

Analyzing the Impact of PGSD Students Interpersonal Intelligence on Mathematical Communication Skills of Students in Microteaching Sessions

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Abstract: *Communication mathematical is competence crucial that allows student for convey and understand draft mathematics in a way effective, so that very important for success learning. Although thus, many student school bases Still experience difficulty in communicate idea mathematical in a way clear. Interpersonal intelligence of students prospective school teachers basic (PGSD) is believed own role important in push effective interaction during microteaching sessions, so that potential increase ability communication mathematical students. However, research that specifically direct study influence interpersonal intelligence of prospective teachers towards ability communication mathematical student Still limited, so that there is gap in literature. Research This aim for analyze influence interpersonal intelligence of PGSD students towards ability communication mathematical student school base in microteaching session. With use design study quantitative correlational, data collected through questionnaire interpersonal intelligence filled by PGSD students and tests communication given mathematics to students. Analysis regression used for test connection predictive between interpersonal intelligence and abilities communication mathematical students. Research results show existence influence positive and significant, which indicates that level students' interpersonal intelligence prospective teachers in contact close with improvement ability communication mathematical students. Findings This confirm importance integration development interpersonal intelligence in curriculum teacher education, in particular in microteaching practices, for optimize effectiveness teaching and results Study mathematics students. Research This give contribution important for educators and creators policy in effort increase quality education mathematics at school base through development competence prospective teacher.*

Keywords: *Communication mathematics, interpersonal communication, microteaching*

Abstrak: *Bahasa Indonesia: Komunikasi matematika adalah kompetensi krusial yang memungkinkan mahasiswa untuk menyampaikan dan memahami rancangan matematika dengan cara yang efektif, sehingga sangat penting untuk keberhasilan pembelajaran. Meskipun demikian, banyak siswa sekolah dasar masih mengalami kesulitan dalam mengkomunikasikan ide matematika dengan cara yang jelas. Kecerdasan interpersonal mahasiswa calon guru sekolah dasar (PGSD) diyakini memiliki peran penting dalam mendorong interaksi yang efektif selama sesi microteaching, sehingga berpotensi meningkatkan kemampuan komunikasi matematika mahasiswa. Namun, penelitian yang secara khusus langsung mempelajari pengaruh kecerdasan interpersonal calon guru terhadap kemampuan komunikasi matematika mahasiswa masih terbatas, sehingga ada kesenjangan dalam literatur. Penelitian ini bertujuan untuk menganalisis pengaruh kecerdasan*

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interpersonal mahasiswa PGSD terhadap kemampuan komunikasi matematika mahasiswa sekolah dasar dalam sesi microteaching. Dengan menggunakan desain studi kuantitatif korelasional, data dikumpulkan melalui kuesioner kecerdasan interpersonal yang diisi oleh mahasiswa PGSD dan tes komunikasi matematika yang diberikan kepada mahasiswa. Analisis regresi digunakan untuk menguji hubungan prediktif antara kecerdasan interpersonal dan kemampuan komunikasi matematika mahasiswa. Hasil penelitian menunjukkan adanya pengaruh yang positif dan signifikan, yang menunjukkan bahwa tingkat kecerdasan interpersonal mahasiswa calon guru berhubungan erat dengan peningkatan kemampuan komunikasi matematika mahasiswa. Temuan ini menegaskan pentingnya integrasi pengembangan kecerdasan interpersonal dalam kurikulum pendidikan guru, khususnya dalam praktik pengajaran mikro, untuk mengoptimalkan efektivitas pengajaran dan hasil belajar matematika siswa. Penelitian ini memberikan kontribusi penting bagi para pendidik dan pembuat kebijakan dalam upaya meningkatkan mutu pendidikan matematika di sekolah melalui pengembangan kompetensi calon guru.

Kata Kunci: Matematika komunikasi, komunikasi interpersonal, pengajaran mikro

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INTRODUCTION

Communication mathematical is one of the skills important things to do owned by students in learning mathematics. Ability This allows student for disclose ideas, explaining solutions, as well as validate understanding mathematical in a way clear and logical (Pantaleon et al., 2018). ability communication mathematical very important in learning mathematics through communication student can convey his ideas to teachers and to student other (Nguyen et al., 2024). Development ability communication mathematics student that is one of the problem important in learning mathematics (Asgafi et al., 2023) (Wandari & Anggara, 2021). Skills communication good mathematics can increase understanding concepts and skills solution problem student (Fatimah & Budi Waluya, 2024) (Diah et al., 2025).

Ability communication is One ability base essential and necessary mathematics owned by students (Rohmanawati et al., 2021a). Ability communication mathematical is ability student in convey something that is known like concepts, formulas, and strategies settlement problem (Sumartini et al., 2021). This Because with through communication mathematical student can express and interpret mathematical ideas Good in a way oral and writing. According to NCTM (Rizqi & Nurjali, 2021) somebody own ability communication mathematical can see from : (1) ability express mathematical ideas through oral , written , and demonstrating it as well as describe it visually ; (2) ability understand , interpret , and evaluate mathematical ideas Good in a way oral , written , and in other visual forms ; (3) ability in use terms , notations mathematics and its structures For presenting ideas, describing relationships with situation models . However, various study show that Lots student school base Still experience difficulty in communicate in a way effective about draft mathematics, so that hinder success Study they

School Teacher Education (PGSD) students as prospective teachers have role strategic in develop ability communication mathematical students. One of them believed factors influence effectiveness teacher and student interaction is interpersonal intelligence (Liao et al., 2024). Interpersonal intelligence is ability somebody for understand, interact, and communicate in a way effective with other people (Sarwi et al., 2021). In In the context of microteaching, interpersonal intelligence of PGSD students is very important Because can increase quality communication and interaction during the learning process

simulation, which ultimately impact on ability communication mathematical student (Gardenia et al., 2021). However sometimes student often difficulty in represent thinking mathematically and express it with words, things This caused by Because student not enough used to in communicate or convey thinking mathematical, they to others. In line with matter said, reality moment This show that ability communication mathematical student Still low (Anwar Rivai et al., 2021). The results of method student in answer which question is partly big student Not yet capable communicate it in a way precise and clear to inform writing. Ability communication mathematical owned student No let go from a number of factors, one of which is is factor ability interpersonal communication.

According to Lie in (Sancho-Cantus et al., 2024), a person who has ability good interpersonal communication will capably convey idea as well as Work The same in finish something work and problem. With Thus, interpersonal communication is owned student in a way gradually can grow ability communication mathematical they. This is in line with results study (Tusyanah et al., 2023) which shows that lack of ability student interpersonal communication in the learning process impact on weakness mastery mathematics, including ability communication mathematically. With Thus, the ability communication mathematical student will develop optimally when supported by capabilities good interpersonal communication (Hambali et al., 2024)

One of material in learning relevant mathematics for hone ability communication mathematical is microteaching. Through microteaching, students' prospective teachers are trained for convey material mathematics with utilise symbols, notations set, or diagram as Language systematic mathematics. This process No only practice skills communicate draft in a way written, but also emphasizes importance interpersonal communication in explaining ideas to others. However, in practice Still Lots students who experience difficulty Good in finish problem mathematics and in communicating mathematical ideas.

The low ability communication mathematical This seen in the results study (Yusoff et al., 2022) which shows that student Still weak in finish question stories, especially when must change problem contextual to in sentence mathematics. This is in line (Rohmanawati et al., 2021b) which confirms that student Still difficulty in express ideas or idea mathematics in a way written from question story. In context microteaching, problems the can minimized if student equipped ability good interpersonal communication. (Fedorova, 2021) (Pfeiffer et al., 2023) state that communication mathematical will develop optimally when student own effective interpersonal communication, because matter This push courage in convey opinion and mathematical ideas in front of others. In line with that, research (Gebremariam et al., 2024) also showed that student with high interpersonal communication capable fulfil all over indicator ability communication mathematical, whereas student with low interpersonal communication Not yet can fulfil all indicator.

Based on the above explanation, researchers formulate problem in study This that is whether there is influence interpersonal skills towards ability communication mathematics in microteaching. As for objective from study This For now influence ability interpersonal communication towards ability communication mathematical student.

METHODS

Method research used in study is quantitative with design study correlational approach quantitative chosen Because allows researchers for measure and analyze connection between two variables, namely communication mathematical and abilities interpersonal communication, among prospective school teachers basic. With use design correlational research This can give clear picture about how much strong connection between two variables; and provide reliable data for support the conclusions drawn. This is in line with study previously shown that approach quantitative effective in explore connection between variables in Educational context (Prawira et al., 2023).

Data collection will be done through instrument designed questionnaire special for measure level communication mathematical and interpersonal communication skills of prospective teachers. Questionnaire This consists of from a number of parts, including question about ability communication mathematical, interpersonal skills. Use of questionnaire as tool selected data collection Because can reach respondents in amount big and possible analysis more statistics deep. In study this, total respondents are 33. Besides that, a standardized questionnaire can increase validity and reliability of the data obtained (Hala & Xhomara, 2024). Research this will also involving prospective teachers or student from University Sragen for ensure diversity and representation samples used. Data analysis will be done through technique statistics descriptive and inferential statistics descriptive, such as age, type gender and background behind education, used for describe characteristics respondents. In addition, that, analysis inferential, such as the Pearson correlation test, can used for determine connection between communication mathematical and interpersonal skills. With Thus, research This give outlook about connection between second variables this and offer recommendation data -based for development curriculum and training programs for prospective school teachers basis. Analysis results This expected can give significant contribution in understand importance ability communication mathematics and interpersonal communication.

RESULT AND DISCUSSION

Discussion: This study presents results based on quantitative data obtained from test results, as well as qualitative data from a questionnaire on interpersonal communication. Trust data self-student obtained from the questionnaire on interpersonal communication, consisting of 28 questions distributed to 33 PGSD students as a sample research. In each of the first-mentioned, there are negative questions, and the score given is a minimum of 1 and a maximum of 4 for every question. Based on the data obtained in the research, this researcher analyzes the interpretation ability of interpersonal communication in a number of categories, namely high, medium, and low. As for level of ability in interpersonal communication in general, presented in table 1 below:

Table 1. Analysis Results Questionnaire

Amount Respondents	Total Score	Ideal Score	Percentage (%)	Interpretation
33	1650	2688	61.38	Currently

Based on Table 1, it is observed that the ability of interpersonal communication of PGSD students generally shows results with a total score of 1,650, which falls within the range of $1,344 \leq X < 2,016$. Therefore, the ability of interpersonal communication of PGSD students at University Sragen can be categorized in a general way.

Capability data communication mathematical obtained with the use of an instrument test oral in the form of implementation of microteaching data collection is carried out with filling a questionnaire by 33 students, the questionnaire was filled in and contains 6 multiple-choice questions with a score questionnaire 11-4 (less okay, enough good, good, and very good). Data collection was carried out with all PGSD students in general, alternating between microteaching practice. After that, PGSD students were asked to fill in a questionnaire. Instrument-distributed tests were previously carried out to assess validity, reliability, and power, with the aim of differentiating and leveling difficulties. Additionally, a content validity test was conducted by an expert prior to the administration of the tests. Based on data that has been obtained, the analysis interpretation ability communication mathematical PGSD students are categorized into a number of categories: high, medium, and low however, the ability communication mathematical PGSD students in general can be seen in Table 2 below:

Table 2. Analysis Results Questionnaire

Amount Respondents	Total Score	Ideal Score	Percentage (%)	Interpretation
33	408	576	70.83	Currently

Based on Table 2, it is observed that the ability of mathematical students generally shows results interpretation, currently with a total score of 408, which falls within the range $288 \leq X < 432$, corresponding to a percentage of 70.83%. Therefore, it can be concluded that the ability of communication among mathematical Elementary School Teacher Education Students at University Sragen is categorized as moderate. Research results: This section presents the findings from the questionnaire instrument on the ability in communication and mathematics in microteaching courses, as well as the results of the distribution questionnaire on interpersonal communication among PGSD students. Before statistical tests were carried out on the ordinal data from the questionnaire, interpersonal communication was transformed, moreover, into interval data using MSI. Data from the variables study tested normality of its distribution using the SPSS (Statistical Package for Social Science) program version 16.0, namely with the Kolmogorov-Smirnov test. The rules used for testing normality are if Sig. Value $> \alpha$, then the data are normally distributed, and if Sig. value $< \alpha$ then the data is distributed abnormally. The test results are shown in Table 3 below:

Table 3. Normality Test Results

Variable	Nilai Sig.	$\alpha=0,05$	Criteria
Interpersonal communication	0,143	0,05	Normal
mathematical communication	0,123	0,05	Normal

Based on Table 3 can see that mark significance ariable trust self is $0.143 > 0.05$ and the value significance on ariable ability communication mathematical is $0.123 > 0.05$. Appropriate with specified rules that when Sig. value > 0.05 then both data normally distributed. After that, a linearity test was carried out for see connection trust self with ability communication mathematical students shown in Table 4 below:

Table 4. Linearity Test Results

Variable	Nilai Sig. Deviation from linearity	Level of significance	Conclusion
interpersonal communication with mathematical communication	0,445	0,05	Linier

Based on Table 4, the Sig. The value of Deviation from Linearity is 0.445. This can be interpreted as sig. value > 0.05 . Then, it was concluded that there is a significant linear relationship between the ability in interpersonal communication, the ability in communication, and the ability in mathematics among students. The next significance test was conducted using regression in the study. This uses SPSS 16.0 for Windows. Results of the significance test calculation regression are presented in Table 5 below:

Table 5. Linearity Test Results

Variable	Nilai Sig. Deviation Linearty	Level of significance	Conclusion
X-Y	0,004	0,05	Signifikan

Based on Table 5 is obtained The Sig. Linearity value is 0.004 and the level significance used in study This of 0.05. Based on criteria testing, then can withdraw conclusion that obtained sig. Linearity value = $0.004 \leq 0.05$, then H_0 is rejected and H_1 is accepted, meaning that connection variables ability interpersonal communication with variables ability communication mathematical is means or significant. After conducting the prerequisite test furthermore simple linear regression test was carried out for see whether there is influence from interpersonal communication towards ability communication mathematical student with results testing shown in Table 6 below:

Table 6. Results of Regression Test (ANOVA)

Variable	FCount	Ftabel	Sig.	α	Conclusion
X-Y	154,292	4,301	0,000	0,05	Have impact

Based on Table 6 is obtained mark F count of 154.292. The calculated F value This compared to with mark Ftable with mark degrees freedom (dk) in numerator = 1 and dk in denominator = 22, then obtained Ftable amounting to 4,301. For test hypothesis, criteria taking his decision is If Fcount > Ftable then H_0 is rejected and H_1 is accepted. With Thus, Fcount = 154.292 > Ftable = 4.301 for level significance of 5% so that coefficient regression means own influence. Next For now big the impact caused from variable X (ability interpersonal communication) towards variable Y (ability communication mathematical) with determine coefficient determination. Coefficient determination can see from R square on both variables mark mentioned. As for mark coefficient determination can see in Table 7 as following:

Table 7. Regression Test Results (Model Summary)

Variable	R	R square	Adjusted R Square	Std. Error of the Estimate	Variable
X-Y	0,936	0,875	70,83	1,260	X-Y

Based on Table 7, the obtained mark coefficient determination of R-squared owned by the variable ability interpersonal communication towards the ability communication mathematical student is 0.875, which means that the ability of student interpersonal communication is influential to ability communication mathematical student by 87.5%, while the remaining 12.5% is influenced by other variables beyond our capabilities. interpersonal communication. Next, a t-test was performed, so that the obtained t-statistic, amounting to 12,421, and the value from the table, amounting to 2,074. Because the value thitung = $12.421 > t \text{ tabel} = 2.074$, then H_0 is rejected and H_1 is accepted. This means there is a significant influence of interpersonal communication on mathematical communication ability among Elementary School Teacher Education students at University Sragen.

In the section This will discuss results study about ability interpersonal communication and skills communication mathematical students. As for discussion results study shared become a number of parts among them level interpersonal communication of students, level ability communication mathematical students and influence interpersonal communication towards ability communication mathematical

students on the material Set. Based on results analysis can know that students who have level low interpersonal communication as many as 7 students with percentage of 12.5%, for participant students who have level trust self currently as many as 18 students with percentage of 75% and for students who have level high interpersonal communication as many as 8 students with percentage of 12.5%. As for results analysis trust self in a way general obtained that level interpersonal communication of PGSD students at University Sragen is in the category moderate. This is can happen Because interpersonal communication in every student influenced by several factor like draft self, state physical, experience, environment family, community and school (Afifah, Hamidah, & Burhani, 2019).

Based on results data interpretation, ability student interpersonal communication show variations in each aspect. Score highest obtained in aspects believe with ability self itself, which reflects that student own belief in face challenge, capable show mastery materials, as well as ability in communication in answer question mathematics without do fraud moment evaluation. Condition This show that dimensions ability communication as one of the component interpersonal communication has relatively good. However, belief the Not yet fully ensure truth answer, so that need directed so that the ability balanced interpersonal communication with skills think critical and reflective to the answers given. On the other hand, the scores lowest contained in the aspect brave put forward opinion. This is show that part big student not optimal in express ideas, exchange thought with Friend peers, as well as convey view to the teacher during learning. Besides that, the low courage in convey opinion also has an impact on the lack of skills accept and appreciate other people's views. Findings This indicates that dimensions openness and skills listen in interpersonal communication is still weak. With thus, it can conclude that although student has shown level ability relative interpersonal communication tall in context academic, they Still face obstacles in aspects openness and courage in communicate. Condition This important be noticed, because effective interpersonal communication No only marked with ability communicate, but also with ability for convey opinion in a way open, listening, and build interaction lead constructive feedback.

Based on results analysis can know that students who have level ability communication mathematical low as many as 6 students with percentage of 8.3%, for participant students who have level ability communication mathematical currently as many as 26 students with percentage of 54.2% and for students who have level ability communication mathematical tall as many as 10 students with percentage of 37.5%. As for results analysis ability communication mathematical in a way general obtained that level ability communication mathematical Elementary School Teacher Education students at University Sragen is in the category moderate. This is due to part student capable in do test related questions ability communication mathematical with fulfil the indicators.

Indicator First that is express mathematical ideas through writing and describing in visual form obtained 26.23% of the total score whole. Partly big participant educates in finish question Not yet capable write what is known in an about, but they direct do calculation. Indicator second that is analyze, interpret, and evaluate mathematical ideas obtained 37.25% of the total. Most of big student Already capable analyze what is known from questions and solve them with true. However, there are also deep ones determine calculation slices and joins Still experience error. Indicator third that is ability in use terms, notations, and structures mathematics for presenting ideas, describing connection with the situation model, obtaining 36.52% of the total. Almost all over student can state something set and not set. However, in presenting ideas in mention set part Still experience error.

Based on results analysis research conducted can know that there is significant influence between trust self to ability communication mathematical MTs students on the material Collection of Beliefs self-tall students will increase ability communication mathematical students. On the other hand, If trust self-student low so student own ability communication low mathematical too. This is strengthened and supported by the results of the simple linear regression test and the t-test which show that mark thitung = 12.421 > t tabel = 2.074 then H0 is rejected and H1 is accepted , p This means there is influence trust

self to ability communication mathematical student class VII at MTs Al- Ma'arif Cilageni Kadungora . With equality regression $\hat{Y} = 3.590 + 0.186 X$. The constant value of 3.590 means if trust self the same with zero (0) then ability communication mathematical student experience increase. Coefficient value regression variables trust self-worth positive which is 0.186 can interpreted that every improvement score trust self as big as One unit, then ability communication mathematical student will increase of 0.186. As for mark coefficient determination (R Square) of 87.5% which means that trust self-influential to ability communication mathematical by 87.5%, while the remaining 12.5% is influenced by factors other.

Things that cause influence positive the namely: (1) students with trust self-Good in mathematics tend own confidence and optimism in finish problems; (2) students tend Keep going try for finish questions to be able to completed with good. Besides that, students with trust less self-Good in mathematics tend finish question as is in accordance with his ability, so that student the No try for do more continue. Based on results research that proves that ability interpersonal communication has an influence to ability communication mathematical students , things This due to student with trust self-tall own belief in himself to be optimistic in finish something problem (Oktavia, 2022) . Besides That there is factor influencing learning ability mathematics with attitude somebody in finish problem that is demanding learning students to be active in think and interact , so that can increase ability mathematics in line with objective learning in general (Miftahul Jannah et al., 2023) . Students who have ability communication mathematical tend capable in linking symbols mathematics. So that student can understand material with OK, teachers can link material mathematics in life every day. In learning mathematics teachers must also give questions that can be grow trust self-students to get A good performance.

Study This reinforced by several research that has been done done by several researchers. Among them is research conducted by (Berliana & Sholihah, 2022) states that in a way theoretical ability communication mathematical student will Good If student the own good interpersonal communication . This is due to view positive student about himself and his abilities, so that student No feel afraid of being wrong or worried when finish problem about communication mathematical. When student Already own ability good personal communication, then student will brave in convey his opinion as well as will pushed for increase his achievements.

CONCLUSION AND SUGGESTIONS

In conclusion that level trust self-student is in the category moderate. As for indicator lowest fulfilled that is indicator brave put forward opinion. Students who have level ability low interpersonal communication as many as 7 students, for student with level ability moderate interpersonal communication as many as 18 students and for student with level ability high interpersonal communication as many as 8 students. Ability level communication mathematical student is in the category moderate. As for indicator lowest fulfilled that is in express mathematical ideas through writing and describing in visual form in the form of a Venn diagram on the problem contextual. There is significant influence from ability interpersonal communication towards ability communication mathematical students on the material the set. As for big influence trust self to ability communication mathematical student is by 87.5%, while the remaining 12.5% is influenced by factors other. Ability good interpersonal communication will increase ability communication mathematically, on the other hand If lack of interpersonal communication Good so will make student not enough in ability communication mathematically

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