The Influence of The Family Social Learning Model on 21st Century Skills in Elementary Schools in The Society 5.0 Era: A Meta-Analysis

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Abstract. of 21st-century 6C skills in elementary school students in the Society 5.0 era. This study employs a meta-analysis approach. The eligibility criteria for this study include: (1) studies analyzed come from journals searchable in online international journal databases; (2) publications indexed in Scopus, WoS, SINTA (a journal indexing portal managed by the Ministry of Education and Culture of the Republic of Indonesia, equivalent to EBSCO and Index Copernicus); (3) the study's topic must be relevant; (4) the study must have been conducted in the Society 5.0 era (2019-2023); (5) publications must have an (r), (t), or (F) value; (6) studies must have a sample size (N) of ≥ 15. The results of this study indicate that (1) the articles examined in this study are heterogeneous; (2) there is a strong positive effect on the implementation of the Family Social Learning Model on 6C skills in the 21st century; (3) this meta-analysis study shows no publication bias. This research concludes that the Family Social Model strongly impacts 6C skills in the 21st century for elementary school students in the Society 5.0 era. The conclusion of this meta-analysis can influence the development of elementary school curricula by emphasizing 21st-century skill development in the Society 5.0 era. This study aims to examine and analyze the influence of the Family Social Learning Model on the development

Keywords: 21st Century Skills, Elementary School, Family Social Learning Model, Meta-Analysis, Society 5.0

1 Introduction

"Society 5.0" was initially introduced by the government and has evolved from the "Society 4.0 " notion associated with the Fourth Industrial Revolution. The idea behind Society 5.0 highlights integrating technology into our lives to create a more sustainable, inclusive, intelligent and centered around human needs [1]. A key focus of Society 5.0 is leveraging technologies like Artificial Intelligence (AI), the Internet of Things (IoT) and cloud computing in settings [2]. Education will increasingly rely on technology to enhance the learning experience [3], [4].

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In the Society 5.0 era, 21st-century education becomes more relevant and essential because high technology and the development of a sustainable society require students to possess appropriate skills and knowledge to compete and contribute effectively in an increasingly interconnected and complex environment [1], [5]. 21st-century education emphasized in Society 5.0, will focus more on the development of skills such as problem-solving, creativity, collaboration, communication, critical thinking, and digital literacy [6]. There is also the well-known concept of the 4Cs about 21st-century education. The "4Cs" concept in 21st-century education refers to four essential skills for students to succeed in an increasingly complex and changing society and economy. These four Cs are Critical Thinking, Communication, Collaboration, and Creativity [7]–[9]. In the 21st century, education has undergone significant shifts and responded to increasingly complex and dynamic demands. Education not only focuses on the development of traditional skills like Critical Thinking, Communication, Collaboration, and Creativity (4Cs) but also adds new and important dimensions: Character and Citizenship, commonly referred to as '6C' 21st-century skills [10]–[12].

In order to provide relevant and effective education for the development of 21st-century skills, innovative teaching models are needed. Innovative teaching models are guidelines for incorporating these 6Cs into education, preparing students to face challenges and opportunities in an increasingly complex and interconnected world [10], [12]. Innovative teaching models provide a foundation for equipping students with the skills and values needed to succeed in a complex and changing society [13].

The Social Family Model is one of the innovative teaching models that can significantly impact the development of 6C 21st-century skills. The social family model emphasizes the effort to develop students' abilities to interact with others to build democratic attitudes in students that value every difference in social reality [14], [15]. The core of this social model is the concept of synergy, which is the energy or strength harnessed through cooperation as one of the phenomena of social life [16], [17]. By applying the social model, learning involves involving students in experiencing, examining, applying, and accepting social functions and roles [18], [19].

This social model is designed to harness the phenomenon of cooperation, guide students in defining problems, exploring various perspectives on issues, collecting relevant data, and developing and testing hypotheses. Therefore, teachers should teach the democratic process directly [20], [21]. Education should be organized by conducting cooperative inquiries into social and academic problems [22]. The teaching models included in the social interaction model group (Social Family), according to Joyce and Weill, are (1) Group Investigation, (2) Role Playing, (3) Jurisprudential Inquiry, (4) Laboratory Training, (5) Social Science Inquiry [23], [24].

In response to the Society 5.0 era, which emphasizes social connectivity and technology-based education, this research makes a new contribution by conducting a meta-analysis on the concrete impact of the Family Social Learning Model on developing 21st-century skills in elementary school students. This study offers valuable insights into integrating traditional education aspects with a more inclusive and responsive educational paradigm to global societal changes. Based on the background provided above, this research aims to comprehensively examine and analyze the influence of the

Family Social Learning Model on the development of 6C 21st-century skills in elementary school students in the Society 5.0 era.

2 Method

2.1 Research Design

This study employs a meta-analysis approach to combine findings from relevant empirical studies within a specific time frame. The research involves searching for and analyzing studies published in verified scientific databases relevant to the research topic, guided by eligibility criteria. One of the main advantages of meta-analysis is its ability to integrate findings from various previous studies [25]. By combining data from different contexts and populations, meta-analysis can provide stronger generalizations about the effect of a variable or intervention [26].

2.2 Eligibility Criteria

The eligibility criteria for this study include: (1) studies analyzed come from journals searchable in online international journal databases; (2) publications indexed in Scopus, Web of Science, SINTA (a journal indexing portal managed by the Ministry of Education and Culture of the Republic of Indonesia, equivalent to EBSCO and Index Copernicus); (3) the study's topic must be relevant; (4) the study must have been conducted in the Society 5.0 era (2019-2023); (5) publications must have an (r), (t), or (F) value; (6) studies must have a sample size (N) of ≥ 15. Data coding in this study is done by considering specific research aspects such as name, year, sample size (N), r, t, and F values, sample characteristics, country, and journal index, as shown in Table 1.

2.3 Research Procedure

The research procedure consists of (1) searching for articles related to the topic, (2) sorting articles based on eligibility criteria, (3) data coding, (4) converting F values to t and then to r, and converting t values to r; (5) conducting heterogeneity tests; (6) conducting heterogeneity tests; (7) calculating effect size and standard error; (8) calculating summary effect size and visualizing a forest plot; and (9) conducting a publication bias test. Data analysis in this study is performed using JASP software. The criteria for Cohen's effect size can be seen in Table 2.

Table 1. Data Coding for 46 Studies

No.	Author	N	r	t	F	Variable		Index
						Independent	Dependent	
1.	Rahim & Nadira (2022)	26		1.790		Group Investigation	Critical Thinking	Index Copernicus
2.	Mastuti, Hastuti & Sartika (2023)	44		0.440		Group Investigation	Character	SINTA 3
3.	Pohma & Waeji (2020)	27		11.808		Group Investigation	Creativity	SINTA 4
4.	Wismanto, Suyoto & Ulumuddin (2022)	30		17.010		Group Investigation	Creativity	SINTA 5
5.	Fauzi, Erna & Linda (2021)	66		3.952		Group Investigation	Critical Thinking	SINTA 4
6.	Santyasa et al. (2019)	70			30.170	Group Investigation	Character	SINTA 2
7.	Nasir, Gani & Haqqini (2019)	78		34.760		Group Investigation	Creativity	SCOPUS Q1
8.	Rosiani, Parmin & Taufiq (2020)	34	0.572			Group Investigation	Critical Thinking	SINTA 3
9.	Disurya & Hamzah (2022)	88		3.402		Group Investigation	Critical Thinking	SINTA 3
10.	Komala, Lestari & Ichsan (2020)	43	0.736			Group Investigation	Critical Thinking	EBSCO
11.	Zorlu & Sezek (2019)	149	0.913			Group Investigation	Collaboration	Index Copernicus
12.	Listiana, Raharjo & Hamdani (2020)	20	0.600			Group Investigation	Character	SCOPUS Q2
13.	Fadilurrahman, Ismaniati & Mustadi (2019)	48	0.909			Group Investigation	Communication	Proceeding of SCOPUS
14.	Octaviyantari, Suarni & Widiana (2020)	129		3.781		Group Investigation	Critical Thinking	SINTA 2

No.	Author	N	r	t	F	Variable		Index
						Independent	Dependent	
15.	Martin et al. (2022)	43			13.874	Group Investigation	Character	EBSCO
16.	Tsani et al. (2019)	28		5.849		Group Investigation	Critical Thinking	Proceeding of SCOPUS
17.	Nofita & Rusnilawati (2022)	42	0.329			Group Investigation	Collaboration	SINTA 2
18.	Ainiyah et al. (2022)	116		2.272		Group Investigation	Collaboration	SCOPUS Q4
19.	Usmeldi & Amini (2019)	200	0.730			Group Investigation	Critical Thinking	Proceeding of SCOPUS
20.	Izzati, Kumar & Priatna (2019)	60		0.283		Group Investigation	Critical Thinking	Proceeding of SCOPUS
21.	Indrawati et al. (2021)	90	0.7602			Group Investigation	Collaboration	Proceeding of SCOPUS
22.	Rahmiati et al. (2021)	42		2.360		Jurisprudential Inquiry	Character	SINTA 2
23.	Badriyah, Warsono & Haidar (2020)	46		3.362		Jurisprudential Inquiry	Critical Thinking	Index Copernicus
24.	Pramana et al. (2020)	140			89.141	Jurisprudential Inquiry	Critical Thinking	Index Copernicus
25.	Sundawa et al. (2019)	66		2.668		Jurisprudential Inquiry	Critical Thinking	Proceeding of WoS
26.	Reinita, Miaz & Waldi (2019)	92		1.980		Jurisprudential Inquiry	Critical Thinking	Index Copernicus
27.	Go (2022)	90	0.680			Laboratory Training	Critical Thinking	SCOPUS Q3
28.	Maricic, Cvjeticanin & Andic (2019)	180			101.031	Laboratory Training	Critical Thinking	SCOPUS Q2
29.	Ernita et al. (2020)	28			3.630	Laboratory Training	Critical Thinking	Proceeding of SCOPUS
30.	Zhong (2022)	36	0.349			Role Playing	Creativity	SCOPUS Q1

No.	Author	N	r	t	F	Variable		Index
						Independent	Dependent	
31.	Henry, Hernalesteen & Collard (2021)	60		16.700		Role Playing	Critical Thinking	SCOPUS Q2
32.	Kusuma et al. (2021)	74			23.552	Role Playing	Creativity	Proceeding of SCOPUS
33.	Asrifan (2022)	26		3.950		Role Playing	Communication	Index Copernicus
34.	Rahman & Angraeni (2020)	40		0.688		Role Playing	Communication	SCOPUS Q3
35.	Alrehaili & Osman (2019)	31	0.719			Role Playing	Collaboration	SCOPUS Q1
36.	Hartono (2023)	25		2.508		Role Playing	Communication	Index Copernicus
37.	Saptono et al. (2020)	206	0.782			Role Playing	Character	SCOPUS Q3
38.	Subandi et al. (2019)	16		2.524		Role Playing	Collaboration	SCOPUS Q1
39.	Murniviyanti, Shaikh & Syandri (2020)	106		3.580		Role Playing	Character	SINTA 4
40.	Khosrumiya et al. (2022)	208		21.942		Role Playing	Character	Index Copernicus
41.	Akyol & Garrison (2020)	63			23.721	Social Science Inquiry	Critical Thinking	Index Copernicus
42.	Guo et al. (2021)	88	0.581			Social Science Inquiry	Critical Thinking	SCOPUS Q1
43.	Syarifuddin et al. (2020)	114			31.220	Social Science Inquiry	Collaboration	SCOPUS Q3
44.	Nurlaili & Sapriya (2019)	112		12.696		Social Science Inquiry	Creativity	Proceeding of WoS
45.	Riyadi (2021)	200		4.096		Social Science Inquiry	Collaboration	SINTA 4
46.	Lumbantobing et al. (2023)	240	0.644			Social Science Inquiry	Communication	Index Copernicus

Table 2. Cohen's Effect Size Criteria

Value	Criteria
< 0 + / -.1	Weak effect
< 0 + / -.3	Modest effect
< 0 + / -.5	Moderate effect
< 0 + / -.8	Strong effect
≥ + / -.8	Very strong effect

3 Result and Discussion

Based on the review of 46 articles, "an analysis of the influence of the social family model on 6C skills in the 21st century was conducted, involving a total sample size of 3,760 elementary school students from various countries. The social family model examined in this study includes (1) Group Investigation, (2) Role Playing, (3) Jurisprudential Inquiry, (4) Laboratory Training, (5) Social Science Inquiry. The percentage of articles analyzed based on the type of learning model can be seen in the Figure 1."

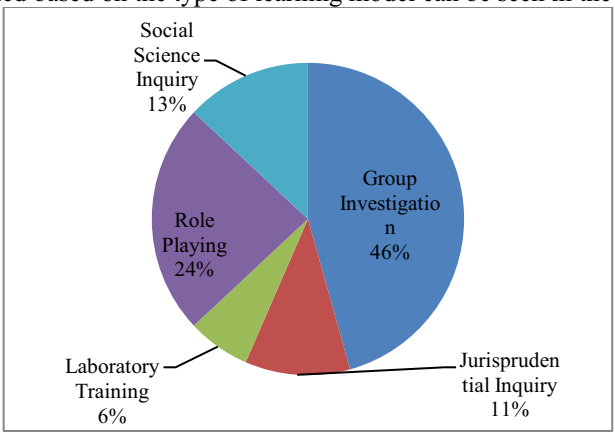

Fig. 1. Percentage Distribution of Studied Learning Models

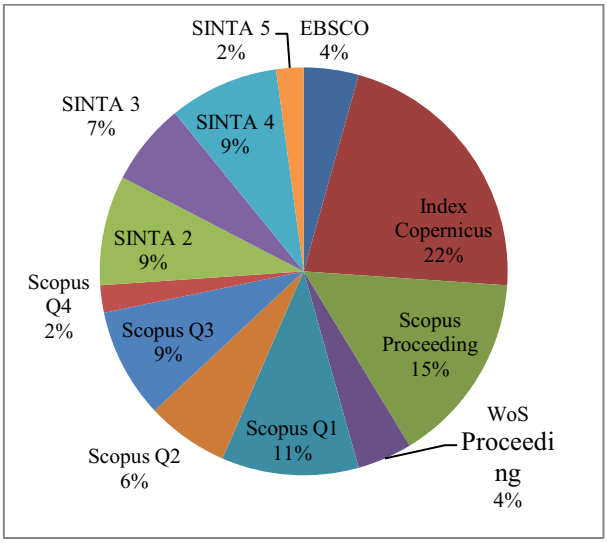

Fig. 2. Percentage Distribution of Studied Journal Indexing

The articles analyzed in this study were sourced from various reputable international journal databases. For example, some articles were indexed in Scopus, WoS, EBSCO, and Index Copernicus. The distribution of journal indexing in each article analyzed is shown in the Figure 2.

First, the results of the heterogeneity test. The heterogeneity test results can be seen in Tables 3 and 4. In Table 3, it is evident that the p-value is < 0.001. This indicates that the 46 articles analyzed in this study are heterogeneous. In Table 4, the information shows that the I^2 (%) value is close to 100%, specifically 98.712%. This means that the studies used are heterogeneous.

Table 3. Heterogeneity Test

	Q	df	p
Omnibus test of Model Coefficients	67.288	1	< .001
Test of Residual Heterogeneity	415.745	45	< .001

Note. *p*-values are approximate.

Note. The model was estimated using the Restricted ML method.

Table 4. Residual Heterogeneity Estimates

Estimation	
τ^2	0.091
τ	0.384
I^2 (%)	98.712
H^2	17.928

Of the 46 articles analyzed, it is evident that the studies used are heterogeneous. The heterogeneity test results in this meta-analysis study help researchers decide whether to use a random or fixed effects analysis method. The random effects method is more suitable for significant heterogeneity, as it accounts for variation among studies. The fixed effects method is more suitable when there is no significant heterogeneity.
Second, the summary effect size test. This study uses a random effects model due to the proven heterogeneity of the data. The summary effect size calculation results from JASP can be seen in Table 5 below.

Table 5. Summary Effect Test

	Esti-mate	**Standard Error**	**z**	**p**	**Lower Bound**	**Upper Bound**
in-trcpt	0.6103	0.0985	6.1932	< .001	0.4172	0.8034

Note. Wald test.

Based on Table 5 above, it can be concluded that applying the social family model to 6C skills in the 21st century has a positive influence. This is indicated by the standard estimate value of 0.613, which can be categorized as a strong effect compared to Cohen's Effect Size Criteria. The significance level used in this study is based on a p-value less than 0.001 at a 95% significance level or alpha (α) of 0.05. Therefore, the p-value is smaller than 0.05, and it can be concluded that the social family model influences 6C skills in the 21st century.

Social learning models often encourage discussion, dialogue, and collaborative problem-solving. This allows students to develop critical thinking skills as they must formulate arguments, evaluate ideas, and make decisions based on information obtained through social interactions [16], [21]. Students learn to communicate clearly and effectively through social interaction in social learning. They practice expressing their opinions, listening attentively, and sharing information within a group [14], [23]. Furthermore, social learning models also encourage students to work together in groups or teams. This allows them to understand the dynamics of collaboration, share responsibilities, and appreciate the contributions of each team member [17], [18].

In social learning, students can often present new ideas, seek creative solutions, and tackle problems with innovative approaches [19], [20]. Another advantage of social learning models is that they can promote independence. When students are invited to participate in discussions, research, or projects, they learn how to manage their time, plan, and self-regulate to achieve learning goals [16], [17]. Additionally, social interaction in social learning can shape character skills such as empathy, social concern, and ethics. Students can understand others' perspectives, learn to respect differences and become better members of society [14], [18].

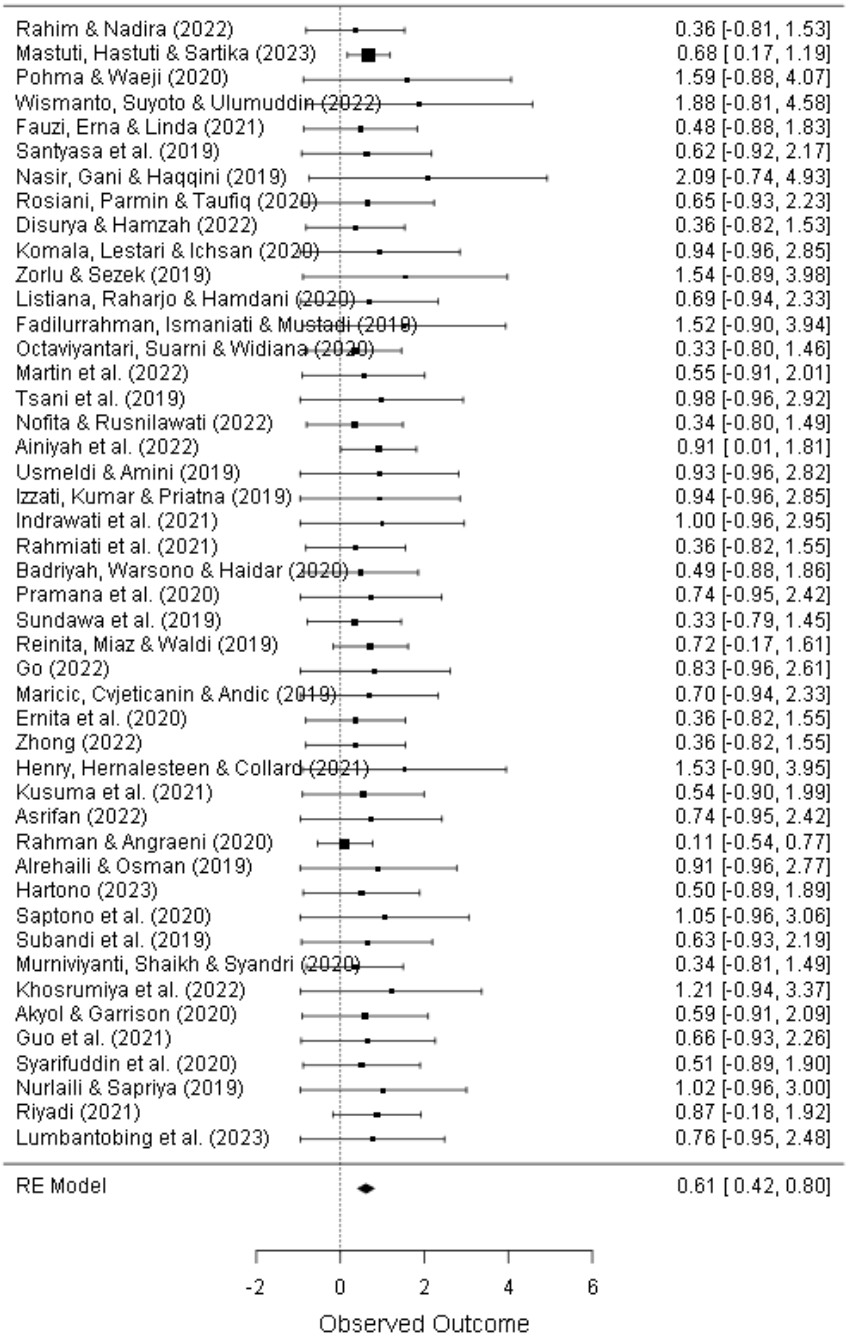

Fig. 3. Forest Plot

Third, the Forest Plot. The summary effect size of each study can also be visualized through a Forest Plot. The Forest Plot includes information on the effect size values of each study, lower and upper bounds, and the RE [27]. The RE model measures the effects obtained by combining all the studies, as seen in the Diamond plot. The Forest Plot can be seen in Figure 3.

The last, "testing for publication bias. The publication bias test in this study is performed by analyzing the Funnel Plot display and further testing using the p-value of The Rank Correlation Test. First, the publication bias test analyzes the Funnel Plot display. A Funnel Plot is a graphical tool commonly used in meta-analysis to evaluate the potential for publication bias or the effect of small studies [28]. This tool helps visualize the distribution of effect sizes from individual studies and whether there is asymmetry that may indicate bias. Each study included in the meta-analysis is represented by a point on the Funnel Plot. Here is the display of the Funnel Plot for the studies analyzed in this research."

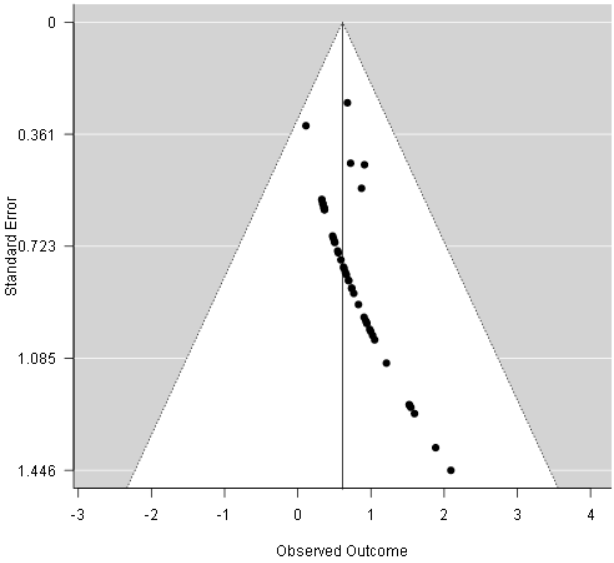

Fig. 4. Funnel Plot

Furthermore, analyzing the display of study points can sometimes be challenging, necessitating further testing for publication bias. Publication bias can be analyzed through The Rank Correlation Test. Based on Table 6, the information shows that Kendall's τ value is positive, specifically 0.0809, with a p-value of 0.588. The p-value is larger than the significance level of 0.05, so it can be concluded that the null hypothesis (Ho) is rejected, indicating no publication bias.

Table 6. Rank Correlation Test

	Kendall's τ	**p**
Rank test	0.0809	0.588

Publication bias occurs when studies with statistically significant results are more likely to be published than studies with non-significant results. Meta-analyses should involve a test for publication bias. This is because studies that are not published or have negative results tend to be excluded from the analysis, which can lead to the neglect of important information about the effects or relationships being studied [25]. Publication bias can lead to overly optimistic results in meta-analyses, reducing the ability to generalize findings to a broader population [29]. This can result in less relevant or unsuitable recommendations for specific populations. A publication bias-free meta-analysis means a meta-analysis that has been designed, conducted, and reported carefully to be free from the influence of the tendency to include or report only positive or statistically significant results. In other words, the meta-analysis strives to be as objective as possible in accessing and including all relevant studies that may have non-significant or negative results [25], [30].

4 Conclusion

The following conclusions can be drawn based on the analysis of 46 studies on the relevant topic. First, the 46 articles examined in this study are heterogeneous; therefore, the summary effect test employs the random effects model. Second, implementing the social family model on 6C skills in the 21st century has a strong positive influence. Third, this meta-analysis study shows no indication of publication bias. The results of this meta-analysis can impact the development of elementary school curricula by placing a greater emphasis on fostering 21st-century skills. This research is also relevant in Society 5.0, where technology and social connectivity play a vital role in daily life.

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