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A Meta-Analysis: Emotional Intelligence and its Effect on Mathematics Achievement

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Until now, many studies have been conducted on the correlation between emotional intelligence and mathematics achievement in Indonesia. However, there are different representations or conclusions regarding the results of the study. Therefore, this study aims to thoroughly investigate the effect of emotional intelligence and mathematics achievement on students in Indonesia and to detect the level of variation between studies using a meta-analysis approach. This study analyzed 36 primary studies with a sample of 2474 published in journals and campus repositories and filtered with certain eligibility criteria. To support the accuracy of the analysis results, JASP software is used. The results of the study found that the combined effect size value generated using the random-effect model estimation was (M = 0.65) with a standard error of (SEM = 0.07). This effect size belongs to the large effect category. Analysis of the study's level of variation was carried out by considering four moderator variables. The results of the analysis of moderator variables found that there were significant differences in the education level group (Qb = 62.94; $p<0.05$). Meanwhile, there was no difference in the publication type group (Qb = 0.64; $p>0.05$). and year of publication group (Qb = 4.16; $p>0.05$). These findings provide a strong theoretical foundation to improve students' mathematical achievement in the future.

Keywords: mathematics, mathematics achievement, emotional intelligence, meta-analisys

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INTRODUCTION

Mathematics is the basic knowledge needed by students to pursue higher education. In addition, mathematics is not only about number operations but also ways of thinking, universal language, art and tools that have goals that are very close to everyday life (Reys, 2009; Prahmana & Suwasti, 2014). Mathematics is an important subject in school because it is associated with more academic and career opportunities (Akinsola & Tella 2003). Learning mathematics as one of the basic sciences that plays an important role in everyday life and the progress of various sciences and technology (Maharani et al., 2019). Mathematical skills are important attributes that must be possessed by all citizens because mathematics is involved at every level of understanding such as climate change, including describing and predicting and the consequences of these changes (Maass et al., 2019). In Indonesia, Mathematics is one of the compulsory subjects in determining the passing of the National Examination, but the fact is that the mathematics achievement of students in Indonesia is still very far from what is expected.

The mathematics achievement obtained by Indonesian students according to the results of the 2018 OECD study at PISA 2018 is at level-1. The mathematics achievement obtained by Indonesian students according to the results of the 2018 OECD study at PISA 2018 is at level-1. Indonesia is ranked 72 out of 78 countries with a score of 379 out of an international average score of 487 (Schleicher, 2019). This indicates that the mathematics achievement of Indonesian students is still very low when compared to the international average score. The results of the 2015 Trends International Mathematics and Science Study (TIMSS) also reported that Indonesian students' mathematics achievement was still far below the international average score. Indonesia is ranked 44th out of 49 registered countries with a score of 379 out of an international average score of 500. This certainly requires special attention by mathematics teachers in schools. In the teaching and learning process at school, it is often found that many students are intelligent but lack emotional development. intelligence such as low self-motivation, lack of feeling what other people feel, less able to adapt to other people, so that these students have not received optimal performance at school (Miftahul, 2016; Nurhuda, 2018). Learning activities in schools usually only emphasize the transformation of factual information and the development of reasoning, namely logical thinking towards achieving one right or wrong answer even though a student sometimes faces problems related to his learning activities or assignments (Maharani, 2014). From the various statements above, it can be concluded that learning mathematics is not enough with higher-order thinking activities, but also requires good emotional management, requires a calm, relaxed but serious and enthusiastic mind to create self-awareness so that it creates a sense of enthusiasm for learning. and solve the problems encountered.

Emotional intelligence is identified as being able to improve students' academic achievement (Sukriadi et al., 2016: Jhorgi, 2021; Izza, 2020). Emotional intelligence is a person's ability to recognize and manage emotions appropriately, empathize, motivate, and control oneself and others (Mansir & Karim, 2020; Ngui & Lay, 2020; Chinyere & Afeez, 2019; Pekaar et al., 2020; Perry et al., 2020; Wood, 2020). In other words, emotional intelligence is a person's intelligence to control and adapt logically to his

environment (Trigueros et al., 2019; Kustyarini, 2020). Good emotional intelligence plays an important role in regulating one's actions to interact with others (Okwuduba et al., 20210). Emotional intelligence is the basic capital for students in facing various challenges to succeed academically (Silen, 2013). Students who get good learning outcomes are identified as having good emotional intelligence (Purnama, 2016).

Low emotional intelligence can lead to stress levels with high acculturation and usually procrastination so that student achievement can be hampered (Prentice et al., 2020; Fteiha & Awwad, 2020; Tam et al., 2021). The way students think is related to their emotional intelligence (Joy, 2019; Nugroho et al., 2019). To achieve good academic performance, students need to be assisted to be able to acquire strong emotional and mental skills in facing various challenges (Jan & Anwar, 2019; MacCann et al., 2019). Students not only need good cognitive abilities, but also must be able to manage social skills in order to excel academically (Mahmud, 2020; Hourani et al., 2020). Emotional intelligence is not only an innate trait, but can be developed through proper coaching (Nayar et al., 2020). The ability to manage mentality by teachers and students is very important to improve emotional intelligence so that it has a significant impact on learning achievement in mathematics (Pozo-Rico & Sandoval, 2020).

Until now, many studies in Indonesia have examined the influence of emotional intelligence and mathematical achievement. However, previous studies investigating this theoretical assumption have yielded mixed results. Research conducted by (Jannah et al., 2016; Sandana et al., 2018; Ranie et al., 2020) has shown that emotional intelligence has a positive and significant effect on mathematics achievement. Meanwhile, (Ningsih, 2020) found different results that there was no positive and significant relationship between emotional intelligence and student achievement in mathematics. The results of different studies on the same topic of course result in drawing conclusions on research questions that can be subjective. Thus, it is necessary to conduct a meta-analysis study to integrate quantitative findings so that the analyzed sample becomes larger and the results of data analysis are accurate (Schmidt & Hunter, 2015; Retnawati et al., 2018). The meta-analysis calculates effect sizes and combines them in an objective formula, thereby increasing the likelihood that different readers will come to the same conclusion (Schmidt & Hunter, 2015). Meta-analyses can answer questions that are not offered in a single study, such as whether sample size affects study results. Meta-analysis can also investigate other variables that may affect the relationship between the main variables (Retnawati et al., 2018).

A meta-analysis research questioning the effect of emotional intelligence on students' academic achievement in general has been conducted by Alvarez et al. (2020), Ganesan & Padmanaban (2018), Carolyn et al. (2020), and Manimozhi & Srinivasan (2018). They found that emotional intelligence affects students' academic achievement. However, these findings are tentative because the inclusion criteria and the scope of the search are limited. Furthermore, in Indonesia, a meta-analysis study on the relationship between emotional intelligence and student academic achievement was carried out by Wullur & Maramis (2018). However, the dependent variable in this study did not specifically analyze mathematical achievement, nor did the study investigate other

variables that might influence the main variable. The results of statistical analysis in this study did not show a suitable estimation model based on the heterogeneity test.

The main objective of the meta-analysis is to analyze the accuracy in estimating effects and evaluating effects (Walker et al., 2008). Estimates of the mean effect size and standard deviation should be tested (Wanous et al., 1989). The meta-analysis includes what are known as fixed-effect and random-effect statistical models. The fixed effects meta-analysis assumes that all studies have the same treatment effect while the randomized effects meta-analysis shows that there are differences in treatment effects (Riley et al., 2011). In the process of statistical analysis for meta-analysis, it is necessary to pay attention to the statistical tests and calculations used. It is important to have care in using statistical significance. Statistical significance is not the same as educational significance. Sometimes there are cases where we find statistically significant correlations but these correlations are not important in the field of education. There are cases that seem insignificant because they do not reach the threshold point of statistical significance. However, this variable should not be ignored in the field of education. This is the importance of effect size as an alternative level of significance. The effectiveness of the relationship between variables or learning programs can be seen from the size of the influence (Setyarini et al., 2017; Wu et al., 2021). The accuracy of the effect size depends on the details of the studies included in the meta-analysis (Marfo & Okyere, 2019).

This study extends and complements previous research that focused on determining the overall effect of emotional intelligence on student mathematics achievement in Indonesia from 2016 to 2021, and examined the reasons for the variation in effect sizes between primary studies by analyzing the relationship between the identified moderator variables, namely differences in level of education, publication sources, and years of research. The findings of this study provide accurate information to educators to improve students' emotional intelligence in learning mathematics.

METHOD

Research Design

This study uses the Correlation meta-analysis method. Correlation meta-analysis is used to see the relationship or influence between two variables by utilizing previous correlation studies (Retnawati et al., 2018). Therefore, this meta-analysis study aims to measure the influence of emotional intelligence on the mathematics achievement of Indonesian students. In general, the meta-analysis procedure in this study refers to Borenstein et al. (2009) and Retnawati et al., (2018), namely; 1) Determine the inclusion criteria; 2) Data collection and coding of variables; 3) Data Analysis.

Inclusion Criteria

All research articles in the initial search were examined and assessed for further meta-analysis. The inclusion criteria used to screen publications of research results are: 1) The year of publication ranges from 2016 to 2021; 2) Research results in Indonesia; 3) Associated with emotional intelligence and mathematical achievement; 4) Each article has a minimum sample of 20 students; 5) Articles are required to report data on the

value of the correlation coefficient (r) or the coefficient of determination which shows the magnitude of the influence of the emotional intelligence variable on students' mathematical achievement; 6) Articles can be accessed on journal publications or campus repositories.

Data Collection and Coding

The primary data in this study is in the form of research on the relationship between emotional intelligence and student achievement in mathematics. Data can be obtained from online databases such as Google Scholar, national journals, international journals, and campus repositories. Key words used in compiling research studies such as "the relationship between emotional intelligence and student achievement in mathematics, and other equivalent words in Indonesian. Coding in this study is needed to facilitate the author in conducting data analysis. The components in coding are information on the year of research, author, sample size (N), correlation coefficient (r), coefficient of determination, education level, and research publications.

Data Analysis

The meta-analysis in this study is a correlation meta-analysis. The analysis was carried out with the help of JASP software. The correlation meta-analysis scheme used in this article consists of several steps, namely: (1) transformation of each r-value to the effect size of each study; (2) heterogeneity test; (3) summary effect count; (4) Moderator analysis ; (5) Evaluation of publication bias. The interpretation of the effect sizes of the correlational studies in this article uses the scale suggested by Cohen (1977, 1988). According to the scale, the size classifications are as follows: Effect size ≤ 0.10 (Small), $0.10 <$ Effect size < 0.40 (Medium), Effect size ≥ 0.40 (Large).

The heterogeneity test in this study was carried out using the Q parameter approach and p value. If the p-value < 0.05, then the estimation model that is suitable for calculating the summary effect is the random effects model. If the p value > 0.05, then the estimation of the fixed effect model is used. Studies containing the statistics required in the meta-analysis require a publication bias test (Retnawati et al., 2018; Juandi & Tamur, 2020; Setiawan et al., 2022). This study is said to be resistant to bias if the spread of the effect size shows a symmetrical distribution around the vertical line (Borenstein, Hedges, & Rothstein, 2009). If the effect sizes are not completely symmetrically distributed, then Rosenthal's File-Safe N (FSN) approach is used to check for publication bias. If the File-Safe N value $> (5K+10)$, where k is the number of studies included in the meta-analysis, this study is said to be resistant to publication bias and scientifically justified (Mullen et al., 2001).

FINDINGS

Overview of Primary Studies

From the search results in accordance with the specified inclusion criteria, 36 studies were obtained that met the eligibility for further analysis. From the research collected, there are several research studies that report the values of t and F, so it is necessary to convert them to *r* first. The characteristics of the research sample and the conversion results can be seen in table 1 below.

Table 1
Characteristics of research samples that meet inclusion criteria

No	Year	Author	N	r	t	F	Education Level	Publication Type
2	2016	Jannah et al	38	0.54			SHS	Journal
3	2016	Sukriadi et al	132	0.86	19.63		JHS	Journal
4	2016	Imron et al	60	0.48	4.12		SHS	Journal
5	2016	Susriyati	70	0.78			PS	Repository
6	2017	Widianawati	213	0.19			JHS	Repository
7	2017	Muti'ah	71	0.66	7.33		JHS	Journal
8	2017	Meisyuri et al	69	0.24	2.00		PS	Journal
9	2017	Rahma et al	56	0.96	26.12		PS	Journal
10	2018	Hakim et al	66	0.39			JHS	Journal
11	2018	Ajeng	34	0.58			PS	Journal
12	2018	Setyawan	191	0.15			SHS	Journal
13	2018	Sandana et al	102	0.72			SHS	Journal
14	2018	Surya	106	0.33			SHS	Journal
15	2018	Wiyono et al	67	0.37			JHS	Journal
16	2018	Mirnawati	30	0.48			PS	Journal
17	2018	Hawa	39	0.41			JHS	Repository
18	2018	Ude	35	0.41	2.59		JHS	Repository
19	2018	Utami	84	0.63			PS	Repository
20	2018	Edwin	40	0.32	2.08	4.32	SHS	Repository
21	2018	Nurhuda,	77	0.77			JHS	Repository
22	2019	Leoh et al	27	0.70	4.95		JHS	Journal
23	2019	Prafitriani et al	100	0.71			JHS	Journal
24	2019	Eriani et al	32	0.55			JHS	Journal
25	2019	Fitrianti et al	44	0.42			JHS	Journal
26	2019	Waluyo	34	0.66	4.94	24.42	SHS	Journal
27	2019	Ardella	40	0.52			PS	Repository
28	2019	Ranie	136	0.82	16.86		PS	Repository
29	2020	Iriana	52	0.14	1.02		JHS	Journal
30	2020	Ningsih	45	-0.20			JHS	Repository
31	2020	Mumek et al	20	0.42	1.99		JHS	Journal
32	2020	Jamilah	57	0.27	2.10		JHS	Repository
33	2020	Izza	48	0.94			JHS	Repository
34	2021	Sulastri	41	0.34			PS	Journal
35	2021	Wulandari et al	80	0.68			JHS	Journal
36	2021	Jhorgi	40	0.77			PS	Repository

Information: PS = Primary School; JHS = Junior High Schoo; SHS = Senior High School

Effect size of each study

The first analysis stage is to calculate the effect size of each study by transforming the r value of each study. Table 2 presents the results of the transformation of the r value to the effect size of each study. Effect size values range from -0.21 to 1.74. Of the total 36 effect sizes, twenty-six effect sizes (n=26 or 72.2%) were classified as large effects, nine

effect sizes (n = 9 or 25%) were classified as moderate effects, and there was one study (n = 1) which has a negative effect. influential, namely research conducted by Ningsih (Study number 30), which means that there is no significant effect between emotional intelligence and learning achievement in mathematics.

Table 2
Effect size and standard error of each study

Study Number	n	r	Effect Size	Standard error	Lower Limit	Upper Limit
1	98	0.42	0.45	0.10	0.25	0.65
2	38	0.54	0.60	0.17	0.27	0.93
3	132	0.86	1.31	0.09	1.13	1.49
4	60	0.48	0.52	0.13	0.27	0.77
5	70	0.78	1.04	0.12	0.80	1.28
6	213	0.19	0.19	0.07	0.05	0.33
7	71	0.66	0.80	0.12	0.56	1.04
8	69	0.24	0.24	0.12	0.00	0.48
9	56	0.96	1.98	0.14	1.71	2.25
10	66	0.39	0.41	0.13	0.16	0.66
11	34	0.58	0.66	0.18	0.31	1.01
12	191	0.15	0.15	0.07	0.01	0.29
13	102	0.72	0.91	0.10	0.71	1.11
14	106	0.33	0.34	0.10	0.14	0.54
15	67	0.37	0.39	0.13	0.14	0.64
16	30	0.48	0.52	0.19	0.15	0.89
17	39	0.41	0.43	0.17	0.10	0.76
18	35	0.41	0.44	0.18	0.09	0.79
19	84	0.63	0.74	0.11	0.52	0.96
20	40	0.32	0.33	0.16	0.02	0.64
21	77	0.77	1.02	0.12	0.78	1.26
22	27	0.70	0.87	0.20	0.48	1.26
23	100	0.71	0.88	0.10	0.68	1.08
24	32	0.55	0.62	0.19	0.25	0.99
25	44	0.42	0.44	0.16	0.13	0.75
26	34	0.66	0.79	0.18	0.44	1.14
27	40	0.52	0.57	0.16	0.26	0.88
28	136	0.82	1.17	0.09	0.99	1.35
29	52	0.14	0.14	0.14	-0.13	0.41
30	45	-0.20	-0.21	0.15	-0.50	0.08
31	20	0.42	0.45	0.24	-0.02	0.92
32	57	0.27	0.28	0.14	0.01	0.55
33	48	0.94	1.74	0.15	1.45	2.03
34	41	0.34	0.36	0.16	0.05	0.67
35	80	0.68	0.83	0.11	0.61	1.05
36	40	0.77	1.01	0.16	0.70	1.32

Heterogeneity Test

The second stage is to test for heterogeneity and select the appropriate estimation model. The heterogeneity test was carried out using the Q parameter approach. Table 3 shows the results of the fixed and random effect heterogeneity test using JASP software. The results of the analysis showed that the value of Q was 468.227 and $p < 0.001$. So it can be concluded, the distribution of effect sizes in the research analyzed is heterogeneous. The degree of variation in effect size between studies is reflected in the I-Squared value ($I^2 = 92,80$) which indicates that 92% of the observed effect size reflects the percentage of variability due to true heterogeneity. Thus, this study has a high heterogeneity value because I2 75%. Therefore, a random effects model was used to calculate the combined effect size.

Table 3
Fixed and random effects

	Q	Df	p	I^2
Omnibus test of Model Coefficients	77.213	1	< 0.001	92.047
Test of Residual Heterogeneity	468.227	35	< 0.001	

Summary Effect Using Random-Effect Model

The third step is to calculate the combined effect size (M). Based on the search using JASP software, the combined effect size (M) = 0.65, standard error ($SE_M = 0.07$). The lower limit confidence interval (LL_M) = 0.51 while the upper limit value (UL_M) = 0.80. To find out whether the hypothesis is accepted or not, it can be seen the p value of the output coefficient. Based on table 4, the p value was found to be less than 0.01. Because p value < 0.01, it can be concluded that there is a significant influence between emotional intelligence and mathematics learning achievement.

Tabel 4
Coefficient estimation using random-effect model

Variabel Moderator	k	Mean effect size	Lower Limit	Upper Limit	Test of null (2-Tail)		Heterogeneity		
					Z	p	Df (Q)	Qb	p
Overall	36	0.65	0.51	0.80	8.79	< 0.001	35	468.23	0.00
Education Level									
PS	10	0.83	0.52	1.15	5.20	< 0.001			
JHS	18	0.62	0.40	0.83	5.65	< 0.001	2	62.94	0.00
SHS	8	0.49	0.32	0.68	5.31	< 0.001			
Publication Type									
Journal	23	0.64	0.47	0.81	7.39	< 0.001	1	0.64	0.43
Repository	13	0.68	0.39	0.96	4.74	< 0.001			
Years									
2016-2017	9	0.79	0.42	1.16	4.14	< 0.001			
2018-2019	19	0.62	0.49	0.75	9.08	< 0.001	2	4.16	0.13
2020-2021	8	0.58	0.15	0.99	2.67	< 0.001			

Moderator Analysis

Based on education level (See table 4), it was found that the combined effect size in the study conducted at the elementary school level was 0.83. This effect size category differs from studies conducted at the junior high and high school levels which have a combined effect size of 0.62 and 0.49 respectively. The results of the heterogeneity test, found a Q value of 62,943 and $p < 0.05$. These results indicate that there are significant differences in the combined effect size between groups of education levels. So it can be said that emotional intelligence is more influential at the elementary school level compared to the junior and senior high school levels.

The results of the analysis based on the type of publication, found that research published in journals and repositories each had a combined effect size of 0.64 and 0.67. The results of the heterogeneity test, the value of Q was found to be 0.64 and $p > 0.05$. This shows that there is no significant difference in the combined effect size between groups of types of publications. Thus, it can be said that the difference in the type of publication does not change the size of the effect of emotional intelligence studies on students' mathematical achievement.

Based on the year of the study, it was found that the effect size generated based on research conducted in 2016-2017 was 0.79. Year 2018-2019 was 0.62 and in 2020-2021 was 0.58. The results of the heterogeneity test, the value of Q was found to be 4.16 and $p > 0.05$. This indicates that there is no significant difference in the combined effect size between the study year groups. Thus, it can be said that the difference in years of research does not change the size of the effect of the study of emotional intelligence on students' mathematics achievement.

Evaluation of Publication Bias

The last step is to detect publication bias. Examine the issue of publication bias in this study using the File-Safe N method. The following is a diagnosis of Rosenthal's fail-safe N values shown in Table 5 below.

Table 5
Fail-Safe N

File Drawer Analysis			
	Fail-safe N	Target Significance	Observed Significance
Rosenthal	12145	0.05	< 0.001

Based on table 4, because the value of K = 36 then 5K + 10 = 190. The Fail-Safe N value obtained is (FSN = 12.145) with a target significance ($\alpha = 0.05$) and $p < 0.001$. As the File-Safe N value > (5K + 10), this indicates that the meta-analysis conducted has no problem of publication bias and is scientifically justified.

DISCUSSION

The results of the analysis show that the overall effect size generated uses a random-effect model estimate of 0.65 with a standard error of 0.07. This effect size belongs to the large effect category. This means that the higher emotional intelligence in students' social interactions will have an impact on the higher the value of their mathematical achievement. However, these findings differ from the results of a previous meta-analysis conducted by MacCan et al (2019) which looked at the effect of emotional intelligence on math achievement with the overall effect size of the study being 0.21 (low effect). This difference in results will certainly be the basic idea for further research involving more primary studies, and expanded inclusion criteria. Emotional intelligence plays an important role in students' academic achievement in mathematics (Awai & Akosubo; 2016). Erasmus (2013) also concluded that emotional intelligence can contribute to the general functioning of students, as well as improve mathematics achievement. Thus, the presence of emotional intelligence in learning activities will stimulate students' open attitude in exchanging ideas and increase interest in challenges in finding solutions to problems. educators must be able to apply learning oriented towards fostering positive relationships with educators and peers (Mattingly & Kraiger, 2018). In addition to emotional intelligence, other meta-analytical studies also report other psychological factors that can improve math achievement, namely self-efficacy (Muhtadi et al., 2022; Kamsurya et al., 2022), Self-Cocept (Moller et al., 2020; Suciati et al., 2020), self-confidence (Çiftçi et al., 2019).

We also investigated the level of study variation on the moderating variables, finding that there were no significant differences between groups of sample size, type of publication, and year of study. This shows that the difference between the three types of variable groups does not affect the size of the effect of emotional intelligence on students' mathematics achievement. However, different results were found in the moderator variable for the education level group. Based on the education level group, it can be seen that the effect size increases from the highest level of education to the lowest level. This is indicated by the magnitude of the effect sizes of SHS, JHS, and PS of 0.834, respectively; 0.616; and 0.499. This shows that emotional intelligence is more influential at the elementary school level compared to the junior and senior high school levels. This finding is in accordance with the results of research by (Perera & DiGiacomo, 2013) which reported a stronger effect of emotional intelligence on academic performance in elementary school students than in college students (r = 0.28

versus r = 0.18). Similarly, Poropat (2008) found a significantly stronger relationship between awareness and academic performance in the early stages of education. This implies that self-regulatory processes (such as EI) may be a more important determinant of educational outcomes at earlier ages and educational stages. This indicates that emotional intelligence does not make a good contribution to first-level and upper-level students. Therefore, fertilizing children's emotional intelligence can be done as early as possible so that character can be formed. According to (Idrus et al., 2020) Emotional intelligence is important to be nurtured and developed in elementary school students because at elementary school age children's emotions are easily formed.

These findings suggest that mathematical ability should be fostered by stimulating a learning environment that can increase students' emotional stability, especially when they are doing math. Many students in Indonesia have the impression that mathematics is a difficult subject and exhausts their minds, especially math problems that require intensive reading, thinking, analyzing, drawing conclusions and manipulating symbols and variables. Their emotions while doing math must be balanced and well controlled so that they can maintain their struggle in solving problems (Npr et al., 2016). Students need to be directed to the development of students' affective domains. In addition to traditional intelligence and standardized tests, other psychological tests should be used to ensure student achievement (Ajai & solomon, 2019). Mathematics teachers need to consider emotional intelligence in planning mathematics learning. Understanding the emotional state of students as well as emotional intelligence, and their respective dimensions, teachers can easily assist students in their emotional and academic needs with minimal work stress. A good understanding of the five dimensions of emotional intelligence (self-perception, self-expression, interpersonal skills, decision making, and stress management) will promote a healthier learning environment as well. Students who can manage their emotions are essential for relieving stress and coping with the everyday academic demands of mathematics. Involving students in emotional exercises will help them build their emotional intelligence to improve their achievement in mathematics (Nnaji et al., 2020).

These findings also have several implications for research and application contexts. The school setting is one of the most important contexts for learning emotional skills and competencies (Zeidner and Matthews, 2016). Developing emotional skills in the early stages of adolescence will enable them to become a consolidated personal resource to deal with risk and promote success-oriented motivation and academic well-being (Herrera et al., 2020). To that end, these findings provide relevant information for the development of programs that focus on enhancing emotional skills in students, as well as provide tools for teachers and counselors, providing an empirical basis for the development of a theoretical achievement-oriented educational model. These findings also imply that students should be given many opportunities to increase emotional self-awareness and social awareness in order to manage academic stress and perform better in their academic fields. This can be done by integrating the emotional intelligence component in the student curriculum. In addition, when transacting methodological curricula involving group activities, group discussions and self-awareness activities can be planned to instill emotional intelligence skills among students. Furthermore, teachers

can also plan group activities to improve students' emotional intelligence skills. In addition, assessing emotional intelligence itself will help middle graders to know and be aware of their own emotions and support them to deal with them appropriately.

CONCLUSION

Based on the results of the research above, it can be concluded that emotional intelligence has a positive effect on learning achievement with an effect size of 0.65 (large effect). This shows that the higher the increase in emotional intelligence variables will have an impact on increasing mathematics learning achievement. In addition, problems related to the strong ambiguity of the correlation between emotional intelligence and academic achievement intelligence variables based on various literatures (some are in the low to high category) become clear after a meta-analysis is carried out, namely the medium category.

Future recommendations for improving emotional intelligence in learning For teachers or educators, provide opportunities for negotiation to students to encourage interactions and initiatives to grow students' emotional intelligence. Understand that students make mistakes not on their own volition, but because of the limited information they get. In the learning process, eliminate the cultural perception of looking at one group or gender over another. Schools or educators need to pay attention to the balance of developing critical thinking skills as a cognitive domain and emotional intelligence as an affective domain. Thus, the behavior of students in every act does not only use ratios, but needs to involve feelings as a whole and instincts in an integrated manner. Thus, it is not excessive if schools require teachers to have good knowledge and emotional intelligence.

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