The Relationship between Multiple Intelligences of Preservice Elementary Teacher toward Their Gender and Performances

Muhamad Ikhlas[*], Kuswanto & Rosario F. Quicho

Central Luzon State University, Science City of Munoz, Philippines
*Email: muhammadikhlas@clsu.edu.ph

Keywords:	Abstract
multiple intelligences; *preservice elementary teachers;* *elementary education;* *performances;* *gender*	*This research studied whether there was a significant relationship between the multiple intelligences of pre-service elementary teachers, their gender, and their performances. The survey method had been used for this study. A "Multiple Intelligence Profiling Questionnaire III (MIPQ-III)" was used to collect the multiple intelligences of the participants. Reliability-test had been used to see the consistency of the questionnaire. In order to analysis of the data, descriptive statistics, independent sample t-test, and Pearson correlation were used for this study. Results showed that naturalistic intelligence has the highest mean score. Meanwhile, logical-mathematics intelligence had the lowest mean score. Results also showed that logical-mathematic, verbal-linguistic, spatial, bodily-kinesthetics, and interpersonal intelligence have differences based on gender, while other intelligence had no differences. Furthermore, results also showed that all intelligence, excluding naturalistic, positively correlates with the performances. Lastly, hierarchical regression showed that among the multiple intelligences, the logical-mathematics intelligence became a predictor for the performance of the pre-service elementary teachers. The implications of this study, such as the results, showed a relationship between multiple intelligence and elementary school pre-service teachers. Besides that, it was found that the multiple intelligence of elementary pre-service teachers had a wide variety of impacts on the performance of those pre-service teachers in the future. Thus, it was expected that relevant stakeholders can better review these aspects, especially in the curriculum*

INTRODUCTION
Background

In the whole process of education in schools, learning activities are the most basic activities. Learning is a necessity or obligation for all individuals. Pritchard (2008) states learning is the process of gaining more knowledge, or of learning how to do something. Furthermore, Domjan (2014) states if learning is defined in terms of a change in the mechanisms of behavior to emphasize the distinction between learning and performance. One of the places where the learning process takes place is at the elementary school level.

Elementary education is the most basic level of education in formal education. At this stage, students need to be directed, developed, and bridged towards their complex development. At this stage, also found a variety of students. That is because elementary students are unique children and need attention. Students come to class with their own distinctive characteristics to be directed according to the objectives of primary school education (Ocak & Dermez, 2008). Therefore, education in elementary schools is essentially education that is more directing and motivates more students to learn (So et al., 2019). The background of their uniqueness is seen in the changes in various aspects of both their attitude, movement, and intelligence so that it affects their development.

Theory that explains students' mental diversity is multiple intelligences by Gardner (Armstrong, 2009). Gardner (2011) explains that intelligence is not only interpreted as intelligence quotient "IQ" as it has been so far, but intelligence concerns a person's ability to solve problems and produce fashion products that are consequences in a particular cultural or community atmosphere. Based on Gardner's Multiple Intelligences, each human being is able to perform seven relatively independent forms of information processing, where each individual is different from one another in terms of the intelligence profile that they show (Gardner & Hatch, 1989; Işık & Tarım, 2009; Erdem & Keklik, 2020), which then added two more intelligences namely naturalistic and existential intelligence (Gardner, 2000).

Multiple intelligences explain that every human being does not have only one intelligence, but several intelligences. The theory of multiple intelligences not only recognizes these individual differences for practical purposes, such as teaching and assessment but also considers and accepts them as normal, reasonable, even interesting and very valuable. Furthermore, Gardner explains that there are nine intelligences that a person has. The nine intelligences are:

1. verbal-linguistic intelligence closely related to words, both oral and written along with the rules;
2. logical-mathematical intelligence related to the ability to process numbers or skills using logic;
3. spatial intelligence related to the ability to capture color, direction, and space accurately and change the capture into other forms such as decoration, architecture, painting, sculpture;
4. bodily-kinesthetic intelligence related to the ability to use the movements of the whole body to express ideas and feelings and the skill to use hands to create or change things. This intelligence includes specific physical abilities, such as coordination, balance, skills, strength, flexibility, speed and accuracy of receiving excitement, touch, and texture;

5. musical intelligence related to the ability to capture sounds, distinguish, compose, and express themselves through sounds that are pitched and rhythmic. This intelligence includes sensitivity to rhythm, melody, and sound color;
6. interpersonal intelligence that involve the ability to understand and cooperate with others. This intelligence involves many skills, such as the ability to empathize with others, the ability to organize a group of people towards a common goal, the ability to recognize and read the thoughts of others, the ability to make friends or establish contact;
7. intrapersonal intelligences related to internal aspects in a person, such as life feelings, range of emotions, the ability to distinguish emotions, mark them, and use them to understand and guide own behavior;
8. naturalist intelligence related to skills in recognizing and classifying flora and fauna in their environment. This intelligence is also related to human love for natural objects, animals, and plants. Naturalist intelligence is also characterized by sensitivity to natural forms, such as leaves, clouds, rocks; and
9. existential intelligence related to human ability to place oneself in the farthest reaches of the cosmos, with the meaning of life, the meaning of death, the fate of the physical and mental world, and with the meaning of deep experiences such as love or art (Armstrong, 2009; Gardner, 1993, 2000).

Every child has these nine intelligences and could develop that intelligence to a sufficiently high level of competence if the child has support, training and teaching. According to Gardner (1993) intelligence could be improved, modified, trained, and even changed. In fact, a person's intelligence and ability are flexible and could be guided (Ahmadian & Hosseini, 2012).

Problem of Study

In the current era, more advanced education which is supported and facilitated by various technologies certainly greatly helps students in the learning process, as well as elementary school students. Generational differences between teachers and students certainly make different ways of thinking and learning styles between the two generations. It is feared that students better understand the content taught by teachers because students better understand how to use the latest technology. Thus, learning multiple intelligences in elementary school students is very important as well as the importance to learn multiple intelligences on preservice teachers of elementary school students themselves. That is because later these preservice teachers would become instructors and educators for these students.

The intended teacher candidates are undergraduate students who majored in education, commonly referred to as preservice teachers. Preservice teachers are related to students who are enrolled in an undergraduate teaching degree in a university setting (Ferry & Kervin, 2011). Therefore, the preservice teacher in this study referred to the preservice elementary teacher. A good preservice teacher is a prospective teacher who is smart in the field of teaching or pedagogic abilities and their respective expertise (Nilsson & Loughran, 2012). Field of expertise for elementary school teachers, of course, these teachers master the material or content related to several subjects that are applied in each school based on the applicable curriculum. Some general subjects taught to elementary school students are mathematics and English (language) subjects. In the Philippines setting, courses applied to elementary education programs related to mathematics is temporary mathematics course while course related to English is speech communication course (Central Luzon State University Curriculum, 2016).

State of the Art

Some previous studies have shown that multiple intelligences have a significant relationship with learning outcomes (Ahmadian & Hosseini, 2012; Ekinci, 2014; Pour-Mohammadi et al., 2012; Zahedi & Moghaddam, 2016). More specifically logical-mathematical intelligence is positively related to students 'mathematical abilities, as well as verbal-linguistics intelligence which is positively related to students' language abilities. Based on these points, the researchers conducted research related to multiple intelligences from preservice elementary teachers who were connected with their performance, especially in mathematics, English, and general performance.

Gap Study & Objective

At this point, the main objective of this study consists in determining the preservice elementary teachers' multiple intelligences; and the relationship between their gender, their multiple intelligences and their performance. In this sense, the purpose of this research are: 1) to describe the level multiple intelligences of the preservice elementary teachers?; 2) to analyze the difference between multiple intelligences of the preservice elementary teacher according to their gender; 3) to analyze the difference between multiple intelligences of the preservice elementary teacher (verbal-linguistic, logical-mathematic, spatial, musical, bodily kinesthetics, interpersonal, intrapersonal, naturalistic, existential) according to their math, English and general performance; 4) to describe how gender and multiple intelligence of the preservice elementary teacher predict their performance in math, English and general performance.

METHOD

Design

The research study used a quantitative research design, which used to establish the relationship between two variables and sometimes explain the cause of such relationship (Ary et al., 2010; Fraenkel et al., 2011). Descriptive-survey approach was used in this study to explore the preservice elementary teacher multiple intelligences, and the relationship between their gender, multiple intelligences toward their performance, especially in math, English, and general performance.

Participant

This research was conducted at College of Education, Central Luzon State University. The data were collected from the students of Elementary Education Department in the first semester of 2018-2019 school year. The sample technique used in this study was purposive sampling, where researchers only limited the participant to first year preservice elementary teacher. Afterwards, these 60 preservice elementary teachers were handed out questionnaires, but the regular questionnaires handed in by 59 preservice elementary teachers were accepted for assessment, so the return rate of the questionnaires was 98.33%. The 59 preservice elementary teachers in the sampling were 19 males or 32.2% and 40 females or 67.8% (See Table 1).

Table 1. Demographic characteristics of the participants according to gender

Variables	Categories	N	Percentage
Gender	1. Male	19	32.2
	2. Female	40	67.8

Instrument and Procedures

Three instruments were used in this study. The first part was developed by the researcher covering the socio-demographic characteristics of the participants, asked the students of their socio-demographic characteristics such as gender, semester, and major. The students were asked to supply the information needed by writing answer whenever possible.

In term to explore the multiple intelligences of preservice elementary teachers, researcher uses questionnaire for the instrument tool. Mackey and Gass (2005) showed questionnaires allow researchers to gather the information that learners are able to describe themselves. The second part was about the multiple intelligences which was adapted the Multiple Intelligence Profiling Questionnaire III (MIPQ-III) by Tirri and Nokelainen (2008). This questionnaire consisted of 35 items concerning multiple intelligences of the students. It consisted by nine dimensions, there are: linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, intrapersonal, natural and existential intelligence. Each dimension was followed by four questions, except natural dimension that only followed by three questions. This part asked the students to rate their multiple intelligences. Using Likert-type scales, participants were asked to judge indicate how agree they with each statement. The last part was about the preservice elementary teachers' performance by asking directly to the lecturer concerned.

Data analysis

The data gathered from the students were analyzed by using the Statistical Package for the Social Sciences 25 (SPSS 25). From the parametric tests, descriptive statistics, independent sample t-tests and Pearson correlation coefficients were employed. Firstly, the reliability of each scale was tested. The Multiple Intelligence Profiling Questionnaire III (MIPQ-III) was analyzed and Cronbach's Alpha reliability was found 0.98. The Cronbach's alpha scores indicated that the scales used for the present study were highly reliable. Furthermore, the researchers analyzed the categories for each intelligence possessed by preservice elementary teachers. As a result, the findings ranging between 5.00 and 4.20, 4.19 and 3.40, 3.39 and 2.60, 2.59 and 1.80, 1.79 and 1.00 were interpreted as very high, high, medium, low, and very low respectively (See Table 2).

Table 2. The Ranges of Multiple Intelligences Questionnaire and Their category

Score	Category
4.20 – 5.00	Very high
3.40 – 4.19	High
2.60 – 3.39	Medium
1.80 – 2.59	Low
1.00 – 1.79	Very low

RESULTS

Firstly, multiple intelligences of the preservice elementary teachers were determined. When multiple intelligences types of the preservice elementary teachers were calculated, it was observed that logical-mathematic intelligence had the lowest mean score and naturalistic intelligence had the highest mean score (see table 3).

Table 3. Multiple Intelligences of the preservice elementary teachers Descriptive Statistics

Descriptive Statistics					
	N	Min	Max	Mean	SD
Logical-mathematic	59	2.00	5.00	3.06	.72
Verbal-linguistic	59	1.00	5.00	3.77	.61
Spatial	59	1.00	5.00	3.25	.62
Musical	59	1.00	5.00	3.33	.87
Bodily-kinesthetics	59	1.00	5.00	3.52	.66
Interpersonal	59	1.00	5.00	3.61	.63
Intrapersonal	59	1.00	5.00	3.83	.63
Naturalistic	59	1.00	5.00	4.21	.54
Existential	59	2.00	5.00	4.00	.53
Valid N (listwise)	59				

The difference between multiple intelligences types of students and gender were also examined. The result of descriptive statistics shows that some intelligence have significant differences between male and female participants, such as logical-mathematical, linguistic, spatial, bodily-kinesthetics, and interpersonal intelligence, while others intelligence did not indicate any significant difference (See Table 4).

Table 4. Result of Independent t Test for Gender and Multiple Intelligences

Types of Intelligence	Gender	N	M	SD	t	Df	Sig.
Logical-Mathematic	Male	19	3.45	.70	2.971	57	.004
	Female	40	2.89	.66			
Verbal-Linguistic	Male	19	3.37	.57	-3.845	57	.000
	Female	40	3.96	.54			
Spatial	Male	19	3.59	.72	3.059	57	.003
	Female	40	3.09	.51			
Musical	Male	19	3.47	.51	.842	57	.404
	Female	40	3.27	.99			
Bodily-Kinesthetics	Male	19	3.91	.53	3.298	57	.002
	Female	40	3.34	.65			
Interpersonal	Male	19	3.97	.50	3.248	57	.002
	Female	40	3.44	.62			
Intrapersonal	Male	19	3.92	.54	.719	57	.475
	Female	40	3.79	.67			
Naturalistic	Male	19	4.37	.52	1.575	57	.121
	Female	40	4.13	.54			
Existential	Male	19	4.12	.66	1.178	57	.244
	Female	40	3.95	.45			

The third objective of this study was to determine the relationship between preservice elementary teachers' multiple intelligences and their performances. It was revealed that most of the intelligence types and the performances had a moderate positive correlation (See Table 5).

Table 5. The relationship of the multiple intelligences and the performances

	Temporary Math	Speech Communication (English)	GPA
Logical-mathematics	.794**	.568**	.528**
Verbal-Linguistic	.140	.629**	.635**
Spatial	.710**	.439**	.477**
Musical	.566**	.550**	.531**
Bodily-Kinesthetics	.671**	.359**	.306*
Interpersonal	.730**	.392**	.388**
Intrapersonal	.521**	.598**	.554**
Naturalistic	.004	-.009	.156
Existential	.416**	.241	.232
*Correlation is significant at p<0.05.			
**Correlation is significant at p<0.01.			

The last objective of this study was to determine whether gender and multiple intelligences of preservice elementary teachers predict their performance in terms of math, English and general performance. Table 6 shows the model summary of hierarchical regression analysis used. Model summary shows that gender has a high influence on the hierarchical regression analysis model used

Table 6. Model summary of hierarchical regression analysis

	Parameter	Model 1	Model 2
Temporary Math	R	,535[a]	,893[b]
	R^2	0.287	0.797
	Adj. R^2	0.274	0.755
	R^2 Change	0.287	0.511
	Sig. F Change	0.000	0.000
Speech Communication (English)	R	,352[a]	,857[b]
	R^2	0.124	0.735
	Adj. R^2	0.109	0.680
	R^2 Change	0.124	0.611
	Sig. F Change	0.006	0.000
GPA	R	,380[a]	,842[b]
	R^2	0.144	0.709
	Adj. R^2	0.129	0.648
	R^2 Change	0.144	0.564
	Sig. F Change	0.003	0.000

a. Predictors: (Constant), Gender
b. Predictors: (Constant), Gender, Intrapersonal, Naturalistic, Existential, Bodily-Kinaesthetic, Linguistic, Musical, Interpersonal, Spatial, Logical Mathematic

Moreover, table 7 shows the hierarchical regression analysis. It was revealed if among the multiple intelligences, logical-mathematics intelligence becomes a predictor for the performance of the preservice elementary teachers.

Table 7. Result of hierarchical regression among gender and multiple intelligence toward performance

Model	Predictor Variable	Temporary Math		Speech Communication (English)		GPA	
		B	Sig.	B	Sig.	B	Sig.
1	(Constant)	3.007	0.000	2.985	0.000	2.369	0.000
	Gender	-0.441	0.000***	0.239	0.006**	0.316	0.003**
2	(Constant)	2.133	0.000	1.854	0.000	0.508	0.251
	Gender	-0.192	0.038*	0.394	0.000***	0.541	0.000***
	Logical Mathematic	0.234	0.022*	0.329	0.001**	0.293	0.019
	Linguistic	-0.056	0.451	0.005	0.948	0.028	0.755
	Spatial	0.175	0.063	0.065	0.457	0.217	0.057
	Musical	0.032	0.563	-0.008	0.879	-0.036	0.593
	Bodily-Kinaesthetic	0.030	0.648	0.010	0.869	-0.007	0.925
	Interpersonal	0.060	0.471	-0.101	0.202	-0.040	0.693
	Intrapersonal	-0.014	0.833	0.122	0.054	0.094	0.245
	Naturalistic	-0.246	0.000***	-0.075	0.148	0.034	0.613
	Existential	0.010	0.874	-0.041	0.505	-0.110	0.171

*** significant at $p < 0.001$;   ** significant at $p < 0.01$;   * significant at $p < 0.05$

gender = 1 – male, 2- female

DISCUSSION

The first question asks about the level of multiple intelligences of preservice elementary teachers. To answer this question researcher uses descriptive statistics. Based on Table 3, the type of intelligence with the highest mean is Naturalistic (M = 4.21), and the one with the lowest mean is Logical-Mathematic (M = 3.07). This indicates that the average intelligence possessed by preservice elementary teachers is more inclined to naturalistic intelligence, or it could be said that the naturalistic intelligence of the preservice elementary teachers is categorized as "very high". In contrast, the logical-mathematics of preservice elementary teachers are classified as medium. The results also showed that verbal-linguistic intelligence (M = 3.78), bodily-kinesthetic (M = 3.52), interpersonal intelligence (M = 3.61), intrapersonal intelligence (M = 3.83) and existential intelligence (M = 4.00) categorized as "high". Meanwhile, spatial intelligence (M = 3.25) and musical intelligence (M = 3.33) categorized as "medium".

The next question is whether there is a significant difference between the gender of the preservice elementary teacher according to their multiple intelligence. To answer this question researcher uses an independent sample t-test. Table 4 showed the differences between the multiple intelligences of the preservice elementary teachers according to their gender. The result showed that there are differences among the logical-mathematic

intelligence of the preservice elementary teachers based on the gender (t(57) = 2.971, p<0.05 (0.004)), where male participants have logical-mathematics (M = 3.45) higher than female participants (M = 2.89). This result is similar to a study by Furnham and Buchanan (2005); Lin (2009); Biria et al. (2014); and Loori (2005), where male participants tend to provide higher logical-mathematics intelligence than female participants.

Results also showed that there are differences among the verbal-linguistic intelligence of the preservice elementary teachers based on the gender (t(57) = -3.845, p<0.001 (0.000)), where female participants have verbal-linguistic (M = 3.95) higher than male participants (M = 3.36). This result is similar to the study by Saricaglu and Arikan (2009), Lin (2009), and Meneviş and Özad (2014), which shows that female participants tend to have higher verbal-linguistics than male participants. Afterward, the result also showed that there are differences among the spatial intelligence of the preservice elementary teachers based on the gender (t(57) = 3.059, p<0.05 (0.003)), where male participants (M = 3.59) have spatial intelligence higher than females participants (M = 3.09). This result is similar to the study by Lin (2009) and Shahzada et al. (2011), which states a difference in spatial intelligence based on gender.

Results also showed that there are differences among the bodily-kinesthetics intelligence of the preservice elementary teachers based on gender (t(57) = 3.298, p<0.05 (0.002)), where male participants have bodily-kinesthetics intelligence (M = 3.91) higher than female participants (M = 3.34). It is identical to a previous study by Lin (2009); and Biria et al. (2014), which shows that male participants tend to have higher bodily-kinesthetic intelligence than the female participant. Furthermore, the result also showed that there are differences among the interpersonal intelligence of the preservice elementary teachers based on gender (t(57) = 3.248, p<0.05 (0.002)), where male participants have interpersonal intelligence (M = 3.97) higher than females participants (M = 3.44).

Otherwise, other result showed there is no difference between musical intelligence (t(57) = 0.842, p>0.05 (0.404)), intrapersonal intelligence (t(57) = 0.719, p>0.05 (0.475)), naturalistic intelligence (t(57) = 1.575, p>0.05 (0.121)), and existential intelligence (t(57) = 1.178, p>0.05 (0.244)) of the preservice elementary teacher according to their gender. This result seemed same like previous study by Meneviş and Özad (2014) that found there is no difference between naturalistic intelligence according to gender.

Furthermore, to answer whether there is a significant difference between the multiple intelligences of the preservice elementary teacher according to their maths, English, and general performance, the researcher uses Pearson correlation. Table 5 shows the result of multiple intelligences of the preservice elementary teacher according to their performances. The result showed that some multiple intelligences such as logical-mathematics, spatial, musical, bodily-kinesthetics, interpersonal, intrapersonal positively correlate with math, English, and general performance. This result seemed the same as the previous study by Ekinci (2014), which showed a positive correlation between verbal-linguistic, logical-mathematic, intrapersonal, and interpersonal intelligence with students' performances; and Ahmadian and Hosseini (2012) that interpersonal intelligence correlates with students' English performance.

Meanwhile, naturalistic intelligence has no relationship with math, English, and general performance. This result is similar to the study by Razmjoo (2008); Sadeghi and Farzizadeh (2012); Ahmadian and Hosseini (2012); and Rad et al. (2014) that found there is no relationship between naturalistic intelligence and students' performances. As for the other intelligence, verbal-linguistics only has a positive relationship with English and general performance and is not related to math performance, whereas existential intelligence has only a positive relationship with math performance and is not related to English and general performance. It seemed the same as the study by Ahmadian and Hosseini (2012) that found verbal-linguistic intelligence correlates with English performance. Result also show that

relationship between logical-mathematic intelligence and math performance (r = 0.794, p<0.01 (0.000)) is the highest correlation, while bodily-kinesthetics intelligence and general performance (r = 0.306, p<0.05 (0.018)) is the lowest correlation.

Lastly, in connection with the final question about whether multiple intelligences predict participants' performance, the researcher uses hierarchical regression analysis. Table 7 shows the results of the model summary for hierarchical regression analysis. On the temporary math as a dependent variable, the first model shows that R Square and R Square Change were 0.287, which indicates that gender affects the temporary math equal with 28.7%, this is also indicated by the value of significance F change (<0.001). Thus, gender plays a role in influencing the model of the hierarchical regression tests performed. Furthermore, on the second model, by adding multiple intelligences to the model, it is seen that R Square experienced a change of 51.1%, from the previous 0.287 to 0.797. The significance F change (<.001) shows that gender and multiple intelligences simultaneously influence the hierarchical regression model that is performed.

Meanwhile, speech communication as a dependent variable is seen on the first model if gender as a predictor affects the hierarchical regression test model by 12.4% (0.124), with a significance F Change value of 0.006 (<.001). Then, after adding multiple intelligences to the model, the significance of the F change becomes 0.000 (<.001), which indicates gender and multiple intelligences as predictors simultaneously affecting the model of the hierarchical regression test. It could also be seen from the magnitude of R square changes by 61.1%, from the previous 0.124 to 0.735. Lastly, on the GPA as a dependent variable, the first model has shown if gender affects the model with a significance value of F change equal to 0.003 (<.001), with an effect of 14.4%. Then, the second model shows that gender and multiple intelligences as predictors simultaneously also influence the hierarchical regression test model conducted, with a significance F change value of 0,000 (<0.01). This could also be seen from the change in R Square by 56.4%, from the previous 0.144 to 0.709.

Table 7 shows the results of the hierarchical regression test for each different dependent variable. The first model for all dependent variables shows that gender is a very significant predictor of temporary math (p <0.01), speech communication (p <0.01), and GPA (p <0.01). Interestingly, in the temporary math results, the value of B has a negative value (B = -0.441), which means that males tend to have better grades than females. Whereas the results of speech communication (B = 0.239) and GPA (B = 0.316) show the opposite results, females tend to have good results compared to males. Furthermore, on the second model, it appears that gender still has an influence on the three dependent variables, such as temporary math (B = -0.192, p <0.05), speech communication (B = 0.394, p<0.01) and GPA (B = 0.541, p<0.01). Interestingly, when added to the nine multiple intelligences, in the temporary math as the dependent variable, only two multiple intelligences predict the math performance, namely logical-mathematics (p <0.05) and naturalistic intelligence (p <0.01). On the logical-mathematic intelligence, seen positive B value (B = 0.234), which indicates that if someone has high logical-mathematical intelligence, they will get high math performance. Conversely, the naturalistic intelligence obtained a negative B value (B = -0.246), which indicates that someone who has less naturalistic intelligence tends to get a good math performance.

On the speech communication as a dependent variable, only has one intelligence as a predictor of speech communication performance, namely logical-mathematic intelligence

(P <0.01), with a positive B value (B = 0.329), which indicates that someone who has high logical intelligence is predicted have an excellent speech communication performance. Likewise, with GPA as a dependent variable, which also only has one intelligence as a predictor, namely logical-mathematics intelligence (P <0.05), with a positive B value (B = 0.293), which also indicates that someone who has high logical intelligence predicted to have a good GPA or average performance. Based on the second model, other multiple intelligences do not predict the three performances, but the three performances are more influenced by gender. Some previous studies have found that multiple intelligences are not predictors of performance (Koura & Al-Hebaishi, 2014). It could be argued that there may be other factors that could predict performance (Javanmard, 2012). We could not predict a person's success in performance only from the basis of his/her scores on the multiple intelligences.

Multiple intelligences are vital to explore (Savas, 2012; Madkour & Mohamed, 2016) because we can see how the potential of each of us is seen from the intelligence we have. In this study, exploration of preservice teachers' multiple intelligences has been carried out. Before the teachers could educate and develop the potential of their students, the teachers themselves must first be intelligent and have good development in terms of various aspects of intelligence. For example, a teacher who teaches math subjects, then the teacher must have good mathematical intelligence. Likewise with other intelligence, of course, it is essential for each teacher to possess, especially preservice elementary teachers.

CONCLUSION

This study explores the relationship between elementary preservice teachers' multiple intelligence and their performances. Based on the study, the naturalistic intelligence of the participants has been found to have the highest mean score among other intelligence, and this could be due to the university's location, which is in an agricultural area surrounded by nature. Meanwhile, the logical-mathematics intelligence was found to have the lowest mean score among other intelligence, for the future preservice elementary teachers are expected to train more extra logical-mathematics abilities. After all, preservice elementary teachers are required to teach math subjects, which are compulsory in elementary school.

Furthermore, it was also found that there were differences between several bits of intelligence (logical-mathematic, verbal-linguistic, spatial, bodily-kinesthetics, and interpersonal intelligence) with gender. This could be due to the less balanced comparison of participants with fewer male participants than female participants. It is expected that research that could include more participants will be conducted in the future. Eight of multiple intelligences, except naturalistic intelligence, correlate with the performances, especially logical-mathematical intelligence has a very positive relationship with math performance, as well as verbal-linguistic intelligence that has a positive relationship with English performance. Lastly, hierarchical regression shows if gender considers as a predictor of temporary math, speech communication, and GPA or average performance. Hierarchical regression also shows if logical-mathematics and naturalistic intelligence could predict temporary math performance, whereas for speech communication and GPA only is predicted by logical-mathematics intelligence.

The findings obtained by this research can be input for related stakeholders, such as the department of education, teachers' supervisors, or preservice teachers themselves. For the department of education and teachers' supervisors, it could be included in terms of seeing how the multiple intelligences possessed by each teacher or preservice teachers, which with the results of intelligence, those related stakeholders can place the appropriate potentials of each teacher in mapping the class or grade to be taught. Meanwhile, for preservice teachers, it could be input for them in terms of improving the intelligence that is lacking and

maximizing the potential of intelligence that is categorized as good. Not limited to that, this study could also be input for other researchers who have the same interest. Lastly, future research could be carried out that looks beyond the relationship of multiple intelligences with other performances such as arts, sports, science, and others. And also, not limited to multiple intelligences, future research could add other variables such as attitude, motivation, interest, learning styles, and other related variables.

REFERENCES

Ahmadian, M., & Hosseini, S. (2012). A study of the relationship between Iranian EFL learners' Multiple Intelligences and their performance on writing. *Mediterranean Journal of Social Sciences, 3*(1), 111-126. https://doi.org/10.5901/mjss.2012.03.01.111

Ary, D., Jacobs, L. C., Sorensen, C., & Razavieh, A. (2010). *Introduction to Research in Education.* Cengage Learning.

Armstrong, T. (2009). *Multiple intelligences in the classroom*. ASCD.

Biria, R., Boshrabadi, A. M., & Nikbakht, E. (2014). The relationship between multiple intelligences and Iranian EFL learners' level of L2 lexical knowledge: The case of gender. *Advances in Language and Literary Studies, 5*(3), 9-17. http://dx.doi.org/10.7575/aiac.alls.v.5n.3p.9

College of Education of Central Luzon State University. (2016). *Curricular Offerings*. https://ced.clsu.edu.ph/curricular%20offerings.php

Domjan, M. (2014). *The Principles of Learning and Behavior*: Nelson Education.

Ekinci, B. (2014). The relationships among Sternberg's triarchic abilities, Gardner's multiple intelligences, and academic achievement. *Social Behavior and Personality: an international journal, 42*(4), 625-633. https://doi.org/10.2224/sbp.2014.42.4.625

Erdem, D., & Keklik, I. (2020). Multiple Intelligences Profiles in Prospective Teachers. *Education Reform Journal, 5*(1), 27-44. http://dx.doi.org/10.22596/erj2020.05.01.27.44

Ferry, B., & Kervin, L. (2011). Using Online Simulation to Engage Users in an Authentic Learning Environment. In *Gaming and Simulations: Concepts, Methodologies, Tools and Applications* (pp. 1460-1476): IGI Global. https://doi.org/ 10.4018/978-1-60960-195-9.ch514

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2011). *How to design and evaluate research in education*. McGraw-Hill

Furnham, A., & Buchanan, T. (2005). Personality, gender and self-perceived intelligence. *Personality and individual differences, 39*(3), 543-555. https://doi.org/10.1016/j.paid.2005.02.011

Gardner, H. (1993). *Multiple Intelligences: The Theory in Practice.* Basic Books.

Gardner, H. (2000*). Intelligence reframed: Multiple intelligences for the 21st century*. Hachette

Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences*. Hachette

Gardner, H., & Hatch, T. (1989). Educational implications of the theory of multiple intelligences. *Educational researcher, 18*(8), 4-10. https://doi.org/ 10.3102/0013189X018008004

Işık, D., & Tarım, K. (2009). The effects of the cooperative learning method supported by multiple intelligence theory on Turkish elementary students' mathematics achievement. *Asia Pacific Education Review*, *10*(4), 465-474. https://doi.org/10.1007/s12564-009-9049-5

Javanmard, Y. (2012). On the relationship between multiple intelligences and their performance on vocabulary tests among Iranian EFL learners. *Global Journal of Human Social Science, 12*(12), 61-73. https://globaljournals.org/GJHSS_Volume12/9-On-the-Relationship-Between.pdf

Koura, A. A., & Al-Hebaishi, S. M. (2014). The Relationship between multiple intelligences, self-efficacy and academic achievement of Saudi gifted and regular intermediate students. *Educational Research International, 3*(1), 48-70. http://www.erint.savap.org.pk/PDF/Vol.3(1)/ERInt.2014(3.1-05).pdf

Lin, S. C. (2009). Gender and major differences in self-estimates of different aspects of Gardner's multiple intelligences: A study of the undergraduate pre-service teachers in Taiwan. *Asian Social Science, 5*(5), 3-14. https://doi.org/ 10.5539/ASS.V5N5P3

Loori, A. A. (2005). Multiple intelligences: A comparative study between the preferences of males and females. Social Behavior and Personality: *an international journal, 33*(1), 77-88. https://doi.org/10.2224/sbp.2005.33.1.77

Mackey, A., & Gass, S. M. (2005). *Second language research: Methodology and design*. Lawrence Erlbaum Associates Publishers.

Madkour, M., & Mohamed, R. A. A. M. (2016). Identifying College Students' Multiple Intelligences to Enhance Motivation and Language Proficiency. *English Language Teaching*, *9*(6), 92-107. https://files.eric.ed.gov/fulltext/EJ1101228.pdf

Meneviş, İ., & Özad, B. E. (2014). Do age and gender influence multiple intelligences? Social Behavior and Personality: *an international journal, 42*(1), 9S-19S. https://doi.org/10.2224/sbp.2014.42.0.S9

Nilsson, P., & Loughran, J. (2012). Exploring the development of pre-service science elementary teachers' pedagogical content knowledge. *Journal of Science Teacher Education*, *23*(7), 699-721. https://doi.org/10.1007/s10972-011-9239-y

Ocak, G., & Dermez, H. G. (2008). the Fulfilment Level of social skills of 4th and 5th Grade students at Primary school According to Multiple Intelligence types. *The New Educational Review, 16*, 157-176. https://tner.polsl.pl/e16/a12.pdf

Pour-Mohammadi, M., Abidin, Z., Jafre, M., & Yang Ahmad, K. A. B. (2012). The Relationship between Students' Strengths in Multiple Intelligences and Their Achievement in Learning English Language. *Journal of Language Teaching & Research, 3*(4). https://doi.org/10.1.1.657.9827

Pritchard, A. (2008). *Ways of learning: Learning Theories and Learning Styles in the Classroom*. Routledge.

Rad, R. S., Khojasteh, L., & Kafipour, R. (2014). The Relationship between Multiple Intelligences and Writing Skill of Medical Students in Iran. *Acta Didactica Napocensia, 7*(3), 1-9. https://files.eric.ed.gov/fulltext/EJ1053260.pdf

Razmjoo, S. A. (2008). On the relationship between multiple intelligences and language proficiency. *The Reading Matrix, 8*(2).

https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.540.3303&rep=rep1&type=pdf

Sadeghi, K., & Farzizadeh, B. (2012). The relationship between multiple intelligences and writing ability of Iranian EFL learners. *English Language Teaching, 5*(11), 136-142. https://files.eric.ed.gov/fulltext/EJ1080111.pdf

Saricaglu, A., & Arikan, A. (2009). A Sudy of Multiple Intelligences, Foreign language Success and Some Selected variables. *Journal of Theory and Practice in Education, 5*(2), 110-122. https://files.eric.ed.gov/fulltext/ED506218.pdf

Savas, P. (2012). Pre-service English as a foreign language teachers' perceptions of the relationship between multiple intelligences and foreign language learning. *Learning and Individual Differences*, *22*(6), 850-855. https://doi.org/10.1016/j.lindif.2012.05.003

Shahzada, G., Ghazi, S. R., Khan, H. N., Iqbal, S., & Shabbir, M. N. (2011). Self-perceived multiple intelligences of male and female. *Mediterranean Journal of Social Sciences, 2*(1), 176. http://www.richtmann.org/journal/index.php/mjss/article/view/10765

So, W. W. M., Chen, Y., & Wan, Z. H. (2019). Multimedia e-learning and self-regulated science learning: A study of primary school learners' experiences and perceptions. *Journal of Science Education and Technology*, *28*(5), 508-522. https://doi.org/10.1007/s10956-019-09782-y

Tirri, K., & Nokelainen, P. (2008). Identification of multiple intelligences with the Multiple Intelligence Profiling Questionnaire III. *Psychology Science, 50*(2), 206. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.522.6173&rep=rep1&type=pdf

Zahedi, S., & Moghaddam, E. M. (2016). The relationship between multiple intelligences and performance of EFL students in different forms of reading comprehension tests. *Theory and Practice in Language Studies, 6*(10), 1929-1939. https://www.academypublication.com/ojs/index.php/tpls/article/view/tpls061019291939