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Verbal and Numerical Abilities of Students in Senior High School in Wajo Regency, South Sulawesi, Indonesia

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Abstract

Verbal and numerical abilities are fundamental skills of a student in Senior High School. However, the research regarding the verbal and numerical abilities specifically in Wajo Regency using psychological tests is minimal. This study aims to determine the profile of verbal and numerical abilities of new students at senior high school (SMAN) in Wajo Regency and a description of the academic abilities of male and female students. The population in this study were all students of SMAN Wajo Regency with specific characteristics, namely sitting in class X, not having cognitive impairment, able to read and operationalize basic mathematics. In this study, the sample that the researcher successfully collected was 991 students. Data collection used a psychological test with two subtests, namely verbal ability and numerical ability. Data were analyzed by descriptive statistics and processed using SPSS version 21.0. This study indicates that the medium category dominates the verbal and numerical abilities of high school students in Wajo Regency. Female students have better verbal skills on synonyms and word analogies. On the other hand, male students are more capable to analyze opposite words. In numerical ability, female students have better abilities in numbers while boys are better at arithmetic and geometric. Statistically, there is no difference in the verbal ability of male and female students.

Keywords: Psychotest; Gender; Senior High School.

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1. Introduction

The rapid development in many countries is very related to human resources capabilities. Education is the leading way in the formation of quality human resources carried out formally and non-formally. In developing countries, the credibility of formal education gets essential attention. Therefore, the admission mechanism requires a certain level of ability as a graduation standard. Admission to Senior High School requires proof of graduation from Junior High School. In other words, students who are accepted into Senior High School must meet specific standardized indicators of academic ability. In other words, students who are accepted into Senior High School must meet specific standardized indicators of academic ability. However, the facts show that students who have passed the previous education level do not have the same intellectual ability. This condition makes many schools do psycho tests to categorize their new students. The categorization is needed to map students into certain grade levels. Generally, academic ability includes three abilities: social ability, verbal ability, and numerical ability[1]. Schools have begun to measure students' social abilities in recent decades, although not as massively as measuring academic abilities[2]. Apart from being a prerequisite in entering a new level of study, intellectual ability is also used to understand the characteristics and interests of students in certain studies. The measurement of academic skills is the basis for developing potential and careers in the future. Students can focus on growing their career path without having doubts about their abilities. Verbal ability is the student's competence to do tasks related to words, sentences, the essence of information, and other matters related to speech[3]. In contrast, numerical ability is the competence to do mathematical tasks that require analysis and critical thinking with numbers[4]. These two abilities support student learning activities because almost all high school and university subjects use verbal and numerical aspects[5]. Verbal ability plays a significant role in the quality of students' written expression, especially the ability to absorb information[6]. Writing skills help improve students' skills in logical thinking (learning to think), making problem-solving strategies (learning to do) so that they can learn to be. Therefore, students who do not have average verbal skills will find it difficult to absorb information. It affects the process of logical thinking, problem-solving, and behavior. While the numerical ability will affect the ability to think, organize information to solve problems related to numbers. Numerical skills include the ability to count in terms of addition, the ability to measure in terms of subtraction, the ability to matter in terms of multiplication, and the ability to trust in terms of the division[7]. This study explores the verbal and numerical abilities of Senior High School students in Wajo Regency, South Sulawesi. As an area that continues to grow, Wajo Regency requires mapping of academic skills in its students. The results of the study will contribute to the educational policy. For local governments, it isn't easy to develop education policies without being accompanied by fundamental data. Likewise for the school, they need a particular picture in stimulating students' academic abilities. Therefore, this study describes the results of tracing new students' verbal and numerical skills at State High Schools in the Wajo Regency.

2. Research Method

This research is descriptive quantitative research by describing the condition of the subject in the form of numbers. The population in this study was all students at the State Senior High School (SMAN) of Wajo Regency with certain characteristics, namely grade X students, who did not have cognitive impairment and could read and operate basic mathematics. In this study, the sample that was collected was 991 students from five

schools. They are collecting data using a psychological test with two subtests, namely, verbal ability and numerical ability. The verbal ability test consists of understanding word equations (synonyms), opposites (antonyms), and word analogies. In contrast, the numerical ability test consists of numbers, algebra, arithmetic, and geometry. The verbal ability test consists of 25 questions (ten question for synonyms, ten question for antonyms and five questions for word analogies). The numerical ability test consists of 25 questions (eight questions for number series, nine questions for algebra/arithmetic and eight number for geometric). The highest score on the test was 25 for the verbal and numerical difficulties. Each correct answer was scored one, and incorrect was scored zero. Analysis of student abilities based on scores with a value range of 1 – 10. The score value is calculated by comparing the test results with the maximum value then multiplied by 10. Furthermore, the statistical inferential analysis uses a different test method that is processed using SPSS version 21.0.

3. Result and Discussion

This study involved 991 people with a percentage of 54.5% female students and 45.5% male students. This study describes the verbal and numerical abilities of students in male and female students.

3.1. Verbal Abilities of Student

The recapitulation of the verbal test results on students found descriptions of the minimum, maximum, and mean scores for two groups of students. Table 1 shows that the definition of students' verbal abilities. Verbal Abilities Study Results.

Table 1: Verbal Ability of Student.

Description	Female	Male
Min	0.8	0.8
Max	6.8	7.6
Mean	3,836	3,948

The average value of verbal ability for female students is lower than that of male students. Based on the descriptive matter, the division of categories for students' speaking abilities and their frequency is presented in table 2.

Table 2: Verbal Ability Value.

Score	Category	Female		Male	
		Freq	%	Freq	%
0.8 - 1.99	Very low	102	18.89	95	21.11
2.0 - 3.19	Low	78	14.44	84	18.67
3.2 - 4.39	Medium	215	39.81	165	36.67
4.4 - 5.59	High	81	15	58	12.89
5.60 - 6.80	Very High	64	11.85	48	10.67
Total		540	100	450	100

The results of the analysis show that male and female students generally have moderate verbal abilities. The

frequency of female students in the medium category was 215 people (39.81%). This frequency is higher than the number of male students with moderate verbal ability, namely 165 people (36.67%). The verbal ability scores of male students and in detail for each indicator are presented in Figure 1.

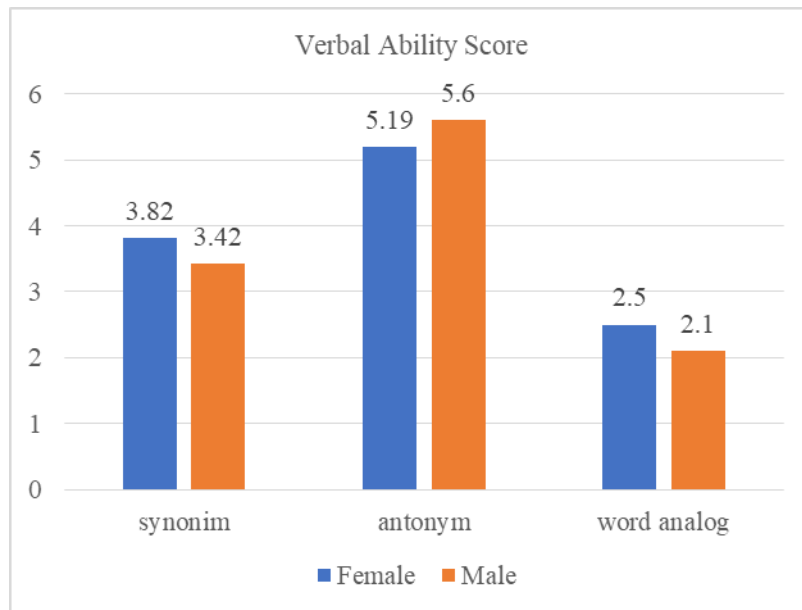


Figure 1: Verbal ability score of study.

Figure 1 shows that male students have verbal skills in finding opposites in the very high category (score 5.8). Unlike the case with female students' ability to find negatives with an average value of 5.19 (high class). Furthermore, the power of female students to find synonyms is better than that of male students. The ability to find word analogies for both groups showed a value between 2.10 – 3.19 with a low category. Therefore, it can be said that students' verbal abilities are supported by finding opposites. In inferential statistics, the analysis of the difference test with SPSS found a Sig value of 0.114 or Sig > 0.05. This result indicates that there is no difference in ability between male and female students in verbal ability. There is no difference in verbal ability between male and female students.

3.2. Numerical Abilities of Student

The results of this study also showed that the numerical ability of female students was lower than that of male students. (Table 3).

Table 3: Students' Numerical Ability.

Description	Male	Female
Min	0.4	1.2
Max	9.6	8.8
Mean	3.69	3.58

The average value of numerical ability for female students is 3.58, with a minimum score of 1.2 and a maximum weight of 8.8. Different things were found in the numerical power of male students with an average score of 3.69 with a minimum score of 0.4 and a maximum value of 9.6. Based on these descriptive values, the division of categories for students' numerical abilities and their frequency is presented in Table 4.

Table 4: The Numerical Value of The Ability.

Numerical ability Score	Category	Female		Male	
		Freq	%	Freq	%
0.4 - 2.24	Very low	99	18.33	99	22.00
2.25 - 4.08	Low	81	15.00	74	16.44
4.09 - 5.92	Medium	227	42.04	170	37.78
5.93 - 7.76	High	74	13.70	60	13.33
7.77 - 9.6	Very High	59	10.93	47	10.44
Jumlah		540	100.00	450	100.00

Table 4 shows that most of the students have moderate numerical abilities. Female students were 227 (42.04%), and male students were 170 (37.78%). Female students with a very high numerical ability level are 59 (10.93%) and 47 (10.44%). As for the numerical ability in the deficient category, the number of students is the same between girls and boys, namely as many as 99 people. Numerical abilities consist of number series, algebra/arithmetic, and geometry. The picture shows that male students have higher numerical skills than female students. Meanwhile, female students' ability in algebra/arithmetic and geometric is higher than that of male students.

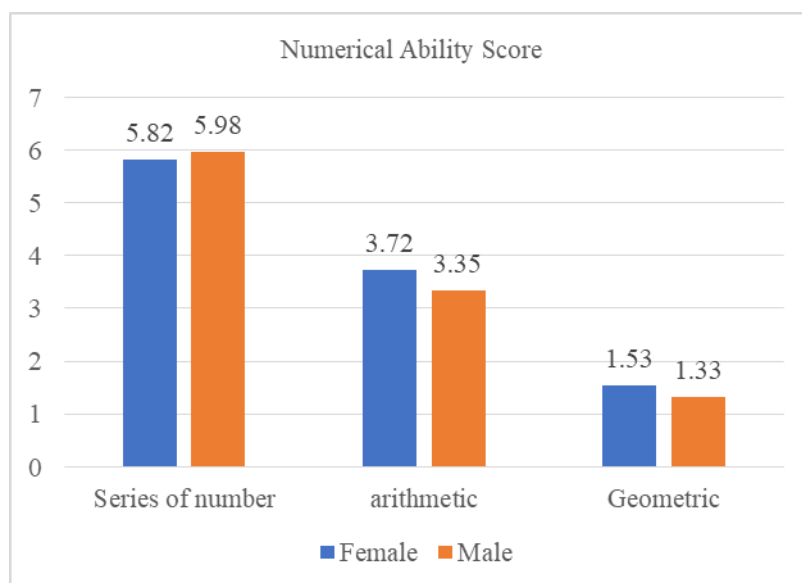


Figure 2: Numerical ability score of students.

3.3. Significance of Differences Between Verbal and Numerical Abilities of Students

The distribution of students' oral and numerical ability data is also considered by looking at the differences between the two variables. Based on the researcher's findings, it was found that there was a significant difference between verbal and numerical abilities in students. The description of differences revealed in Table 5.

Table 5: Differences Between Oral and Numerical.

Verbal-	X	T	Sig. (2-tailed)
Numerical	0,664	5,548	0,000

The researcher also analyzed the description of students' verbal and numerical abilities in terms of gender. Based on the researchers' findings, there was no difference in power between men and women in verbal and numerical skills.

Table 6: Statistical Analysis Result.

Analysis	Sig (2- tailed)
Differences in verbal ability	0.114
Differences in numerical ability	0.269

4. Discussion

4.1. Profile of Verbal Ability of Senior High School Students in Wajo District

Based on the research results above, it was found that the moderate category dominated the verbal ability of senior high school students in Wajo Regency. The verbal ability in the high class is less than the students in the low sort. The results indicate that the vocal ability of students in Wajo Regency should be developed. This verbal ability includes understanding synonyms (synonyms), opposites (antonyms), and word analogies. This research is survey research that tries to describe the condition of the research subjects so that we do not have a strong enough evidence base to explain the factors that affect students' verbal abilities, except for some additional data that should be considered. However, using a literature review approach, various factors can affect a person's vocal ability. The other research revealed that the factors that influence students' difficulties in verbal abilities are difficulties to understand the problems or questions given or the students are also tricky in discussing the results of their calculations as the final answer [8].

4.2. Numerical Ability Profile of Senior High School Students in Wajo Regency

Based on the research results above, it was also found that the verbal ability of senior high school students in Wajo Regency was categorized as moderate for men and women. However, the number of students with high numerical knowledge is much less than organizing low numerical ability. The numerical skills studied have included an understanding of number series, algebra, arithmetic, and geometry. Numerical abilities can be related to ideas, processes, reasoning, and prioritizing logical, practical, and scientific thinking. Students who have mathematical concepts can make abstractions of the objects at hand to be placed in certain groups. These objects are visualized in the minds of students to give rise to understanding. This activity is very useful in

solving geometric problems. According to Basri [9], mastery of concepts in critical mathematical thinking is related to the level of intelligence. In addition to intelligence, according to Purba [10], several factors affect a person's numerical ability. The factors that affect students' difficulty in numerical abilities are students who do not understand the formula, namely wrong in determining multiples and wrong in choosing the least common multiple using a factor tree.

4.3. The Relationship Between Verbal Ability and Numerical Ability in Students

There is a difference between oral and numerical abilities in students. The contrast makes us unable to say that students who have good verbal skills will have good numerical abilities or vice versa. However, we also cannot deny that a student can have these two abilities simultaneously. Some studies revealed that verbal link abilities and numerical abilities to psychological variables; for example, research linked verbal and numerical skills to mathematical critical thinking skills [11]. Of course, when faced with a mathematical problem, students must understand the context and content of the question well. The process requires an analysis of the diction used by the questions so that students can understand the instructions or information correctly. In this case, of course, students' verbal and numerical abilities will be related. Our research doesn't say so. Verbal ability and numerical ability are not the same. They can be related but still operationally different. Verbal ability relates to the human capacity to perceive information in words. Conceptual understanding of the information becomes an essential dimension in linguistics. This understanding includes a version of synonyms (synonyms), opposites (antonyms), and word analogies. Numerical ability is a branch of ability that is the foundation of mathematics. Students who have numerical ability mean that they can do arithmetic work. This study relates to students' abilities in number series, algebra, arithmetic, and geometry. In general characteristics, verbal and numerical abilities are different. Therefore, Peng and Fuchs [12] also distinguish between oral and numerical abilities explaining children's learning difficulties. Many things cause students who have high verbal and numerical abilities. These factors can be seen intrinsically and extrinsically. Verbal and numerical skills are influenced by students' readiness to learn and their persistence. According to Rubio-Valdehita and his colleagues [13], task load and cognitive abilities affect verbal, numerical skills, and even other types of intelligence or abilities. They can do the workload given to students because the task is by their abilities specifically. Likewise, with cognitive skills, students with low intelligence or have lesions in the brain will find it difficult to do tasks that require complex thinking concepts. Extrinsically, verbal and numerical abilities are influenced by the environment. Environmental factors in it, such as parental guidance, peers, and the school environment. Parental guidance, in this case, has a significant influence on their understanding and ability to verbal and numerical skills. For high school students, peers are also able to direct students' interests. The academic climate that is channeled through friends becomes a support system in running their abilities. Of course, this is also supported by the learning system in their school. Schools provide adequate facilities, mentoring teachers, and appropriate learning materials. If students do not find verbal and numerical abilities, they have abilities in other fields. According to Gardner, there are nine types of intelligence [14]. This intelligence is mathematical-logical, spatial, kinesthetic, musical, interpersonal, intrapersonal, naturalist, and existential. Our research found that some students simultaneously had lower verbal and numerical abilities. However, due to humans' many types of intelligence, researchers cannot conclude that these students are stupid.

4.4. Review of Academic Ability by Gender

Based on the researcher's findings, there was no difference in the ability of male and female students in their verbal and numerical skills. The skills of men and women can be developed in these two abilities. In general, no significant difference was found, but each student may excel in certain parts of the problem; for example, in verbal ability, students are superior in terms of synonyms and less in other regions. Other researchers revealed that junior high school students found that male and female students had low numerical abilities. The difference is that male students have better numerical skills in arithmetic, quantitative comparison, and mathematical concepts than female students. It's just for some parts, such as counting, quantitative comparisons, application of integer operations, square root operations, time unit measures, distance and speed, social arithmetic, flat shapes, and mixed operations for female students. Better than male students [15]. There were no significant differences in verbal and numerical abilities in male and female students influenced by several factors. Students' intellectual abilities at the school were classified as good, and the curriculum provided had met good operational standards. The researchers mentioned earlier that verbal and numerical skills require good intelligence skills in students. This is because verbal and numerical problems require skills in analysis and memory. In addition to these factors, the curriculum provided by the school in Wajo Regency also affects students' abilities. The right curriculum can support students' abilities because the characteristics of human development will follow easy to complex patterns. A systematic curriculum will start from more accessible subjects to complex ones. In this case, the school has provided a standardized and equal curriculum for male and female students.

5. Conclusion

Based on the findings and discussion of the research results, it can be concluded that the medium category dominates the verbal and numerical abilities of high school students in the Wajo Regency. Female students have better verbal skills on synonyms and word analogies. On the other hand, male students are better able to analyze opposite words. In numerical ability, female students have better abilities in numbers while boys are better at arithmetic and geometric. Statistically, there is no difference in the verbal ability of male and female students.

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