ELEMENTARY *Islamic Teacher Journal*
E-ISSN : 2503-0256 / ISSN : 2355-0155
Volume 10 Number 2 July - December 2022 (PP. 243-262)
http://dx.doi.org/10.21043/elementary.v10i2.17143
Diakses di : http://journal.iainkudus.ac.id/index.php/elementary

The Numeracy Competency Profile of Elementary School Teachers in Ponjong District, Gunungkidul Regency Viewed from Demographic Factors

Irfan Wahyu Prananto
Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
irfan.wahyu@uny.ac.id

Yoppy Wahyu Purnomo
Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
yoppy.wahyu@uny.ac.id

Fery Muhamad Firdaus
Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
fery.firdaus@uny.ac.id

Abstract

This study aims to describe the numeracy competency profile of elementary school teachers in Ponjong District, Gunungkidul Regency, viewed from demographic factors. The demographic factors used to describe, there were gender, type of school (public or private), length of teaching, age, and whether the teacher in question was certified as an educator. This numeracy competency was essential to explore because this skill was one of the most critical primary education goals; it helped realize successful advanced learning, social interaction, meeting the necessities of life, and global employment. This study used a design-based research (DBR) approach combined with professional learning community (PLC) and participatory action research (PAR), in which a sample of forty teachers was drawn equally from each group of teachers working groups (KKG). The data were taken using test instruments and analyzed using inferential statistical tests. The results showed that from the gender aspect, there was no difference in numeracy competence for both men and women. The second, based on the type of school, there was no difference in numeration competence

between public and private schools. The third, from the length of teaching, it was found that teachers with a duration of education under five years had a higher numeracy score. The fourth, in terms of age, there was no difference in numeracy ability from twenty-five to fifty-six years. The conclusion, from the aspect of educator certification, was fascinating. Although not significant, there was an average difference in the numeracy ability test between teachers who were certified educators and those who were not certified, where teachers who did not have an educator certificate had a higher test average than those who already had an educator certificate.

Keywords: Competence, Numeracy, Elementary School Teachers, Demographic Factors

Abstrak

Penelitian ini bertujuan untuk menggambarkan profil kompetensi numerasi guru sekolah dasar di Kecamatan Ponjong Kabupaten Gunung Kidul ditinjau dari faktor demografi. Adapun faktor demografi yang digunakan untuk menggambarkan kemampuan tersebut adalah jenis kelamin, jenis sekolah (negeri atau swasta), lama mengajar, usia, dan apakah guru yang bersangkutan sudah bersertifikat pendidik atau belum. Kompetensi numerasi ini penting untuk digali, dikarenakan Keterampilan ini menjadi salah satu tujuan pendidikan dasar paling penting karena berguna untuk mewujudkan sukses belajar tingkat lanjut, berinteraksi sosial, memenuhi kebutuhan hidup, dan lapangan kerja global. Penelitian ini menggunakan pendekatan design-based research (DBR) dipadukan dengan professional learning community (PLC), dan participatory action research (PAR), dimana sampel berjumlah empat puluh guru yang diambil secara merata dari masing-masing gugus kelompok kerja guru (KKG). Data diambil menggunakan instrumen tes dan dianalisis menggunakan uji statistik inferensial. Hasil penelitian didapat bahwa dari aspek gender, tidak ada perbedaan kompetensi numerasi baik yang pria maupun perempuan. Kedua, dari jenis sekolah didapatkan tidak ada perbedaan kompetensi numerasi dari sekolah negeri maupun swasta. Ketiga, dari lama mengajar didapatkan guru dengan lama mengajar di bawah lima tahun mempunya skor numerasi yang lebih tinggi. Keempat, dari usia tidak ada perbedaan kemampuan numerasi dari rentang usia 25 sampai dengan 56 tahun. Simpulan terakhir, dari aspek sertifikasi pendidik merupakan hal yang menarik. Meskipun tidak signifikan, didapatkan perbedaan rata-rata tes kemampuan numerasi antara guru yang bersertifikat pendidik degan yang belum bersertifikat. Dimana guru yang belum memiliki sertifikat pendidik memiliki rata-rata tes lebih tinggi dibanding yang sudah memiliki sertifikat pendidik.

Kata Kunci: *Kompetensi, Numerasi, Guru Sekolah Dasar, Faktor Demografi*

INTRODUCTION

Literacy and numeracy skills are often perceived as language and math skills so that they seem discrete or separate from one another. This opinion is erroneous, considering both are attached to social practices, not just technical skills for purely individual activities (Tout, 2020; Windisch, 2015). The terms literacy and numeracy skills are defined from various perspectives. In general, numeracy skills include a variety of skills in ways of thinking, reasoning, communicating, and generating knowledge in the use of mathematics in various contexts. Meanwhile, literacy refers to the capacity to understand, use, and reflect on information to achieve one's goals, develop one's knowledge and potential, and participate in society (Tout, 2020; Windisch, 2015). For this study, we agree with Tout's opinion (Tout, 2020) that numeracy literacy is a social practice related to the use of mathematics in a context that is defined not only by the problem but also by the physical and social context in which it is located.

In several countries, numeracy literacy skills can be exchanged with several terms. In Australia, mathematical literacy is numeracy literacy, while in America called quantitative literacy (Stacey, 2011). In the context of this study, we use the term numeracy literacy rather than just numeracy. Almost all countries, especially developing countries, focus on numeracy skills for their education because they are related to productivity and economic growth and support adaptation to new work requirements (Windisch, 2016). For example, the Irish government is placing a new national strategy focused on teaching and learning numeracy (Coffey & Sharpe, 2021). Furthermore, Coffey & Sharpe (Coffey & Sharpe, 2021) through their study shows the need for teachers to understand the concept of numeracy, and the need for professional development to overcome these problems, apart from developing teacher identity and pedagogical practice in that field. Schools need to consider how policies can provide support to enable teacher development. Policymakers must consider and differentiate mathematics and numeracy and support school engagement with interdisciplinary, interdisciplinary, and transdisciplinary approaches to embed numeracy throughout the curriculum. Apart from targeting in-service teachers, several researchers have prepared prospective teachers to face programs designed to develop literacy and numeracy skills (Fanshawe *et al.,* 2021; Schack *et al.,* 2013).

Golsteyn and colleagues (Golsteyn *et al.,* 2016) used studies conducted by the OECD, namely PIAAC and ALL, which showed that secondary school teachers, on average, had better literacy and numeracy skills than primary school teachers in almost all of the 15 the sample country of the study. These data indicate that special attention needs to be paid to the basic education level as a foundation for building these skills. Similar findings were revealed by Meeks and colleagues (Meeks *et al.,* 2014), who stated that a survey from PIACC found a close relationship between the results of the Program for International Student Assessment (PISA) and their students' literacy and numeracy skills. In other words, we need to reflect that the PISA scores obtained by students at the basic education level in Indonesia still need to be revised. This evidence shows that literacy and numeracy skills need serious attention. This research is fundamental because teachers have a strategic role in organizing education and preparing a skilled generation. In addition, as stated in Permendiknas number 35 of 2010, teachers are required to improve their professionalism through training, research, seminars, and publications as a form of embodiment of sustainable professional development.

In Indonesia, several studies related to numeracy literacy have been carried out, both at the level of school children (Rakhmawati & Mustadi, 2022), prospective teachers (Yustitia *et al.,* 2021), and teachers (Sayekti *et al.,* 2021). However, how to design or program or policy to improve teacher numeracy skills, especially elementary school teachers, has yet to be found in the literature. Piper and colleagues (Piper *et al.,* 2018) note that policymakers are increasingly focusing on what skills children learn in school which would be helpful when they leave school. These skills are literacy and numeracy. These skills were often called skills for life (Giannakaki, 2005). These skills are important primary education goals because they help realize successful advanced learning, social interaction, meeting the needs of life, and global employment (Kovas *et al.,* 2013; Tout, 2020; Windisch, 2016).

Several studies state that numeracy literacy skills are well formed due to interactions with adults (LeFevre *et al.,* 2010; Munn, 1994). Therefore, during half the day, students can form these skills through their interactions with the teacher at school. In other words, developing children's numeracy literacy skills, namely by building supporting resources for teachers in developing these skills, is a strategic effort and is also carried out by international researchers (Golsteyn *et al.,* 2016;

Piper *et al.,* 2018). However, this opportunity has yet to be consistently carried out in Indonesia, and the training has not been oriented explicitly toward improving these skills.

The strategy for developing a training program certainly has many challenges and obstacles. One of the programs to develop training is design-based research (DBR). This program will produce good results combined with a professional learning community (PLC) and participatory action research (PAR). The common characteristic of these programs is that they emphasize collaboration between researchers and teachers in designing research, training, and learning. This is supported by Groth and Bergner's statement (Groth & Bergner, 2007) that research will strongly influence learning practices if teachers play an active role in preparing research designs. Furthermore, Hales (2016) suggested combining PLC and PAR activities simultaneously to complement each other. Hales (Hales, 2016) argues that PLC and PAR are efforts that should be integrated with teacher professional development and educational research.

PLC is described as a group of people who share and criticize their learning process (Stoll *et al.,* 2006). Therefore, in this PLC, teachers gather to share their experiences and interpret them to solve problems related to learning in collaboration and to provide mutual motivation. In addition, the effectiveness of PLCs can be seen from several characteristics such as shared goals, mutual sharing, trust, mutual respect, collaboration, and dialogue (Borko, 2004; Lieberman & Pointer Mace, 2008; Stoll *et al.,* 2006). If appropriately used, KKG, MGMP, or other forms of PLC have a significant role in improving teacher competence. Collaboration between teachers and researchers is the key to the success of this program. In addition, Hales (2016) emphasized Participatory Action Research (PAR) as an integral part of this PLC activity.

PAR is a practical approach to teacher professional development because it involves related parties such as teachers and researchers with cyclical action research (James, 2006). This cycle in PAR consists of planning, implementing, observing, and reflecting (Kemmis *et al.,* 2014). One of the goals of PAR is to produce knowledge and its direct implementation that is beneficial through research (Morales, 2016). In addition, according to (Chevalier & Buckles, 2013), there are three principles of PAR, namely: (1) participation in social interaction,

action or implementation that pays attention to concepts and discussions, and investigation of knowledge and processes.

Previous studies have revealed the effectiveness of PAR implementation. (McIntyre, 2003), for example, asserts that PAR opens opportunities for intense collaboration and communication between universities and public educational institutions. Meanwhile, (Ball, 2009) states that PAR facilitates teachers to develop an awareness of improving learning through inquiry and reflection. The positive contribution of PAR to the professional development of teachers has been demonstrated. However, the emphasis on increasing literacy and numeracy skills in PAR has yet to be comprehensively discussed. Moreover, the combination of PAR with PLC in the Indonesian context to develop research-based practices is very important and urgent to improve the quality of learning. Therefore, the researcher feels the need to initiate this research.

Just as learning is ingrained in students if they experience and are actively involved in constructing concepts, we use this theory to apply to teacher training. Teachers will learn more with understanding (learning with understanding) if they experience and do it themselves. Therefore, we adopted PAR to be applied in designing practical training. Teachers not only listen to how to develop literacy and numeracy skills but also experience how to apply them in class. This, of course, has many advantages, including time efficiency, cost, and energy. We also use a platform in the form of a teacher-learning community to facilitate socialization and synergy to expand benefits.

METHODS

This study used the Design-Based Research (DBR) method approach. This method combined a professional learning community (PLC) and participatory action research (PAR). The participatory action research (PAR) was research between researchers (lecturers) and practitioners (teachers), used to develop literacy and numeracy skills with children as research objects. Therefore, to ensure that this training was practical, this study adopted a design-based research method with teachers as research objects.

The sample in this study was elementary school teachers in the Ponjong subdistrict, Gunungkidul district. Samples were taken using a purposive sampling

technique, in which each teacher working group (KKG) sent representatives as samples to be involved in this study. This involvement was enabled so that later teacher representatives from the teacher cluster or working group (KKG) could transmit what had been obtained in the teacher cluster or working group (KKG). Thus, there were forty teachers involved in this study to become the sample.

The instrument used in this study was a test. The test contained ten numeration questions adapted from ACER. Data analysis techniques in this study used inferential statistics. Inferential statistics was a statistical technique used to analyze sample data, and the results were applied to the population. The steps of inferential analysis were as follows: 1) Estimating the regression model 2) Prerequisite analysis test consisting of normality test and homogeneity test 3) Regression model test/ regression linearity 4) Regression significance test 5) Correlation coefficient test (Test of the degree of closeness with the test t). The data obtained were then classified according to demographic factors and used as ordinal data to facilitate data analysis. Furthermore, data analysis was carried out using the SPSS tool according to the needs of what demographic factors would be tested. Finally, the data was described as the profile according to the research objectives.

RESULTS AND DISCUSSION

The numeracy ability of elementary school teachers in terms of gender

The first demographic factor to be analyzed was gender. This nominal data by the researcher was coded one for men and zero for women. The data was then reviewed based on the average numerical test results obtained. The output of statistical calculations of numeracy abilities in terms of gender is shown in table 1.

Table 1. Results of Statistical Calculations of Teachers' Numeral Ability in terms of gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Post test	Female	29	7,00	1.813	0.337
	Male	11	7,09	1.136	0.343

From table 1, it can be shown that the number of female teachers is twenty-nine while the number of male teachers is eleven. It also shows that the average post-test score obtained is 7.00 for women and 7.09 for men. Thus, when viewed descriptively, it can be shown that there is an average difference between female and male students for post-test scores. However, to see whether there is a significant difference, it will be tested again with a statistical test of the value of Levene's test for equality of variances. The hypothesis proposed is as follows.

H_0: there is no difference in post test scores in terms of gender

H_1 : there are differences in post test scores in terms of gender

Complete statistical test results can be shown by observing table 2 below.

Table 2. Levene's test scores for equality of variances the teacher's Numerical Ability in terms of gender

	Levene's Test for Equality of Variances		t-test for Equality of Means				
Post test	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	3,479	0.070	-0.155	38	.878	-0.091	0.588
Equal variances not assumed			-0.189	28.982	.851	-0.091	0.480

Based on table 2 above, the sig value for Levene's test for equality of variances is 0.070 > 0.05. With this value, it can be interpreted that male and female teachers are homogeneous or the same. Furthermore, interpretation is done by looking at the row of equal variances assumed obtained. The sig line value of equal variances assumed is 0.878 <0.05. Thus, it can be concluded that H_0 is accepted and H_1 is rejected. That means there is no difference in post-test scores regarding the gender of elementary school teachers in Ponjong District, Gunungkidul Regency.

The numerical ability of elementary school teachers in terms of teaching institutions

The second demographic factor that concerns researchers is the teaching institutions of elementary school teachers. Two teaching institutions serves as nominal data in this study, namely public elementary schools, and private elementary schools. The researchers code one for public schools and zeroed in for private schools. This value is then juxtaposed with the average score of the teacher's test obtained. The results of statistical calculations of teachers' numeracy abilities in terms of teaching institutions are shown in table 3 below.

Table 3. Results of statistical calculations for teachers' numeracy skills in terms of teaching institutions.

	School Type	N	Mean	Std. Deviation	Std. Error Mean
Post test	Private	7	6,86	1.464	.553
	Public	33	7,06	1.694	.295

Public Schools from Table 3 above, it ccan be shown that seven private elementary school teachers participated in this study. As for public schools, the number of primary school teachers involved was 33. The results obtained, the average post-test scores for private school teachers are 6.86 and 7.06 for public school teachers. Thus, when viewed descriptively, it can be shown that there is an average difference between private and public elementary school teachers. A second test is carried out using Levene's test for equality of variances to see whether there is a significant difference. The hypothesis proposed is as follows:

H_0 : there is a difference in post test scores in terms of schools

H_1 : there is no difference in post test scores in terms of schools

The results of the Levene's test for equality of variances in the numerical abilities of teachers in terms of school origin are shown in table 4 below.

Table 4. Levene's test results for equality of variances in the numeracy abilities of teachers in terms of school origin

	Levene's Test for Equality of Variances		t-test for Equality of Means				
Post test	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	0.118	0.733	-0.295	38	0.770	-0.203	0.691
Equal variances not assumed			-0.325	9.748	0.752	-0.203	0.627

Based on table 4 above, it is shown that the sig value for Levene's test for equality of variances was 0.733 > 0.05. From the values obtained, it can be interpreted that the teachers teaching in private and public elementary schools are homogeneous or the same. The subsequent interpretation is by looking at the line equal variances not assumed. Based on the line, equal variances are not assumed; the sig value obtained was 0.770 > 0.05. Thus, H_0 is accepted, and H_1 is rejected. In other words, there is no difference in numerical ability in the post-test for both teachers who teach in private and public elementary schools in Ponjong District, Gunungkidul Regency.

The numerical ability of elementary school teachers in terms of teaching experience length

The third demographic factor that concerns researchers to see teachers' numeracy skills is the duration of teaching. There are four categories for this third demographic factor. The first teacher teaches 0-5 years, the second teacher teaches 6-10 years, the third teacher teaches 11-20 years, and the teacher teaches more than

20 years. To simplify data calculations, the researcher gave code one to teachers with five years of teaching and under, code two to teachers with six to ten years of teaching, code three to teachers with 11-20 years of teaching, and code four to teachers with years of experience. They had been teaching for more than twenty years. This value was then juxtaposed with the average score of the teacher's test obtained. The results of the statistical calculation of the teacher's numeracy skills in terms of the length of teaching experience are shown in table 5 below.

Table 5. Statistical Test Results for Teachers' Numeral Ability in terms of teaching experience length

	Long teaching experience	N	Mean	Std. Deviation	Std. Error Mean
Post test	≤ 5	12	7,67	1.371	0.396
	$5 < x \leq 10$	4	7,25	0.500	0.250
	$11 < x \leq 20$	21	7,05	1.596	0.348
	$20 < x$	3	4,00	0.000	0.000

Based on Table 5 above, it can be shown that twelve teachers have less than five years of teaching experience, while four teachers teach between five and ten years. For elementary school teachers with eleven to twenty years of teaching experience, there are twenty-one teachers, while teachers with more than twenty years of teaching experience are three teachers. The post-test average score for teachers who hav taught less than five years is 7.67, while teachers with five to ten years of teaching experience hav an average score of 7.25. While teachers who have taught between eleven and twenty years have an average value of 7.05, and teachers with more than twenty years of teaching experience have an average value of 4.00. Thus, when viewed descriptively, it can be shown that there are differences in the post-test averages between elementary school teachers who have a long experience teaching in the four categories. However, further testing will be carried out with the Kruskall Wallis test to see whether there was a significant difference. The hypothesis proposed was as follows:

H_0: there is no difference in post test scores based on long teaching experience

H_1: there are differences in post test scores based on long teaching experience

The results of the test calculations could be shown in Table 8 below. To help make it easier to read the results, tables 6 and 7 are also provided as a complement to the data in table 8.

Table 6. First auxiliary table Kruskall Wallis tests Teacher's numeration ability in terms of teaching experience length

	N	Mean	Std. Deviation	Minimum	Maximum
Posttest	40	7.03	1.641	3	9
Length of Teaching	40	2.38	1.005	1	4

Table 7. Second supporting table Kruskall Wallis Test The teacher's numeration ability in terms of the teaching experience length

Length of Teaching	N	Mean Rank
1	12	25.21
2	4	19.50
3	21	20.36
4	3	4.00
Total	40	

Table 8. Results of the Kruskall Wallis Test The teacher's numeracy ability in terms of the teaching experience length

	Post test
Chi-Square	8.512
Df	3
Asymp. Sig.	.037

Based on table 8 above, using the Kruskall Wallis test, the sig value for Asymp sig is 0.037 <0.05. With this acquisition value, there are differences in numeracy abilities in the post-test assessment of the teacher group in terms of length of teaching experience. Furthermore, it is also shown that teachers with teaching experience of fewer than five years have higher numeracy test results than other groups with teaching experience.

Elementary school teacher's numeracy ability in terms of age

The fourth demographic factor of concern to researchers looking at teachers' numeracy skills is the teacher's age. For age, the researchers summarize all respondents according to accurate data as of November 2022. The age distribution and statistical calculations of age demographic factors are shown in table 9 below.

Table 9. Distribution and statistical calculation results of numeracy abilities in terms of teacher age.

Age	N	Mean	Std. Deviation	Std. Error
25	3	7.33	1,528	0.882
27	1	5.00	0.000	0.000
28	1	8.00	0.000	0.000
30	2	8.00	0.000	0.000
32	5	8.20	0.837	0.374
33	3	7.67	1.155	0.667
34	2	7.50	2.121	1.500
35	2	7.00	0.000	0.000
36	1	7.00	0.000	0.000
37	3	8.00	0.000	0.000
38	1	4.00	0.000	0.000
39	2	9.00	0.000	0.000
40	1	7.00	0.000	0.000
41	2	7.00	0.000	0.000
42	1	7.00	0.000	0.000
43	3	6.00	2.646	1.528
44	1	4.00	0.000	0.000
45	1	8.00	0.000	0.000
51	1	4.00	0.000	0.000
52	1	4.00	0.000	0.000

Age	N	Mean	Std. Deviation	Std. Error
53	1	4.00	0.000	0.000
54	1	7.00	0.000	0.000
56	1	7.00	0.000	0.000

Based on table 9 above, it can be shown that the age range of teachers is between the ages of twenty-five to fifty-six, with varying average post-test scores. Table 9, it can be shown the various post-test values. To see whether there is a significant difference for each age distribution, the following hypothesis was proposed.

H_0 : there is no teacher's age on post-test scores for numerical abilities.

H_1 : there is a teacher's age on the post-test score of numerical ability.

The assumption is that if the Sig value > 0.05, then H_0 is accepted and H_0 is rejected, and vice versa; if the Sig value ≤ 0.05, then H_0 is rejected, and H_1 is accepted. Calculations using the Kruskall Wallis test. The results of the test calculations are shown in table 11 below. As a helper, table 10 was also shown.

Table 10. Kruskall Wallis Test Assistant Teacher's Numeral Ability in terms of Age

	N	Mean	Std. Deviation	Minimum	Maximum
Posttest	40	7.03	1.641	3	9
Age	40	37.45	8.048	25	56

Table 11. Kruskall Wallis Test Results for Teachers' Numeral Ability in terms of Age

	Post test
Chi-Square	25.048
Df	22
Asymp. Sig.	0.295

Based on table 11 above, using the Kruskall Wallis test, the sig value for Asymp sig is 0.295 > 0.05. The acquisition of these scores can be interpreted that the group

of teachers with an age range of twenty-five to fifty-six have no difference in the post-test scores of numeracy skills. Thus, there is no difference in the numeracy abilities of elementary school teachers in the Ponjong sub-district, Gunungkidul Regency, regarding the age factor.

The numerical ability of elementary school teachers in terms of educator certification

The fifth and final demographic factor that concerns researchers to see a teacher's numeracy ability is whether the teacher already have an educator certificate. To simplify the analysis, the researchers assign a code of one for teachers who are already certified educators and zero for teachers who did not yet have educator certificates. The results of statistical testing of teachers' numeracy abilities in educator certificates Ownership are shown in table 12 below.

Table 12. Results of Statistical Calculations of Elementary School Teachers' Numeral Ability in terms of educator certificates Ownership

	Certification description	N	Mean	Std. Deviation	Std. Error Mean
Post test	Not Certified yet	14	7.43	1.651	0.441
	Certified	26	6.81	1.625	0.319

Based on table 12 above, it can be shown that fourteen teachers are not certified educators, while twenty-six teachers already have educator certificates. The average post-test score for teachers who do not yet have an educator certificate is 7.43, and those who are certified educators have an average post-test score of 6.81. Thus, when viewed descriptively, it can be shown that there is an average difference between teachers who are certified educators and those who are not certified, educators. A Levene's test for equality of variances is carried out to see whether there is a significant difference. The hypothesis proposed are as follows.

H_0 : there is no difference in post test scores based on certification

H_1 : there is a difference in post test scores based on certification

The results of Levene's statistical test for equality of variances in teacher numeracy abilities in terms of educator certificates ownership are shown in table 13 below.

Table 13. Levene's test for equality of variances in teacher numeracy abilities in terms of educator certificates ownership

	Levene's Test for Equality of Variances		t-test for Equality of Means				
Post test	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	0.378	0.542	1.146	38	0.259	0.621	0.542
Equal variances not assumed			1.141	26.375	0.264	0.621	0.544

Based on table 13 above, the sig value for Levene's test for equality of variances is 0.542 > 0.05. It can be interpreted as the teachers who have or have not been certified being homogeneous or the same. With further interpretation, looking at the line, equal variances are not assumed with a sig value of 0.259 > 0.05, then H_0 is accepted, and H_1 is rejected. In other words, there is no difference in numerical abilities in the post-test for both teachers who already had an educator certificate and those who do not have an educator certificate.

CONCLUSION

Based on the results and discussion above, several conclusions can be drawn. The first, in terms of gender, there was no difference between men and women in terms of numeracy skills. The second, from the aspect of school type, there was no difference in teachers' abilities in public and private schools. The third, from the aspect of the teacher's teaching experience, it could be interpreted that the group

of teachers with long teaching experience had differences in the post-test scores of numerical abilities, where the average difference shown that the high post-test scores were owned by teachers with less than five years of teaching experience. The fourth, from the age aspect, it could be interpreted that the group of teachers with an age range between 25 to 56 had no difference in the numerical ability post-test scores. The fifth, from the aspect of educator certification, there was no difference in numeracy skills between teachers who were Sudanese or who were not certified, educators.

REFERENCES

Ball, E. (2009). A Participatory Action Research Study on Handwritten Annotation Feedback and Its Impact on Staff and Students. *Systemic Practice and Action Research*, *22*(2), 111–124. https://doi.org/10.1007/s11213-008-9116-6

Borko, H. (2004). Professional Development and Teacher Learning: Mapping the Terrain. *Educational Researcher, 33(8), 3–15. https://doi.org/10.3102/0013189X033008003*

Chevalier, J. M., & Buckles, D. (2013). *Participatory action research: Theory and methods for engaged inquiry*. Routledge.

Coffey, P., & Sharpe, R. (2021). An investigation into the teaching of numeracy in subjects other than mathematics across the curriculum. *International Journal of Mathematical Education in Science and Technology, 1–28. https://doi.org/10.1080/0020739X.2021.1978570*

Fanshawe, M., Saltmarsh, S., & Larsen, E. (2021). Learning and exploring teacher identity: Preparing for teaching in the Partners in Literacy and Numeracy (PLaN) programme. *Asia Pacific Journal of Education, 1–15. https://doi.org/10.1080/02188791.2020.1866492*

Giannakaki, M.-S. (2005). Using Mixed-Methods to Examine Teachers' Attitudes to Educational Change: The case of the Skills for Life strategy for improving adult literacy and numeracy skills in England. *Educational Research and Evaluation, 11(4), 323–348. https://doi.org/10.1080/13803610500110687*

Golsteyn, B. H. H., Vermeulen, S., & de Wolf, I. (2016). Teacher Literacy and Numeracy Skills: International Evidence from PIAAC and ALL. *Economist (Netherlands), 164(4), 365–389. https://doi.org/10.1007/s10645-016-9284-1*

Groth, R. E., & Bergner, J. A. (2007). Teachers' perspectives on mathematics education research reports. *Teaching and Teacher Education, 23(6), 809–825. https://doi.org/10.1016/j.tate.2005.12.002*

Hales, P. D. (2016). *Using participatory action research to approach teacher professional development: An analysis of teacher talk in a writing professional learning community*. The University of North Carolina at Greensboro

.

James, E. A. (2006). A study of participatory action research as professional development for educators in areas of educational disadvantage. *Educational Action Research, 14(4), 525–533. https://doi.org/10.1080/09650790600975726*

Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The action research planner: Doing critical participatory action research.* Springer Science & Business Media.

Kovas, Y., Voronin, I., Kaydalov, A., Malykh, S. B., Dale, P. S., & Plomin, R. (2013). Literacy and Numeracy Are More Heritable Than Intelligence in Primary School. *Psychological Science, 24(10), 2048–2056. https://doi.org/10.1177/0956797613486982*

LeFevre, J., Polyzoi, E., Skwarchuk, S., Fast, L., & Sowinski, C. (2010). Do home numeracy and literacy practices of Greek and Canadian parents predict the numeracy skills of kindergarten children? *International Journal of Early Years Education, 18(1), 55–70. https://doi.org/10.1080/09669761003693926*

Lieberman, A., & Pointer Mace, D. H. (2008). Teacher Learning: the Key to Educational Reform. *Journal of Teacher Education, 59(3), 226–234. https://doi.org/10.1177/0022487108317020*

McIntyre, A. (2003). Participatory Action Research and Urban Education: Reshaping the Teacher Preparation Process. *Equity & Excellence in Education, 36(1), 28–39. https://doi.org/10.1080/10665680303497*

Meeks, L., Kemp, C., & Stephenson, J. (2014). Standards in literacy and numeracy: Contributing factors. *Australian Journal of Teacher Education, 39(7), 106–139. https://doi.org/10.14221/ajte.2014v39n7.3*

Morales, M. P. E. (2016). Participatory Action Research (PAR) cum Action Research (AR) in Teacher Professional Development: A Literature Review. *International Journal of Research in Education and Science, 2(1), 156–165.*

Munn, P. (1994). The Early Development of Literacy and Numeracy Skills. *European Early Childhood Education Research Journal, 2(1), 5–18. https://doi.org/10.1080/13502939485207491*

Piper, B., Simmons Zuilkowski, S., Dubeck, M., Jepkemei, E., & King, S. J. (2018). Identifying the essential ingredients to literacy and numeracy improvement: Teacher professional development and coaching, student textbooks, and structured teachers' guides. *World Development, 106, 324–336. https://doi.org/10.1016/j.worlddev.2018.01.018*

Rakhmawati, Y., & Mustadi, A. (2022). The circumstances of literacy numeracy skill: Between notion and fact from elementary school students. *Jurnal Prima Edukasia, 10(1), 9–18. https://doi.org/10.21831/jpe.v10i1.36427*

Sayekti, I., Sukestiyarno, Y., Wardono, & Dwijanto. (2021). Perception and understanding of Madrasah Tsanawiyah teachers on numerical literacy in mathematics learning. *Journal of Physics: Conference Series, 1918(4), 042029. https://doi.org/10.1088/1742-6596/1918/4/042029*

Schack, E. O., Fisher, M. H., Thomas, J. N., Eisenhardt, S., Tassell, J., & Yoder, M. (2013). Prospective elementary school teachers' professional noticing of children's early numeracy. *Journal of Mathematics Teacher Education, 16(5), 379–397. https://doi.org/10.1007/s10857-013-9240-9*

Stacey, K. (2011). The PISA view of mathematical literacy in Indonesia. *Indonesian Mathematical Society Journal on Mathematics Education, 2(2), 95–126.*

Stoll, L., Bolam, R., Mcmahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change, 7(4), 221–258. https://doi.org/10.1007/s10833-006-0001-8*

Tout, D. (2020). Evolution of adult numeracy from quantitative literacy to numeracy: Lessons learned from international assessments. *International Review of Education, 66(2–3), 183–209. https://doi.org/10.1007/s11159-020-09831-4*

Windisch, H. C. (2015). *Adults with low literacy and numeracy skills: A literature review on policy interventions*. OECD Education Working Papers No. 123, 12(123), 2–125. https://doi.org/10.1787/5jrxnjdd3r5k-en

Windisch, H. C. (2016). How to motivate adults with low literacy and numeracy skills to engage and persist in learning: A literature review of policy interventions. *International Review of Education, 62(3), 279–297. https://doi.org/10.1007/s11159-016-9553-x*

Yustitia, V., Siswono, T. Y. E., & Abadi. (2021). Numeracy of prospective elementary school teachers: a case study. *Journal of Physics: Conference Series, 1918(4), 042077. https://doi.org/10.1088/1742-6596/1918/4/042077*