IJSSR
International Journal of Social Service and Research

Vol. 03, No. 08, August 2023
e-ISSN: 2807-8691 | p-ISSN: 2807-839X

Analysis of Mathematical Knowledge of Journalists in West Kalimantan Based on Journalistic Profile

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Keywords

knowledge of mathematics, journalism, journalistic profiles, and news writing

ABSTRACT

This study aims to determine the basic mathematical knowledge of journalists in West Kalimantan. A total of 20 tests in the form of multiple-choice questions were given to 33 respondents to find out their basic knowledge of mathematics. All respondents worked as journalists in various media in West Kalimantan. The test results showed that 39.39 percent of respondents had low mathematical knowledge, 36.36 percent on medium criteria, 18.18 on high criteria, and 6.07 percent on very low criteria. The results of this test can be a baseline for improving the mathematical knowledge of journalists through various trainings or workshops. Mathematical knowledge is needed for journalists to increase credibility in news writing.

INTRODUCTION

Numbers, like words, are an important part of journalism. Both can explain how an event happens in this world. Every aspect of modern life, from the quality of the air we breathe to safety while driving, is measurable and can be explained through numbers.

Political news, for example, is also mostly based on numbers. In elections, for example, numbers play a significant role, starting with turnout; percentage of novice voters; percentage of female voters; up to the winning rate of a candidate or candidate. These reports become more reliable by containing numbers and mathematical calculations (Scott R Maier, 2005).

Similarly, in the budget prepared by the government and the DPR, everything is related to numbers. Therefore, it can be said, various aspects of life, ranging from economic issues, business, employment, to sports, all require numbers. Like it or not, journalists or journalists when writing news need these mathematical calculations.

In presenting news, journalists often use mathematical data and numbers. In the preliminary research, researchers have analyzed the content of news in the Pontianak Post Daily which contains mathematical content. Content analysis was carried out in the January 2, 2020 edition of Pontianak Post to January 31, 2022. Of the 631 news stories analyzed, it was found that as many as 212 news stories or 33.60 percent contained mathematical content. While the rest, as many as 419 news or 66.40 percent did not contain mathematical content. The results of this content analysis indicate that data and figures play a significant role in news.

Today, the public needs credible and reliable news. As we know, it is the duty of journalists to tell the truth. So that citizens can get the information they need to be sovereign (Bill Kovach and Tom Rosenstiel, 2001).

The decision to interpret and react to data should not be left solely to scientists or politicians. The mass media must also encourage its journalists to improve their mastery and comprehension of reading data and numbers. The media also continues to be encouraged to increase the use of data in news writing. Not just relying on statements or comments from sources.

https://doi.org/10.46799/ijssr.v3i8.484

The world is currently entering what is called an information flood (Bill Kovach, 2011). The development of information technology and the rapid use of the internet make everyone easily access information. Almost every second, information comes like a flood. However, the quality of information received is often questioned credibility.

According to Bill Kovach, a lot of information is not sourced from clear sources. The data and figures submitted are also less reliable. But not all readers can select which news is credible or not, which contains data and figures that are true and which are not. Therefore, the role of the media is to be able to present information that can be accounted for and contain reliable data.

A study conducted by Ragne Kõuts-Klemm (2019) confirms that data literacy is recognized by journalists as a need for the future of journalism, but their ability is actually still low.

In the future, the media must be able to convince readers through valid and accountable data and figures. In the midst of the current era of information flood, the media plays a role in filtering news that is really important and needed by the community. It can also provide important data that can be part of criticizing government policies.

News that contains data and figures will be more argumentative than news that only contains comments from sources. For this reason, numeracy or the ability to read numbers is an essential part of the world of journalism.

Numbers are not just needed in journalism, they are a weapon in fair, objective and credible news coverage.

The Poynter Institute (1998) states that numeracy is one of ten competencies for journalists. According to the institute, without mathematical skills, journalists will fail in their quest for accuracy. Even if these journalists keep their jobs, their numerical incompetence will only damage the credibility of the media in which they work.

Poynter Institute (1998) in its study stated, journalists often use numbers poorly. Research shows that many mathematical errors commonly appear in newspapers and television.

Taking into account that numeracy is one of ten essential competencies for journalists, The Poynter Institute for Media Studies states: "Simply put, journalists need mathematical skills to understand numbers just as they need language skills to understand words." (Poynter Institute, 1998)

The lack of mathematical competence among journalists goes back a long time. Research conducted by James J. Kilpatrick in the United States for several years found a number of examples related to mathematical errors published in the mass media. Kilpatrick concluded that the mathematical skills of the journalists he studied were still low. (Kilpatrick, 2001).

Although the ability to understand numbers and use them in news writing is an essential skill in modern journalism, there is still little research that can be relied on for journalists to use mathematics in news writing.

There are also not many studies that can reveal mathematical errors seen in newspaper reports. If the media didn't have the ability to sort through piles of conflicting and confusing numbers, who would do it?

Therefore, through this research, the author wants to know the competence of journalists in West Kalimantan in using data and mathematical numbers in news writing.

This research is very important today as part of encouraging the media to provide a larger portion to contain mathematical data and numbers. So far, research that explores this problem is still very minimal.

Researchers tried to search the literature by typing the keyword 'mathematical concepts in the news' but did not get the data they were looking for. This indicates that this research is still minimal. This research could be the basis for future research. This research will be very useful for journalists, editors, media owners, and students of journalism.

METHODS

In this research, researchers used quantitative research methods. Data collection using research instruments, where the results are analyzed quantitatively (statistically) with the aim of testing hypotheses that have been set. The respondents of the study were 33 journalists in West Kalimantan who were selected by purposive sampling. The sample works in a number of mass media in West Kalimantan and is domiciled in various regions (regencies/cities) in West

Kalimantan, namely Pontianak, Kubu Raya, Sambas, Singkawang, Mempawah, Ketapang, Kapuas Hulu, Bengkayang, Landak, North Kayong, Sintang, Melawi, and Sekadau. Research subjects were selected based on their journalistic profile.

This study aims to measure the basic mathematical competence of journalists and is analyzed based on journalistic profiles, such as gender (male or female), education, age, length of work as a journalist, and the level of journalist competency test that has been followed.

RESULTS AND DISCUSSION

Based on the data that has been collected, then an analysis of the research data is carried out. Before the data is analyzed, it is also analyzed about the results of the validity and reliability of the test instruments used. This is done to determine the accuracy of the test kit so that it can measure the mathematical ability of journalists in West Kalimantan precisely.

A. Validity Test

Validity tests are carried out to show the accuracy of instruments or measuring instruments, both in the form of test devices and questionnaires used in research. In this study, validity measurement uses correlation from Kart Pearson (*Pearson correlation),* which compares R-count *with* R-table. If *the R-count is greater than* the R-table then the measuring instrument is declared valid.

For this validity and reliability test, the research instrument has been tested on 31 journalists by filling out 20 test answers on google form. The results of respondents' answers are automatically recorded on Google Sheets and read on Excel tabulations.

After that, the available data is calculated for validity using Kart Pearson *correlation.* The results of validity tests that have been carried out in this study are shown in the following table:

Table 1
Validity Test Results of 31 Respondents

Indicators	R count	R Table	Information
P1	0,529	0.3610	Valid
P2	0,562	0.3610	Valid
P3	0,444	0.3610	Valid
P4	0,608	0.3610	Valid
P5	0,562	0.3610	Valid
P6	0,538	0.3610	Valid
P7	0,444	0.3610	Valid
P8	0,524	0.3610	Valid
P9	0,482	0.3610	Valid
P10	0,554	0.3610	Valid
P11	0,501	0.3610	Valid
P12	0,646	0.3610	Valid
P13	0,589	0.3610	Valid
P14	0,374	0.3610	Valid
P15	0,454	0.3610	Valid
P16	0,447	0.3610	Valid
P17	0,603	0.3610	Valid
P18	0,403	0.3610	Valid
P19	0,470	0.3610	Valid
P20	0,465	0.3610	Valid

Based on the validity testing in the table above, the math competency test consisting of 20 questions is all valid. This conclusion is obtained because in all questions*, R counts > R tables*.

B. Reliability Test

Reliability test conducted using *Reliability Analysis Statistic* with *Cronbach Alph*a (α). Based on the calculations made, for all questions obtained Cronbach values more than 0.6 (*Cronbach Alpha* (α) > 0.60) then all variables of the questions were reliable. The results of the reliability test of this study are as follows:

Table 2
Reliability Test Results

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
P1	56,1290	431,183	0,469	0,832
P2	55,8065	438,495	0,520	0,833
P3	55,9677	440,699	0,385	0,836
P4	56,2903	421,613	0,549	0,829
P5	55,8065	438,495	0,520	0,833
P6	57,9032	414,624	0,446	0,833
P7	55,9677	440,699	0,385	0,836
P8	58,0645	416,129	0,431	0,833
P9	58,2258	420,914	0,385	0,836
P10	59,0323	417,366	0,473	0,831
P11	57,4194	419,785	0,408	0,835
P12	57,7419	403,065	0,569	0,826
P13	58,5484	410,323	0,507	0,829
P14	58,8710	434,516	0,374	0,841
P15	57,0968	426,290	0,360	0,837
P16	57,9032	424,624	0,346	0,838
P17	56,7742	414,247	0,531	0,829
P18	60,0000	443,333	0,342	0,837
P19	57,0968	424,624	0,378	0,836
P20	58,5484	423,656	0,368	0,837

Based on the table above, it can be seen that the reliability on question X is 0.841. Because of its reliability > 0.6, the instrument is declared reliable or reliable.

Instruments that are declared valid and reliable can be used to conduct research. This test instrument is considered to be able to measure the mathematical ability or competence of journalists in West Kalimantan.

Description of Mathematical Knowledge Journalist

To measure the mathematical competence of journalists, researchers have compiled 20 questions in the form of multiple-choice questions. This problem was adopted from a math competency problem for journalists developed by the Poynter institute. Questions have been given to 33 respondents who work as journalists in various mass media in West Kalimantan. The correct answer gets 5 points and the wrong answer gets 0 points. The highest number of points is 100 and the lowest points are 0.

The results of respondents' answers are grouped into four categories, namely good, medium, low, very low based on the range of values obtained.

Table 3
Respondents' Answer Criteria

Range of Values	Answer Criteria
75-100	Tall
56-74	Keep
31-55	Low
<31	Very Low

Table 4
Level of Response Criteria Based on Test Answer Results

No	Respondent's Name	Value	Criterion
1	AXLE	75	Tall
2	DFS	80	Tall
3	AF	80	Tall
4	AP	80	Tall
5	NS	85	Tall
6	SU	80	Tall
7	AT	70	Keep
8	.SH	65	Keep
9	TB	60	Keep
10	NMF	70	Keep
11	MRS	65	Keep
12	SS	70	Keep
13	VI	70	Keep
14	NA	65	Keep
15	AN	70	Keep
16	MA	75	Keep
17	ME	70	Keep
18	I	60	Keep
19	MK	55	Low
20	AXLE	50	Low
21	YU	50	Low
22	ICE	55	Low
23	EY	50	Low
24	AN	55	Low

25	AM	50	Low
26	GY	55	Low
27	NW	45	Low
28	AND	55	Low
29	CA	40	Low
30	SO	45	Low
31	RMS	50	Low
32	YB	20	Very Low
33	WK	30	Very Low

Table 5
Percentage of Criteria Based on Respondents' Answers

Criterion	Sum	Percentage
Tall	6	18,18
Keep	12	36,36
Low	13	39,39
Very Low	2	6,07
Total Respondents	**33**	**100**

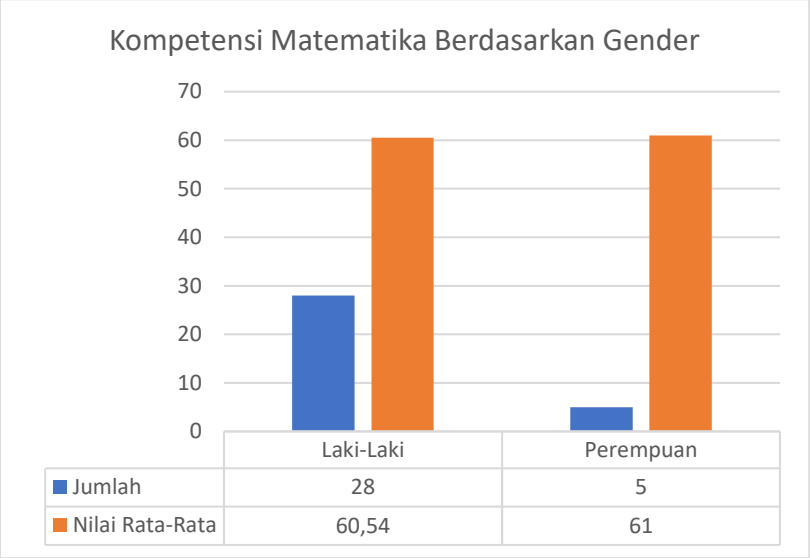
In the respondents' answers, the highest score obtained was 85, while the lowest score was 20. Based on the results of the mathematics competency test that has been given, the criteria for the most speakers are low criteria, namely as many as 13 respondents or 39.39 percent. In second place, on the medium criterion with 12 the number of 12 respondents or 36.36 percent. As for the high criterion, it is in third place with 6 respondents or 18.18. Meanwhile, for very low criteria there were 2 respondents or 6.07 percent.

Knowledge of Mathematics Based on Gender

Table 6
Average Knowledge by Gender

Gender	Sum	Average rating
Man	28	60,54
Woman	5	61

If you pay attention, there is no noticeable difference between the average scores of male and female respondents. For male respondents with an average score of 60.54, while women were slightly higher at 61.



Mathematical Knowledge by Age

When viewed based on age, the average value of respondents is quite variable. For respondents under 25 years old, there were 2 resource persons, where the test scores were 40 and 70 respectively. This means that there is a significant difference in the test scores obtained by the two respondents.

While respondents with an age range of 26 to 35 years get mixed scores. Of the 12 respondents in this age range, the scores obtained varied, ranging from 40 to 80.

The acquisition of highly variable values can be seen in 15 respondents with an age range of 36-45 years. In respondents with this age range, the highest score obtained was 80, while the lowest value was 20. This shows that there is a fairly high value disparity, which also shows that there is an ability gap among these respondents.

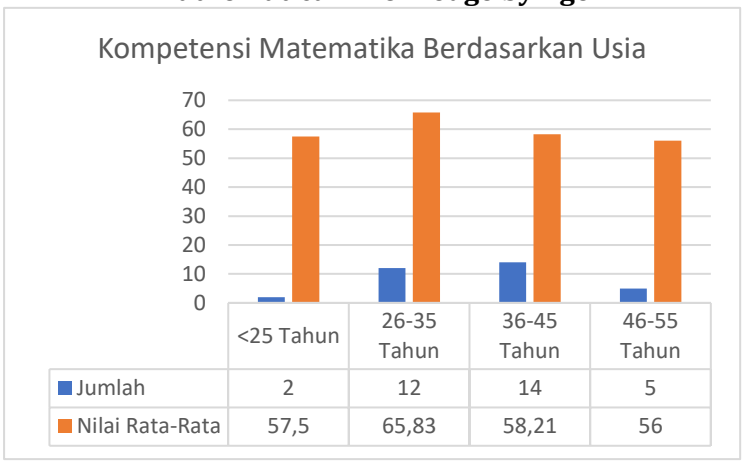
Table 7
Average Respondents' Scores by Age

Mathematical Knowledge by Age		
Age Range	**Sum**	**Average rating**
<25 Years	2	57, 5
26-35 Years	12	65, 83
36-45 Years	14	58, 21
46-55 Years	5	56

In table 4.7, it is known that respondents with an age range of 26-35 years get the highest average score with a value of 65.83. Followed by respoden with an age range of 36-45 years with a value of 58.21. While respondents with an age range under 25 years get a score of 57.5.

As for the average lowest score obtained by respondents with an age range of 46-55 years, namely 56. Although there are differences, the average value seen from the age of these respondents is not so striking the disparity.

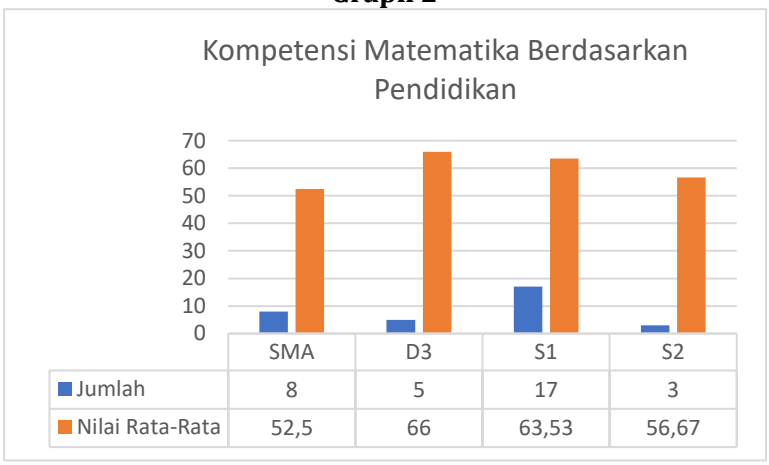
Graph 1
Mathematical Knowledge by Age



By looking at graph 4.2, it is known that there is a difference in the average score of mathematical competence of the respondents when viewed based on age. But the difference is not too noticeable. This means that the average abilities of the respondents are almost diverse.

Mathematical Knowledge Based on Education

Graph 2



The mathematical competence of journalists seen based on their education is interesting to discuss. As is known, the respondents of this study had various educational backgrounds, ranging from high school, D3, S1, to S2.

Based on graph 4.3, it is known that the highest average score was obtained by respondents with D3 education, namely with a score of 66. While the lowest score was obtained by respondents with a high school education level. While S1 respondents obtained an average score of 63.53 or in second position. While respondents with S2 education level get an average score of 56.67 or in third place.

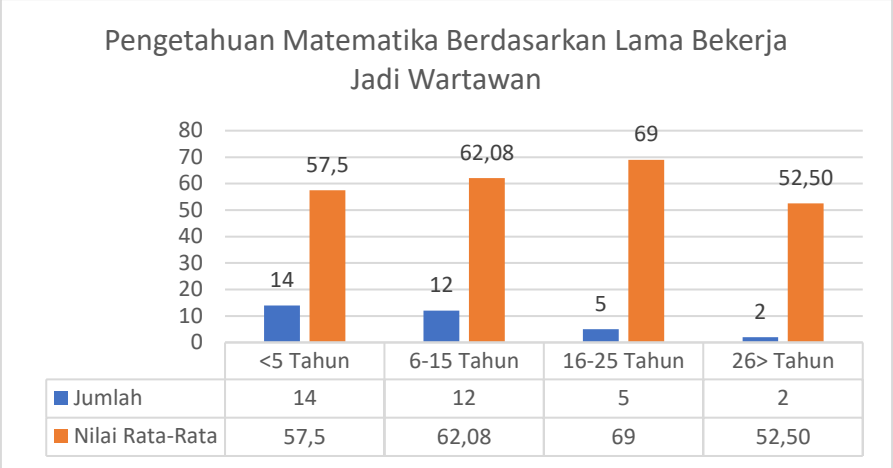
When viewed from the fields of study pursued while taking S1, the majority of respondents were graduates of social study programs, namely Management Science, Graphic Design, Geography Education, Information Management, Tarbiyah, Sociology, Law, Social Science, Communication Science, Legal Science, English, Islamic History Science, Law, Human Resources Management, History Education, Political Science and State Administration, FISIP, FKIP Economic Education, and Islamic Broadcasting Communication (KPI). While the education of respondents from exact fields, namely Biology and Soil Science.

Mathematical Knowledge Based on Length of Work

Table 8
Mathematics Competence Based on Length of Work as a Journalist

Duration	Sum	Average rating
<5 Years	14	57,5
6-15 Years	12	62,08
16-25 Years	5	69
26> Years	2	52,50

Graph 3



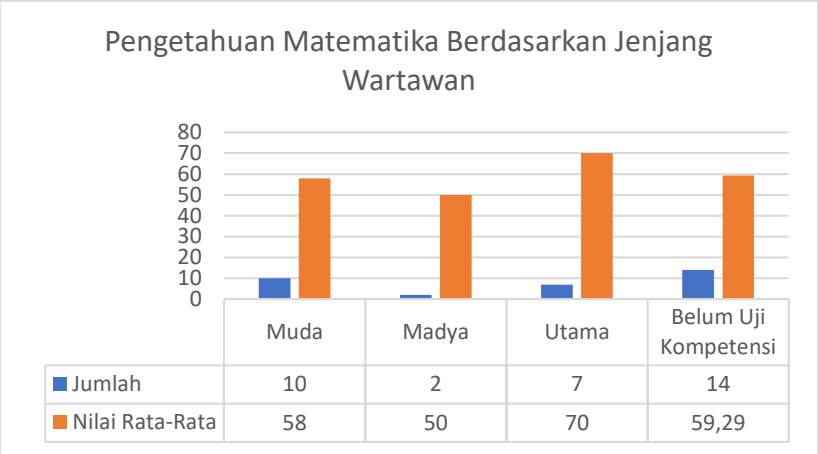
The highest average score based on length of work was respondents with a duration of work between 16-25 years, with an average score of 69. While the lowest average score was respondents aged 26 years and over with an average value of 52.50. While respondents aged 6-15 got an average score of 62.08. For respondents with less than 5 years of service, the average score was 57.5.

Mathematical Knowledge Based on Journalistic Competency Level

Table 9
Mathematical Knowledge Based on Journalist Level

Ladder	Sum	Average rating
Young	10	58
Associate	2	50
Main	7	70
Not yet Competency Test	14	59,29

Graph 4



	Muda	Madya	Utama	Belum Uji Kompetensi
Jumlah	10	2	7	14
Nilai Rata-Rata	58	50	70	59,29

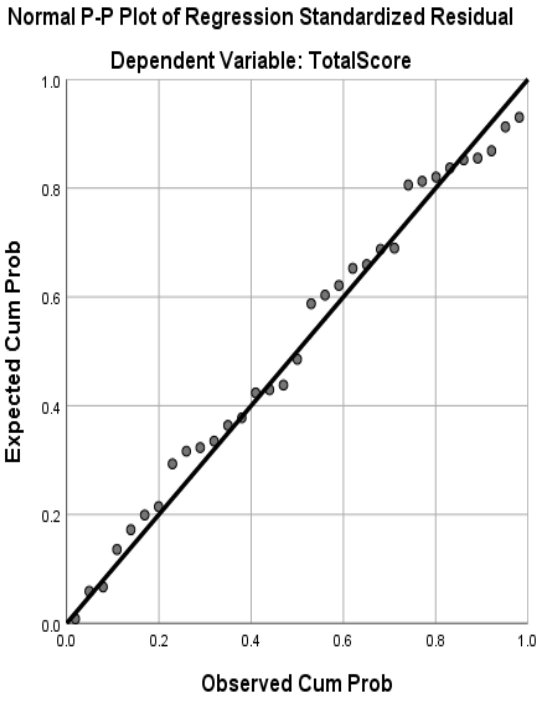
D. Regression Test on Research Variables

Before the regression test is carried out, an assumption test is first carried out, namely the normality, multicollinearity, heteroscedasticity, autocorrelation tests.

1. Normality test

Normality Test is a test conducted with the aim of assessing the distribution of data in a group of data or variables, whether the distribution of data is normally distributed or not.

Graph 5
Normality Test Results



From graph 5 it can be seen that the points spread around the line and follow the diagonal line so that it can be said that the data is normally distributed. Thus, it means that the results of the answers to the mathematical competency test that have been given to the respondents of this study are distributed normally.

2. Heteroscedasticity

Table 10
Heteroscedasticity Test Results

Coefficientsa								
Type				Standardized Coefficients	t	Sig.	Collinearity Statistics	
				Beta			Tolerance	VIF
1	(Constant)	5,169	12,758		0,405	0,689		
	Gender	4,388	4,596	0,199	0,955	0,348	0,725	1,380
	Age	-0,046	0,254	-0,055	-0,181	0,858	0,346	2,886
	Education	2,535	1,601	0,307	1,583	0,125	0,839	1,192
	Working age of Journalists	0,087	0,297	0,094	0,293	0,772	0,308	3,251
	Journalist Competency Level	-2,013	1,601	-0,294	-1,257	0,219	0,577	1,733
a. Dependent Variable: Abs_res								

Because the significance value in the calculation of table 4.10 above is more than 0.05, heteroscedasticity does not occur. A good regression model is one in which homoscedasticity or heteroscedasticity does not occur.

3. Multicollinearity

Table 11
Multicollinearity Test Results

Coefficientsa								
Type				Standardized Coefficients	T	Sig.	Collinearity Statistics	
				Beta			Tolerance	VIF
1	(Constant)	78,709	24,346		3,233	0,003		
	JK	-5,561	8,770	-0,133	-0,634	0,531	0,725	1,380
	Age	-0,666	0,485	-0,415	-1,371	0,182	0,346	2,886
	Pendidikan_K	1,664	3,056	0,106	0,545	0,591	0,839	1,192
	Lama_Wartawan	0,245	0,566	0,139	0,433	0,668	0,308	3,251
	Jenjang_K	3,486	3,056	0,268	1,141	0,264	0,577	1,733
a. Dependent Variable: TotalScore								

From the output above, it is known that the value "*Collinearity Tolerance*" variable is more than 0.10 and the value of "Statistics VIF" is less than 10. Then it can be concluded that here there is no multicollinearity between independent variables.

4. Autocorrelation Test

For ametoxcorrelation test there are three conditions that must be observed:

a. If d is less than dL or greater than (4-dL) then the hypothesis is rejected, meaning that there is autotolerance.
b. If d lies between dU and (4-dU), then the hypothesis is accepted which means there is no correlation.
c. If d lies between dL and dU or between (4-dU) and (4-dL) then it does not produce a definite conclusion.

Based on the data above, then:
N = 33
K = Number of variables =5
Dl = 1.13
Du = 1.81
4-du = 2.19

Because the value of 1.929 lies between du and 4-du, it is concluded that there is no autocorrelation in the data above.

5. Regression Test Results

Table 12
Regression Test Results

Model Summary[b]

Type	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.377a	0,142	-0,017	15,375	1,929

a. Predictors: (Constant), Jenjang_K, JK, Pendidikan_K, Age, Lama_Wartawan
b. Dependent Variable: TotalScore

ANOVAa

Type		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1054,933	5	210,987	0,892	.500b
	Residuals	6382,945	27	236,405		
	Total	7437,879	32			

a. Dependent Variable: TotalScore
b. Predictors: (Constant), Jenjang_K, JK, Pendidikan_K, Age, Lama_Wartawan

Coefficientsa

Type				Standardized Coefficients	t	Sig.	Collinearity Statistics	
				Beta			Tolerance	VIF
1	(Constant)	78,709	24,346		3,233	0,003		
	JK	-5,561	8,770	-0,133	-0,634	0,531	0,725	1,380
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	Jenjang_K	3,486	3,056	0,268	1,141	0,264	0,577	1,733

a. Dependent Variable: TotalScore

Based on the output table "ANOVA" above, it is known that the significance value (Sig.) in the F test is 0.5. Because Sig. 0.5 > 0.05, then as the basis for decision making in the F test it can be concluded that five variables (together) have no effect on the Mathematics ability score. The five variables are gender, age, education, length of work as a journalist, and journalist competence do not have a simultaneous influence on the dependent variable of mathematical competence.

CONCLUSION

From the results of the discussion of Chapter IV it can be concluded that: (1) Result The test showed that 39.39 percent of respondents had low mathematical knowledge, 36.36 percent on medium criteria, 18.18 on high criteria, and 6.07 percent on very low criteria. (2) There were no significant differences in the mathematical competence of journalists in West Kalimantan by gender. The average score of the competency test of male respondents was 60.54, while the average score of female respondents was 61. (3) There are differences in the mathematical competence of journalists in West Kalimantan by age, although the disparity is not striking. Respondents with an age range of 26-35 years get the highest average score with a value of 65.83. Followed by next Respoden with an age range of 36-45 years with a value of 58.21. While respondents with an age range under 25 years get a score of 57.5. As for the average lowest score obtained by respondents with an age range of 46-55 years, namely 56. (4) The mathematics competence of journalists in West Kalimantan based on education, the highest average score was obtained by respondents with D3 education, which was 66. While the lowest score was obtained by respondents with a high school education level with a score of 52.5. While S1 respondents obtained an average score of 63.53 or in second position. For respondents with S2 education level, they get an average score of 56.67 or in third place. (5) The highest average score based on length of work was respondents with a duration of work between 16-25 years, with an average score of 69. While the lowest average score was respondents aged 26 years and over with an average value of 52.50. While respondents aged 6-15 got an average score of 62.08. For respondents with less than 5 years of service, the average score was 57.5. (6) The highest average score based on length of work was respondents with a working duration between 16-25 years, namely 69. While the lowest average score was respondents with a length of work of 26 years and over, namely 52.50. While respondents aged 6-15 got an average score of 62.08. For respondents with less than 5 years of service, the average score was 57.5.(7) Based on the table output "ANOVA" it is known that the significance value (Sig.) in the F test is 0.5. Because Sig. 0.5 > 0.05, then as the basis for decision making in the F test it can be concluded that five variables (together) have no effect on the Mathematics ability score. The five variables are gender, age, education, length of work as a journalist, and journalist competence does not have a simultaneous influence on the dependent variable of mathematical competence

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