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SUMMARY **REVIEW** EDITING

SUBMISSION

Authors	Muhtarom Muhtarom, Adelia Dian Pratiwi, Yanuar Hery Murtianto
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Section	Articles
Editor	Wahyu Hidayat

PEER REVIEW

ROUND 1

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EDITOR DECISION

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Author Version	1951-6679-1-ED.DOCX 2021-01-15 DELETE

We have reached a decision regarding your submission to Infinity Journal, "MATHEMATIC COMMUNICATION SKILLS PROFILE OF PROSPECTIVE MATHEMATICS TEACHERS REVIEWED FROM ADVERSITY QUOTIENT".

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Please highlight the changes to your manuscript within the document by using the track changes mode in MS Word or by using bold or colored text.

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Thank you for your attention.
Sincerely,

Wahyu Hidayat
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Reviewers Comment:

Reviewer A:
1. In the introduction, it is necessary to clarify several sentences which should be the result of the research.

2. In the research method section, there should be stages in the research.

3. On the results and discussion of some of the records provided:
a. Adding questions given to students
b. Description of the table is converted in the form of a narrative
c. The final table is placed in the results section.

4. Please see the attached file of the review results.

Reviewer B:
1. The answer to the students shouldn't be provided with tables. Please provide it one by one and explain the answer based on the figure one by one.

2. Please see the attached file of the review results.

Reviewer C:
1. Need explanation on the methodology, especially instrument development, clarity of AQ indicators and mathematical communication skills. in the discussion section, no interview data is presented and discussed.

2. Please see the attached file of the review results.

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MATHEMATIC COMMUNICATION SKILLS PROFILE OF PROSPECTIVE MATHEMATICS TEACHERS REVIEWED FROM ADVERSITY QUOTIENT

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ABSTRACT

Communication skills are a very important aspect that needs to be possessed by students who want to succeed in their studies, where students' mathematical communication can organize mathematical thinking both orally and in writing. While AQ is an intelligence in facing difficulties, a student must be able to face the difficulties that exist in him. This study aims to determine the profile of mathematical communication skills of prospective mathematics teacher candidates in terms of adversity quotient. This research was conducted on mathematics education students at the 6th semester of PGRI Semarang University. This type of research is a descriptive qualitative study. Subjects taken from 57 respondents were 3 students in the category of climbers, campers, and quitters. Data collection is done by written tests and interviews. Indicators of mathematical communication skills used include drawing, writing, and mathematical expression Based on the results obtained 1) Subject climbers are able to meet all the indicators of mathematical communication skills and can be said to be good 2) Subject campers tend to be able to meet all indicators of mathematical communication skills, have the power of communication in indicators drawing and can be quite good 3) Quitters subject tends not to be able to meet all the communication indicators, the subject does not answer the problem in the drawing indicator, and the writing and mathematical expression indicators are still wrong.

Corresponding Author:

1. INTRODUCTION

The 21st century is a century marked by the occurrence of a massive transformation from an agrarian society to an industrial society and continues to a knowledgeable society (Soh, Arsad, & Osman, 2010). Life in the 21st century requires a variety of skills that must be mastered by someone, education is becoming increasingly important to ensure students have learning and innovation skills, skills to use technology and information media, and can work, and survive using life skills (Wijaya, Sudjimat, Nyoto, & Malang, 2016).

Scott (2015) states that the International Commission on Education for the Twenty-first Century proposes four visions of learning, namely knowledge, understanding, competence for life, and competence to act. In addition to this vision, four principles known as the four pillars of education are formulated, namely learning to know, lerning to do, learning to be and learning to live together. Fridanianti, Purwati & Murtianto (2018) stated that strengthening character education in schools must be able to foster student character to be able to think critically, creatively, be able to communicate, and collaborate, who are able to compete in the 21st century. This is in accordance with the four competencies that students must have. in the 21st century which is called 4C, namely critical thinking and problem solving (Critical Thinking and Problem Solving), creativity (Creativity), communication skills (Communication Skills), and the ability to work together (Ability to Work Collaboratively). The Introduction presents the purpose of the studies reported and their relationship to earlier work in the field. It should not be an extensive review of the literature.

Use only those references required to provide the most salient background to allow the readers to understand and evaluate the purpose and results of the present study without referring to previous publications on the topic.

Communication is one of the skills in Learning to do, oral and written communication skills contribute to career development in the 21st century. The results of the 2018 PISA assessment (Tohir, 2019) show that the mathematical abilities of students in Indonesia are still low. One of the low mathematical abilities is mathematical communication skills, this can be caused by student confusion in presenting ideas or ideas in the form of symbols, graphs, tables or other media to clarify mathematical problems. Ulfa, Buchori & Murtianto (2017) stated that in general the process of learning mathematics in the classroom is teacher-centered. This is in line with Hampson, Patton & Shanks (2011) who state that high-quality teachers are those who have a strong influence on student achievement. The ability to communicate in learning activities is said to be good if the ability of a teacher and lecturer to create a communicative climate, where between lecturers and students or teachers with students as subjects are actively involved in learning activities, both verbally and nonverbally, in other words this communicative climate as a vehicle for the implementation of learning in accordance with the design and achieving learning objectives (Son, 2015). It would be better if the provision of mathematical communication skills is integrated in every lecture. So the hope is that when prospective teacher students are equipped with high mathematical abilities, they can improve the mathematical abilities of the students they teach. Hapsari, Nizaruddin & Muhtarom (2019) state that teachers play a very important role in improving the quality of learning and learning outcomes that will be achieved by students before going to a higher level.

Many students still have imperfect mathematical communication skills. Paradesa & Ningsih (2017) states that the ability of students in the aspect of mathematical communication seen from the ability to provide mathematical evidence in the form of facts and data is still experiencing difficulties. If it is related to the problem of mathematical communication skills, the type of intelligence can be used, namely AQ (Adversity Quotient). AQ is often identified with fighting power against adversity. AQ is considered to be able to support student success in increasing achievement motivation.

Many studies have been carried out to see the influence of AQ, including: Hidayat, Herdiman, Aripin, Yuliani & Maya (2018) who try to improve AQ and mathematical creative reasoning of student teacher candidates. Kartika & Yazidah (2019) also tried to analyze the ability of mathematical proof in real analysis courses based on AQ. Paramita (2017) also conducted research on mathematical communication skills in terms of AQ through the application of the SCSS learning model to class VIII students.

Based on the above explanation that AQ has a significant effect in determining the success of students' mathematical communication skills, therefore the mathematical communication skills of students who have high AQ or students with climbers level will be different from the mathematical communication skills of students who have AQ at the campers and quitters level. The research above has not reviewed the mathematical communication skills of prospective mathematics teacher students in terms of AQ, so in this study, the researcher wanted to find out how the profiles of climbers, campers and quitters on student mathematics teacher candidates to their mathematical communication skills. Thus the purpose of this study is to determine and investigate in depth the AQ profile of prospective mathematics teacher students on mathematical communication skills.

2. METHOD

The method used in this research is descriptive qualitative research method using written and oral data. This research was conducted online, where the AQ questionnaire was

Commented [1]: This sentence does not connect with the subject being explained.

Commented [2]: Whose word is this? What is the basis for this statement?

Commented [3]: need to be explained in what course or material the questions are given?

filled out via google form, and a written test of mathematical communication was carried out via the WhatsApp group video call, while interviews were conducted via WhatsApp calls. The subjects identified in this study were 3 semester VI students of the Mathematics Education Study Program of the PGRI University Semarang class of 2017 including one student with AQ quitters, one student with AQ campers, and one student with AQ climbers. This study used purposive sampling or purposive sampling. Sugiyono (2016) states that purposive sampling is a technique of sampling data sources with certain considerations, with the consideration that the person we choose is considered to know best about what we expect or he is the ruler, making it easier for researchers to explore the object or social situation under study.

The instruments used in this study included the AQ questionnaire, the mathematical communication skills test sheet, and the interview guide. The AQ questionnaire for sixth semester mathematics education students was given to two classes via google form and obtained 57 respondents. This questionnaire was conducted to select 3 students with the categories quitters, campers, and climbers. Then an online written test was conducted through the WhatsApp group video call for students who had the intelligence of quitters, campers, and climbers. After that, an online interview was conducted via a WhatsApp call to get more in-depth information about the form of mathematical communication possessed by these students.

3. RESULTS AND DISCUSSION

3.1. Results

The first step was to determine the students as categories climbers, campers, and quitters. From the AQ questionnaire that has been distributed, it was obtained from 57 respondents that 3.51% of students with AQ quitters, 0% of students with low AQ to moderate AQ, 31.58% of students with AQ campers, 57.89% of students with moderate AQ to AQ high, and 7.02% of students with AQ climbers as in the following figure:

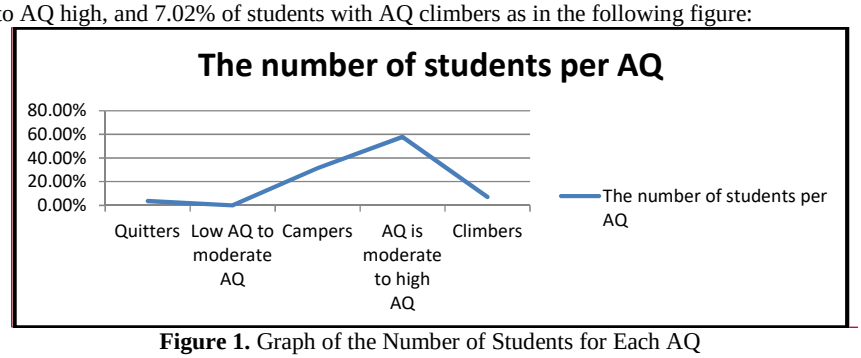


Figure 1. Graph of the Number of Students for Each AQ

After selecting 3 students with the categories climbers, campers, and quitters, then the three students were given questions on communication skills tests and interviews. Instruments used for mathematical communication skills include drawing, writing, and mathematical expression. Analysis of the mathematical communication skills of each subject can be seen in the following table:

Table 1. NDC Subject Work Results (Climbers) at All Stages

Step	Jawaban Subjek NDC	Information

Commented [4]: Written exam via WA group video call? This is not appropriate, except for verbal or interview.

Commented [5]: ? Check sentences! do you mean 3 students in semester VI?

Commented [6]: Written 2 times

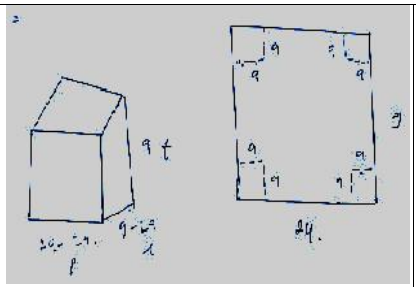
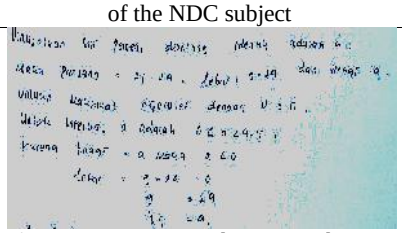
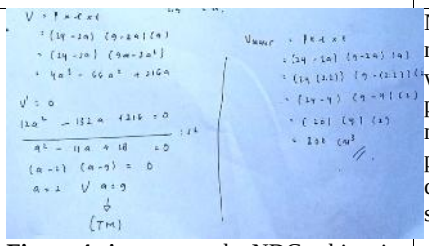
Commented [7]: What is this?

Commented [8]: How about the development of the instrument? Did it go through the instrument validation process?
What kind of AQ indicator is used? What about the indicators of mathematical communication skills used? It needs to be emphasized here.
How many kinds of AQ categorization and based on what? Only three (Climber, Champer and Quitter)? or is there any other classification? Serve in tabular form.
All questions must be displayed, either in the methodology or in the results section.

Commented [9]: It will be clearer if presented through the table

Commented [10]: This categorization needs to be clarified in the methodology

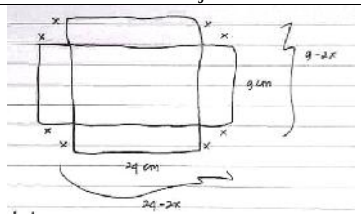
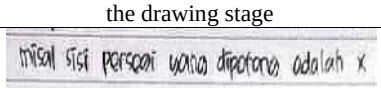
Commented [11]: Is this the NDC? What is the abbreviation of the name? Or courses? There has been no previous explanation

Drawing	 **Figure 2.** Answers to the drawing stage of the NDC subject	NDC subjects can state the problem in the form of an image correctly and precisely and provide information on the length, width, and height of the problem in the question.
Writing	 **Figure 3.** Answers to the NDC subject at the writing stage	NDC subjects can use mathematical language appropriately and correctly, and are able to explain ideas or situations from images that have been made previously in their own words in writing, the subject takes his own side in written form, the subject considers the side of the square which is cut off with the symbol "a ", And also write an explanation in determining the interval" a "correctly.
Mathematical Expression	 **Figure 4.** Answers to the NDC subject in the mathematical expression stage	NDC subjects can state mathematical solutions in writing clearly and precisely, are able to use mathematical symbols and perform calculations or get complete and correct solutions.

Step	Jawaban Subjek NDC	Information
		The subject is able to determine the length of the shape she has previously made with the values 24 - 2a, and for the width 9 - 2a, and the height a. Then the subject is able to write the volume formula used with

		V = pxlxt, the subject is also able to apply the first derived properties with V '= 0 and is able to determine the value "a" that meets the maximum volume sought, and performs calculations correctly both in calculating the initial volume, determine the equation V ', find the value of a, and determine the maximum volume

Table 2. Results of KAL Subject Work (Campers) at All Stages

Step	Jawaban Subjek KAL	Information
Drawing	 **Figure 5.** Answers to the KAL subject at the drawing stage	KAL subjects can state the problem in the form of an image correctly and precisely and are able to provide information on the length, width, and height of the problem in the question.
Writing	 **Figure 6.** Answers to the KAL subject at the writing stage	KAL subjects can use mathematical language correctly, and are able to explain ideas or situations from previously made pictures in their own words in written form but are still incomplete. The KAL subject takes the cut side of the square with the symbol "x". However the KAL subject did not specify the interval of "x".

Step	Jawaban Subjek KAL	Information

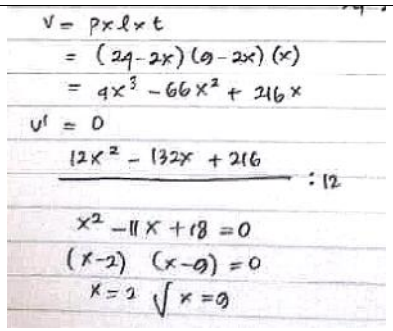
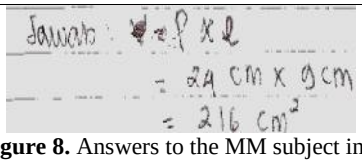
Mathematical Expression	 **Figure 7.** Answers to the KAL subject in the mathematical expression stage	The subject of KAL can clearly state mathematical solutions in writing, can use mathematical symbols, and perform calculations but is still incomplete. The subject is able to determine the length of the shape he made previously with the values 24 - 2x, and for the width 9–2x, and the height a. Then the KAL subject is able to write the volume formula used with V = p x l x t and its calculations, the subject is also able to apply the first derivative with V '= 0, but the KAL subject cannot determine the maximum volume of the given problem.

Table 3. Results of MM Subject Work (Quitters) at All Stages

Step	Jawaban Subjek MM	Information
Drawing	-	The subject of MM did not fulfill the mathematical communication indicators of drawing in solving the questions, the subject did not present the data or information from the questions in the form of pictures.
Writing	-	The MM subject did not meet the indicators of writing mathematical communication skills, the MM subject could not write an explanation of the answer to the problem mathematically and did not use mathematical language or symbols appropriately and correctly.

Step	Jawaban Subjek MM	Information

Mathematical Expression	 **Figure 8.** Answers to the MM subject in the mathematical expression stage	The subject of MM is not able to express mathematical solutions in writing, and perform calculations but is wrong, because the MM subject solves the problem not with the formula for the volume of blocks but by using the rectangular formula and the determination of the length and width values is still wrong.

Data were also collected through in-depth interviews with the subjects of climbers (NDC), campers (KAL), and quitters (MM). Written test results data were compared with interview data to obtain valid data. From the research results written tests and interviews conducted by climbers subjects met all indicators of mathematical communication skills used, campers subjects tended to be able to meet all indicators of mathematical communication skills used, while quitters subjects were unable to meet all indicators of mathematical communication skills used.

Commented [12]: Interview data not shown? There should be, moreover the terms used are there; in-depth interviews, it is necessary to have several transcripts of the interview presented here.

3.2. Discussion

From the results of the tests and interviews, the researcher observed that the data obtained was sufficient, so the written test and interview were not continued to the next stage. From the analysis of written tests and interviews of mathematical communication skills, the following results are obtained:

1. Student Mathematics Teacher Candidate with AQ climbers

Based on the results of the description and analysis of the written test results, the student subject with the AQ climbers category can meet all indicators of mathematical communication skills used by the researcher, including drawing, writing, and mathematical expression. Subjects with AQ climbers are able to express, express and describe mathematical ideas in the form of pictures, subjects with AQ climbers are able to provide answers using their own language or problems using writing and algebra, and are able to explain ideas or situations from an image or graph with own words in written form, the subject with AQ climbers is able to state a situation in the form of a mathematical model, and is able to perform mathematical calculations correctly.

This is in line with Nartani, Hidayat, and Sumiyati (2015) improving the communication skills of mathematics indicated by students are able to express ideas or ideas with mathematics verbally sentence, students are actively involved in discussions about math, students can formulate definitions and generalizations about the math, students can formulate a definition of mathematics by using its own words. Mathematical communication skills are shown by students being able to express ideas or ideas with mathematical sentences verbally, students are actively involved in discussions about mathematics, students can formulate definitions and generalizations about mathematics, students can formulate mathematical definitions using their own words. This is also in line with Ansari (2012) who states that drawing communication skills are reflecting real objects, drawings and diagrams into

mathematical ideas, writing is stating and explaining a mathematical drawing or model into a mathematical idea form, mathematical expression is express a situation or mathematical idea into a symbol or mathematical model and solve it.

It can be concluded that the subject of AQ climbers is able to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. Stoltz (2000) states that the subject of climbers is a group of people who always try to reach the peak of success, are ready to face any obstacles, and always raise themselves to success. This is also in line with the results of Supardi's research (Azzura, 2017) that the subject of climbers plays an important role in what has been done, the good or bad results of every action and work become responsibility and do not blame others. This is evident in this study the climbers subject was able to fulfill the 3 indicators asked by the researcher with correct and correct answers.

Commented [13]: Can this sentence support the previous statement? Is there any data from this research that suggests this? There doesn't seem to be

This research is in line with the research of Paramita (2017), Kartika & Yazidah (2019), and Yuniarti (2015). In Paramita's research (2017) which states that the climbers subject is able to meet all indicators of mathematical communication skills including the ability to state a situation in mathematical language, the ability to describe mathematical ideas visually, the ability to explain mathematical ideas in writing, and the ability to evaluate mathematical ideas in writing. In Kartika & Yazidah's research (2019), which states that climbers students are more able to compile direct evidence than quitters and campers students. In research Yuniarti (2015) also states that the climber category is capable of almost all indicators of mathematical communication.

2. Prospective Mathematics Teacher Students with AQ campers

Based on the results of descriptions and analysis of written test results, student subjects with the AQ campers category tend to be able to meet all indicators of mathematical communication skills used by researchers, including drawing. writing, and mathematical expression. Subjects with AQ campers are able to state, express and describe mathematical ideas in the form of images, subjects with AQ campers tend to be able to provide answers in their own language or problems using writing and algebra, and are able to explain ideas or situations from an image or graphic In their own words in written form, subjects with AQ campers tend to be able to state a situation in the form of a mathematical model, but have not been able to complete it completely in finding the maximum volume value requested in the problem. This is in line with Nartani, Hidayat, and Sumiyati (2015) improving the communication skills of mathematics indicated by students are able to express ideas or ideas with mathematics verbally sentence, students are actively involved in discussions about math, students can formulate definitions and generalizations about the math, students can formulate a definition of mathematics by using its own words. Mathematical communication skills are shown by students being able to express ideas or ideas with mathematical sentences verbally, students are actively involved in discussions about mathematics, students can formulate definitions and generalizations about mathematics, students can formulate mathematical definitions using their own words. This is also in line with Ansari (2012) who states that drawing communication skills are reflecting real objects, drawings and diagrams into mathematical ideas, writing is stating and explaining a mathematical drawing or model into a mathematical idea form, mathematical expression is express a situation or mathematical idea into a symbol or mathematical model and solve it.

Commented [14]: This sentence is repeated

It can be concluded that the subject of AQ climbers tends to be able to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. Stoltz (2000) stated that campers are a group of people who still have the desire to respond to existing challenges, but do not reach the peak of success and easily give up on what has been achieved. Stoltz (2000) also adds that campers do not fully exploit their potential, campers have a limited ability to change, especially major changes, campers live with the belief that after several years or after making a number of efforts, life should be relatively free of difficulties. In this study, the campers subject tends to be able to fulfill the 3 indicators requested by the researcher but is still incomplete.

Commented [15]: Needs further explanation

In this study, new things were found because the subject of AQ campers tended to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. This is not in line with previous research conducted by Paramita (2017) and Yuniati (2015). In Paramita's (2017) research which states that campers tend to be able to fulfill two indicators, namely the ability to express a situation in mathematical language and the ability to visualize mathematical ideas only, and in Yuniarti's (2015) study which states that the camper category is quite capable in several communication indicators. Mathematically and the category of campers make process errors and conclusion errors.

3. Prospective Mathematics Teacher Students with AQ quitters

Based on the results of descriptions and analysis of written test results, the student subject with the AQ quitters category cannot meet all indicators of mathematical communication skills used by researchers, including drawing. writing, and mathematical expression. The subject of AQ quitters is not able to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. Stoltz (2000) states that quitters are a group of people who prefer to avoid and reject opportunities, easily give up, give up easily, tend to be passive, and are not enthusiastic about reaching the peak of success. Stoltz (2000) also adds that quitters have limited abilities in facing adversity, quitters tend to resist change and claim its every success, or to avoid it and actively walk away from it. This is in line with Supardi (Azzura, 2017) that the subject of quitters tends to think that the difficulties that arise will continue to occur, so that they are constantly overshadowed by obstacles that often arise, every difficulty, the cause is also considered something that will continue to appear again in the future. It is proven in this study that the quitters subject is not able to meet all the indicators requested by the researcher.

This study is in line with the research of Paramita (2017), and Yuniarti (2015). In Paramita's research (2017) which states that quitters are not able to fulfill all indicators of mathematical communication skills, including the ability to express a situation in mathematical language, the ability to visualize mathematical ideas, the ability to explain mathematical ideas in writing, and the ability to evaluate mathematical ideas in writing . Yuniarti's research (2015) also states that the quitter category has not been able to meet almost every mathematical communication indicator and almost all types of errors occur in the quitters category. This is consistent with the results of this study where the quitters subject is not able to meet all indicators of mathematical communication skills including drawing, writing, and mathematical expression.

The results of this study finally produce a summary of the understanding of mathematical communication skills of prospective mathematics teachers in terms of AQ, as shown in the following table:

Table 4. Summary of Mathematical Communication Skills

Number	Aspect	Indicator	Category		
			AQ Climbers	AQ Campers	AQ Quitters
1.	*Drawing*	The ability to express, express and describe mathematical ideas in the form of pictures, graphs or visual mathematical models.	Fulfilled	Fulfilled	Not Fulfilled
2.	*Writing*	The ability to provide answers using your own language or problems using writing and algebra, and to explain an idea or situation from a picture or graphic in your own words in written form.	Fulfilled	Fulfilled	Not Fulfilled
3.	*Mathematical Expression*	The ability to express mathematical concepts by expressing everyday events in mathematical language or symbols, and expressing a situation in the form of a mathematical model	Fulfilled	Fulfilled	Not Fulfilled

Table 4 shows that the results of the study show that the subjects of prospective mathematics teachers who have AQ climbers and AQ campers are able to meet all indicators of mathematical communication skills, indicators of mathematical communication skills used include drawing, writing, and mathematical expression, while the subject of student mathematics teacher candidates. those who have AQ quitters are not able to meet all indicators of mathematical communication skills,

Commented [16]: Then what's the difference? Needs to be discussed

indicators of mathematical communication abilities used include drawing, writing, and mathematical expression. This is in line with Stoltz (2000) who states that success is greatly influenced by one's ability to control or control one's own life. Success is also highly influenced and can be predicted by how a person responds to and describes adversity.

Commented [17]: This sentence does not explain the previous sentence

Table 4 shows that the results of each individual in communicating the problems obtained are in accordance with their AQ. This is in line with Syarifah, Sujatmiko, and Setiawan (2017), mathematical communication is the process of expressing mathematical ideas and understanding verbally, visually, and in writing, using numbers, symbols, pictures, graphs, diagrams, and words. someone. The results of this study are also in line with Nopiyani, Turmudi & Prabawanto (2016), mathematical communication is the ability to express mathematical ideas or ideas either in writing or in pictures. This is also in line with Murtafiah (2016) that mathematical communication is the ability to express mathematical ideas through speech, writing, demonstrations, and visually depicting them in different types for each person.

4. CONCLUSION

Based on the results of research and discussion that has been done with the subject of climbers (NDC), the conclusion is that students are able to solve problems using mathematical communication properly and correctly. Of the three stages of communication the subject is able to meet all the indicators of mathematical communication used. The subject of camping (KAL) is quite capable of solving mathematical communication problems properly and correctly, but there are calculations in resolving incomplete problems. Of the three stages of communication the subject tends to be able to meet all the indicators of mathematical communication used. The subject of quitters (MM) has not been able to solve problems using mathematical communication properly. Of the three stages of communication, the subject tends not to be able to meet all the indicators of mathematical communication used.

Based on the results and conclusions of this study, the following suggestions can be made: to examine more deeply about mathematical communication with the factors that influence students. In addition, it is also based on conducting further research using other types of data based on the findings in this study.

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MATHEMATICS COMMUNICATION SKILLS PROFILE OF PROSPECTIVE MATHEMATICS TEACHERS REVIEWED FROM ADVERSITY QUOTIENT

Article Info

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Keywords:

adversity quotient
student communication skills

ABSTRACT

Communication skills are a very important aspect that needs to be possessed by students who want to succeed in their studies, where students' mathematical communication can organize mathematical thinking both orally and in writing. While AQ is an intelligence in facing difficulties, a student must be able to face the difficulties that exist in them ~~him~~. This study aims to determine the profile of mathematical communication skills of prospective mathematics teacher candidates in terms of adversity quotient. This study ~~research~~ was conducted on mathematics education students at the 6th semester of PGRI Semarang University. This ~~type of~~ research is a descriptive qualitative study. Subjects taken from 57 respondents were 3 students in the category of climbers, campers, and quitters. Data collection is done by written tests and interviews. Indicators of mathematical communication skills that used in this study include drawing, writing, and mathematical expression. Based on the results obtained 1) Subject climbers are able to meet all the indicators of mathematical communication skills and can be said to be good 2) Subject campers tend to be able to meet all indicators of mathematical communication skills, have the power of communication in indicators drawing and can be quite good 3) Quitters subject tends not to be able to meet all the communication indicators, the subject does not answer the problem in the drawing indicator, and the writing and mathematical expression indicators are still wrong.

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1. INTRODUCTION

The 21st century is a century marked by the occurrence of a massive transformation from an agrarian society to an industrial society and continues to a knowledgeable society (Soh, Arsad, & Osman, 2010). Life in the 21st century requires a variety of skills that must be mastered by someone, education is becoming increasingly important to ensure students have learning and innovation skills, skills to use technology and information media, and can work, and survive using life skills (Wijaya, Sudjimat, Nyoto, & Malang, 2016).

Scott (2015) states that the International Commission on Education for the Twenty-first Century proposes four visions of learning, namely knowledge, understanding, competence for life, and competence to act. In addition to this vision, four principles known as the four pillars of education are formulated, namely learning to know, lerning to do, learning to be and learning to live together. Fridanianti, Purwati & Murtianto (2018) stated that strengthening character education in schools must be able to foster student character to be able to think critically, creatively, be able to communicate, and collaborate, who are able to compete in the 21st century. This is in accordance with the four competencies that students must have in the 21st century which is called 4C, namely critical thinking and problem solving ~~(Critical Thinking and Problem Solving)~~, creativity ~~(Creativity)~~, communication skills ~~(Communication Skills)~~, and the ability to work together ~~(Ability to Work Collaboratively)~~. The Introduction presents the purpose of the studies reported and their

relationship to earlier work in the field. It should not be an extensive review of the literature. Use only those references required to provide the most salient background to allow the readers to understand and evaluate the purpose and results of the present study without referring to previous publications on the topic.

Communication is one of the skills in Learning to do, oral and written communication skills contribute to career development in the 21st century. The results of the 2018 PISA assessment (Tohir, 2019) show that the mathematical abilities of students in Indonesia are still low. One of the low mathematical abilities is mathematical communication skills, this can be caused by student confusion in presenting ideas or ideas in the form of symbols, graphs, tables or other media to clarify mathematical problems. Ulfa, Buchori & Murtianto (2017) stated that in general the process of learning mathematics in the classroom is teacher-centered. This is in line with Hampson, Patton & Shanks (2011) who state that high-quality teachers are those who have a strong influence on student achievement. The ability to communicate in learning activities is said to be good if the ability of a teacher and lecturer to create a communicative climate, where between lecturers and students or teachers with students as subjects are actively involved in learning activities, both verbally and nonverbally, in other words this communicative climate as a vehicle for the implementation of learning in accordance with the design and achieving learning objectives (Son, 2015). It would be better if the provision of mathematical communication skills is integrated in every lecture. So the hope is that when prospective teacher students are equipped with high mathematical abilities, they can improve the mathematical abilities of the students they teach. Hapsari, Nizaruddin & Muhtarom (2019) state that teachers play a very important role in improving the quality of learning and learning outcomes that will be achieved by students before going to a higher level.

Commented [MGR2]: Its too general. Your title is mathematics communication skills, please connect the problem of students mathematics communication sskills with what prospective mathematics teachers do to solve it.

Many students still have imperfect mathematical communication skills. Paradesa & Ningsih (2017) states that the ability of students in the aspect of mathematical communication seen from the ability to provide mathematical evidence in the form of facts and data is still experiencing difficulties. If it is related to the problem of mathematical communication skills, the type of intelligence can be used, namely AQ (Adversity Quotient). AQ is often identified with fighting power against adversity. AQ is considered to be able to support student success in increasing achievement motivation.

Many studies have been carried out to see the influence of AQ, including: Hidayat, Herdiman, Aripin, Yuliani & Maya (2018) who try to improve AQ and mathematical creative reasoning of student teacher candidates. Kartika & Yazidah (2019) also tried to analyze the ability of mathematical proof in real analysis courses based on AQ. Paramita (2017) also conducted research on mathematical communication skills in terms of AQ through the application of the SCSS learning model to class VIII students.

Based on the above explanation that AQ has a significant effect in determining the success of students' mathematical communication skills, therefore the mathematical communication skills of students who have high AQ or students with climbers level will be different from the mathematical communication skills of students who have AQ at the campers and quitters level. The research above has not reviewed the mathematical communication skills of prospective mathematics teacher students in terms of AQ, so in this study, the researcher wanted to find out how the profiles of climbers, campers and quitters on student mathematics teacher candidates to their mathematical communication skills. Thus the purpose of this study is to determine and investigate in depth the AQ profile of prospective mathematics teacher students on mathematical communication skills.

Commented [MGR3]: The reference that show AQ affect mathematics communication skill still not enough. Please provide more research about the connection between AQ and mathematics communication skill.

2. METHOD

Commented [MGR4]: Please provide the test instrument in this section.

The method used in this research is descriptive qualitative research method using written and oral data. This research was conducted online, where the AQ questionnaire was filled out via google form, and a written test of mathematical communication was carried out via the WhatsApp group video call, while interviews were conducted via WhatsApp calls. The subjects identified in this study were 3 semester VI students of the Mathematics Education Study Program of the PGRI University Semarang class of 2017 including one student with AQ quitters, one student with AQ campers, and one student with AQ climbers. This study used purposive sampling ~~or purposive sampling~~. Sugiyono (2016) states that purposive sampling is a technique of sampling data sources with certain considerations, with the consideration that the person we choose is considered to know best about what we expect or he is the ruler, making it easier for researchers to explore the object or social situation under study.

The instruments used in this study included the AQ questionnaire, the mathematical communication skills test sheet, and the interview guide. The AQ questionnaire for sixth semester mathematics education students was given to two classes via google form and obtained 57 respondents. This questionnaire was conducted to select 3 students with the categories quitters, campers, and climbers. Then an online written test was conducted through the WhatsApp group video call for students who had the intelligence of quitters, campers, and climbers. After that, an online interview was conducted via a WhatsApp call to get more in-depth information about the form of mathematical communication possessed by these students.

Commented [MGR5]: Before interview conducted, did you check the answer of the test first? If you did it, please write it.

3. RESULTS AND DISCUSSION

3.1. Results

Commented [MGR6]: Please provide one by one analysis based on their AQ category.

The first step was to determine the students as categories climbers, campers, and quitters. From the AQ questionnaire that has been distributed, it was obtained from 57 respondents that 3.51% of students with AQ quitters, 0% of students with low AQ to moderate AQ, 31.58% of students with AQ campers, 57.89% of students with moderate AQ to AQ high, and 7.02% of students with AQ climbers as in the following figure:

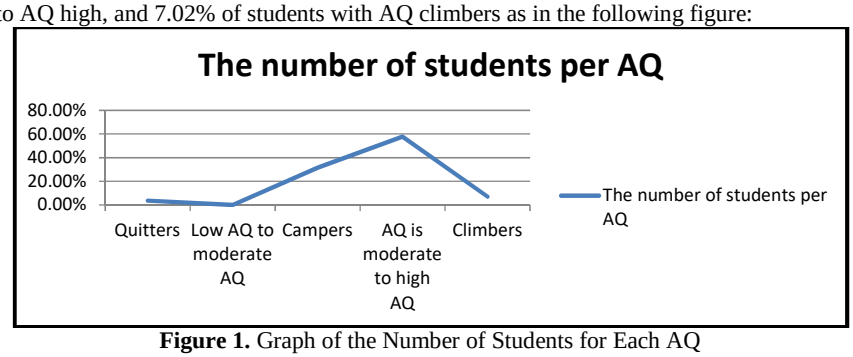


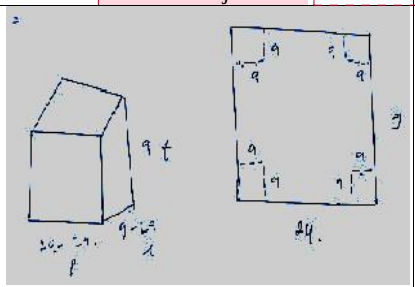
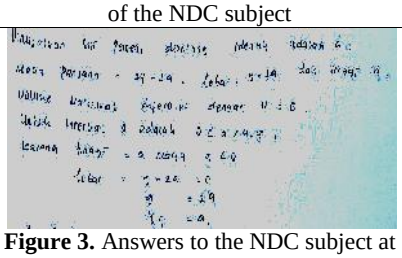
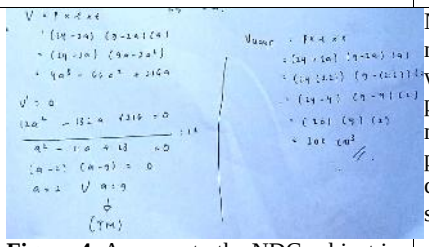
Figure 1. Graph of the Number of Students for Each AQ

After selecting 3 students with the categories climbers, campers, and quitters, then the three students were given questions on communication skills tests and interviews. Instruments used for mathematical communication skills include drawing, writing, and mathematical expression. Analysis of the mathematical communication skills of each subject can be seen in the following table:

Commented [MGR7]: The sstudents' answers should be provided one by one. Figure 1 and then the explanation, Figure 2 and then the explanation, etc.

Table 1. NDC Subject Work Results (Climbers) at All Stages

Commented [MGR8]: Before using this code, please said it first what is the meaning of NDC, KAL, etc.

Step	Jawaban Subjek NDC	Information
Drawing	 **Figure 2.** Answers to the drawing stage of the NDC subject	NDC subjects can state the problem in the form of an image correctly and precisely and provide information on the length, width, and height of the problem in the question.
Writing	 **Figure 3.** Answers to the NDC subject at the writing stage	NDC subjects can use mathematical language appropriately and correctly, and are able to explain ideas or situations from images that have been made previously in their own words in writing, the subject takes his own side in written form, the subject considers the side of the square which is cut off with the symbol "a ", And also write an explanation in determining the interval" a "correctly.
Mathematical Expression	 **Figure 4.** Answers to the NDC subject in the mathematical expression stage	NDC subjects can state mathematical solutions in writing clearly and precisely, are able to use mathematical symbols and perform calculations or get complete and correct solutions.

Commented [MGR9]: Should in English.

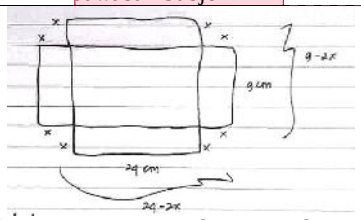
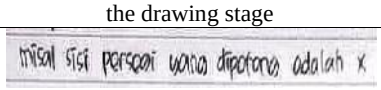
1
2

Step	Jawaban Subjek NDC	Information
		The subject is able to determine the length of the shape she has previously made with the values 24 - 2a, and for the width 9 - 2a, and the height a. Then the subject is able to write the

Commented [MGR10]: Should in English.

		volume formula used with V = pxlxt, the subject is also able to apply the first derived properties with V '= 0 and is able to determine the value "a" that meets the maximum volume sought, and performs calculations correctly both in calculating the initial volume, determine the equation V ', find the value of a, and determine the maximum volume

Table 2. Results of KAL Subject Work (Campers) at All Stages

Step	Jawaban Subjek KAL	Information
Drawing	 **Figure 5.** Answers to the KAL subject at the drawing stage	KAL subjects can state the problem in the form of an image correctly and precisely and are able to provide information on the length, width, and height of the problem in the question.
Writing	 **Figure 6.** Answers to the KAL subject at the writing stage	KAL subjects can use mathematical language correctly, and are able to explain ideas or situations from previously made pictures in their own words in written form but are still incomplete. The KAL subject takes the cut side of the square with the symbol “x”. However the KAL subject did not specify the interval of “x”.

Step	Jawaban Subjek KAL	Information

Commented [MGR11]: Should in English.

Commented [MGR12]: Should in English.

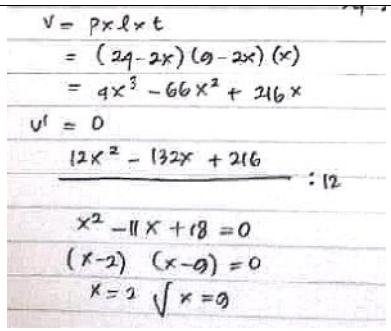
Mathematical Expression	 **Figure 7.** Answers to the KAL subject in the mathematical expression stage	The subject of KAL can clearly state mathematical solutions in writing, can use mathematical symbols, and perform calculations but is still incomplete. The subject is able to determine the length of the shape he made previously with the values 24 - 2x, and for the width 9–2x, and the height a. Then the KAL subject is able to write the volume formula used with V = p x l x t and its calculations, the subject is also able to apply the first derivative with V '= 0, but the KAL subject cannot determine the maximum volume of the given problem.

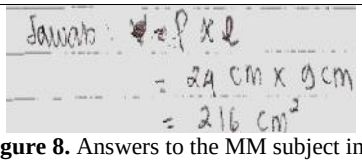
Table 3. Results of MM Subject Work (Quitters) at All Stages

Step	Jawaban Subjek MM	Information
Drawing	-	The subject of MM did not fulfill the mathematical communication indicators of drawing in solving the questions, the subject did not present the data or information from the questions in the form of pictures.
Writing	-	The MM subject did not meet the indicators of writing mathematical communication skills, the MM subject could not write an explanation of the answer to the problem mathematically and did not use mathematical language or symbols appropriately and correctly.

Commented [MGR13]: Should in English.

Step	Jawaban Subjek MM	Information

Commented [MGR14]: Should in English.

Mathematical Expression	 **Figure 8.** Answers to the MM subject in the mathematical expression stage	The subject of MM is not able to express mathematical solutions in writing, and perform calculations but is wrong, because the MM subject solves the problem not with the formula for the volume of blocks but by using the rectangular formula and the determination of the length and width values is still wrong.

Data were also collected through in-depth interviews with the subjects of climbers (NDC), campers (KAL), and quitters (MM). Written test results data were compared with interview data to obtain valid data. From the research results written tests and interviews conducted by climbers subjects met all indicators of mathematical communication skills used, campers subjects tended to be able to meet all indicators of mathematical communication skills used, while quitters subjects were unable to meet all indicators of mathematical communication skills used.

Commented [MGR15]: Please provide the results of the interview.

3.2. Discussion

From the results of the tests and interviews, the researcher observed that the data obtained was sufficient, so the written test and interview were not continued to the next stage. From the analysis of written tests and interviews of mathematical communication skills, the following results are obtained:

1. Student Mathematics Teacher Candidate with AQ climbers

Based on the results of the description and analysis of the written test results, the student subject with the AQ climbers category can meet all indicators of mathematical communication skills used by the researcher, including drawing, writing, and mathematical expression. Subjects with AQ climbers are able to express, ~~express~~ and describe mathematical ideas in the form of pictures, subjects with AQ climbers are able to provide answers using their own language or problems using writing and algebra, and are able to explain ideas or situations from an image or graph with own words in written form, the subject with AQ climbers is able to state a situation in the form of a mathematical model, and is able to perform mathematical calculations correctly.

This is in line with Nartani, Hidayat, and Sumiyati (2015) improving the communication skills of mathematics indicated by students are able to express ideas or ideas with mathematics verbally sentence, students are actively involved in discussions about math, students can formulate definitions and generalizations about the math, students can formulate a definition of mathematics by using its own words. Mathematical communication skills are shown by students being able to express ideas or ideas with mathematical sentences verbally, students are actively involved in discussions about mathematics, students can formulate definitions and generalizations about mathematics, students can formulate mathematical definitions using their own words. This is also in line with Ansari (2012) who states that drawing communication skills are reflecting real objects, drawings and diagrams into

mathematical ideas, writing is stating and explaining a mathematical drawing or model into a mathematical idea form, mathematical expression is express a situation or mathematical idea into a symbol or mathematical model and solve it.

It can be concluded that the subject of AQ climbers is able to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. Stoltz (2000) states that the subject of climbers is a group of people who always try to reach the peak of success, are ready to face any obstacles, and always raise themselves to success. This is also in line with the results of Supardi's research (Azzura, 2017) that the subject of climbers plays an important role in what has been done, the good or bad results of every action and work become responsibility and do not blame others. This is evident in this study the climbers subject was able to fulfill the 3 indicators asked by the researcher with correct and correct answers.

This research is in line with the research of Paramita (2017), Kartika & Yazidah (2019), and Yuniarti (2015). In Paramita's research (2017) which states that the climbers subject is able to meet all indicators of mathematical communication skills including the ability to state a situation in mathematical language, the ability to describe mathematical ideas visually, the ability to explain mathematical ideas in writing, and the ability to evaluate mathematical ideas in writing. In Kartika & Yazidah's research (2019), which states that climbers students are more able to compile direct evidence than quitters and campers students. In research Yuniarti (2015) also states that the climber category is capable of almost all indicators of mathematical communication.

2. Prospective Mathematics Teacher Students with AQ campers

Commented [MGR16]: Plese be consistent. The climbers said student mathematics teacher.

Based on the results of descriptions and analysis of written test results, student subjects with the AQ campers category tend to be able to meet all indicators of mathematical communication skills used by researchers, including drawing. writing, and mathematical expression. Subjects with AQ campers are able to state, express and describe mathematical ideas in the form of images, subjects with AQ campers tend to be able to provide answers in their own language or problems using writing and algebra, and are able to explain ideas or situations from an image or graphic In their own words in written form, subjects with AQ campers tend to be able to state a situation in the form of a mathematical model, but have not been able to complete it completely in finding the maximum volume value requested in the problem. This is in line with Nartani, Hidayat, and Sumiyati (2015) improving the communication skills of mathematics indicated by students are able to express ideas or ideas with mathematics verbally sentence, students are actively involved in discussions about math, students can formulate definitions and generalizations about the math, students can formulate a definition of mathematics by using its own words. Mathematical communication skills are shown by students being able to express ideas or ideas with mathematical sentences verbally, students are actively involved in discussions about mathematics, students can formulate definitions and generalizations about mathematics, students can formulate mathematical definitions using their own words. This is also in line with Ansari (2012) who states that drawing communication skills are reflecting real objects, drawings and diagrams into mathematical ideas, writing is stating and explaining a mathematical drawing or model into a mathematical idea form, mathematical expression is express a situation or mathematical idea into a symbol or mathematical model and solve it.

It can be concluded that the subject of AQ climbers tends to be able to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. Stoltz (2000) stated that campers are a group of people who still have the desire to respond to existing challenges, but do not reach the peak of success and easily give up on what has been achieved. Stoltz (2000) also adds that campers do not fully exploit their potential, campers have a limited ability to change, especially major changes, campers live with the belief that after several years or after making a number of efforts, life should be relatively free of difficulties. In this study, the campers subject tends to be able to fulfill the 3 indicators requested by the researcher but is still incomplete.

In this study, new things were found because the subject of AQ campers tended to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. This is not in line with previous research conducted by Paramita (2017) and Yuniati (2015). In Paramita's (2017) research which states that campers tend to be able to fulfill two indicators, namely the ability to express a situation in mathematical language and the ability to visualize mathematical ideas only, and in Yuniarti's (2015) study which states that the camper category is quite capable in several communication indicators. Mathematically and the category of campers make process errors and conclusion errors.

3. Prospective Mathematics Teacher Students with AQ quitters

Based on the results of descriptions and analysis of written test results, the student subject with the AQ quitters category cannot meet all indicators of mathematical communication skills used by researchers, including drawing. writing, and mathematical expression. The subject of AQ quitters is not able to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. Stoltz (2000) states that quitters are a group of people who prefer to avoid and reject opportunities, easily give up, give up easily, tend to be passive, and are not enthusiastic about reaching the peak of success. Stoltz (2000) also adds that quitters have limited abilities in facing adversity, quitters tend to resist change and claim its every success, or to avoid it and actively walk away from it. This is in line with Supardi (Azzura, 2017) that the subject of quitters tends to think that the difficulties that arise will continue to occur, so that they are constantly overshadowed by obstacles that often arise, every difficulty, the cause is also considered something that will continue to appear again in the future. . It is proven in this study that the quitters subject is not able to meet all the indicators requested by the researcher.

This study is in line with the research of Paramita (2017), and Yuniarti (2015). In Paramita's research (2017) which states that quitters are not able to fulfill all indicators of mathematical communication skills, including the ability to express a situation in mathematical language, the ability to visualize mathematical ideas, the ability to explain mathematical ideas in writing, and the ability to evaluate mathematical ideas in writing . Yuniarti's research (2015) also states that the quitter category has not been able to meet almost every mathematical communication indicator and almost all types of errors occur in the quitters category. This is consistent with the results of this study where the quitters subject is not able to meet all indicators of mathematical communication skills including drawing, writing, and mathematical expression.

The results of this study finally produce a summary of the understanding of mathematical communication skills of prospective mathematics teachers in terms of AQ, as shown in the following table:

Table 4. Summary of Mathematical Communication Skills

Number	Aspect	Indicator	Category		
			AQ Climbers	AQ Campers	AQ Quitters
1.	*Drawing*	The ability to express, express and describe mathematical ideas in the form of pictures, graphs or visual mathematical models.	Fulfilled	Fulfilled	Not Fulfilled
2.	*Writing*	The ability to provide answers using your own language or problems using writing and algebra, and to explain an idea or situation from a picture or graphic in your own words in written form.	Fulfilled	Fulfilled	Not Fulfilled
3.	*Mathematical Expression*	The ability to express mathematical concepts by expressing everyday events in mathematical language or symbols, and expressing a situation in the form of a mathematical model	Fulfilled	Fulfilled	Not Fulfilled

Table 4 shows that the results of the study show that the subjects of prospective mathematics teachers who have AQ climbers and AQ campers are able to meet all indicators of mathematical communication skills, indicators of mathematical communication skills used include drawing, writing, and mathematical expression, while the subject of student mathematics teacher candidates. those who have AQ quitters are not able to meet all indicators of mathematical communication skills,

indicators of mathematical communication abilities used include drawing, writing, and mathematical expression. This is in line with Stoltz (2000) who states that success is greatly influenced by one's ability to control or control one's own life. Success is also highly influenced and can be predicted by how a person responds to and describes adversity.

Table 4 shows that the results of each individual in communicating the problems obtained are in accordance with their AQ. This is in line with Syarifah, Sujatmiko, and Setiawan (2017), mathematical communication is the process of expressing mathematical ideas and understanding verbally, visually, and in writing, using numbers, symbols, pictures, graphs, diagrams, and words. someone. The results of this study are also in line with Nopiyani, Turmudi & Prabawanto (2016), mathematical communication is the ability to express mathematical ideas or ideas either in writing or in pictures. This is also in line with Murtafiah (2016) that mathematical communication is the ability to express mathematical ideas through speech, writing, demonstrations, and visually depicting them in different types for each person.

4. CONCLUSION

Based on the results of research and discussion that has been done with the subject of climbers (NDC), the conclusion is that students are able to solve problems using mathematical communication properly and correctly. Of the three stages of communication the subject is able to meet all the indicators of mathematical communication used. The subject of camping (KAL) is quite capable of solving mathematical communication problems properly and correctly, but there are calculations in resolving incomplete problems. Of the three stages of communication the subject tends to be able to meet all the indicators of mathematical communication used. The subject of quitters (MM) has not been able to solve problems using mathematical communication properly. Of the three stages of communication, the subject tends not to be able to meet all the indicators of mathematical communication used.

Based on the results and conclusions of this study, the following suggestions can be made: to examine more deeply about mathematical communication with the factors that influence students. In addition, it is also based on conducting further research using other types of data based on the findings in this study.

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MATHEMATIC COMMUNICATION SKILLS PROFILE OF PROSPECTIVE MATHEMATICS TEACHERS REVIEWED FROM ADVERSITY QUOTIENT

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Keywords:

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student communication skills

ABSTRACT

Communication skills are a very important aspect that needs to be possessed by students who want to succeed in their studies, where students' mathematical communication can organize mathematical thinking both orally and in writing. While AQ is an intelligence in facing difficulties, a student must be able to face the difficulties that exist in him. This study aims to determine the profile of mathematical communication skills of prospective mathematics teacher candidates in terms of adversity quotient. This research was conducted on mathematics education students at the 6th semester of PGRI Semarang University. This type of research is a descriptive qualitative study. Subjects taken from 57 respondents were 3 students in the category of climbers, campers, and quitters. Data collection is done by written tests and interviews. Indicators of mathematical communication skills used include drawing, writing, and mathematical expression Based on the results obtained 1) Subject climbers are able to meet all the indicators of mathematical communication skills and can be said to be good 2) Subject campers tend to be able to meet all indicators of mathematical communication skills, have the power of communication in indicators drawing and can be quite good 3) Quitters subject tends not to be able to meet all the communication indicators, the subject does not answer the problem in the drawing indicator, and the writing and mathematical expression indicators are still wrong.

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1. INTRODUCTION

The 21st century is a century marked by the occurrence of a massive transformation from an agrarian society to an industrial society and continues to a knowledgeable society (Soh, Arsad, & Osman, 2010). Life in the 21st century requires a variety of skills that must be mastered by someone, education is becoming increasingly important to ensure students have learning and innovation skills, skills to use technology and information media, and can work, and survive using life skills (Wijaya, Sudjimat, Nyoto, & Malang, 2016).

Scott (2015) states that the International Commission on Education for the Twenty-first Century proposes four visions of learning, namely knowledge, understanding, competence for life, and competence to act. In addition to this vision, four principles known as the four pillars of education are formulated, namely learning to know, lerning to do, learning to be and learning to live together. Fridanianti, Purwati & Murtianto (2018) stated that strengthening character education in schools must be able to foster student character to be able to think critically, creatively, be able to communicate, and collaborate, who are able to compete in the 21st century. This is in accordance with the four competencies that students must have. in the 21st century which is called 4C, namely critical thinking and problem solving (Critical Thinking and Problem Solving), creativity (Creativity), communication skills (Communication Skills), and the ability to work together (Ability to Work Collaboratively). The Introduction presents the purpose of the studies reported and their relationship to earlier work in the field. It should not be an extensive review of the literature.

Use only those references required to provide the most salient background to allow the readers to understand and evaluate the purpose and results of the present study without referring to previous publications on the topic.

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Communication is one of the skills in Learning to do, oral and written communication skills contribute to career development in the 21st century. The results of the 2018 PISA assessment (Tohir, 2019) show that the mathematical abilities of students in Indonesia are still low. One of the low mathematical abilities is mathematical communication skills, this can be caused by student confusion in presenting ideas or ideas in the form of symbols, graphs, tables or other media to clarify mathematical problems. Ulfa, Buchori & Murtianto (2017) stated that in general the process of learning mathematics in the classroom is teacher-centered. This is in line with Hampson, Patton & Shanks (2011) who state that high-quality teachers are those who have a strong influence on student achievement. The ability to communicate in learning activities is said to be good if the ability of a teacher and lecturer to create a communicative climate, where between lecturers and students or teachers with students as subjects are actively involved in learning activities, both verbally and nonverbally, in other words this communicative climate as a vehicle for the implementation of learning in accordance with the design and achieving learning objectives (Son, 2015). It would be better if the provision of mathematical communication skills is integrated in every lecture. So the hope is that when prospective teacher students are equipped with high mathematical abilities, they can improve the mathematical abilities of the students they teach. Hapsari, Nizaruddin & Muhtarom (2019) state that teachers play a very important role in improving the quality of learning and learning outcomes that will be achieved by students before going to a higher level.

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Many students still have imperfect mathematical communication skills. Paradesa & Ningsih (2017) states that the ability of students in the aspect of mathematical communication seen from the ability to provide mathematical evidence in the form of facts and data is still experiencing difficulties. If it is related to the problem of mathematical communication skills, the type of intelligence can be used, namely AQ (Adversity Quotient). AQ is often identified with fighting power against adversity. AQ is considered to be able to support student success in increasing achievement motivation.

Many studies have been carried out to see the influence of AQ, including: Hidayat, Herdiman, Aripin, Yuliani & Maya (2018) who try to improve AQ and mathematical creative reasoning of student teacher candidates. Kartika & Yazidah (2019) also tried to analyze the ability of mathematical proof in real analysis courses based on AQ. Paramita (2017) also conducted research on mathematical communication skills in terms of AQ through the application of the SCSS learning model to class VIII students.

Based on the above explanation that AQ has a significant effect in determining the success of students' mathematical communication skills, therefore the mathematical communication skills of students who have high AQ or students with climbers level will be different from the mathematical communication skills of students who have AQ at the campers and quitters level. The research above has not reviewed the mathematical communication skills of prospective mathematics teacher students in terms of AQ, so in this study, the researcher wanted to find out how the profiles of climbers, campers and quitters on student mathematics teacher candidates to their mathematical communication skills. Thus the purpose of this study is to determine and investigate in depth the AQ profile of prospective mathematics teacher students on mathematical communication skills.

2. METHOD

The method used in this research is descriptive qualitative research method using written and oral data. This research was conducted online, where the AQ questionnaire was

filled out via google form, and a written test of mathematical communication was carried out via the WhatsApp group video call, while interviews were conducted via WhatsApp calls. The subjects identified in this study were 3 semester VI students of the Mathematics Education Study Program of the PGRI University Semarang class of 2017 including one student with AQ quitters, one student with AQ campers, and one student with AQ climbers. This study used purposive sampling or purposive sampling. Sugiyono (2016) states that purposive sampling is a technique of sampling data sources with certain considerations, with the consideration that the person we choose is considered to know best about what we expect or he is the ruler, making it easier for researchers to explore the object or social situation under study.

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The instruments used in this study included the AQ questionnaire, the mathematical communication skills test sheet, and the interview guide. The AQ questionnaire for sixth semester mathematics education students was given to two classes via google form and obtained 57 respondents. This questionnaire was conducted to select 3 students with the categories quitters, campers, and climbers. Then an online written test was conducted through the WhatsApp group video call for students who had the intelligence of quitters, campers, and climbers. After that, an online interview was conducted via a WhatsApp call to get more in-depth information about the form of mathematical communication possessed by these students.

3. RESULTS AND DISCUSSION

3.1. Results

The first step was to determine the students as categories climbers, campers, and quitters. From the AQ questionnaire that has been distributed, it was obtained from 57 respondents that 3.51% of students with AQ quitters, 0% of students with low AQ to moderate AQ, 31.58% of students with AQ campers, 57.89% of students with moderate AQ to AQ high, and 7.02% of students with AQ climbers as in the following figure:

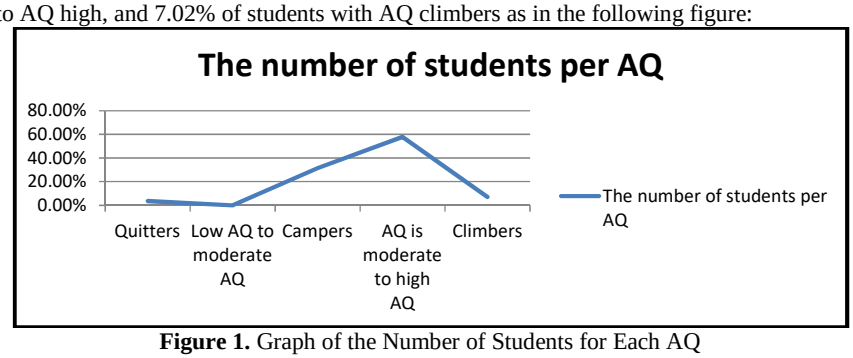

Figure 1. Graph of the Number of Students for Each AQ

After selecting 3 students with the categories climbers, campers, and quitters, then the three students were given questions on communication skills tests and interviews. Instruments used for mathematical communication skills include drawing, writing, and mathematical expression. Analysis of the mathematical communication skills of each subject can be seen in the following table:

Commented [u5]: Describe the selected subject from each level of AQ

Table 1. NDC Subject Work Results (Climbers) at All Stages

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Step	Jawaban Subjek NDC	Information

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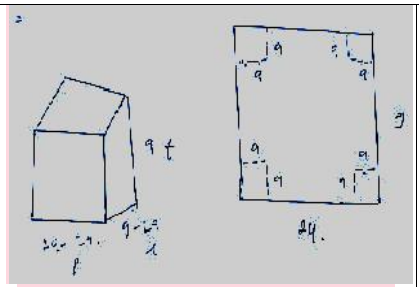
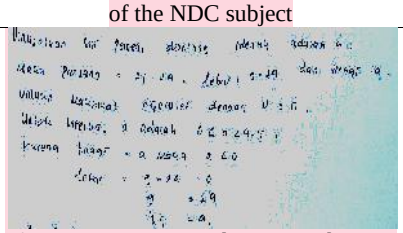
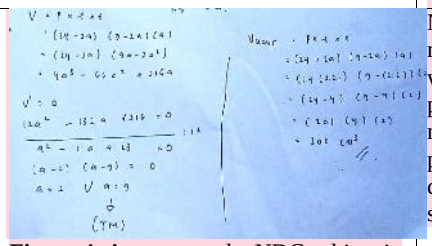
Drawing	 **Figure 2.** Answers to the drawing stage of the NDC subject	NDC subjects can state the problem in the form of an image correctly and precisely and provide information on the length, width, and height of the problem in the question.
Writing	 **Figure 3.** Answers to the NDC subject at the writing stage	NDC subjects can use mathematical language appropriately and correctly, and are able to explain ideas or situations from images that have been made previously in their own words in writing, the subject takes his own side in written form, the subject considers the side of the square which is cut off with the symbol "a ", And also write an explanation in determining the interval" a "correctly.
Mathematical Expression	 **Figure 4.** Answers to the NDC subject in the mathematical expression stage	NDC subjects can state mathematical solutions in writing clearly and precisely, are able to use mathematical symbols and perform calculations or get complete and correct solutions.

Step	Jawaban Subjek NDC	Information
		The subject is able to determine the length of the shape she has previously made with the values 24 - 2a, and for the width 9 - 2a, and the height a. Then the subject is able to write the volume formula used with

		V = pxlxt, the subject is also able to apply the first derived properties with V '= 0 and is able to determine the value "a" that meets the maximum volume sought, and performs calculations correctly both in calculating the initial volume, determine the equation V ', find the value of a, and determine the maximum volume

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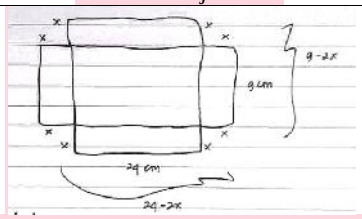
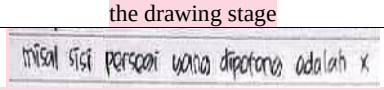
Table 2. Results of KAL Subject Work (Campers) at All Stages

Step	Jawaban Subjek KAL	Information
Drawing	 **Figure 5.** Answers to the KAL subject at the drawing stage	KAL subjects can state the problem in the form of an image correctly and precisely and are able to provide information on the length, width, and height of the problem in the question.
Writing	 **Figure 6.** Answers to the KAL subject at the writing stage	KAL subjects can use mathematical language correctly, and are able to explain ideas or situations from previously made pictures in their own words in written form but are still incomplete. The KAL subject takes the cut side of the square with the symbol "x". However the KAL subject did not specify the interval of "x".

Step	Jawaban Subjek KAL	Information

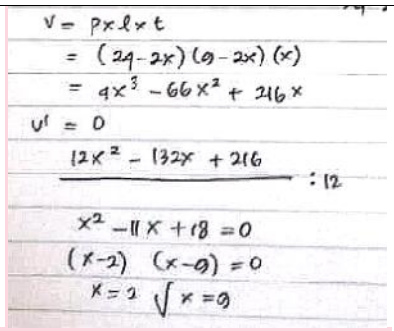
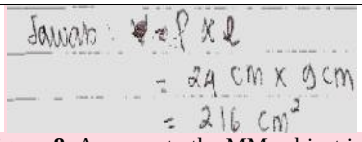
Mathematical Expression	 **Figure 7.** Answers to the KAL subject in the mathematical expression stage	The subject of KAL can clearly state mathematical solutions in writing, can use mathematical symbols, and perform calculations but is still incomplete. The subject is able to determine the length of the shape he made previously with the values 24 - 2x, and for the width 9–2x, and the height a. Then the KAL subject is able to write the volume formula used with V = p x l x t and its calculations, the subject is also able to apply the first derivative with V '= 0, but the KAL subject cannot determine the maximum volume of the given problem.

Table 3. Results of MM Subject Work (Quitters) at All Stages

Step	Jawaban Subjek MM	Information
Drawing	-	The subject of MM did not fulfill the mathematical communication indicators of drawing in solving the questions, the subject did not present the data or information from the questions in the form of pictures.
Writing	-	The MM subject did not meet the indicators of writing mathematical communication skills, the MM subject could not write an explanation of the answer to the problem mathematically and did not use mathematical language or symbols appropriately and correctly.

Step	Jawaban Subjek MM	Information

Mathematical Expression	 **Figure 8.** Answers to the MM subject in the mathematical expression stage	The subject of MM is not able to express mathematical solutions in writing, and perform calculations but is wrong, because the MM subject solves the problem not with the formula for the volume of blocks but by using the rectangular formula and the determination of the length and width values is still wrong.

Data were also collected through in-depth interviews with the subjects of climbers (NDC), campers (KAL), and quitters (MM). Written test results data were compared with interview data to obtain valid data. From the research results written tests and interviews conducted by climbers subjects met all indicators of mathematical communication skills used, campers subjects tended to be able to meet all indicators of mathematical communication skills used, while quitters subjects were unable to meet all indicators of mathematical communication skills used.

3.2. Discussion

From the results of the tests and interviews, the researcher observed that the data obtained was sufficient, so the written test and interview were not continued to the next stage. From the analysis of written tests and interviews of mathematical communication skills, the following results are obtained:

1. Student Mathematics Teacher Candidate with AQ climbers

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Based on the results of the description and analysis of the written test results, the student subject with the AQ climbers category can meet all indicators of mathematical communication skills used by the researcher, including drawing, writing, and mathematical expression. Subjects with AQ climbers are able to express, express and describe mathematical ideas in the form of pictures, subjects with AQ climbers are able to provide answers using their own language or problems using writing and algebra, and are able to explain ideas or situations from an image or graph with own words in written form, the subject with AQ climbers is able to state a situation in the form of a mathematical model, and is able to perform mathematical calculations correctly.

This is in line with Nartani, Hidayat, and Sumiyati (2015) improving the communication skills of mathematics indicated by students are able to express ideas or ideas with mathematics verbally sentence, students are actively involved in discussions about math, students can formulate definitions and generalizations about the math, students can formulate a definition of mathematics by using its own words. Mathematical communication skills are shown by students being able to express ideas or ideas with mathematical sentences verbally, students are actively involved in discussions about mathematics, students can formulate definitions and generalizations about mathematics, students can formulate mathematical definitions using their own words. This is also in line with Ansari (2012) who states that drawing communication skills are reflecting real objects, drawings and diagrams into

mathematical ideas, writing is stating and explaining a mathematical drawing or model into a mathematical idea form, mathematical expression is express a situation or mathematical idea into a symbol or mathematical model and solve it.

It can be concluded that the subject of AQ climbers is able to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. Stoltz (2000) states that the subject of climbers is a group of people who always try to reach the peak of success, are ready to face any obstacles, and always raise themselves to success. This is also in line with the results of Supardi's research (Azzura, 2017) that the subject of climbers plays an important role in what has been done, the good or bad results of every action and work become responsibility and do not blame others. This is evident in this study the climbers subject was able to fulfill the 3 indicators asked by the researcher with correct and correct answers.

This research is in line with the research of Paramita (2017), Kartika & Yazidah (2019), and Yuniarti (2015). In Paramita's research (2017) which states that the climbers subject is able to meet all indicators of mathematical communication skills including the ability to state a situation in mathematical language, the ability to describe mathematical ideas visually, the ability to explain mathematical ideas in writing, and the ability to evaluate mathematical ideas in writing. In Kartika & Yazidah's research (2019), which states that climbers students are more able to compile direct evidence than quitters and campers students. In research Yuniarti (2015) also states that the climber category is capable of almost all indicators of mathematical communication.

2. Prospective Mathematics Teacher Students with AQ campers

Based on the results of descriptions and analysis of written test results, student subjects with the AQ campers category tend to be able to meet all indicators of mathematical communication skills used by researchers, including drawing. writing, and mathematical expression. Subjects with AQ campers are able to state, express and describe mathematical ideas in the form of images, subjects with AQ campers tend to be able to provide answers in their own language or problems using writing and algebra, and are able to explain ideas or situations from an image or graphic In their own words in written form, subjects with AQ campers tend to be able to state a situation in the form of a mathematical model, but have not been able to complete it completely in finding the maximum volume value requested in the problem. This is in line with Nartani, Hidayat, and Sumiyati (2015) improving the communication skills of mathematics indicated by students are able to express ideas or ideas with mathematics verbally sentence, students are actively involved in discussions about math, students can formulate definitions and generalizations about the math, students can formulate a definition of mathematics by using its own words. Mathematical communication skills are shown by students being able to express ideas or ideas with mathematical sentences verbally, students are actively involved in discussions about mathematics, students can formulate definitions and generalizations about mathematics, students can formulate mathematical definitions using their own words. This is also in line with Ansari (2012) who states that drawing communication skills are reflecting real objects, drawings and diagrams into mathematical ideas, writing is stating and explaining a mathematical drawing or model into a mathematical idea form, mathematical expression is express a situation or mathematical idea into a symbol or mathematical model and solve it.

It can be concluded that the subject of AQ climbers tends to be able to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. Stoltz (2000) stated that campers are a group of people who still have the desire to respond to existing challenges, but do not reach the peak of success and easily give up on what has been achieved. Stoltz (2000) also adds that campers do not fully exploit their potential, campers have a limited ability to change, especially major changes, campers live with the belief that after several years or after making a number of efforts, life should be relatively free of difficulties. In this study, the campers subject tends to be able to fulfill the 3 indicators requested by the researcher but is still incomplete.

In this study, new things were found because the subject of AQ campers tended to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. This is not in line with previous research conducted by Paramita (2017) and Yuniati (2015). In Paramita's (2017) research which states that campers tend to be able to fulfill two indicators, namely the ability to express a situation in mathematical language and the ability to visualize mathematical ideas only, and in Yuniarti's (2015) study which states that the camper category is quite capable in several communication indicators. Mathematically and the category of campers make process errors and conclusion errors.

3. Prospective Mathematics Teacher Students with AQ quitters

Based on the results of descriptions and analysis of written test results, the student subject with the AQ quitters category cannot meet all indicators of mathematical communication skills used by researchers, including drawing. writing, and mathematical expression. The subject of AQ quitters is not able to meet all indicators of mathematical communication skills of drawing, writing, and mathematical expression. Stoltz (2000) states that quitters are a group of people who prefer to avoid and reject opportunities, easily give up, give up easily, tend to be passive, and are not enthusiastic about reaching the peak of success. Stoltz (2000) also adds that quitters have limited abilities in facing adversity, quitters tend to resist change and claim its every success, or to avoid it and actively walk away from it. This is in line with Supardi (Azzura, 2017) that the subject of quitters tends to think that the difficulties that arise will continue to occur, so that they are constantly overshadowed by obstacles that often arise, every difficulty, the cause is also considered something that will continue to appear again in the future. . It is proven in this study that the quitters subject is not able to meet all the indicators requested by the researcher.

This study is in line with the research of Paramita (2017), and Yuniarti (2015). In Paramita's research (2017) which states that quitters are not able to fulfill all indicators of mathematical communication skills, including the ability to express a situation in mathematical language, the ability to visualize mathematical ideas, the ability to explain mathematical ideas in writing, and the ability to evaluate mathematical ideas in writing . Yuniarti's research (2015) also states that the quitter category has not been able to meet almost every mathematical communication indicator and almost all types of errors occur in the quitters category. This is consistent with the results of this study where the quitters subject is not able to meet all indicators of mathematical communication skills including drawing, writing, and mathematical expression.

The results of this study finally produce a summary of the understanding of mathematical communication skills of prospective mathematics teachers in terms of AQ, as shown in the following table:

Commented [u10]: This table should be presented in the results section, before describing the answers of each subject.

Table 4. Summary of Mathematical Communication Skills

Number	Aspect	Indicator	Category		
			AQ Climbers	AQ Campers	AQ Quitters
1.	*Drawing*	The ability to express, express and describe mathematical ideas in the form of pictures, graphs or visual mathematical models.	Fulfilled	Fulfilled	Not Fulfilled
2.	*Writing*	The ability to provide answers using your own language or problems using writing and algebra, and to explain an idea or situation from a picture or graphic in your own words in written form.	Fulfilled	Fulfilled	Not Fulfilled
3.	*Mathematical Expression*	The ability to express mathematical concepts by expressing everyday events in mathematical language or symbols, and expressing a situation in the form of a mathematical model	Fulfilled	Fulfilled	Not Fulfilled

Table 4 shows that the results of the study show that the subjects of prospective mathematics teachers who have AQ climbers and AQ campers are able to meet all indicators of mathematical communication skills, indicators of mathematical communication skills used include drawing, writing, and mathematical expression, while the subject of student mathematics teacher candidates. those who have AQ quitters are not able to meet all indicators of mathematical communication skills,

indicators of mathematical communication abilities used include drawing, writing, and mathematical expression. This is in line with Stoltz (2000) who states that success is greatly influenced by one's ability to control or control one's own life. Success is also highly influenced and can be predicted by how a person responds to and describes adversity.

Table 4 shows that the results of each individual in communicating the problems obtained are in accordance with their AQ. This is in line with Syarifah, Sujatmiko, and Setiawan (2017), mathematical communication is the process of expressing mathematical ideas and understanding verbally, visually, and in writing, using numbers, symbols, pictures, graphs, diagrams, and words. someone. The results of this study are also in line with Nopiyani, Turmudi & Prabawanto (2016), mathematical communication is the ability to express mathematical ideas or ideas either in writing or in pictures. This is also in line with Murtafiah (2016) that mathematical communication is the ability to express mathematical ideas through speech, writing, demonstrations, and visually depicting them in different types for each person.

4. CONCLUSION

Based on the results of research and discussion that has been done with the subject of climbers (NDC), the conclusion is that students are able to solve problems using mathematical communication properly and correctly. Of the three stages of communication the subject is able to meet all the indicators of mathematical communication used. The subject of camping (KAL) is quite capable of solving mathematical communication problems properly and correctly, but there are calculations in resolving incomplete problems. Of the three stages of communication the subject tends to be able to meet all the indicators of mathematical communication used. The subject of quitters (MM) has not been able to solve problems using mathematical communication properly. Of the three stages of communication, the subject tends not to be able to meet all the indicators of mathematical communication used.

Based on the results and conclusions of this study, the following suggestions can be made: to examine more deeply about mathematical communication with the factors that influence students. In addition, it is also based on conducting further research using other types of data based on the findings in this study.

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