Identification of Multiple Intelligence for 5th Grade of Elementary Student in Magelang Regency

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Abstract. This research was aimed to understand the distribution and domination of intelligences of 5th grade students in Magelang Regency, to analyze the rank differences of the multiple intelligence, and to analyze the correlation among intelligences. The research was carried out in two elementary schools in Magelang, including total respondents of 39 students. Data collection was carried out using test instrument which included eight aspects of intelligences. Statistical data analysis was carried out with ANOVA and correlation. Observation resulted that the most dominant intelligence of the 5th grade students was linguistic. However, based on their score achievement the potential intelligence was kinesthetic, followed by logic-mathematics and linguistic. There was significant difference of the achievement among intelligences. Statistical analysis showed F value of 69.128 (p = 0.000). Furthermore, seventeen correlations were obtained from the analysis from weak to moderate level. All the correlation was positive. Thus, the potential to improve students' intelligences is wide open.

Keywords: achievement, correlation, domination, intelligence, potential

1 Introduction

The theory of multiple intelligence has been an interesting topic in the education field. There are eight types of intelligences, including interpersonal, intrapersonal, kinesthetic, linguistics, logic-mathematics, musical, naturalistic and spatial [1]. Every teacher needs to understand the eight types of intelligences owned by the students in order to enrich their competence. Moreover, the students are suggested to easier understand the learning subject if the materials are presented according to their intelligence [2].

Basic education such as the elementary school has a vital role in developing the student's intelligence. The latest statistic data showed there are approximately 147,536 elementary schools and as many as 25,885,053 students in Indonesia [3]. It shows a great potential of human resources which will play the important part in the development of the nation.

There are several reasons why schools need to identify the initial multiple intelligence of the students. By understanding that students are born with various types of intelligence, it is expected that the teachers will consider that intelligence is not only related to the academic context, but also related to the psychomotor and affective [4].

The research was inspired by the fact obtained from the observation and interview carried out in the elementary school that elementary schools in Magelang Regency do not carry out initial mapping for students' intelligence. Thus, the teachers do not consider the intelligence in arranging the teaching plan. The orientation of the teaching plan is more likely focused on the

material, resulting a monotonous learning activity. As the result, the students' achievement are ont optimum. The students might easier understand the subject if the materials are presented according to the prominent intelligence owned by the particular groups of students [2].

The problems mentioned above arises due to the lack of teachers' understanding regarding to the types of intelligence. Thus, the students' potential is not well facilitated in the learning process. The suggested solution for this problem would be the renovation of the education system in the elementary school through the improvement on the understanding of students' intelligence. Thus, the teachers could develop more appropriate teaching plan based on student's intelligence [2].

Initial identification of students' multiple intelligence is an effort to develop learning program which facilitates the students' capacity. Based on the information, the teacher would be easier in determining the appropriate curriculum for the students [2]. Mapping of students' intelligence in the elementary school is expected to improve the education system, resulting in a more effective learning activity. Thus, the schools need to adapt the education model based on the multiple intelligence.

Various study concerning multiple intelligence has been studied, such as the impact on the critical thinking skills and students' achievement [5, 6]. It was proven that the application of multiple intelligence in the learning has significant effect on the students' critical thinking skill [5]. Moreover, learning activity based on the multiple intelligence also significantly improve the students' achievement on science subject [6]. Even though the studies mentioned have shown the role of intelligence based learning, but there are still lack of informations, such as how the intelligences are correlated. This study is important in order to provide reference to the teachers in determining students' learning group according to their intelligences.

The research was aimed to: 1) understand the distribution and domination of intelligences of 5th grade students in Magelang Regency; 2) to analyze the rank differences of the multiple intelligence; and 3) to analyze the correlation among the types of intelligences.

2   Method

The research is designed as descriptive explanative research. The aim was to describe the characteristic of the variables and fruther understand the relationship between variables. The research was carried out in Magelang Regency, involving SD Muhammadiyah Inovatif Mertoyudan and SD Muhammadiyah 1 Borobudur as the sampling location. The samples (respondents) was focused on the 5th grade students. Both samples were selected due to their appropriateness to sample criteria, which is both schools have particular consideration on the students' multiple intelligence. Sampling activity was carried out purposively.

Data collection was carried out using test instrument which included eight aspects of intelligences. Each type of intelligence was examined using some statements. The students were then required to provide response in the provided options "Yes" or "No". Data analysis used in this research included qualitative and naturalistic quantitative analysis. Qualitative analysis was carried out by describing the obtained data in tables and figures. Qualitative analysis was carried out with ANOVA to obtain the difference of intelligence rank and correlation to obtain the linkage between intelligence.

3 Results

3.1 Composition of students' intelligence

During the research, there were 36 students involved. Collected data showed that there were variations on the intelligence of the students. The first thing to analyze from the obtained data was the composition of the students' intelligence. Among the eight intelligences, the linguistic was considered as the most dominant intelligence owned by the students. Detailed composition of the students' intelligence is presented in **Table 1**.

Table 1. Composition of students' dominant intelligence in Magelang Regency

No.	Types of Intelligence	Range (Average ± Std.Dev)	Number of Student	Proportion
1	Interpersonal	27% — 93% (64% ± 17%)	4	9.1%
2	Intrapersonal	23% — 92% (62% ± 20%)	3	6.8%
3	Kinesthetic	9% — 100% (55% ± 24%)	6	13.6%
4	Linguistic	13% — 100% (71% ± 24%)	16	36.4%
5	Logic-Mathematics	19% — 100% (56% ± 20%)	1	2.3%
6	Musical	7% — 93% (59% ± 22%)	2	4.5%
7	Naturalistic	13% — 100% (71% ± 19%)	9	20.5%
8	Spatial	0% — 100% (45% ± 23%)	3	6.8%
	Total		*42*	*100%*

Table 1 shows that all types of intelligences were existed as the most dominant intelligence of students. However, the frequency of intelligence ownership was varied. Among the intelligences, linguistic was the most dominant intelligence owned byt the students, followed by naturalistic and kinesthetic intelligences. According to the analysis result, there were several students who owned several dominant intelligences.

3.2 Ranks and difference of intelligence achievement

Ranking and analysis on the difference of intelligence was carried out to provide important information concerning the potential of the types of intelligence to be utilized in the development of teaching/learning program. Analysis was carried out using ANOVA. Data analysis showed that the interpersonal obtained the highest rank among the other intelligence, followed by logic-mathematic and musical. Statistical analysis showed the F value of 92.761 with probability 0.000 (< 0.05), indicating significant difference. Detailed analisis result of intelligence ranks and its difference is presented in **Table 2**.

Table 2. Score achievement and difference among intelligence

No.	Intelligence	Score Achievement	Rank

1.	Interpersonal	$9{,}59^a$	1
2.	Intrapersonal	$8{,}05^a$	4
3.	Kinesthetic	$6{,}08^b$	6
4.	Linguistic	$5{,}64^b$	7
5.	Logic-Mathematics	$8{,}97^a$	2
6.	Musical	$8{,}82^a$	3
7.	Naturalistic	$5{,}64^b$	7
8.	Spatial	$6{,}36^b$	5

Notation: similar letter indicates insignificant difference

The difference of intelligence's rank achievement as shown in **Table 2** represents the students' general potential regarding their intelligences. However, compared to the student's dominant intelligence as presented in **Table 1**, there was difference on the rank distribution. This indicates that the variation of students' achievement of each test type. There is a probability that some the dominant intelligence is not always achieved by high score achievement, or at least the score achievement of each dominant intelligence was variable.

The result of this anaysis shows the potential intelligence to be considered for improvement. Selection for potential intelligence may be required due to the impossibility of facilitating all type of intelligence. Thus, the ranking of the student's potential is needed as a consideration.

Further analysis was carried out with correlation analysis. This analysis was required to further understand the linkage between intelligence owned by the students. From the analysis, it can be revealed which intelligences are correlated with the potential intelligence proposed for improvement obtained from the ANOVA. Thus, potential advantage obtained from the improvement of certain intelligence can be mapped and used for evaluation in the future. Detailed result of correlation analysis is presented in **Table 3**.

Table 3. Correlation between intelligences

	Inter-personal	Intra-personal	Kinesthetic	Linguistic	Logic-Mathematic	Musical	Naturalistic	Spatial
Inter-personal	#	++	-	++	++	++	+	-
Intra-personal	0.470	#	-	-	+	+	+	-
Kinesthetic	-	-	#	-	-	+	-	-
Linguistic	0.648	-	-	#	++	++	+	-
Logic-Mathematic	0.540	0.375	-	0.719	#	++	+	-
Musical	0.471	0.382	0.334	0.434	0.473	#	++	++
Naturalistic	0.331	0.340	-	0.356	0.317	0.449	#	-
Spatial	-	-	-	-	-	0.527	-	#
Total Number of Correlation	5	4	1	4	5	7	5	1

Notation: - correlation is not significant
                + correlation is significant at confidence interval 95%
                ++ correlation is significant at confidence interval 99%

Table 3 shows that 16 correlations were obtained from the analysis. Each intelligence was correlated with other intelligences. However, the coefficient of correlations were generally weak. Only the 8 correlations were found to have the coefficient over 0.5. The correlation coefficient was ranging from 0.331 to 0.719. Musical intelligence obtained the most correlation, which was found to be correlated to all other intelligences, followed by interpersonal, logic-mathematic and naturalistic intelligences with 5 other intelligences.

Kinesthetic and Spatial intelligence obtained the least correlation with only 1 other intelligences.

According to the ANOVA and correlation analysis as presented in Table 2 and Table 3, it can be formulated which intelligences are potential to be improved. According to the ANOVA analysis, the suggested inteligences to be improved woule be interpersonal, logic-mathematic or musical. However, the correlation analysis showed that the three intelligences were correlated each other. The three intelligences also correlated with many other intelligences. Another finding from the correlation analysis was instead of interpersonal, musical obtained more correlation to the other intelligences, showing its potential to be included in the consideration.

4 Discussion

The dominant intelligence within a population or a community may differ one another. A research carried out for secondary school students showed the dominant intelligence of naturalistic [7], while another research carried out for teachers shown the domination of intrapersonal intelligence [8]. However, this research which was carried out for theh 5th grade of elementary students resulted linguistic as dominant intelligence. This emphasize that there are various aspects affecting the distribution of intelligence in a community.

According to the students' achievement, the most dominant intelligence was interpersonal. Apart from the students' dominant intelligence, which was linguistic. Thus, even students' achievement is more appropriate to be used as the base of teaching/learning plan [9].

Instead of its dominant intelligence, the achievement is also important to be evaluated. Both intelligence and achievement are interrelated [10]. Thus, particular analysis with anova and correlation were carried out. The result indicated that interpersonal and musical were the most reliable inteligences to be adopted in the teaching/learning plan of the current audience.

Basically, various intelligence can be adapted in the class teaching simultaneously in order to improve studets' achievement [9]. HoweverThe multiple intelligence as studied in this research is basically non verbal (potential) ability. However, to further improve th students ability, evaluation on the verbal (readiness) aspect should also be carried out [10].

Multiple intelligence is considered as an underlying aspect of students' potential. Through the application of multiple intelligence based teaching, students' achievement on the learning subjects can be improved [11, 12]. Intelligence is varied among people. Various factors may affect someone's multiple intelligence, such as age and sex [13]. Multiple intelligence is also correlated to father's educational status and family income [7]. Thus, someone's intelligence may change along with their growth. Application of multiple intelligence in the teaching-learning activities also has significant effect in improving students' learning interest [14].

The result implicates that the interpersonal and musical intelligences were the most potential to be considered in the development of learning program. However, linguistic intelligence were potential alternative wich can be considered.

5 Conclusion

In conclusion, the 5th grade elementary students in Magelang Regency tends to have linguistic as their dominant intelligence, followed by naturalistic and kinesthetic. There was significant difference of the students' score achievement, which was dominated by musical. Sixteen linkage pattern was obtained from the correlation of the intelligences, ranging from weak to moderate.

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