



Meta-analysis of factors related to the philosophical mindset of public-school students based on researches published from 2011 to 2021 in Iran

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Abstract

The purpose of this research is meta-analysis of factors related to philosophical mindset of public-school students based on researches published from 2011 to 2021 in Iran. The statistical population includes articles that have been published in Iran in the last ten years. Sampling was done purposefully. From 13 published studies, based on meta-analysis criteria, 10 articles including 14 variables were selected as samples. Meta-analysis checklists were used in order to select relevant studies for the present meta-analysis and to extract appropriate information. These checklists include researchers' names, research title, year of publication, place of implementation, statistical population and sample size, gender, educational level, research tool, Cronbach's alpha and significance level. CMA3 software was used to analyze the questions. According to the research results, the effect size and Z calculated for 12 variables out of 14 variables are significant. The largest effect size according to the hex g index is related to self-direction with a hex index of 2.509 and creativity with a hex index of 1.754, as well as the lowest effect size related to mathematical self-efficacy with a hex index of 0.330 and problem solving with a hex index of 0.325

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Introduction

In today's complex world, many changes are taking place in human life and we are witnessing a very intense competition of societies for superior technology. It seems that the individual and the society should change their situation in such a way that they do not lag behind the convoy of science, technology and progress (Shirkarmi & Goddadi, 2017). Education is no exception to this rule. Because a 21st century student cannot be an involuntary element that even the way of learning is out of his control. The pre-determined and unequivocal plans do not answer his questions. In order to raise a dynamic and diligent generation in promoting the stability and durability of society, students should be taught ways to judge society and think about their lives. Anyone with an open and philosophical mind is sensitive to new perceptions, has the power of concentration, and can connect different perceptions. On the other hand, we live in an era that moves towards progress and technology with an indescribable speed, and in every multi-dimensional movement, both the complexity and the breadth of the science of that movement are added. In this case, the need for research and researchers is felt more than ever. In fact, research is one of the important axes that ensure progress and sustainable development in any country (Van Bavel et al., 2021). If there is no research, human knowledge will not increase and will stagnate, and learning will not have enough dynamism and vitality. Everything that is known as the progress of science in different periods of history is the result of the efforts of people who have a research approach in their work. One of the main goals of any educational system is to train knowledgeable people who have based their thinking on the basis of correct reasoning and logic, and in dealing with the world around them, examine various aspects of affairs and flexibility with a comprehensive and deep thought (Kaveshi et al., 2018). They have a high level of ability to deal with life issues, in other words, they have a philosophical mind. Philosophical mentality is the abilities and characteristics of the mind that help a person to think correctly and accustom him to correct judgments. Philosophy in Greek culture means lover of wisdom and knowledge. Philosophy emphasizes the type of human thinking and wisdom. Philosophy, in addition to being a field of study, can also provide mental structure and way of thinking. Mentality means the ability of the mind, the way of thinking, the product of the way of thinking or mental image (Smith, 2002)).

Philosophical mindset can help people to think correctly and make them accustomed to making correct judgments. The more you can use the power of thought, the more likely you are to succeed and progress. In social life, one should have dynamic, selective, holistic and systematic thinking in order to achieve desirable results with activities and intelligent decisions based on principles and understanding important facts. Because with the increasing development and complexity of societies and the occurrence of rapid scientific, industrial and social developments, it is difficult to predict the knowledge and skills necessary for life, and the past cannot be emphasized as a guide for the future (Bahriniazadeh et al., 2017).

The issue of thinking and correct thinking is one of the important issues that have occupied the minds of scholars for a long time (Smith, 2002). Smith (2002) considers philosophical mindset as the mental abilities that help a person to think in the right way and accustom him to make appropriate judgments. He considered three dimensions for the philosophical mind including the following:

Dimension of comprehensiveness: a person has intellectual comprehensiveness that can connect the present to the future and looks at the phenomena with a systemic attitude and has the ability to generalize.

Influence dimension: influence means deep thinking and deep look at phenomena. A person who thinks deeply about phenomena that is obvious to others

Flexibility dimension: A flexible person does not become psychologically stable and has the ability to accept new methods and methods that are universal and efficient.

The importance and necessity of this issue is to the extent that if teachers and administrators who are involved in the education of a country cannot take the necessary measures to strengthen the philosophical mindset of students, they will fail to achieve the ideals designed for their country. And it is natural that at that time, the country will suffer from any aspect. Considering the importance of the factors related to the students' philosophical mindset and also the lack of research that summarizes the results of the research in this field, this article investigates the antecedents and consequences of students' philosophical mindset by conducting a meta-analysis of the research

conducted in the field of students' philosophical mindset in the last 10 years.

Fahraji & Tabatabai (2021) investigated the prediction of creative thinking based on learning styles and philosophical mindset in second grade high school students in Yazd city. The results of this research using regression analysis showed that creative thinking is predicted based on divergent, convergent, adaptive and absorbing learning styles and philosophical mindset.

Mehzadeh et al. (2019) investigated the structural modeling of predicting mental well-being based on philosophical mindset and perfectionism through the mediation of mindfulness. The structural model of predicting mental well-being based on philosophical mindset and perfectionism with the mediation of mindfulness in employees satisfactorily matched the research data.

Karimi (2019) investigated the relationship between philosophical mindset and psychological capital with teaching quality of primary education teachers in Bojnord. The results showed that the correlation between psychological capital and teachers' philosophical mindset is significant and also between philosophical mindset and teachers' teaching quality, but the correlation between psychological capital and teachers' teaching quality was not significant.

Yan et al (2018) conducted a meta-analysis examines the research on teaching philosophy to children, published from 2002 to 2016, regarding how it affects pre-collegiate students' cognitive outcomes. Ten studies (including two follow-up studies are included in their meta-analysis. Results suggest that the extant empirical studies on teaching philosophy to children show an overall moderate positive effect ($d=0.58$) on students' cognitive learning outcomes and a significant positive effect on reasoning skill ($d=1.06$).

Ismaili Shad (2018) examined the relationship between philosophical mindset and self-regulation of students' learning with the mediating role of using information technology. The results showed that there is a relationship between philosophical mindset and learning self-regulation by testing the mediating role of using information technology.

Weis Karimi et al. (2018) investigated the effectiveness of TREZ training on the philosophical

mindset and metacognitive strategies of female students. The results indicated the effectiveness of TREZ training on the philosophical mindset and metacognitive strategies of female students in the post-test and follow-up stages.

Ajam & Mubasheri (2018) investigated the effectiveness of "Qur'anic stories" on "philosophical mindset" and "tendency to critical thinking" of sixth grade female students. The results of the research showed that the use of Quranic stories has a positive effect on increasing the philosophical mindset and critical thinking tendency of sixth grade elementary students.

Bahrainizadeh et al. (2017) also presented a model in order to cultivate philosophical mindset in the elementary school mathematics curriculum. The obtained results showed that the philosophical mindset includes three components of comprehensiveness, contemplation and flexibility, which should be used in order to develop the philosophical mindset of students, each of the four elements of goals, content, teaching methods and evaluation in the elementary school mathematics curriculum. Based on the three dimensions of philosophical mentality, he determined.

Shir Alipour et al. (2013) investigated the role of creativity, philosophical mindset, mathematical self-efficacy and mathematical self-concept on students' mathematical progress. The results of model fitting showed that all the direct effects of math self-efficacy on the variables of creativity, math self-concept and math progress are positive and significant, and the indirect effect of math self-efficacy on math progress was confirmed. Also, the direct effect of the math self-concept variable on the math achievement variable received the necessary support.

Nouri et al. (2013) investigated the effect of philosophical mindset on solving mathematical problems of high school students in Hamadan. The findings of the research confirmed that philosophical mindset affects students' ability to solve mathematical problems and showed that this effect is very high. The results also showed that a more philosophical mindset leads to a greater ability to solve mathematical problems.

Trickey & Topping (2004) conducted a systematic critical review of controlled outcome studies of the 'Philosophy for Children' method in primary (elementary) and secondary (high) schools. Ten studies met the stringent criteria for inclusion,

measuring outcomes by norm-referenced tests of reading, reasoning, cognitive ability, and other curriculum-related abilities, by measures of self-esteem and child behavior, and by child and teacher questionnaires. All studies showed some positive outcomes. The mean effect size was 0.43 with low variance, indicating a consistent moderate positive effect for P4C on a wide range of outcome measures. The implications for practice, policy, and future research were explored, particularly in relation to cost-effectiveness.

According to what has been said, students' philosophical mindset is one of the important Construct that paying attention to it can help school administrators and educational planners in realizing the ultimate and operational goals of educational processes.

Based on the reviews that were done, although in recent years, several studies have been conducted on the factors related to the philosophical mindset of students in Iran, but in each study, one or more variables have been studied separately, and no study that can compare the results it has not been done to combine these researches. Therefore, it is felt necessary to conduct a meta-analytical research on the variables related to the students' philosophical mindset.

Based on the findings of the present research, school administrators can take action on new planning, with the aim of improving the state of philosophical mindset of students and, accordingly, increasing the effectiveness of educational programs..

According to the purpose of the research, this research seeks to answer the following questions:

1- What researches have been published about the variables related to the philosophical mindset of students from 2011 to 2021 in Iran?

2- In these researches, what variables have been studied in connection with the students' philosophical mindset?

3- What is the size of the effect of the studied variables on the philosophical mindset of students?

2. Research methodology.

Approach and strategy:

In this research, it is assumed that there is no difference between the studied studies in terms of their quality, and for this reason, fixed and random effects models have been used. In order to search for articles, a systematic search was carried out in the databases with the keyword "philosophical mentality". To perform the search, the combination of the words philosophical mentality and related variables (and similar meanings) was used.

Research population:

The statistical population of this research is all the researches published in the last 10 years in Iran about the factors related to the philosophical mindset of students. There were 13 of them.

The list of researches is presented in table number 1

Table 1Reviewed articles

	title	researcher	year
1	The effectiveness of Quranic parables on the philosophical mindset of sixth grade female students	Eslam kord	2021
2	Investigating the role of IT information technology on the philosophical mindset of secondary school students	Rezaee et al	2021
3	Prediction of creative thinking based on learning styles and philosophical mindset in secondary school students of Yazd city	Farahji & tabatabaee	2021
4	Investigating the relationship between spiritual intelligence, philosophical mindset and religious beliefs of middle school female students in Tehran	Lisar et al	2017
5	Presenting a model in order to develop philosophical mindset in elementary mathematics curriculum	Bahrnizade et al	2017
6	The effectiveness of Tarez education on the philosophical mindset and metacognitive strategies of female students	Weiss Kerami et al	2018
7	The relationship between philosophical mindset and self-regulation of students' learning with the mediating role of using information technology	Ismaeeli shad et al	2018
8	The effectiveness of Quranic stories on the philosophical mindset and critical thinking tendency of sixth grade female students	Ajam et al	2018
9	The effect of philosophical mindset on the ability to solve mathematical problems of the third year middle school students of Hamadan by gender	Noori et al	2012
10	Philosophical mentality in smart school students	Shirvani et al	2021
11	Investigating the effect of philosophical mindset on the ability to solve mathematical problems of second grade high school students of Parsian city in the academic year of 2014-2015	Parsa et al	2016
12	Investigating the degree of flexibility in the philosophical thinking of intelligent students	Zoraghi et al	2015
13	Structural model of the role of creativity, philosophical mindset, self-efficacy and mathematical self-concept on mathematical progress	Shir alipoor et al	2013

Statistical sample:

The statistical sample passed several filters as criteria for entering the meta-analysis (1- meeting the necessary conditions of meta-analysis, 2- connection with philosophical mindset, 3- reporting sufficient indicators such as mean and standard deviation and statistical tests, 4- publication of researches within 10 recent year). Finally, 10 articles were selected as a statistical sample.

Research tool:

The data collection tool of the present study was the meta-analysis checklist, which was completed by three experts.

Effect size:

After converting the statistics to estimate the effect size, the Hedges method was used. The most common indices used in meta-analysis are d and r , where r is used in correlation studies and d is used for group differences. The interpretation of the effect sizes is based on Cohen's (1977) approach. CMA3 software was used to analyze the questions.

3. Descriptive information:

In the following, the descriptive information of the investigated research is presented in the form of a summary table:

Table 2 Descriptive information of researches used in meta-analysis

Row	researcher	Year	Tool	Cronbach	City	gender	section	Sampling
1	Mirzaei et al	2021	Jahangiri	0.84	Esfrain	-	High school	Stratified
2	Farahji & tabatabaee	2021	.Philip Smith	J -	Yazd	Girl	high school	clustered
3	Zoraghi et al	2015	Kamili	0.97	Zahedan	girl-boy	high school	clustered
4	Ismaili Shad	2018	.Philip Smith	J 0.84	Behshahr	Girl	sixth grade	Stratified
5	Shir ali pour	2013	Soltani	0.72	Marand	girl-boy	thirdgrade	clustered
6	Lisar	2017	Philip Smith	J 0.79	Tehran	Girl	High school	clustered
7	Nouri	2012	Researcher made	0.86	Hamedan	girl-boy	guidance	Stratified
8	Parsa	2016	Saif Hashemi	0.714	Parsian	girl-boy	The second grade of secondary school	clustered
9	Weiss Kerami	2018	Talebpour	0.89	Khorramabad	Girl	high school	clustered
10	Ajam	2018	.Nouri et al	0.79	Ghaien	Girl	sixth grade	clustered

4. Meta-analysis findings:

In this section, the assumptions of meta-analysis, including publication bias and homogeneity of studies,

are presented first, then the effect size of the studied variables on the philosophical mindset is presented. At the end, the overall effect size of the meta-analysis model is presented.

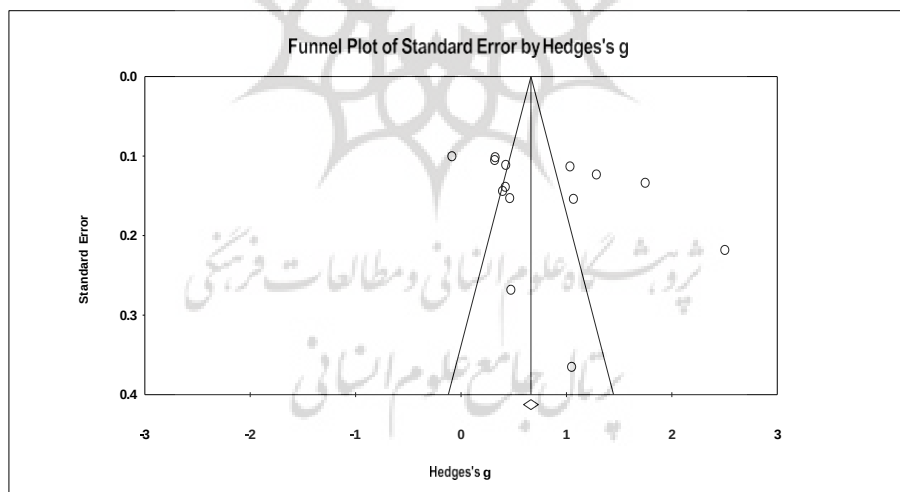


Figure 1 Funnel plot of standard error with standard deviation of the mean for the hedges's g

In the above diagram, the studies that must be added to make the diagram symmetrical are specified. The

graph shows no publication bias, so there is no need to add any items to remove publication bias

Table 3: The results of the heterogeneity test of the studies

Model	Q value	Df	p value	I ²
Fixed	268.622	13	0.0001	95.160

Based on the results of the heterogeneity test of the studies presented in Table (2), the Q value for 14 variables with 13 degrees of freedom is equal to 268.622, which is significant at the alpha level of 0.01. Based on this, the null hypothesis of heterogeneity of studies is confirmed. Also, the value of the I^2 index is equal to 95.160, which indicates the effect of heterogeneity of studies on 95.16% of the total changes.

Separate and overall effect size of the studies: for each of the conducted researches and based on the available data, the effect size index, upper and lower limit, Z value and their significance were calculated separately, and the results in The following table is provided:

Table 4: Statistical indices and effect size for each study

researcher	Year	Variable	Statistical indicators			
			hedges's g	Variance	Z value	p value
Mirzaei et al	2021	Information Technology	1.291	0.015	10.402	0.0001
Fahraji and Tabatabai	2021	Creative escape	0.431	0.013	3.845	0.0001
Zoraghi et al	2015	Flexibility in thinking	0.468	0.024	3.045	0.002
Ismaili Shad	2018	Technology	1.073	0.024	6.934	0.0001
Ismaili Shad	2018	Self-driving	2.509	0.048	11.545	0.0001
Shir ali pour		Self-concept	1.040	0.013	9.124	0.0001
	2013					
Shir ali pour	2013	Creativity	1.754	0.018	13.034	0.0001
Shir ali pour	2013	Mathematical progress	0.080-	0.010	0.790-	0.430
Shir ali pour	2013	Math self-efficacy	0.330	0.010	3.219	0.001
Lisar		religious belief	0.400	0.021	2.765	0.006
Nouri	2012	Problem solving	0.325	0.011	3.068	0.002
Parsa	2016	Problem solving	0.426	0.020	3.052	0.002
Weiss Kerami	2018	TREZ	0.479	0.072	1.782	0.075
Ajam	2018	Quranic story	1.055	0.134	2.884	0.004
Fixed			0.663	0.001	18.571	0.0001
Random			0.809	0.028	4.868	0.0001

Table (3) shows the effect size of each study and the statistical index related to it. According to the results in the table, the effect size and Z calculated for 12 of the 14 variables are significant at the alpha level of 0.01. Also, based on the results, the largest effect size based on the hedges's g index of hedges's is related to the self-directed variable (Ismaili Shad) with a

hedges's g index of 2.509, creativity (Shir Alipour) with a hedges's index of 1.754, as well as the lowest effect size related to the mathematical self-efficacy variable (Shir Alipour) with a hedges's index of 0.330 and problem solving (Nouri) with a hedges's index of 0.325.

Table 5: The overall effect size of studies based on fixed and random models

Model	Effect size and 95% confidence level				Significance test	
	N	Effect size	lower limit	upper limit	Z vlue	P value
Fixed	14	0.663	0.593	0.733	18.571	0.0001
Random	14	0.809	0.483	1.135	4.868	0.0001

Table (4) shows that the value of Z in the fixed model is equal to 18.571 and is significant at the $p < 0.05$ level. Also, in the random model, the Z value is equal to 4.868 and is significant at the $p < 0.05$ level. In the fixed model, the overall effect size is equal to 0.663 and in the random model, it is equal to 0.809.

5. Discussion

This research was done with the purpose of meta-analysis of factors related to students' philosophical mindset. The findings indicate that the average effect size of variable "Information Technology" (with 2 repetitions) "Creative Thinking", "Flexibility in Thinking", "Self-direction", "Self-concept", "Creativity", "Mathematical Self-efficacy", "Religious Beliefs", "Problem Solving" (with 2

repetitions) and “Quranic Stories” on students' philosophical mindset is significant, and the average effect size of “Mathematical Progress” and “TREZ training” on students' philosophical mindset is not significant. The results of this part of the study regarding the non-significance of the effect of “Mathematical Progress” and “TREZ training” on philosophical mindset are in line with the results of some scientific and research studies (non meta-analysis) by Shir Alipour et al. (2013), and are not in line with the results of some studies by Nowrouzi & Rakhshandeh (2006), Sternberg (2001), Bigdeli (2013) and Abdus (2001).

Being significant of the effect size of “Information Technology” on the philosophical mindset is consistent with various studies by Hayati et al. (2016), Ismaili Shad (2018). The findings of the research by Hayati et al. (2016) showed that there is a positive relationship between the use of information technology and the philosophical mindset of students. The findings of Ismaili Shad's research (2018) showed that there is a positive relationship between philosophical mindset and the use of information technology.

According to the findings of the present research, teachers can strengthen the ability of self-directed learning in students by strengthening their philosophical mindset and using information and communication technology skills. The importance of the educational findings of this research is that it shows the process that students' problems in the courses are not necessarily caused by their weakness and inability to learn. Rather, it is because maybe they are not yet ready to enter the courses that require self-direction. In this research, it was found that having a philosophical mindset and using information technologies in schools can have an impact on the readiness to attend by increasing self-directed skills in learning.

The results of being significant the effect size of “Creative Thinking” on philosophical mindset are consistent with the researches of Fahraji et al. (2021). In this regard, it can be said that logical thinking is a basic issue for every person, and a person should proceed with logical thinking from identifying the problem to finding suitable solutions for problems, and this is not possible unless he has the characteristics of logical thinking. Logical thinking is the result of having a philosophical mind.

If we consider philosophy as thinking and the student as an exploratory being, then during the process of exploring to solve the problem, the student learns deep thinking, reasoning, judgment, as well as interaction and respect for the opinions of others.

Being significant of the effect size of “Flexibility in Thinking” on the philosophical mindset is consistent with the researches of Zouraghi et al. (2015), Daneshi Lisar and Khosravi Babadi (2017), Yervani (2021) and Jack et al. (2016). To explain these findings, it can be said that the philosophical mind gives insight and knowledge to people so that they can avoid narrow-mindedness, self-centeredness and one-sidedness when facing issues. It also helps him to act rationally by knowing the necessary knowledge.

The results of being significant of the effect size of “Self-concept”, “Creativity” and “Mathematical Self-efficacy” on the philosophical mindset and not being significant of the effect size of “Mathematical Progress” on the philosophical mindset is consistent with the researches of Shir Alipour et al. (2013), Saif Hashemi (2014), Nowrozi & Rakhshandeh (2006). To interpret this research finding, it can be said that as the students' philosophical thinking ability increases, students' divergent thinking (creativity) also increases, which means that philosophical thinking is one of the effective factors in increasing creativity.

Being significant of the effect size of “Problem Solving” on philosophical mindset is consistent with the researches of Nouri et al. (2013), Lippman (2003). In his research, Lippman (2003) showed that the experimental groups that used the philosophy for children program significantly improved their reasoning ability, including formal inference, comprehension, mathematical progress, self-concept, etc., compared to the control groups.

Based on the findings of this research, it is recommended that the managers and educational planners of the schools should be diligent in cultivating the philosophical mindset of the learners and also make the teaching processes more attractive and objective through the use of information technology so that the learner can also strengthen their self-management skills by increasing the internal motivations of learning. Also, adjusting the lesson content according to the student's ability and evaluating the situation of each student according to the individual abilities and capabilities, all of them make the student in this system learn how to benefit

from the information collection without relying on others and find the opportunity to reveal his abilities and capabilities.

It is suggested that more information and communication technologies be used in educational processes and educational processes should be such as to strengthen the skill of philosophical mentality and its dimensions.

It is also recommended to hold courses and workshops in a practical way for students and teach philosophical mindset and the connection of this type of thinking to solve problems.

Another suggestion is to pay attention to different dimensions and aspects of philosophical mentality in curricula at different educational levels.

In addition, it is suggested to include book reading and story reading programs in students' classroom activities.

It should be noted that the goal of education should be to educate students who can look at issues with a broad and general perspective and examine different aspects of the issue in the investigation of affairs. Also, a curriculum should be prepared for students that enables them to relate the issues they face in the classroom and school with the real issues of their lives and use them to solve the future problems of life. They should learn to ask basic questions and ask questions about what they don't know. They should learn to create ideas and concepts and learn to question ideas and beliefs.

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