

SCHOOLS' CHARACTER EDUCATION VALUES AND STUDENTS' MATHEMATICS LEARNING ACHIEVEMENT: A META-ANALYSIS

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Abstract: Character education plays a critical role in all aspects of life and thus, it has been widely-adopted in schools. An indication of its success can be reflected in the student learning achievement. The purpose of the study was to determine the effect size of the relationship between character education values and mathematics learning achievement, with a meta-analysis study. In this research, character education value is the independent variable while mathematics learning achievement is the dependent one. The data were obtained from the results of online database search at Google Scholar from 2012-2019. Based on the search, 16 research publications met the criteria determined based on rigorous screening. The data were analyzed using a quantitative meta-analysis approach, specifically correlation meta-analysis. The results show that there was a significant relationship between character education values and students' mathematics learning achievement. The effect size value was in the moderate effect category. The findings are in line with those of previous studies investigating this relationship and thus, strengthen the theory about the factors that influence mathematics learning achievement. In addition, these findings suggest five-character education values that teachers can provide to improve students' mathematics learning achievement.

Keywords: Character education, learning achievement, mathematics, meta-analysis

NILAI PENDIDIKAN KARAKTER DI SEKOLAH DAN PRESTASI BELAJAR MATEMATIKA SISWA: KAJIAN META-ANALYSIS

Abstrak: Pendidikan karakter sangat diperlukan pada semua aspek kehidupan sehingga pendidikan karakter di sekolah sangat penting untuk diterapkan, dan nilai pendidikan karakter dapat terlihat dari prestasi belajar matematika. Tujuan penelitian adalah untuk membuktikan dan mengetahui hubungan dan besarnya dampak hubungan nilai pendidikan karakter dan prestasi belajar matematika siswa, dengan penelitian meta-analysis. Nilai pendidikan karakter sebagai variabel *independent* dan prestasi belajar matematika sebagai variabel *dependent*. Sumber data diperoleh dari hasil penelusuran basis data online di *google scholar* dari tahun 2012-2019. Berdasarkan penelusuran, terdapat 16 publikasi penelitian yang memenuhi kriteria yang ditentukan berdasarkan penyaringan yang ketat. Analisis data menggunakan pendekatan kuantitatif meta-analysis dengan tipe *corelation meta-analysis*. Hasil penelitian menunjukkan bahwa ada hubungan yang signifikan antara nilai pendidikan karakter dan prestasi belajar matematika siswa. Nilai bobot *effect size* berada pada kategori sedang. Temuan dari hasil penelitian ini telah membuktikan konsistensi temuan para peneliti sebelumnya tentang hubungan nilai-nilai Pendidikan karakter dan prestasi belajar matematika dan memperkuat teori tentang faktor-faktor yang mempengaruhi prestasi belajar matematika. Selain itu, hasil temuan ini dapat membantu pendidik untuk menemukan lima nilai pendidikan karakter yang berdampak pada prestasi belajar matematika.

Kata Kunci: Pendidikan karakter, prestasi belajar, matematika, meta-analysis

INTRODUCTION

The interconnected world where a global phenomenon in the 21st century seems to be in contrast to that of the previous century. The 21st century life skills-based education is reflected in the study results conducted by the

World Economic Forum (2015). The study explored 16 different skills which fall in 3 categories, namely, foundation literacy, competencies, and character qualities (World Economic Forum, 2015). In the context of the character, Berkowitz (2012) argues that it is a combination of individual characteristics

that directly motivates and enables him/her to act as a moral agent. Fleeson et al. (2014) states that indicators determined the quality of an individual's character are relevant to morals. The person's behaviour can be reflected as his/her moral attribute. Furthermore, Fleeson et al. (2014) argues that an individual is considered successful when his/her action incorporates moral values and meaningful intentions. Jia and Krettenauer (2017) states that a person's moral identity can influence his/her moral actions. This description shows that moral identity is very important for any individual when interacting with other people within his/her social circumstance since a good moral identity will result in good moral action.

Meanwhile, Khoury (2017) states that the term character relates to a positive behaviour. Character traits are long-lasting behaviour patterns that can be generalized into personality characteristics (Diggs & Akos, 2016). Meanwhile, Lerner (2017) states that an individual's character involves the achievement of feelings, thoughts, and skills. All of those are essential traits someone should have to maintain positive ambiances at any extent of life, comprehensively particularly for him/herself and also for others. Character qualities relate to a person's behaviour in responding to or dealing with changes in their environment, including curiosity, initiative, persistence, adaptation, leadership, as well as social and cultural sensitivity (World Economic Forum, 2015).

The development of character quality in Indonesia has become the effort to embody the mandate of Pancasila and the Preamble of the 1945 Constitution. The effort to support the realization of character building is mandated by Pancasila and the Preamble of the 1945 Constitution with the hope that it will be able to gradually overcome national problems. National government has constitutionally added character development as a priority to enhance the nation development. In the current era, character education is emphasized to be carried out in all aspects of life. In a school level, a program called strengthening character education is specifically addressed (Presidential Regulation of the Republic of Indonesia No. 87 of 2017).

Efforts are being made to further strengthen the implementation of character education The Ministry of National Education Curriculum Centre (2010) and the Presidential

Regulation of the Republic of Indonesia No. 87 Article 3 of 2017 formulate 18 characters education values which are derived from different aspects: religion, Pancasila, social-culture, and national education goals. The values of character education are religious, honest, tolerant, discipline, hardworking, creative, independent, democratic, curious, having the spirit of nationalism, love for the country, respectful for achievement, friendly and communicative, love peace, love to read, care for the environment, social care, and responsible. Meanwhile, Zuchdi et al. (2009) classifies character values from a psycho-social point of view, which include thinking, heart exercise, exercise, and feeling/intention. The values that come from thinking are intelligent, critical, creative, innovative, curious, open-minded, productive, science-oriented and reflective. Values that come from the heart are honest, faithful and pious, trustworthy, fair, responsible, brave to take risks, willing to sacrifice, and have a patriotic spirit. Tough, clean, disciplined, sporty, reliable, resilient, cooperative, friendly, competitive, and cheerful are values that come from sports. The values that come from feeling/initiative are caring, friendly, polite, neat, comfortable, respectful, tolerant, mutual help, mutual cooperation, nationalist, cosmopolitan, prioritizing public interests, the nation uses domestic products, dynamic, hard work, have a work ethic, and be persistent. This shows that it is so important to implement character education in schools.

Character education particularly implemented in a school level has a very important role. It can be justified from the study results conducted by Gable et al. (2013) who state that character education is a system change approach to overcome the influence of students' cognition and behaviour. Helterbran and Strahler (2013) also give a point of view that character education helps children develop skills and attitudes. Meanwhile, Ugurlu (2014) states that character education is a series of appropriate experiences and continues to develop designed to promote positive social attitudes and related behaviours to encourage the growth of social competence. Meanwhile, Um et al. (2014) argue that character education can be conceptualized through key character traits such as wisdom, courage, integrity, simplicity, devoted virtue, and several other virtues coming from moral and ethical backgrounds. Character education is also associated with a higher level of expression of love, integrity, compassion and self-discipline (Jeynes, 2017). Character education establishes the values of virtue as the main goal of character education: politeness, child righteousness, honesty, responsibility, respect, consideration, communication, and cooperation (Par, 2017). Therefore,

character education is related to the efforts to form behaviour, morals, ethics, virtue, and the development of students' skills.

The importance of character education values can be seen from the output or student learning outcomes, one of which is by looking at the effect on student learning achievement. Improving student learning achievement is the main goal and an indicator of the quality of learning (Gore et al., 2021). This achievement is the final result of several learning efforts and shows the students' learning capacity (Slattery et al., 2021). The mathematics learning achievement is the hope of teachers (Timmermans et al., 2021), and the mastery of mathematics has a major impact on students in the future (Juandi et al., 2021). There are several aspects that contribute to successful learning achievement, for example, openness which includes positive aspects and negative aspects (Gatzka, 2021). Differences within each individual, such as differences in pubertal maturation can also describe the differences in learning achievement (Torvik et al., 2021). Learning habits also become significant predictors of learning achievement (Quilez-Robres et al., 2021). In other words, there are many different factors which are quite prevalent to enhance student learning achievement.

Several studies mention the contribution of character education to student success as stated by Arthur (2011), Bevel and Mitchell (2012), Chang (2011), Diggs (2016), Park and Peterson (2006), and Tucker et al. (2016), that students who are always optimistic in the academic field have an influence on their learning achievement. Whereas in Indonesia, several research results obtained stated that the value of character education (discipline, responsibility, religious, independent, and friendly) contributed to students' mathematical achievement (Novi, 2012; Basuki, 2015; Pianyta, 2016; Rahayu et al., 2017; Wardani, 2019; Zefanya, 2018). However, the research mentioned are still partial, so another research is needed to involve a lot of character education values. One alternative to answer this challenge is to determine the relationship between the value of character education and mathematics achievement in Indonesia is through a meta-analysis study.

Meta-analysis is a statistical analysis that combines the results of several scientific studies to produce the best approximation

(Nordmanna et al., 2012). The consistent results of the meta-analysis research increase the confidence in implementing the study and the recommendations given (Higgin et al., 2003). Meta-analysis is often used to provide and filter the variables that contribute to the most pre-valent variables used in the study target (Kim et al., 2020). A meta-analysis is used to obtain more convincing and more effective information, (Benavides-Varela et al., 2020; Juandi et al., 2021). A meta-analysis from previous studies was carried out to provide a more robust answer and to synthesize the relationship between several variables (Lebuda et al., 2021; Shen et al., 2020). The meta-analysis strategy is searching for data, determining criteria, eligibility, and findings included (Aksayli et al., 2019). In this study, the meta-analysis strategy was used statistically to draw and analyze the data as the critical part of evidence-based study.

The main purpose of meta-analysis is to analyze the accuracy in estimating effects and evaluating the effects (Walker et al., 2008). Estimated mean effect sizes and standard deviation should be tested (Wanous et al., 1989). Meta-analysis includes what is known as the fixed effect statistical model and random effects. Fixed effects meta-analysis assumes that all studies have the same treatment effect while random effects meta-analysis suggests that there are differences in treatment effects (Riley et al., 2011).

In the statistical analysis process for meta-analysis, it is necessary to pay attention to the statistical tests and calculations used. It is important to have thoughtfulness in using statistical significance. The statistical significance is not the same as the education significance. Sometimes there are some cases that find a statistically significant correlation but this correlation is not important in the field of education. There are cases, which seem insignificant because they do not reach the limit point of statistical significance. However, the variable should not be ignored in the field of education. This is the importance of the effect size as an alternative to the level of significance. To see whether the sample size or coefficient makes a significant difference, an effect size is used (Cohen et al., 2020). The effectiveness of a relationship between variables or learning programs can be seen from the size of the effect (Setyarini et al., 2017; Wu et al., 2021). The accuracy of the effect size depends on the details of the conducted study included in the meta-analysis (Marfo & Okyere, 2019). In this study, the effect size was used with Cohen's criteria because it is the most relevant to the field of education.

Based on the description above, we know that character education is very important. To find a

bigger picture of the relationship between character education’s values and mathematics learning achievement in Indonesia, a meta-analysis study is needed. At the present, however, there is still no study which has directly assessed the relationship between those two aspects, so the purpose of this study was to prove and determine the effect size of the relationship between character education values and student mathematics learning achievement through a quantitative meta-analysis research approach.

METHODS

The research design used was quantitative meta-analysis (Hunter & Schmidt, 2004). Quantitative meta-analysis combines two or more published research results for statistical analysis. Research publications are related to the influence or relationship of the value of character education in schools and students’ mathematics learning achievement.

Eligibility Criteria

The eligibility criteria used by the author in filtering or selecting research publications in the Google Scholar online database are as follows; (1) publications can be accessed on the Google Scholar online database; (2)

publications have the research results from Indonesia; (3) publications are either written in Indonesian or English; (4) publications can be taken in the form of journals, procedures, and e-Prints; (5) publications must contain variables of character education values and student mathematics achievement; (6) publications are published no later than the recent 9 years back (since 2012-present); (7) publications have a correlation value (*r*), (*t*), or (*F*) which explains the relationship of the character education value variable and the student’s mathematics learning achievement variable; (8) the sample in publication must be $N \geq 25$; (9) Total sample is as much as 1006; (10) sample selection is based on predetermined criteria, namely discipline, responsibility, religious, independent, and friendly; (11) there are out of 18 character education scores, five criteria selected are considered suitable and in accordance with mathematics learning achievement; (12) the criteria were based on the selection stage with predetermined conditions, then the sample is selected and meets the requirements within 16 publications; (13) each variable has a mean and variance; and (14) the instrument used to measure the variable character education value use a non-test (questionnaire) instrument, and the instrument used to measure the student’s mathematics learning achievement variable is by using tests.

Table 1. Sample Characteristics

Authors	Year	N	R	t	F	Characteristics	Remarks	
							Independent Variable	Dependent Variable
Susilowati	2012	29	.497	-	-	Elementary school students	Peer association (Friendly)	Mathematical achievements
Basuki	2015	120	.412	-	-	High school student	Spiritual intelligence (Religious)	Mathematical achievements
Pianyta	2016a	56	-	2.477	-	Junior high school student	Discipline	Mathematical achievements
Pianyta	2016b	56	-	2.053	-	Junior high school student	Task Commitment (Responsible)	Mathematical achievements
Nurrahmah	2016	90	-	4.372	-	Junior high school student	Independent	Mathematical achievements
Anwar et al.	2016	41	.514	-	-	Junior high school student	Discipline	Mathematical achievements
Riswanti	2016	123	.412	-	-	Junior high school student	Discipline	Mathematical achievements
Purnomo	2016	72	-	3.153	-	Junior high school student	Independent	Mathematical achievements
Dewi	2016	32	-	3.047	-	High school student	Independent	Mathematical achievements
Puspitasari, et al.	2017a	40	.314	-	-	Junior high school student	Independent	Mathematical achievements
Puspitasari, et al.	2017b	40	.322	-	-	Junior high school student	Discipline	Mathematical achievements
Rahayu, et al.	2017	60	-	-	13.705	Junior high school student	Discipline	Mathematical achievements
Rusmiyati	2017	65	.443	-	-	High school student	Independent	Mathematical achievements
Zefanya	2018	40	-	2.163	-	Vocational High School Students	Discipline	Mathematical achievements
Dewi, et al	2018	110	.475	-	-	Elementary school students	Discipline	Mathematics learning outcomes
Wardani	2019	32	-	2.539	-	Elementary school students	Responsible	Mathematical achievements

Sample and Data Collection

Data collection in this study was carried out by accessing the Google Scholar database with the help of internet services. The reason for choosing Google Scholar is that Google Scholar users are more active in maintaining and updating their accounts compared to ResearchGate users who have only a few publications and accounts that have not been updated for a long time. As for Scopus indexed journals, some journals are charged a fee to access them. The publication that was sought was related to the relationship or influence of the variable character education value and the variable student mathematics learning achievement. Of the 18 values of character education, five criteria selected were suitable and in accordance with mathematics learning achievement. These criteria were discipline, responsibility, state of being religious, honesty, independence, friendliness. Based on the search results, 16 publications were selected with a sample in publications $N \geq 25$, namely 1006.

Based on the search results of data collection, 16 research publications obtained were about the relationship between character education values in schools and student mathematics achievement in Indonesia. The

characteristics of the research sample are presented in Table 1.

The characteristics of the research sample show that there are five-character values obtained, namely discipline, responsibility, state of being religious, independence, and friendliness. These character values were all related to students' mathematics achievement. The research sample for each publication was very diverse in nature. The sample of the population came from different level of education representing elementary, junior high, and high school level, and another vocational level. There are 8 publications that only have an r value, 7 publications that only have a value of F , and 1 publication that only has an F value. Publications that only have a t or F value, then first convert them to an r value.

Coding

The data coding in this study was used to ease the writer analyzing the data systematically and avoiding some missed or overlooked data. Coding or symbols in the sample characteristics give the information about the year of publication, sample size (N), correlation (r_{xy}), t value, F value, mathematics education value variable (Independent), and mathematics learning achievement variable (dependent) which will be included in the Table 1 and Table 3. In the heterogeneity test the effect size uses information about the heterogeneity test with the parameter Q , the Tau-squared parameter (τ^2), and the parameter value I^2 .

Table 2. Criteria of Cohen's Effect Size

Value	Criteria
$< 0 + / - .1$	weak effect
$< 0 + / - .3$	modest effect
$< 0 + / - .5$	moderate effect
$< 0 + / - .8$	strong effect
$\geq + / - .8$	very strong effect

Table 3. The Results of the Value of t , F Convergence to the Value of r

Authors	Year	Publication	N	R	Remarks
Susilowati	2012	e-Prints	29	.497	-
Basuki	2015	Reputable national journal	120	.412	Sinta 2
Pianyta	2016a	Reputable national journal	56	.319	Sinta 4
Pianyta	2016b	Reputable national journal	56	.269	Sinta 2
Nurrahmah	2016	Reputable national journal	90	.422	Sinta 2
Anwar et al	2016	Reputable national journal	41	.514	Sinta 3
Riswanti	2016	Reputable national journal	123	.412	Sinta 5
Purnomo	2016	Reputable national journal	72	.353	Sinta 2
Dewi	2016	Proceedings	32	.486	-
Puspitasari, et al	2017a	National journal	40	.314	Not reputable
Puspitasari, et al	2017b	National journal	40	.322	Not reputable
Rahayu, et al	2017	National journal	60	.437	Not reputable
Rusmiyati	2017	Reputable national journal	65	.443	Sinta 4
Zefanya	2018	Reputable national journal	40	.331	Sinta 2
Dewi, et al	2018	Reputable international journal	110	.475	Scopus
Wardani	2019	Proceedings	32	.421	-

Data Analysis

Data analysis in this study refers to the theory from Grasman (2017), Borenstein et al. (2009), and Hunter and Schmidt (2004), which explain that the stages of meta-analysis method consist of: (1) the characteristics of the research sample; (2) heterogeneity test of effect size; (3) calculating summary effect; (4) calculating the p -value; and (5) determining and plotting the publication bias/trim-fill analysis. The data analysis in this study used correlation meta-analysis. An effect size can lie between 0 to 1. Cohen's effect size criteria can be described in Table 2 (Cohen et al., 2020).

FINDINGS AND DISCUSSION

Findings

The conversion results of this study are presented in Table 3. In addition, the publications obtained were the results of research published in journals, proceedings, or e-Print. The distribution of publications is presented in Figure 1.

Publications obtained from journals were the previous research studies conducted individually or in groups. Journals publishing the mentioned research were managed by higher education institutions) in Indonesia. Publications which were presented nationally were published in the form of proceedings. Meanwhile, other research results were published in an e-Print form. There were about 13 (81.250%) articles published in journals, 2 (12.500%) articles published in the form of proceedings, and one (6.250 %) article published in an e-Print form.

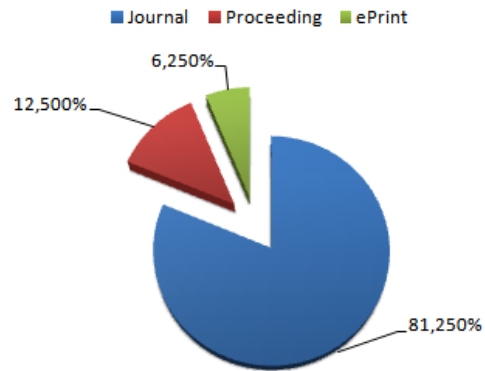


Figure 1. Publications of Sample

Heterogeneity Test of Effect Size

The next stage in data analysis was the heterogeneity effect size test. The heterogeneity test used the Q value, the τ value, and the I^2 value approach. Based on the results of the test of residual heterogeneity analysis, the values of Q (5.518), df (15), and p (.987) were obtained. Because the p -value $< .05$, the effect size of each research publication used was not heterogeneous. Based on the estimation of the τ value approach, the value of τ (0), τ^2 (0) was obtained. Because the value of τ or $\tau^2 = 0$, the effect size of each research publication used was also not heterogeneous. In addition, based on the I^2 value estimation approach, the I^2 value was obtained (0%) because the value of $I^2 = 0\%$, the effect size of each research publication used was not heterogeneous. Based on the three approaches above, it can be concluded that the effect size of each research publication used was not heterogeneous. In conclusion, the analysis used in calculating the summary effect applied the fixed effect model.

Table 4. Effect Weight Calculation Results

Sample Number	N	r	W	$Y(Z)$	V_y	$W.Y$	$W.Y^2$	W^2
1	29	.497	26	.545	.038	14.178	7.732	676
2	120	.412	117	.438	.009	51.248	22.448	13689
3	56	.319	53	.331	.019	17.518	5.790	2809
4	56	.269	53	.276	.019	14.617	4.031	2809
5	90	.422	87	.450	.011	39.161	17.627	7569
6	41	.514	38	.568	.026	21.590	12.266	1444
7	123	.412	120	.438	.008	52.562	23.023	14400
8	72	.353	69	.369	.014	25.452	9.388	4761
9	32	.486	29	.531	.034	15.393	8.171	841
10	40	.314	37	.325	.027	12.024	3.908	1369
11	40	.322	37	.334	.027	12.353	4.125	1369
12	60	.437	57	.469	.018	26.705	12.512	3249
13	65	.443	62	.476	.016	29.509	14.045	3844
14	40	.331	37	.344	.027	12.726	4.377	1369
15	110	.475	107	.517	.009	55.266	28.545	11449
16	32	.421	29	.449	.034	13.018	5.844	841
Total	1006	6.427	958	6.858	.339	413.322	183.832	72488

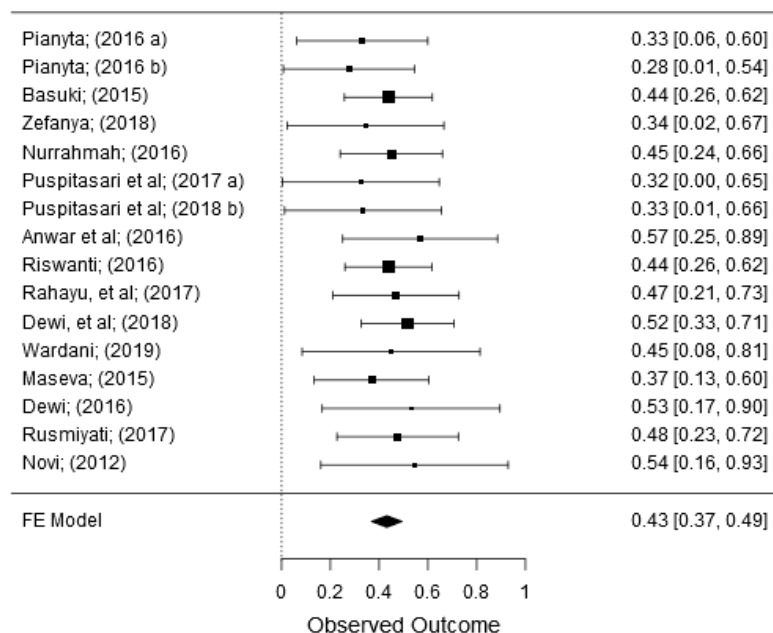


Figure 2. The Forest Plot Summary Effect

Summary Effect Calculation

The summary effect was calculated by counting the weight of each publication. The calculation results obtained are presented in Table 4. Based on the calculation of the weight value, the weight effect average (M) was .431, the variance value (VM) was .001, and the standard error value (SEM) was .032. Meanwhile, the confidence interval value was obtained from entering the M and SEM values into the formula $M \pm 1.96 SE_M = M \pm 1.96 (.032)$, so that it was obtained $.370 < x < .493$. Thus, the average effect size (M) of 0.431 was between the receiving interval areas. Value .431 was in the moderate effect. The resulting weight average value of the effect size (M) was positive. Thus, it can be said that the value of character education and student mathematics learning achievement had a positive size effect.

The next step was creating a forest plot based on the weight value of each publication. The analysis results obtained a forest plot for each research publication were marked with a square mark along the x -axis. The estimated effect size of the combined meta-analysis was shown with a symbol (diamond) below the plot line and visualized in a comprehensive manner. The results of the forest plot analysis are presented in Figure 2.

P-value Calculation

The next stage was calculating the p -value. The p -value obtained was used to test the following hypothesis.

H_0 : There is no significant relationship between the value of character education in schools and students' mathematics learning achievement

H_a : There is a significant relationship between the value of character education in schools and students' mathematics learning achievement

Based on the results of the analysis, it is shown that there was a significant relationship between the value of character education in schools and students' mathematics learning achievement. It can be concluded that the character education values obtained at school had an impact to accelerate students' mathematics learning achievement.

Biased Publication Calculations

In this study it is very necessary to check or calculate the biased publication of the research study used. Publication calculations can be made through the rank correlation test approach for funnel plot asymmetry, regression test for funnel plot asymmetry ("Egger's test"), and Trim-fill analysis. Based on the results of the analysis with the rank correlation test approach for funnel plot asymmetry, it was obtained Kendall's (τ) value of .0085; and the p -value of .964. Because the p -value is $> .05$, there was no publication bias. Calculations using the Regression test for Funnel plot asymmetry ("Egger's test") and Trim-fill Analysis obtained a z value of -.2755 and a p -value of .783. Since the p -value $> .05$, it can be said that there was no publication bias. Furthermore, to check the publication bias, this research study used the Trim-fill analysis diagnostic. The diagnostic results are presented in Figure 3.

Based on Figure 3, the forest plot from the diagnostic results using the Trim-fill method shows

that the summary effect of the resulting fixed effect model was the same as the summary effect (Figure 2). In addition, the forest plot, shown in Figure 3, did not experience any additional samples or research publications. This suggests that no publication bias occurred. Meanwhile, based on the funnel plot, it appears that the model was formed with symmetry and no empty circles appeared, only black circles were shown. It means that from the funnel plot approach, there was no publication bias. From the results shown by the forest plot and funnel plot, it can be concluded that there was also no publication bias. This means that the research sample used to analyze the relationship between the value of character education in schools and student mathematics learning achievement was valid and met the requirements.

Discussion

Based on the research objective, which is to determine the relationship between the value of character education in schools and mathematics learning achievement of students in Indonesia, a meta-analysis study was conducted. Meta-analysis is a statistical technique that combines two or more similar studies in order to obtain a quantitative combination of data. Meta-analysis does not only focus on the conclusions obtained in various studies, but rather focuses on the data, such as performing operations on variables, the size of the effect size, and the sample size. To synthesize the research literature, a statistical meta-analysis uses the end results from similar studies such

as effect size, or effect size. There were 16 research publications used as samples in this study. Based on the results from the data analysis, it is known that there was a significant relationship between the value of character education (values of discipline, responsibility, religion, independence, and friendship) with students' mathematics learning achievement. This evidence is supported by previous research studies which stated that character education gives contribution to student success (Arthur, 2011; Bevel & Mitchell, 2012; Diggs & Akos, 2016; Park & Peterson, 2006;). This significant relationship was because the variance (VM) and standard error (SEM) values generated in the analysis were still very small. These results certainly have proven consistency and have strengthened the theories or findings of previous researchers.

The prominent values in character education, such as the value of discipline, responsibility, religion, independence, and friendship have had a good impact on students' mathematics learning achievement, so it is very important to be instilled in school. Disciplined students will do and obey what has been planned, for example, collecting math assignments on time, coming to school on time and so on. Students who have high responsibility will carry out their duties and obligations, for example doing math assignments given by the teacher. Religious students will have good spiritual intelligence. Spiritual intelligence will make students calm in learning mathematics. Independent students will have a good attitude to learn mathematics or do math assignments without any support from the teacher. Meanwhile, students are friendly will show an attitude of willing to learn together with their classmates, for example, in group discussions during the learning process.

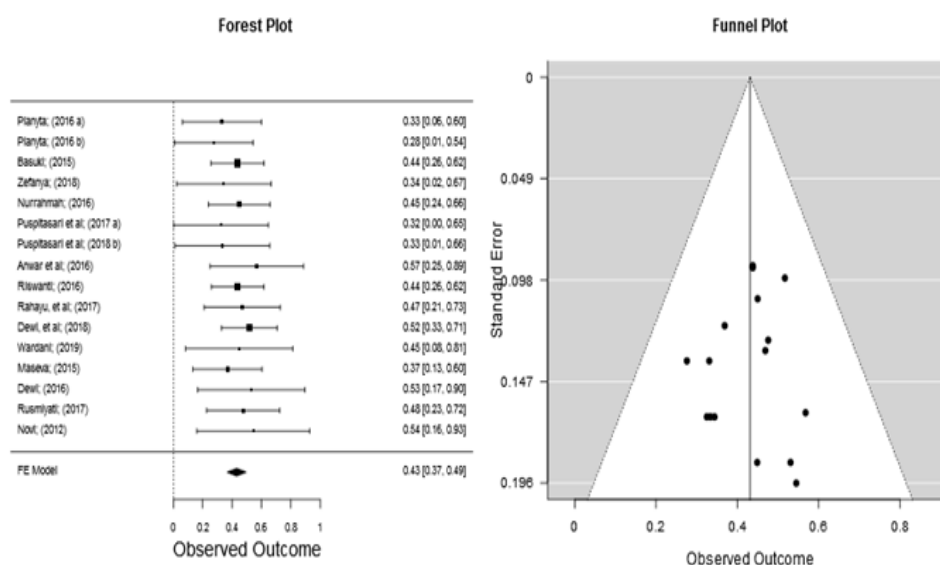


Figure 3. Forest Plot and Funnel Plot after Trim-Fill Diagnosis

The weight effect size value resulted from the relationship between character education values and students' mathematics learning achievement was .431. The weight effect size value was in the moderate effect (Cohen et al., 2020). This means that the value of character education instilled in schools had an influence on students in learning mathematics. The weight effect size value which was in the moderate effect gave an initial impact on the efforts that the school must take to preserve the value of character education to students. The implementation of character education values in schools can be done through three approaches, namely the learning approach, the extra-curricular activity approach, and the school management approach. These three approaches must be carried out in an integrated manner. Principals, teachers, and staffs are responsible for the success of the character education. In addition, according to (Harun et al., 2020a), character education is effective if it is developed based on the multicultural and local wisdom. Cultures and norms prevalently attached in a school level can provide strong character to students (Daniati et al., 2019). Character education is an approach used to overcome the influence of cognition and student behaviour (Gable et al., 2013) and to help children develop skills (Helterbran & Strahler, 2013). The value of character education is a students' leading factor to learn mathematics, so that the objectives of learning mathematics can be achieved. In addition, studying mathematics will have an impact on the formation of other characters, for example the character values of being honest, fair, sympathetic, and objective (Rosnawati et al., 2015). The success achieved in learning mathematics will have an influence on subsequent mathematics success (Kiss, 2018). The existing character values will also survive (Diggs & Akos, 2016).

In this study, no publication bias was found. Publication checking was done through the rank correlation test approach for funnel plot asymmetry, regression test for funnel plot asymmetry ("Egger's test"), and Trim-fill analysis. Those three different ways drew the same conclusion. This shows that the research publication sample used met the existing requirements. In addition, the absence of biased publications has strengthened, reinforced, or supported the weight effect size value resulting from the relationship between character

education values and student mathematics learning achievement.

CONCLUSION

Based on the evidence presented, the results of this study has strongly affirmed that the value of character education in schools is very important to introduce to students. The value of character education has brought a good impact on students' mathematics learning achievement. It is seen through the existence of a significant relationship between the variable of character education value and the mathematics learning achievement variable drawn from a meta-analysis study. The resulting weight effect size is positive, and it is in the moderate effect. Moreover, it is supported by the absence of publication bias. The variable value of character education must be of concern to teachers in teaching mathematics at any level of formal education, whether in Primary School, Junior High School, Senior High School or Vocational Education. The character value (good character) embedded in students will have a further impact on students, namely the student's readiness to face the 21st century or the era of industrial revolution 4.0 and society 5.0.

Recommendations

The characteristics of the research sample show that there are five characters values obtained, namely discipline, responsibility, state of being religious, independence, and friendliness, which are later related to student mathematics learning achievement. Other researchers who are interested in similar topics have a big chance to enhance the scope and develop this research study to find out other possible characters that will support students' mathematics learning achievement.

Limitations

A limitation in this study is the publication bias. The data used are articles that have been published with significant observations. Meanwhile, research with insignificant results is commonly unpublished. Therefore, in order to include unpublished research data, a very careful search is needed to seek for relevant data.

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