PERPENSION OF

Displacing of Dispusition Score	Cated) Point	Citeria	Olegon
Normal.	Mon	Digreton-	Fitals
		Thipsakon C ware ware	Topic .
Tatal House	William	Proposition III	real
		Tropostren S.	Line

In this study the annount of data in early well way not the ume. The technique of data analysis for mise effect hypothesis and attention effect used two path Assava with a way not squal (Separdi, 2013) [19].

III. RESELY AND DISCUSSION

- i. Risult
- Mathematical Communication Skills

a. Middensified Communication Skills. Field tests that had been conducted at two schools SMKN of Padeng & SNON 8 Padeng) unded with a measurement of students' methamatical communication kills. In the cummary, the measure of methamatical communication skills of students in the experimental and control classes in both schools were aboven in table V.

TABLE V. The Avenue in Mathematica Department in Bell a strength from the SANC A AND BME & Presion

Class:	SMKN 475	larg	SHEN Frading	
station -	Experiment		Exertime	antol
9.	29	23	36	- 15
7	01.79	95,33	72.51	3400
None	90	13	45.81	36,64
None	87	3.2	MCAP.	2530

80	110.24	214.0	149.26	320.64
	11.58	14061	11.11	13:05
≥ KKM	24	13	36	1
< KIKM	2	22	34	34

From the table V, it can be sear that some of mathematical communication addity got by hoth experimental classes taught by Realistic Model of PSE, had

experimental classes taught by Realistic Model of PIL had higher mean value than had got by the control classes. However the shandard deviation of experimental class was smaller than that got by control class at both schools. See 2 bity, it can be road that the experimental class had better enthernolical communication skills than the control class. This can be resistered by the qualitative interpretation of students' mathematical ammunication skells in detail as shown to table VI believe. shown to table VI ballow.

TABLE VI. DETERMINATION OF WATERWAYERS CHARGESTON STREET, STRE

Del CONTRA	200-1-1-1-2013-1-1-1	534	KN4	554	KN8
June CO' effectivements invol	Convenientes Stat	Step. Class.	Cast	Elep. Clan	Class
Vice:	Verygood	13	*		
Effective.	Cloud		2		2
Ulactive	Association	. 4	*	19	- 11
Less affective	Ties	4	13		2
Notethictive.	Very goon			1	12
	Tetal	. 39	50	.30	34

From Table VI. It can be sen first in the experimental class at SMRN 4. Instanting mathematical communication with was mostly in the "very good" category whoreas the control class was an in "lead category. Whereas in SMRN 8. Pading, it was soon that in the experimental class, stabularly mathematical communication with the experimental class, stabularly mathematical communication. If the affective state who was in "effective category. It the affective of smaller mathematical communication in the control class of SMRN 8 was in the category of "satisfactory and poor" with the level of effectivements was less effective. Details of each institute percentage of communication on each specific was shown by held VII.

TABLE VII. DRUGG PRODUCT IN SCHOOL ACRESSION POLICE PRODUCT POLICE PRODUCT PARTY PARTY PRODUCT POLICE PRODUCT PARTY PART

No.	Indicator of test	- 50	855.4	5345	CNE.
		Tags: (Tab	Chil	Esp.	rho
1	Linking rold objects, chanings, or chapteons role more streat objects	ire	27.37	801	80.74
±	Dring scene, and deep a market and strackers to project libra.	70,00	80.39	71,30	36,80
ŀ	Explaining store, markets and markets stool				

	od atomolepu with and objects, alternings or altergasses	818	38,9	mas	41.27	
d	Directory conclusions compiling evaluate and group masses				10.66	
	Avenue	417	323	75.60	11,7	

The results of each indicator ashievement (%) also ministread the finding that the separations class attoying with PEE. Realistic Model had in average better communication shifts from the control class in both exhaust.

t. Ability of Mathematical Disposition

The decord learner intent of the PHI. Realistic Model was the difference of indents matternated deposition didities between the analogs in the experimental class and the students of the control allow for this purpose, students were given a disposition scale questionnine continuing some students. The results of disposition scale questionnine processing at SMKN 4 and SMKK 8 Packag were diston in Table VIII.

TAREE/VIE: STARRY BURNAYING SOUTHER SMCN 4 (NO SMENS)
PLEASE

Calgary	- 8	8860.4		design.
	Thip .	(704 (70)	(24)	(74)
Wee field		-	5.33	
High	34,48	28-09	1647	11.1
Statistics	49,21	39,40	55.33	80,64
how.	17.34	43.46	35.51	46.50
Various.	+			3.7
Titel	100	199	300	110
21				

Table VIII showed that the 20 ceruge of statents with high and mechanic deposition ability in experimental class were higher than control class for both schools.

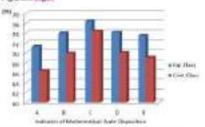
Additionally, the description of the scores per each adictive of mathematical disposition in the experimental dates and control classes for both schools teas shown by Table IX.

TABLETS. PRESENCE OF BY LAST PROBLEMS, 1986 OF STURBET MATERIAN COLUMN TO SERVICE SCALE. OF SMKING PROBLEMS OF SMKING

Na.	Mich		EXEA.	51800EF	
	doportes	- Exp.	Cont	Engli	City
1	Confidence toring total	71.20	88.3	77.17	76,15
2	Floribitity in softing work problem	23.00	40.98	72.10	3031

1		Average	7334	69.12	71.96	80,65
	я,	modic of numberatus habits to their aclor mety with modit	70.15	SNAT.	21,9	65,89
	4	flavor a bagin excisency about economising their	78.09	*	71/08	87.22
	1	Persistant is witness anoth problems	7644	74.39		75.89

The committee of data for such disposition scale indicator 20 tophic form for both schools was shown by Fig.2 and Fig.3.



nice of Substitute Males one Disposite Ability is

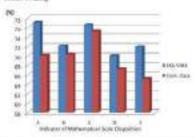


Fig. 3. Companion of Statest Nathensievá Ability is 80000 8 Palang

- AB Confident in many math

- Piceble is done mathematical work
 Determined to resolve much problems
 Have a high curroncy about everything that smalls of E | Reflective thinking drost mathematics

c. Hypothess Testing

The Learning model developed was end to be effective what delivering results as expected. In this study it was expected that the development of Journay model will

provide surficient differences, especially on the ability of numbers of communication and traderratical deposition delity of motions in experimental data when occupants with the control class. The significant difference will be investigated by seving a 2 × 2 factorial design. To be able to test the hypothesis that had been proposed, it woodone some

the temperature of the second perpendicular analysis.

To be able to test hypothesis with factorial design, then
the data must be normally devoluted and had
bettogenous varieties.

a) Ner 16 yant

The monutary test of the date was done by using SPSS offmare, which was described in Table X.

	TABLE N. TOUR			Manner	Napin-Will		
i na sui s	Zarioto	Di	No.	Barren	DC.	796	
Al	B.86	.99	B053	8.962	50-	8,3675	
AZ	8,074	80	0.209	BALL:	PF.	1,000	
10	B.100	45	6,266	0.86	45	8.D09	
142	1000	40	1000	6379	- 64	1000	
AIR	6,038	25	6288	6349	25	9,253	
A201	0,100	20	4071	1.20	26	10/01	
AHE	6.66	0.0	0,200	6265		1,000	
ATE	15	(8)	1200	9.904	*	0.478	

Librar Representation when?

Since all significance values (p-value) were higher than 0.15, then all groups of data saintied the exteris of normally distributed data.

b) Howogmosty Test

The homogeneity test of all data groups for factorial purposes was done by Levene Statistic test with SPSS and gave the following nearlt:

TABLE SI. BUSINESSETT TORTO VARIANCE

Engorators	Tanene	10/201	17/2200	1885011
Savable:	71668s	40.0	162	7984
AJAT	1.00	-	347	0.265
BIBG	2200		MT	8335
ABI-AZH	0.504	100	41	0.00
A 612-A212	3.064		1.00	0.811

Since the sig values of dependent variables were higher than 0.05 then all data was said as horizonessus.

Hypothesis Terring Hypothetical terring was perfurred by Isso-paths Farance Analysis (Anava) with megond s-cells. For the purpose of the research results, it can be surranarized some data as follows:

TABLE VII. ATTACK AND AND ADDRESS ASSESSED.

Learning Model

	Deposition Scale	Reside Madel 1981	Conventional violes	Total	
-	Nigh	90.87	45.66	HUST	18.1
	Seic	34.59	55.26	129.86	42
•	Teni	88,18	11776	27249	0
-		- 16	10		

Score's tabulation contained in table XII above problems a terrance analysis as shown in Table XIII below.

TABLETON, WILLIAMS WAS ASSESSED.

Variance : Season:	(Ree)	(Distance)	Seignation)	Kales	Total
Scanor.	1381/34	3088.71	9.95	123.7%	2740031
Dir	1.	1.		int	19
84	1770.66	WHEN TH	6.00	80,60	
Series	4,60	10.07	6.00		
Fratie	3.90	3,97	3.00		
Decision	Heat	This is separated	Buck		

Based on the surrount of the Annua in Table XIII, it appeared that the F infiberatic (Stat. Test) on the source of the "row" Sturruly was greater than F table (8-38-3-32) so that Bo-ma-rejected. Borden, because the Fernat (Stat test) on the source the districts of "robustes" was greater than F table (5-37-3-302), the mea also rejected.

On other hand, at the course of interaction diversity, it can be seen that the Festian of the interaction diversity source was less than Itable (ILIA - 332). Based in this fact the results of hypothesis testing were as follows:

- There was a difference in restlamental communication ability between students who had high disposition dilliand students who had here of president skills.
- h) These were differences in the shifts of mathematical communication between students studying with Realistic PBL. Model and students who survived with learning model when the Realistic PBL Model.
- These was an interaction between students' methoration disposition abilities and the koming model weel.

2. Discount

The results of hypothesis testing showed that students' methoration' communication shelly in SMK was influenced by mathematical disposition and huming model mod. However, there was an exceptation between the learning model and the mathematical disposition of students.

The centrits of the study added to the amount of research on PBI. Model 42 RME Approach that had been done before, each at The PBE readed our representability improve student multiconstant communication and problem solving skills [28] and it was also reconsensible to be tood as a meaningful knowing stronger that can improve student's

huming achievement and improve students' belook about Nigoran reatherastics [21].

The RME approach is various studies has pervan to be effective in railing studies stone netter in learning molecution (22) [24], improving studies? made enterpts [24], improving students high-level studies, skills [24], and improving students' orbig-tensent in learning mathematics (22) [28].

The remarch findings in this study were also relevant to some previous studies, such as: I) experimental research on the use of PHI. Model with RMII Approach with the help of S-Lauring Edn. 14. The result of the resourch showed that PHI, with RMI approach assemble by S-Lauring Ednario an improve distorts because that S-Lauring Ednario an improve distorts because that S-Lauring Ednario and Ednario research on the development of students rethermatical connection shifts through Problem-Based Methad Learning and Course there Raview. The dusty was conducted in justice help acheod with research of mathematical connection 5 Neptiment group was better him another group [24], 3) Development of Problem Based Learning Model with scientific approach on Immige material images learning movements linear or transportant manual learning movements in the learning process [25].

IV. Courtmodes

Conclusion
 From the exposure of the research findings above, if can be associated things as follows:

- a Three was a difference in the ability of methomatical communication between students who had high methomatical dispositions and students who had how methomatical dispositions. It was constuded from the results of data analysis with Aurora of two different s-call mod in which it was obtained that the calculation of statistical test was separal to 6,00 while the tables of statistic F is table was 3.92, so the dismutive hypothesis was accepted.
- b. There was a difference in the whole 10 mathematical communication between vocational stakents who were might by PM. Realistic Model with andwart who were might by crowning learning. It was concluded from the results of data analysis with Asian two different foodly post in which it was obtained that statistical test extended not 55.43 while the F statistic value is the table was 3.92 as that the alternative hypothesis was computed.
- There was no consistent offset between bearing result and mathematical deposition on sufficientical communication shifty. It was consisted from the data unityee with Analys two seedl amonal paths. The criculation of emission test was 0.00, while the statistical value in the table sum 202. This directed in the reportion of the abanative hypothesis.

7 Succession

Based on the wavelessons obtained then put forward some suggestions as follows:

- Suggestions for policy makes: Realistic PSI, model has been able to improve the ability of metheratical communication for vocational atoleots. This is expected to be one of the alternative models of mathematics learning in vocational schools in order or improve teacher competence. To realize this, the policy realizers (NMK leaders) need to facilitate the teacher by holding the regrised training.
- Suggestions for teachers and elevation practitioners. Readings: PHL model effectively reproves attached to be feeting a feeting of the province of teaching. students' accenge in exposuring opinions, and seminorization skills and mathematical disposition of students. Teachers and education practitioners can use the PRE Resiliate Model to recovered along constraints related to student activity, communication skills and reatherwised disposition of students
- Suggestions for the next respector. It is recognized that the development of the model has huntarious. Therefore, if is necessary to recommend to the next researcher to further develop the limitations of the development of this model so that it becomes more in line with the demands of each subject and advention level respectively

VCICIOMI 8 CNEW

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RESIDENCES

- [1] NCIM Prevale and Nonley for Robot Mahousius Finder, VA
- [2] Rossin Charles S. Nen Vacationalism is the Critical Source Presental Problems and Chellout. Economics of Education Review. 36 (2):211– 212, 1997.
- Shalog Figur. Moretition Combine Com. Mourout to 5565 Flori Postwiajeme Videpositia Yosg Mongoon Piels Pistonovikiano No. 2 Tabon. (2006. Jugalijeto: Frankisca. Widyo Seniora. 1999/TK Pistonositia 2007.
- Paramorta 2007.

 Taulit Fraftisi Dani Wanya, Mebiano Anakita Freebbissons Biamartia dar Kremepun Listud Seta Kimiket Sons SMK. Ungo, Joseph Michaelas, Illicolon Roscock (Illinti), 4(1), 155; Joseph Limbona Standards and Tirol Pendulpain. Matematika Biapanisipan Theptanii dan Irrol Pendulpain Matematika Biapanisipan Theptanii dan Irrolana I. Okone Listure Cita. Biada 2008.
- [81] Stement, Unit European Makalah Bepikis dan Desp Philosophia seria profesionarea Bandeng 1994(SACS), 200
- [7] Washer, X. Frederlaner Salare Mohit Street Until Besperdungker Kristivan dan Katurapean Penacahan Husiki Herocolda Mementika Neuro Sakulah Menengah Asia. Horsenin tron PTS (IP). Supelibriusi 2004.
- [8] System M. Manggoratan (Syon-Ludied Porticle mick Massection Bespita: Massecute: [Erden]. Carnella: http://doi.org/ 0.000/b.net/1004.2.php/limiters-eco...committel-.pdf/-0104-14-.[17 03000-2003]

- Ands. J. Scoren Term anatomatika cher Upone Bungirikan (lainde Score). Toponiu.
- Servic. Probable Services and other software probable 2004.
 [97] Arrad Wijson. Treaded Notemarks Southers. Some Attached Southers. Probable Services Southers. Tregolated Crade State. CH2h.
- [11] Senarro, Chel, Pinnan Komengoin Lajik dan Kejaran Beluar belande Komangone Pensadan Muselah Manusal pada Sarka 94X, d. Kodys Bushung. Lajoran Perselaian IEEP Budong tidak disebestra 1990.
- [14] See acyclotion of Physics of Robotal Education No. 22 of 2006 on bestway Solution process of ETRF correlation. (EW).
- [17] Minister of Fibruation and Culture Engalution of Indicines 2015 about the standard of leasing constanton 2017, 2005.
- 1901 Area & R. L. Chicaron Astronom and Management Advilsor-11E 1907
- 1957 Ferrig Tecnol (2013) Educational Theopie Sciencid: An Introduction in Educational Design Research; SLO
- [16] Namete Preses Heiger Menggar Dalon Steen Koole, States Rosela (63)
- 117) Proce S. Ship Women and also Proportioners Vogotkom: Patricks Policies 2009.
- [26] Segrin. H. Mosingtocker Kommegney beggins Lensid for Disposer Sciences. Song ACI: metho: Feminstanen Commet. Tens. pain PER URL ADD
- [89] Spored Aplikov Halistin Adam Founding: Marte Point Web. Smith. 2011.
- 200 Teli, Variart, Rivali and Sri Salvari, "Persperhanger Perseglat Pembriagness Sanhara Mandari (Frielders Based Learning) Useque Pendelaum Beside Pala recent capture Kerls VIESAF Sr. Echopotos Estatogories Talane Phagease, 2012/2014; "Asserta elektronic penhologram matematika, Vol. 2, No. 9 tol 501-521, ISSN 2319-
- [31] A Doul O. Fande, Abosom A. Anghilio, David Moquel, Admin O. A Avedida: To oxigating Summ Scientific Striked Student Forbid Actor Forthe Mathematics in Problem Based Control of Control Biguita Journal of Science and Sciences Policy (IUTSP). Volume 9.79 million 1. 470-9
- [22] Ellewit Zokova, Marcikler Symmen. "The Office of Endroise Implementary Elevation Approved to Santonic: Advantaged And Advantary Towards Mathematics", Journal of Mathematical Societies, Topols and Structural Nov. 1, 21–49, 2017.
- [25] Kyan Holmer, Zenders E. Bleen. The Effect of Endistry. Mediumetric Education on Studies's Conceptual Understanding of Later. Programming. Control. Intelligence, 8:2428-2442. http://doi.org/10.0238/ssc22016.02333. 2013.
- [26] T.D. Nonest, Nucleibles Manusch, Kouliside Helteriner Kompun-thedr Mesingholian High Cyder Titaking Shilli Das Infraerunad 1863a of Med Rases SMF, Data Picto Infraeruna Discontaire. 2014.
- [25] Barkino, Sil. Waloya, Sodanika Matani, S. Chardin, " Mathematica Literary on Peritoni Found Laurency with Industrian Radicis: Mathematics Volumes: Appeach Assistad E-Locality Education Journal of Thesis Continuous Series (SIZ SCANAMI): 2015. 2014.
- [16] P. M. Melmani, H. Medinani, Instadia, "David-special of Mathematical Conceiling Ability of Shalard's in Assem High Subsect Hongrid a Personal Theory Sense with Contra Decirco Tener Method: Assemble of Physics Continuous Sense VLMSSQ, 18, 2017.
- III) Frenzes, Yann. Mongoelbergker Kremmunn: Kienreiken der Dopreie Manmert Stein beleicht Monsegeit /ein beleich in des Eintag Aufmers. Wahrte bronn Mahre Peng-Pengun & Freihnichtung veräufetze d. Versun Keptenkehmer bebeg einen d. Hänich habent 2004.
- [30] Andrey Sandre, V., Crimerras, Johannes, Hore A, outlinia, Multimerica: Discontrum Laproach Affices Sunder's Application to Financy Salted. "Consolidation and Sulfactured Sunsess 197 architects under an year automobilists, com. 2019.

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