Research Paper

Effect of Self-efficacy Training for Mothers on Their Daughters' Critical Thinking

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ABSTRACT

Background: Ability to analyze information and make effective decisions in life develops through learning. Considering the role of mothers in teaching learning principles to their children, the present study was conducted to determine the impact of self-efficacy training for mothers on their daughters' critical thinking.

Methods: The present quasi-experimental study was conducted on 80 mothers (40 in each group) of first-grade high school girls in Esfarayen, Iran, in 2023. The sampling method was multi-stage randomization. The data collection tools included the Ricketts' critical thinking questionnaire and Morris' self-efficacy questionnaire. Educational sessions consisted of five 50-minute sessions held at school through group discussions, brainstorming, and Q &A sessions for the intervention group (mothers). Then, the questionnaires were completed by their daughters before educating mothers, immediately after educating them, and three months later. Data were analyzed by SPSS software, version 26 using the Mann-Whitney U test, Friedman test, and chi-square test. The level of significance in all tests was set at $P<0.05$.

Results: The mean age of mothers in the intervention group was 36.5±6.3 years, while in the control group, it was 34.7±6.2 years. The mean age of students in the intervention group was 14.5±5.37 years, while in the control group, it was 14.37±5.57 years. The critical thinking score and the total score of self-efficacy immediately and three months after the intervention had a significant increase in both groups compared to before the intervention ($P<0.05$). The intervention and control groups had statistically significant differences in terms of the mean scores of critical thinking and self-efficacy over time ($P<0.05$).

Conclusion: Teaching mothers based on the self-efficacy theory successfully improved the critical thinking skills of their daughters. Therefore, it is recommended that education policymakers use this theory to implement comprehensive educational programs for parents to improve life skills, including critical thinking skills of their children.

Keywords: Critical thinking, Mothers, Self-efficacy, Students

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Introduction

A major sector in any country is the education system, the importance of which has caused planners and policymakers to consider it as the foundation of the development of societies [1]. Since the majority of society is comprised of students [2], enhancing students' intellectual skills is a major goal of this system in different countries [3]. Poor thinking and analysis along with incorrect judgment of the opinions and information available in today's world, are some of the existing issues facing students [4]. Relying solely on memorizing content and recalling information—both relevant and irrelevant to real life—can waste resources and opportunities. To cultivate a dynamic and active generation, we can transform the ways of thinking about ourselves and society through education [5, 6]. In this regard, teaching critical thinking skills helps solve problems and resolve life issues [7]. Critical thinking is a cognitive process, through which an individual makes appropriate judgment and decision to solve problems through examining the reasons, analyzing the available information, and drawing conclusions [8]. Possessing this skill helps search for the truth in the false information received every day and achieve a sound knowledge of the existing issues. According to Zhang and Kim, students currently exhibit an unfavorable level of critical thinking tendency [9].

Studies have shown that mothers are the key and influential factor affecting the social, academic, and emotional performance of children [10, 11]. Therefore, teaching critical thinking skills to mothers improves their social abilities. It also affects children's social and emotional health, enabling them to learn constructively and make progress [12]. The results of different studies show that critical thinking skills can be improved through education [13-15]. An important aspect of educational interventions in this context is the emphasis on self-efficacy theory [16]. The self-efficacy construct, proposed by Bandura in social-cognitive theory, is defined as an individual's belief in his or her abilities to perform a behavior. Perceived self-efficacy reduces the fear of failure and increases one's motivation to achieve success [17]. There is a significant and positive relationship between self-efficacy and critical thinking. Thus, with an increase in self-efficacy, critical thinking also tends to improve [18, 19]. Taghva et al. and Qiang et al. showed that an increase in self-efficacy is associated with an increase in critical thinking [18, 19].

To our knowledge, no study has yet investigated the role of mothers as a key and influential factor in the health of family members, especially children, and their critical thinking. Addressing this issue and implementing practical interventions and policies can empower students as the future builders of society. Therefore, the present study aimed to determine the impact of teaching critical thinking skills to mothers using self-efficacy strategies on the critical thinking of their daughters in Esfarayen, Iran.

Methods

Design of study

The present quasi-experimental study included the control and intervention groups, and was conducted to educate mothers as a mediating factor influencing their daughters' behavior in 2023 in Esfarayen. Also, the effectiveness of educational interventions was assessed based on feedback from their daughters.

Participants and sampling

The sample size, based on Yousefi and Bagherpour's study, was estimated at 26 for each group, using a 95% confidence interval and a test power of 80%. Considering a potential attrition rate of 20%, the final sample size was set at 40 in each group [20].

Mothers were selected and included in the study using a multi-stage randomized sampling method. Girls were selected from the first cycle of secondary schools (according to the current education system of Iran). Then, two schools were selected randomly by drawing lots, considering the social and economic similarities, as well as ensuring the schools were located at an acceptable geographical distance from one another. The schools were then divided into intervention and control groups. Subsequently, eligible mothers were selected from each school to participate in the study.

The inclusion criteria were mothers with at least secondary education, daughters in the first grade of high school, signing informed consent letters, and no history of mental illnesses. The exclusion criteria were unwillingness to participate in the study and the occurrence of unfortunate events during the study (such as the mother's illness, etc).

The female students in both groups completed the questionnaires in three stages: Before, immediately after, and three months after the educational intervention. The questionnaires were completed in approximately 40 minutes in the presence of the researcher. The researcher's presence was necessary to answer the respondents' questions, emphasize the importance of providing honest answers, and ensure that no questions were missed.

Instrumentation

Data were collected using a tripartite questionnaire that included a demographic section, a critical thinking section, and a section on self-efficacy.

The first section enquired about demographic information (six questions), which included the mother's age, the girl's age, the father's education level, the mother's education level, the father's occupation, and the mother's occupation. The second section of the questionnaire included questions related to critical thinking, for which the Ricketts' critical thinking questionnaire was used [21]. It contained 33 items divided into three subscales. The subscales were as follows: The creativity scale (11 questions, exemplified by "I always believe there is more to learn"), cognitive maturity (nine questions, exemplified by "I am confident that I can reach a favorable conclusion"), and commitment (13 questions, exemplified by "I focus on working on something until I find it working correctly"). each item was rated on a 5-point Likert scale (strongly disagree, disagree, uncertain, agree, and strongly agree). The sum of the scores of all items in each subscale was considered the total score for that sub-scale. The final score ranged between 33 and 165, with low scores indicating poor critical thinking and vice versa. The validity of questionnaire was confirmed by Pakmehr et al. Thus, to substantiate validity in the research, the correlation coefficients between the scores on two occasions, i.e. test and re-test for boys, girls, and participants, and the total score were estimated, were estimated at r=0.77, r=0.88, and r=0.67, respectively [22]. The reliability was also established by Eizadifard using Cronbach's α for the entire questionnaire, which was found to be 0.94 [23].

The third section of the questionnaire contained questions related to the self-efficacy theory. For this purpose, Morris' self-efficacy questionnaire was used [24]. This questionnaire contained 23 items divided into three subscales, including social self-efficacy (eight questions, exemplified by "How well can you express your opinion when other classmates disagree with you?"), academic self-efficacy (eight items, exemplified by "How well do you manage to do your homework every day?") and emotional self-efficacy (seven items, exemplified by "How well can you cheer yourself up when something unpleasant happens?). In this questionnaire, each question was rated on a five-point Likert scale (strongly disagree, disagree, uncertain, agree, and strongly agree). The sum of the scores of each subscale was considered the total score; thus, the final score ranged between 23 and 115. Low scores indicated poor self-efficacy and vice versa. The validity of the questionnaire was tested by Habibi et al. across academic, social, and emotional dimensions, with correlation coefficients for the total score with the subscales being 0.7, 0.73, and 0.83, respectively. The reliability was estimated at 0.89 for the whole scale [25].

Educational intervention

In this study, mothers first signed the informed consent letter. After collecting data from the participants of the intervention and control groups (their daughters), before the intervention and its analysis, five educational sessions were organized for the mothers of the intervention group based on the needs assessment. According to a similar study [26], educational sessions were held for 50 minute at school. We used methods, such as brainstorming, group discussion, and Q&A sessions to improve critical thinking in three areas (creativity, cognitive maturity, and commitment). Group discussion was also used to improve self-efficacy in three areas (social self-efficacy, academic self-efficacy, and emotional self-efficacy). To improve self-efficacy, four effective factors were considered in educational sessions. These included verbal encouragement, alternative experiences, previous failures and successes, and physical and emotional states. The scientific content of educational sessions was evaluated and approved by two experts: The thinking and research teacher in the selected schools and a health education expert.

Data analysis and statistical tests

Data were analyzed by SPSS software, version 26. The normality of data distribution was checked using the Kolmogorov-Smirnov test. Mean±SD were used to describe interval data, and frequency and percentage were used to describe non-interval data. Interval data in both groups were analyzed using the Mann-Whitney U test, and Friedman test according to the normality of data. Also, to compare non-interval data in both groups, the chi-square test was used. The significance level was set at 0.05 for all tests.

Results

The mean age of mothers in the intervention group was 36.5±6.3 years, while in the control group it was 34.7±6.2 years. The mean age of daughters in the intervention group was 14.5±5.37 years, while in the control group it was 14.37±5.57 years. Most fathers in the intervention group (45%) held a diploma. In the control group (50%) most fathers held a degree below diploma. Most mothers in the intervention and control groups held a degree below diploma (45% and 50%, respec-

Table 1. Demographic characteristics of female students (n=80)

Variables	Category	No. (%)		Test Results*
		Intervention Group	Control Group	
Father's education level	<Diploma	20(50)	17(42.5)	P=0.271 df=2 X^2=2.77
	Diploma	19(47.5)	18(45)	
	Bachelor's degree	1(2.5)	5(12.5)	
	>Bachelor's degree	0(0)	0(0)	
Mother's education level	<Diploma	19(47.5)	18(45)	P=0.272 df=2 X^2=2.77
	Diploma	20(50)	17(42.5)	
	Bachelor's degree	1(2.5)	5(12.5)	
	>Bachelor's degree	0(0)	0(0)	
Father's occupation	Employed (non-official)	2(5)	3(7.5)	P=0.895 df=2 X^2=0.364
	Employed (official)	35(87.5)	34(85)	
	Unemployed	0(0)	0(0)	
	Retired	3(7.5)	3(7.5)	
Mother's occupation	Employed (non-official)	1(2.5)	4(10)	P=0.124 df=2 X^2=4.29
	Employed (official)	29(72.5)	32(80)	
	Retired	10(25)	4(10)	
	Housewife	0(0)	0(0)	

*Chi-square test.

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tively). In the intervention and control groups, 85% and 87.5% of fathers were non-employees, respectively. The results showed no statistically significant difference between the two groups in terms of demographic variables (P>0.05) (Table 1).

Table 2 shows that the mean score of creativity increased significantly immediately after the intervention in the intervention and control groups (P<0.05). Also, the mean score of creativity decreased significantly three months after the intervention in the control group (P<0.05). The intra-group test revealed that the mean score of creativity exhibited a statistically significant difference across the three time periods in both the intervention and control groups (P<0.05).

The mean score of cognitive maturity showed an increasing trend immediately after the intervention in the intervention and control groups (P<0.05). The intra-group test showed that the mean score of cognitive maturity showed a statistically significant difference between the two groups across the three time periods (P<0.05) (Table 2).

The mean score of commitment showed an increasing trend immediately after the intervention in the intervention group (P<0.05). However, in the control group, there was a significant decrease immediately after and three months following the intervention (P<0.05). The intra-group test indicated that the mean score of commitment showed a statistically significant difference between the two groups across the three time periods of the study (P<0.05) (Table 2).

Table 2 shows that the mean score of total critical thinking had a significant increase in the groups immediately after and three months after the intervention compared to before the intervention (P<0.05). Also, the intra-group test showed that this increasing trend was statistically significant in intervention and control groups (P<0.05).

Table 2. Mean scores of critical thinking before, immediately after, and three months after the intervention in the intervention and control groups

Variables	Groups	Mean±SD			Test Results**
		Before the Intervention	Immediately After the Intervention	3 Months After the Intervention	
Creativity	Intervention	24.87±5.73	35.87±3.5	35.67±3.68	P=0.001
	Control	28.65±5.59	29.37±5.46	24.65±3.93	P=0.002
	Test result*	P=0.005 Z=-2.84	P=0.001 Z=-5.26	P=0.001 Z=-5.1	
	The difference between the two groups	$P^{1,2}$<0.001 Z=-7.787	$P^{2,3}$=0.001 Z=-3.671	$P^{1,3}$<0.001 Z=-8.831	
Cognitive maturity	Intervention	20.07±4.6	28.73±3.47	28.67±3.48	P=0.007
	Control	23.82±4.13	24.65±3.93	24.73±3.97	P=0.004
	Test result*	P=0.001 Z=-0.3.4	P=0.012 Z=-4.03	P=0.002 Z=-4.18	
	The difference between the two groups	$P^{1,2}$<0.001 Z=-7.655	$P^{2,3}$=0.079 Z=-1.754	$P^{1,3}$<0.001 Z=-7.654	
Commitment	Intervention	35.87±3.5	40.05±4.34	39.67±4.44	P=0.008
	Control	40.05±4.34	32.92±6.49	32.88±6.52	P=0.001
	Test result*	P=0.001 Z=-4.03	P=0.005 Z=-5.02	P=0.023 Z=-4.72	
	The difference between the two groups	$P^{1,2}$<0.001 Z=-7.62	$P^{2,3}$=0.289 Z=-1.061	$P^{1,3}$<0.001 Z=-8.659	
Critical thinking	Intervention	71.17±14.34	104.6±9.54	104.77±9.58	P=0.006
	Control	84.4±13.75	84.5±13.75	86.72±13.5	P=0.002
	Test result*	P=0.001 Z=-3.83	P=0.001 Z=-5.68	P=0.001 Z=-5.57	
	The difference between the two groups	$P^{1,2}$<0.001 Z=-7.718	$P^{2,3}$=0.321 Z=-1.261	$P^{1,3}$<0.001 Z=-8.718	

*Mann-Whitney U test, **Friedman test.

[1]Before the intervention, [2]Immediately after the intervention, [3] Three months after the intervention.

The mean score of social self-efficacy showed a significant increase in both groups immediately after the intervention (P<0.05). In the control group, there was a significant decrease three months after the intervention. The intra-group test showed that the mean score of social self-efficacy exhibited a statistically significant difference across the three time periods in both the intervention and control groups (P<0.05) (Table 3).

Table 3 shows that the mean score of academic self-efficacy had a significant increase in the intervention group twice: Once immediately after the intervention and again three months after the intervention (P<0.05). Moreover, the mean score of academic self-efficacy in the control group increased significantly immediately after the intervention (P<0.05). However, three months after the intervention, a significant decrease was observed (P<0.05). The intra-group test indicated that the mean score of academic self-efficacy across the three time periods in both groups exhibited a statistically significant difference (P<0.05).

The mean score of emotional self-efficacy demonstrated a significant increasing trend in both groups immediately after the intervention and three months following the intervention (P<0.05). Also, the intra-group test showed that this increasing trend was statistically significant in intervention and control groups (P<0.05) (Table 3).

The mean score of total self-efficacy showed a significant increasing trend in both groups immediately after and three months after the intervention (P<0.05). Also,

Table 3. Mean scores of self-efficacy before, immediately after, and 3 months after the intervention in the intervention and control groups

Variables	Groups	Mean±SD			Test Results**
		Before the Intervention	Immediately After the Intervention	3 Months After the Intervention	
Social self-efficacy	Intervention	19.05±4.13	27.6±2.7	27.55±2.69	P=0.003
	Control	18.9±4.51	20.05±4.34	20±4.02	P=0.004
	Test results*	P=0.42 Z=-0.807	P=0.009 Z=-6.47	P=0.001 Z=-6.43	
	The difference between the two groups	$P^{1,2}$<0.001 Z=-7.378	$P^{2,3}$=0.917 Z=-1.114	$P^{1,3}$<0.001 Z=-7.369	
Academic self-efficacy	Intervention	19.65±6.9	29.42±2.93	29.47±2.89	P=0.006
	Control	24.27±5.29	24.72±5.07	24.28±4.99	P=0.005
	Test results*	P=0.003 Z=-4.44	P=0.009 Z=-2.98	P=0.008 Z=4.45	
	The difference between the two groups	$P^{1,2}$<0.001 Z=-7.118	$P^{2,3}$=0.569 Z=-0.572	$P^{1,3}$<0.001 Z=-7.047	
Emotional self-efficacy	Intervention	13.7±3.46	25±2.48	25.07±2.58	P=0.001
	Control	15.65±5.05	17.02±4.42	17.25±4.31	P=0.004
	Test results*	P=0.043 Z=-2.02	P=0.003 Z=-6.95	P=0.004 Z=-7.72	
	The difference between the two groups	$P^{1,2}$<0.001 Z=-7.746	$P^{2,3}$=0.405 Z=-0.832	$P^{1,3}$<0.001 Z=7.697	
Self-efficacy	Intervention	52.15±10.99	82.11±5.67	82.46±5.78	P=0.004
	Control	58.82±8.6	61.42±7.9	61.72±8.04	P=0.002
	Test results*	P=0.002 Z=-3.14	P=0.001 Z=-7.66	P=0.002 Z=-7.62	
	The difference between the two groups	$P^{1,2}$<0.001 Z=-5.91	$P^{2,3}$=0.786 Z=-0.811	$P^{1,3}$<0.001 Z=-7.691	

*Mann-Whitney U test, **Friedman test.

[1]Before the intervention, [2]Immediately after the intervention, [3]Three months after the intervention.

the intra-group test showed that this increasing trend was statistically significant in both groups (P<0.05) (Table 3).

Discussion

The findings of the present study showed that mothers play an effective role in improving their daughters' critical thinking skills. NikPay et al. demonstrated in their study of secondary school girls in the second period of Khorram Abad City that teaching learning strategies based on self-regulation theory is effective in enhancing female students' critical thinking [27]. It can be argued that self-regulation plays a significant role in controlling an individual's internal state to achieve higher goals and emphasizes the individual's responsibility to guide her continuous efforts toward achieving those goals [27]. The results of Mozaffari et al.'s study of female students aged 15 to 18 in Tehran showed that education based on the Poual-Elder model is effective in improving the critical thinking skills of female students [13]. One reason for the effectiveness of this model was the active participation of students in educational sessions, as active participation facilitates the transfer of ideas and is a key factor in enhancing critical thinking [13]. Also, in the study by Samiee et al. on secondary school girls in Tehran, the results showed that

education based on self-regulation theory is effective in improving students' critical thinking skills [15].

Arguably, in the process of self-regulation, students set goals and self-assess for their courses according to their learning stages. Therefore, this is an effective factor in developing critical thinking in students [15]. Liu and Pasztor showed that problem-solving-based education is effective in improving students' critical thinking skills [28]. In this educational method, by engaging in the problem-solving process, students acquire skills in how to obtain information to solve a problem, which effectively improves their critical thinking [28]. In a study by Hacioğlu and Gülhan et al. on middle school students, education based on the STEM[1] model improved critical thinking skills in students [29]. This improvement is attributed to the use of this model, which increases students' creativity in providing suitable solutions for problem-solving; increasing creativity is a key factor in enhancing students' critical thinking skills [29]. All these findings [13, 15, 27-29] are in line with the results of the present study, which ultimately led to the improvement of critical thinking in adolescent girls. Critical thinking skills allow people to think clearly and objectively about issues [13]. This ability is considered important for making effective decisions [19]. Therefore, this skill is important not only during school but throughout one's life. While other studies have directly addressed the effect of the educational process on critical thinking [19], in the present study, mothers participated in educational sessions as mediators and effective factors in improving life skills, including critical thinking skills in children. The content of the educational sessions was conveyed by the mothers to their daughters, and the extent of improvement in their daughters' critical thinking skills was investigated. The results confirmed the effectiveness of this process.

In this research, the effect of education based on the self-efficacy theory was tested, and the results showed improvements in social, academic, and emotional self-efficacy, as well as the total score of self-efficacy in the intervention group. The results of Jafari and Peyman's study on second-year high school female students showed that education based on self-efficacy theory is effective in stress management of female students [30]. It can be argued that people who have high self-efficacy can effectively deal with emotionally destructive events, including stressful events [30]. Khoy Nejad et al. also showed in their study on second-year high school boys in Mashhad that education based on self-efficacy reduced academic harm and increased academic success [31]. It can be argued that high self-efficacy is associated with mental peace in confrontation with difficult tasks [31]. Kooshki et al. assessed female students in the first cycle of secondary school in Mamulan (Khorramabad) and showed that the self-efficacy theory-based assessment is effective in reducing academic stress and improving students' social skills [32]. Arguably, when students believe in their ability to plan lessons and complete homework, this can foster effort and motivation, leading them to perform their tasks regularly and reducing academic stress.

Self-efficacy provides a sense of self-confidence, which can create a desire to establish social interactions and improve an individual's social skills [32]. Yedemie showed that education based on self-efficacy theory is effective in improving students' psychological performance. Among the reasons for this effect, group discussion sessions utilizing self-efficacy theory to share positive experiences in emotion regulation can be highlighted [33]. Schönfeld et al. showed that education based on self-efficacy theory is effective in reducing daily stress in German students [34]. One reason for this effect may be the use of self-efficacy strategies and a focus on the positive attributes an individual possesses when completing tasks [34]. These findings [30-34] are in line with the results of the present study, showing an improvement in self-efficacy in adolescent girls. The results show that self-efficacy plays an important role in people's performance and belief [34, 35], and it can increase motivation and effort to achieve success [33]. If people believe in their abilities to succeed, their self-confidence and motivation will increase; therefore, self-efficacy is considered one of the most effective human characteristics [33]. The self-efficacy component provides students with a strong sense of self-confidence and helps them assess their skills and plan lessons to effectively demonstrate their ability to perform assigned tasks [35].

Self-efficacy plays a key role in improving an individual's belief in their necessary abilities to complete related tasks. Mothers also play a key role in the family, as they can see themselves as effective role models and teachers for their children. Girls tend to bond well with their mothers; therefore, education based on self-efficacy theory that involves mothers can significantly impact the improvement of their daughters' critical thinking skills.

Conclusion

Educating mothers based on self-efficacy theory improved critical thinking skills in their daughters. Therefore, in teaching life skills, especially critical thinking skills, self-efficacy strategies can be used, especially to

1. STEM is an approach to learning and development that integrates the areas of science, technology, engineering and mathematics. Through STEM, students develop key skills including: Problem solving creativity.

improve mental and physical states, with an emphasis on reducing stress and creating positive mental states. Having the appropriate skills to manage stress is crucial for making sound decisions, especially in emotional situations. Therefore, it is recommended that education policymakers implement comprehensive educational programs for parents, particularly mothers, to improve life skills, including the critical thinking skills of their children (both boys and girls).

Limitations of study

One limitation of this study is that the intervention was carried out solely with mothers of female students in the first grade of high school; therefore, it is suggested that a similar study be carried out with mothers of male students at the high school level. Self-reporting was another limitation of this study.

Ethical Considerations

Compliance with ethical guidelines

The present study was approved by the Ethics Committee of Mashhad University of Medical Sciences (IR.MUMS.FHMPM.REC.1402.029). All mothers were assured that participation in the study was voluntary and that they could withdraw from the study at any time. They were informed that the details of information contained in the questionnaires were confidential. To respect human rights, after collecting data three months after the intervention, the subjects in the control group received all educational materials in the format of pamphlets and videos.

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Authors' contributions

Conceptualization: Nooshin Peyman, Melika Babaei, and Fatemeh Goldani Mohghaddam; Data curation: Melika Babaei; Methodology: Melika Babaei, Fatemeh Goldani Mohghaddam; Project administration: Nooshin Peyman, and Fatemeh Goldani Mohghaddam; Formal analysis: Saeed Akhlaghi; Visualization and writing: Nooshin Peyman, Melika Babaei, Fatemeh Goldani Mohghaddam, and Saeed Akhlaghi.

Conflict of interest

The authors declared no conflict of interest.

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References

[1] Rad HS, Jahani J, Shafiei M, Sarvestani MM. Designing a critical thinking training model on critical thinking skills of sixth grade elementary students. Research in Curriculum Planning. 2021; 18(70):113-34. [DOI:10.30486/jsre.2021.1934529.1941]

[2] Gorjinpour F, Barzegar M. [The effectiveness of self-efficacy training on emotional cognitive adjustment and student's stress in secondary school students (Persian)]. Quarterly Journal of Women and Society. 2022; 13(49):105-18. [DOI:10.30495/jzvj.2021.26917.3458]

[3] Danvers E. Individualised and instrumentalised? Critical thinking, students and the optics of possibility within neoliberal higher training. Critical Studies in Training. 2021; 62(5):641-56. [DOI:10.1080/17508487.2019.1592003]

[4] Ghanizadeh A. The interplay between reflective thinking, critical thinking, self-monitoring, and academic achievement in higher training. Higher Training. 2017; 74:101-14. [DOI:10.1007/s10734-016-0031-y]

[5] Ramdani A, Jufri A, Gunawan G, Fahrurrozi M, Yustiqvar M. Analysis of students' critical thinking skills in terms of gender using science teaching materials based on the 5e learning cycle integrated with local wisdom. Jurnal Pendidikan IPA Indonesia. 2021; 10(2):187-99. [DOI:10.15294/jpii.v10i2.29956]

[6] Campo L, Galindo-Domínguez H, Bezanilla M-J, Fernández-Nogueira D, Poblete M. Methodologies for fostering critical thinking skills from university students' points of view. Training Sciences. 2023; 13(2):132. [DOI:10.3390/educsci13020132]

[7] Ma X, Zhang Y, Luo X. Students' and teachers' critical thinking in science training: Are they related to each other and with physics achievement? Research in Science & Technological Training. 2023; 41(2):734-58. [DOI:10.1080/02635143.2021.1944078]

[8] Hwang GJ, Chen CH. Influences of an inquiry-based ubiquitous gaming design on students' learning achievements, motivation, behavioral patterns, and tendency towards critical thinking and problem solving. British Journal of Trainingal Technology. 2017; 48(4):950-71. [DOI:10.1111/bjet.12464]

[9] Zhang L, Kim S. Critical thinking cultivation in Chinese college english classes. English Language Teaching. 2018; 11(8):1-6. 59 [DOI:10.5539/elt.v11n8p1]

[10] Majlisi Azar MM, Ghaffari K, Nateghi F. [The effectiveness of parenting skills model based on conversational skills in increasing empathy and understanding the parent-child relationship (reducing intergenerational gap) in high school students in public schools in district (1) of Urmia city (Persian)]. Medical Journal of Mashhad University of Medical Sciences. 2019; 61(6):2211-23. [DOI:10.22038/mjms.2021.18499]

[11] Ghaffari Jam M. [Effectiveness of anger management and assertiveness practices on reducing risky behaviors and increasing assertiveness in mothers of children with neurodevelopmental disorders (Persian)]. Pajouhan Scientific Journal. 2021; 19(2):19-25. [DOI:10.52547/psj.19.2.19]

[12] Moodi S. The effectiveness of life skills training for parents in decreasing aggression and improving the academic motivation in adolescent children. Journal of Applied Family Therapy. 2021;2(2):376-90. [Link]

[13] Mozaffari Z, Abdollahi MH, Farzad V, Ghayedi Y. The effectiveness of critical thinking training based on the Paul-Elder model on students' critical thinking skills. Trainingal Psychology. 2021; 18(44):20-9. [DOI:10.22111/jeps.2021.6536]

[14] Asgari Majareh M, Banahan Qomi M, Ahmadi P. [The effect of blended learning on critical thinking components of primary school students (Persian)]. Teaching and Learning Research. 2022; 18(2):115-29. [DOI:10.22070/tlr.2023.16631.1312]

[15] Samiee Zafarghandi M, Nemati M, Alizade M. [The effectiveness of teaching self-regulatory learning strategies on self-efficacy and critical thinking in secondary school students in district 6 of Tehran (Persian)]. Research in Curriculum Planning. 2021;18(69):153-69. [Link]

[16] Mata ÁN, de Azevedo KP, Braga LP, de Medeiros GC, de Oliveira Segundo VH, Bezerra IN, et al. Training in communication skills for self-efficacy of health professionals: A systematic review. Human Resources for Health. 2021; 19(1):1-9. [DOI:10.1186/s12960-021-00574-3]

[17] Gozali A. Employee psychological analysis: Communication, self esteem, and self efficacy. Akademik. 2022; 2(3):111-9. [DOI:10.37481/jmh.v2i3.475]

[18] Taghva F, Rezaei N, Ghaderi J, Taghva R. Studying the relationship between critical thinking skills and students' trainingal achievement (Eghlid Universities as case study). International Letters of Social and Humanistic Sciences. 2014; 25(2):18-25. [DOI:10.18052/www.scipress.com/ILSHS.25.18]

[19] Qiang R, Han Q, Guo Y, Bai J, Karwowski M. Critical thinking disposition and scientific creativity: The mediating role of creative self-efficacy. The Journal of Creative Behavior. 2020;54(1):90-9. [DOI:10.1002/jocb.347]

[20] Yosefi S, Bagherpur M. [The effectiveness of training based on multiple intelligence theory on problem-solving skills and critical thinking skills of students (Persian)]. Research in School and Virtual Learning. 1970; 6(3):53-64. [DOI:10.30473/etl.2019.5406]

[21] Ricketts JC, Rudd RD. Critical thinking skills of selected youth leaders: The efficacy of critical thinking dispositions, leadership, and academic performance. Journal of Agricultural Training. 2005; 46(1):32-43. [DOI:10.5032/jae.2005.01032]

[22] Pakmehr H, Mirdrogi F, Ghanaei A, Karami M. Reliability, validity and factor analysis of ricketts' critical thinking disposition scales in high school. Quarterly of Trainingal Measurement. 2013; 3(11):33-54. [Link]

[23] Eizadifard R. [Effectiveness of cognitive-behavioral therapy with problem solving skills training on reduction of test anxiety symptoms (Persian)]. International Journal of Behavioral Sciences. 2010; 4(1):23-7. [Link]

[24] Muris P. Self-efficacy questionnaire for children. Journal of Psychopathology and Behavioral Assessment. 2001; 23(3):145-9. [DOI:10.1023/A:1010961119608]

[25] Habibi M, Tahmasian K, Ferrer-Wreder L. Validation and standardization of Persian version of self-efficacy questionnaire children. Journal of Applied Psychology. 2007; 1(4):5. [DOI:10.1037/a0036059]

[26] Khalilipoor Darestani M, Komeili A, Jalili Z. The effect of trainingal intervention based on the health belief model on improvement of preventive behaviors towards premenstrual syndrome (PMS) among girls of pre-university in Tehran. Iranian Journal of Health Training and Health Promotion. 2017; 5(3):251-9. [DOI:10.30699/acadpub.ijhehp.5.3.251]

[27] NikPay E, Farahbakhshs S, Yousefvand L. [The effect of training self-regulated learning strategies on critical thinking of students (Persian)]. Journal of School Psychology. 2017;6(3):116-35. [DOI:10.22098/jsp.2017.588]

[28] Liu Y, Pásztor A. Effects of problem-based learning instructional intervention on critical thinking in higher training: A meta-analysis. Thinking Skills and Creativity. 2022; 45:101069. [DOI:10.1016/j.tsc.2022.101069]

[29] Hacioğlu Y, Gülhan F. The effects of STEM training on the students' critical thinking skills and STEM perceptions. Journal of Training in Science Environment and Health. 2021; 7(2):139-55. [DOI:10.21891/jeseh.771331]

[30] Jafari Y, Peyman N. Effect of training program on students stress training, based on self-efficacy theory. Journal of Health Literacy. 2019; 4(1):33-42. [DOI:10.22038/jhl.2019.40178.1052]

[31] Khoy Nejad G, Rajaei A, Nazemi SMR. [The effectiveness of academic self-efficacy training on trainingal injuries and academic success in second grade high school students (Persian)]. The Journal of New Thoughts on Training. 2020; 16(3):191-212. [DOI:10.22051/jontoe.2020.31199.3035]

[32] Kooshki M, Keramati H, Hasani J. [The effectiveness of self-efficacy training on academic stress and social skills of female students (Persian)]. Journal of school psychology. 2018; 7(2):196-213. [DOI:10.22098/jsp.2018.700]

[33] Yedemie YY. Evaluating the influence of self-efficacy, trepidation of stigma, and previous counseling experience on university students' attitudes toward psychological and social counseling: implications for intervention. International Quarterly of Community Health Training. 2020; 40(2):115-23. [DOI:10.1177/0272684X19859692]

[34] Schönfeld P, Brailovskaia J, Bieda A, Zhang XC, Margraf J. The effects of daily stress on positive and negative mental health: Mediation through self-efficacy. International Journal of Clinical and Health Psychology. 2016; 16(1):1-10. [DOI:10.1016/j.ijchp.2015.08.005]

[35] Wray E, Sharma U, Subban P. Factors influencing teacher self-efficacy for inclusive training: A systematic literature review. Teaching and Teacher Training. 2022; 117:103800. [DOI:10.1016/j.tate.2022.103800]

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