

Design and Validation of a Desirable Model for Developing Critical Thinking in The First-Grade High School Curriculum Based on The Upper Documents of Education in Iran

Saber sharifi¹, Maryam Seif Naraghi^{2*}, Ezatollah Naderi³ and Qodsi Ahghar⁴

1. PhD student, Department of Psychology and Educational Science, Science and Research Branch, Islamic Azad University, Tehran, Iran
2. Professor, Department of Psychology and Educational Science, Science and Research Branch, Islamic Azad University, Tehran, Iran
3. Professor, Department of Psychology and Educational Science, Science and Research Branch, Islamic Azad University, Tehran, Iran
4. Associate professor, Department of Psychology and Educational Science, Science and Research Branch, Islamic Azad University, Tehran, Iran

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Abstract

Purpose: The purpose of this study was to design and validation of a desirable model for developing critical thinking in the first-grade high school curriculum based on the upper documents of education in Iran.

Methodology: This research is an evaluation study which the field research has been used in doing that. In this study, three methods were used to collect data. With reviewing the literature review of the research, the components of common critical thought by various theorists and researchers were specified then, the national curriculum was analyzed with respect to the components of critical thought. In the next step, the proposed model was designed and validated according to the components emphasized in the upper documents. A researcher-made questionnaire was used for validation. The research community consists of all curriculum practitioners who are as permanent members in Iranian Student Planning Association (500 people). In this research, simple random sampling method was used for sample selection and Morgan table was used to determine the sample size (217 ones). **Findings:** In addition to descriptive statistics, Chi-square method with an acceptable error rate of 0.05 was used for data analysis. The results of the research indicate that all the hypotheses and the appropriateness of the proposed model have been confirmed by specialists. **Discussion:** According to the results of the research Reviewing the objectives, content, learning activities and evaluation practices in Iranian first-grade high school education system with emphasis on developing the critical thinking in students can be proposed.

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* Corresponding Author Email: mseifnaraghi@yahoo.com

1. Introduction

Understanding the information that learners constantly interact with is a fundamental problem in education. Educational instructors have to review their role in order to create ever-increasing social changes and focus on teaching skills and methods that students need to it for dealing with the current situation. One cannot deny the fact that though is the basis of education and the development of talent of thinking is the most important and perhaps the main goal of education.

2. literature review

According to the results of the researches that are discussed in the second chapter, the critical thinking is disregard in many cases such as the educational activities, learning and even the content of the course. In these circumstances, the most important points to the mind of any curriculum specialist is the neglect of the subject in the upper documents of the educational system which kind of directs and determines all educational and educational activities and learning; secondly, there is no program and an appropriate pattern for curriculum development to foster this ability. Accordingly, in this research, the researcher attempts to identify the components of critical thinking based on a comprehensive study of the subject review (the viewpoints of topic theorists and literature review) and studying the position of the components of critical thinking in the upper documents of the education system in Iran in order to design and validate a good model for developing critical thinking in the first-grade high school curriculum. The purpose of educational systems is to educate students as the future makers of the society. Education as the two main concepts sometimes is defined and interpreted wrong by some individuals. Education or training emphasize on the transfer, delivery, presentation and consolidation of values, beliefs, behaviors, tendencies, attitudes, knowledge, skills, and so on in a variety of fields, but nurture pays attention to the strengthening, establishment, prominence and manifestation of human attributes or traits that are universal and harmonious with human nature and entity regardless of the temporary cultural and social conditions which is accepted and appreciated by all people in all places and times (Seif Naraghi & Naderi, 2016; 4).

Undoubtedly, one of the universal traits and harmony with human nature is thinking; one of the most valuable human abilities that manifests its superiority over other beings by thinking. It is therefore necessary to develop the ability to think. Human thinking becomes objective in many ways. One of the most important forms of thinking is critical thinking. In most countries of the world, the educational system is designed in such a way that an individual is taught the understanding and interpreting issues, analyzing the content, evaluating and judging, and ultimately the logic of critical thinking. In this process, teachers, students, school administrators, curriculum librarians, etc. (all of who are kinds of factors and elements involved in education) play a valuable and effective role. The students need to learn not to accept thoughts and information intact, and to think appropriately according to the critical thinking to accept or reject them. In the present situation, and in the future conditions, people are constantly subjected to information, which should be evaluated and judged by the own person. It can be argued that without the ability and critical thinking tendencies in the current societies, people will now have valuable and fruitful positions in the current societies. Critical thinking is defined by most philosophers of education as one of the most important task of education to prepare students for effective participation in a community. In many cases, critical thinking defines an enlightened person. The ability to think critically is a necessary skill in today life. It is necessary to ensure that young people have the power of flexible and creative thinking in the present world, which changes much faster than the rest of the eras (Hove 2011, 2).

When the educators are setting the purpose for education, thinking is definitely one of the priorities. Critical thinking has always been considered as the most important and most used type of thinking, and it can

be somehow claimed that the most educators consider it as the main purpose of the education system. In the third millennium, when people face a variety of complex issues, there is no possibility of mastering information which is increasingly being produced and accumulated, having critical thinking skills to judge the results of affairs and decide on them based on evidence is inevitable (Moradi Mokhles et al. 41, 2014). Given the unique characteristics of critical thinking, specialists have provided countless definitions that can be cited in several examples:

Barbara Fowler (quoted from Abbasi Yadkooi, 2002:22) has compiled and criticized ten definitions of critical thinking from a variety of people, as follows: 1) Critical thinking is rational decision-making about what to believe and what not to believe (Nowruz, 1985). 2) Critical thinking is to test and evaluate the functionality of the proposed solutions (Lindsey, Hall and Thompson 1987). 3) Critical thinking is the formulation of logical inference (Simon & Kaplan, 1989). 4) Critical thinking is the development of coherent and logical argument patterns. (Estelle and Estelle, 1991). 5) Critical thinking is a deliberate and informed determination of acceptance and rejection or suspended judgment (Moore and Parker, 1994).

Critical thinking is the great ability that students must learn at school to evaluate the hearings, readings and beliefs they face in their lives and make logical decisions about them (Seif, 2015, 394).

The main factor in critical thinking is the ability to design related questions and review solutions without proposing alternatives. However, some of the elegant elements of critical thinking do not show a very clear connection with the utility of the problem-solving approach (Ebli, 2014, 11).

Logic and problem solving, in spite of their limitations, are a useful departure point for more specific approaches of critical thinking. In general, critical thinking in all disciplines combines the basic elements of rational argument with elements, in particular those dealing with the right judgments by inferring or utilizing inductive argument. In the same way, critical thinking often takes the form of problem solving or analysis in each discipline (Ebli, 2014, 12).

However, in many scientific texts, the elements of critical thinking are considered to be the same as solving the problem, but these two have differences with each other. Critical thinking, unlike problem solving, does not end with a solution and Critical Thinking, unlike the linear process of problem solving, is a set of abilities that allow one to simply facilitate each linear step in the problem-solving process (Neyestani and Imam Verdi, 2015, 32-33).

In all definitions, there are common features that are the essential features of life in the present age.

Braytr describes how to teach intellectual skills and believes that such skills should form the exclusive focus of educational systems (Mehrmohammadi, 2015, 159).

The intellectual skills have a significant relationship with the components of critical thinking; these components are categorized in two groups to Neyestani and Imam Verdi (2015, 92) views: A) Cognitive skills (such as analyzing, interpreting, evaluating, and self-regulation). B) Tendencies (negligence, analyticity, truthfulness, maturity, systematic, curiosity and confidence)

These components create a variety of critical thinking skills in individuals. Critical thinking skills are a group of skills including analysis, deduction, and argument that have been important in the last thirty years and philosophers, psychologists and educators attempt to research, identify, develop and evaluate them (Alfonso 2015, 1).

Dialogue-based learning, using question-based designing techniques, collaborative learning, problem solving-based learning, project-based learning, and case-study learning are constructivist learning strategies that mentors can develop the students' critical thinking through that (Neyestani and Imam Verdi 2015, 139). Before the development of critical thinking, it must be done in three areas: knowledge, behavior, and authority (Ashkan, 1394, 24-23).

Considering critical thinking in Islamic civilization can be clearly seen. In the Golden Age of Islamic Civilization and the establishment of the Beit Al-Hakma of Baghdad, Greek sciences were carefully translated and criticized. Muslim scholars thought and added with the critical approach about the sciences that had survived from the past civilizations such as Greece, Iran and India. Undoubtedly, the philosophy that the West borrowed from Islamic civilization and great philosophers such as Ibn Sina and Ibn Rush, was more advanced than the Muslims got by translation from Greece (Mokhber Dezfoulie, 2014, 14).

Several studies have been done on the position of critical thinking in the educational system, which is briefly summarized below: In their research, Hatami et al. (2009, 105) examined the critical thinking position in the high school implemented curriculum and concluded that the level of attention to critical thinking in the programs

implemented by public schools is not favorable. The situation of nongovernmental schools is more appropriate in this regard. Education specialist has expressed concern about the low ability of students to think critically, and they have realized that attention and commitment to this goal have been somewhat forgotten in educational systems (Atakheri et al. 2011, 1041). The existence of an optimal curriculum for developing critical thinking can be a great remedy for many problems. The curriculum, as a set of rules and regulations, makes logical all the elements of learning, and organizes the learning system (Maleki 1391, 21). The results of Alfonso's research (2015-1) indicate the educational system's focus on critical thinking skills in Colombia. In his research, Paul discovers a lack of attention to critical thinking in the American educational system (Osareh 2010.61). Hill (2006, 462), examining the American educational system, concluded that his educational system was in conflict with democratic characteristics and critical thinking.

In his research, Howe (2011,2) showed that critical thinking has a positive effect on the academic performance of high school students, higher education, and economic and environmental activities. Anderson et al. (2001) in a study on peer interaction and learning critical thinking skills in learners concluded that critical thinking can be increased through directed and guided exercises as well as peer interactions. In another study by Brunson (2008), titled as "Critical Thinking in the Distance Education Center" showed that applying critical thinking skills in distance education courses based on the Internet as the core of the education has had a great impact on the students' learning and academic achievement. Don and Bob (2001) in their study, titled as "increasing of students' critical thinking skills using the communication showed that participating in the course has increased the critical thinking skills of students; it can be inferred that critical thinking skills can be trained.

Ishri and Shefali (2015) in a research titled "Critical Education for the Future in Indian Education", showed that critical education can help creating a more democratic society. To do this, the following items are needed: 1) Holding more democratic classes. 2) Teachers with a democratic perspective. 3) Preparing the conditions for theory and practical teaching of critical thinking. 4) Insistence on Student Independence.

Kathleen (2014) in a research on "developing critical thinking skills in students with learning disabilities through online problem-based learning" concluded that problem-based learning as an educational approach brings critical thinking to successful students. Also, the problem-based education on critical thinking skills in online learning environments has a higher effect on students with learning disabilities than normal ones. According to the results of the mentioned researches, it can be concluded that the curriculum is important as a critical factor in the development of critical thinking. This research is trying to the following questions: 1) The proposed features of the desired curriculum objectives for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists. 2) The proposed features of the desired curriculum content for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists. 3) The proposed features of the learning activities of desired curriculum for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists. 4) The proposed features of the evaluation method of desired curriculum for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists. 5) The proposed curriculum model for developing critical thinking based on the upper documents of Iran education first-grade high school is valid from Iranian curriculum specialists' point of view.

3. Methodology

According to the nature and purpose of this study, this research is an evaluation study type, in which the researcher uses the field research method. In this type of researches, the attention of the researcher is to point out the important and effective factors that affect the recognition of past and present or the study of the variation of a particular case (Naderi & Seif Naraghi, 2016; 49).

The field research requires specialization and planning, combined with an initiative, analysis and accurately interprets the data collected and providing a professional and logical report of the findings (Sharifi, 2015, 254).

In the course of the research, content analysis activity has also been used. The content analyst analyzes the required content in terms of defined or predetermined criteria. Therefore, the type of analyst's activity is the content analysis (evaluation). If during the course of doing it, he studies and searches for criteria or indexes in the content, in this case, he has been used the descriptive research method (Naderi and Seif Naraghi, 2016, 181).

The descriptive method is used because the researcher himself studies and searches criteria and indexes. The statistical population of the study consisted of all curriculum specialists who are as permanent members of the Iranian Student Planning Association (500 students). In the research, a simple random sampling method was used to select a sample from society (curriculum specialists). In this type of sampling, the studied signs or units are selected for the sample group in the way that all of them have the opportunity to be equalized in choice and each choice is independent of other choices (Naderi and Seif Naraghi 1395, 126-125). 217 individuals were selected randomly based on Morgan's table from the statistical population of the study.

4. Findings

In this study, three methods have been used to collect the data. According to the review the literature review of the research, common components of critical thinking were identified from the viewpoints of various theorists and researchers. In this section, Bloom's revised classification was used as the dominant theory and its last three classes: analysis, evaluation, and composition (creation) were selected as common components for review. In order to evaluate the extracted components, the components were delivered to the three specialists, along with their definitions, their examples, the subject, the goals, and the research questions, which were confirmed.

Table 1. Conceptual Matrix of Critical Thinking Components for Content Analysis

Row	The class name	Definition	Example in the document text of national curriculum	Code
1	Analysis	Breaking a subject into its components or elements, in such a way that the hierarchy of thoughts is clearly displayed and the relationship between the non-expressed thoughts are specified.	Example One: In the domain of Persian language and literature, the students are acquainted with a systematic structure and elements of language instruments in a manner that is both enlightening and scientific. second example: In the field of mathematical	1

			<p>education, one of the goals of providing the platform for the growth and development of observation, description is the analysis of the perimeter environment.</p> <p>Example 1: In the realm of culture and art, the students gain the ability to critique and evaluate artwork. Second example: In the field of education and learning of wisdom and Islamic education, it is emphasized the thought in the meaning of the power of measuring and evaluating the findings based on the standard system (Islam).</p> <p>Example 1: Students in the field of learning Persian language and literature acquire the ability to create, write and create literary works. Second example: in organizing the content and teaching artistic education, the students are</p>	
2	Assessment and judgment	<p>judging by using valid criteria about the value of the subject matter for a given purpose</p>		2
3	Composition (creation)	<p>Putting together elements and components to create an integrated whole and produce design that were not already in the present form.</p>		3

focused on
creativity and the
application of
different senses in
diverse artistic
formats.

After determining the components of critical thinking, the national curriculum is divided into four sections according to the features of the text and research questions, and the text was reviewed by specifying the unit of analysis that is the subject of this research. The theme is the most valuable unit that should be considered in the analysis of the content, and the content means a special meaning derived from a word or sentence or paragraph (Yousefzadeh & Maroufi, 2011; 136).

A re-test method was used in accordance with the process of this study (content analysis) in order to calculate the reliability. In this method, the content will be reviewed in two steps and the issues that are subject to dispute, will be reviewed. In this study, the content of the curriculum document was analyzed in two steps with the time of one month; in both cases, the same and similar cases were abandoned as agreements, and items that were difference were reviewed. The following formula was used to calculate the reliability:

$$C.R2 = \frac{2M}{N1 + N2}$$

M is the number of cases of agreement in two encoded turns, N1 is the number of first codes and N2 is the number of second-order codes (Saroukhani 2013, 144-156). The reliability coefficient is 96% in this study. In the next step, the proposed model was designed according to the components emphasized in upper documents and special purposes, questions and the research hypotheses. A researcher-made questionnaire was used from curriculum specialists' point of view to validate it. The questionnaire consists of ten questions about the research hypothesis, which is designed as a five-point (very high-high-medium- low, very low) Likert Scale. Multi-specialists view has been used to determine the validity of the subject. Cronbach's alpha test was used to determine the reliability coefficient. Cronbach's test, alpha or the reliability of the questionnaire is a statistical test that results is a factor called the Cronbach's alpha. A proposed template and a validation form for members of the association were sent to validate through the official electronic channel of the Iranian Studies Curriculum Association.

Descriptive and inferential statistics were used in this study. The descriptive statistics were used in addition to the use of tables, charts etc. for tabulating and frequency tables, mean, etc. According to the research purpose (expected and observed frequency difference), the scale of measurement (nominal and value), the number of statistical samples (the answers of the questionnaire questions were in 5 spectra which 44 people are placed in each class, according to a sample with 217 ones), and the type of distribution (abnormal), Chi square test (inferential statistics) was used to validate the designed pattern. Chi square test is used when the data is as frequency, nominal, and value (Delaware 2015, 406).

Table 2. General statistics of the search sample based on job, age, marital status and gender

Variables											
job				age			marital status		gender		
academic	education	student	other	Younger than 30	Between 31 to 40	Between 41 to 50	Older than 50	Married	single	female	male
39	100	49	29	54	94	59	10	135	82	136	81

Number of Samples, Standard Deviation, Mean, Minimum and Maximum Score of Subjects in Research Variables

Table 3. Descriptive Data of the Desirable Curriculum Objectives Variable

variable	number of samples	Standard Deviation	Mean	Minimum	Maximum
Desirable Curriculum Objectives	217	2.773	32.42	16	35

The information in Table 3 indicates that the number of samples, standard deviation, mean, lowest and highest score of subjects in the curriculum objectives variable is desired.

Table 4. Descriptive data of the desired curriculum content variable

variable	number of samples	Standard Deviation	Mean	Minimum	Maximum
desired curriculum content	217	4.517	50.37	24	55

The information in Table 4 indicates that the number of samples, standard deviation, mean, lowest and highest score of subjects in the curriculum content variable is desired.

Table 5. Descriptive data of the desired curriculum learning activities variable

variable	number of samples	Standard Deviation	Mean	Minimum	Maximum
desired curriculum learning activities	217	4.491	55.11	32	60

The information in Table 5 indicates that the number of samples, standard deviation, mean, lowest and highest score of subjects in the curriculum learning activities variable is desired.

Table 6. Descriptive Data of desired Curriculum Evaluation Variable

variable	number of samples	Standard Deviation	Mean	Minimum	Maximum
desired Curriculum Evaluation	217	2.421	32.24	23	35

The information in Table 6 indicates that the number of samples, standard deviation, mean, lowest and highest score of subjects in the curriculum evaluation variable is desired.

Table 7. Descriptive data of curriculum pattern variable

variable	number of samples	Standard Deviation	Mean	Minimum	Maximum
curriculum pattern	217	12.370	170.15	109	185

The information in Table 7 indicates the number of samples, standard deviation, mean, lowest and highest score of subjects in the curriculum pattern variable.

B. Inferential statistics

First Hypothesis: The proposed features of the desired curriculum objectives for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view.

Table 8. Chi square test results on the subjects' scores in the desired curriculum objectives variable

The proposed features of the desired curriculum objectives for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view.	Freedom degree	X ²	Significance level	result
	13	293.64	0.000	Rejection of null hypothesis

The null hypothesis is rejected according to the results of chi-square test and the significance level given in Table 8 and its comparison with the allowed error at level 0.05. It means that the proposed features of the desired curriculum objectives for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view (sig=0.000, df=13). Therefore, the first hypothesis of the research can be confirmed according to these results.

Second Hypothesis: The proposed features of the desired curriculum content for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view.

Table 9. Chi square test results on the subjects' scores in the desired curriculum content variable

The proposed features of the desired curriculum content for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum	Freedom degree	X ²	Significance level	result
	20	308	0.000	Rejection of null hypothesis

specialists' point
of view.

The null hypothesis is rejected according to the results of chi-square test and the significance level given in Table 9 and its comparison with the allowed error at level 0.05. it means that the proposed features of the desired curriculum content for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view (sig=0.000, df=20). Therefore, the first hypothesis of the research can be confirmed according to these results.

Third Hypothesis: The proposed features of the desired curriculum learning activities for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view.

Table 10. Chi square test results on the subjects' scores in the desired curriculum learning activities variable

The proposed features of the desired curriculum learning activities for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view.	Freedom degree	X ²	Significance level	result
	21	249.86	0.000	Rejection of null hypothesis

The null hypothesis is rejected according to the results of chi-square test and the significance level given in Table 10 and its comparison with the allowed error at level 0.05. it means that the proposed features of the desired curriculum learning activities for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view (sig=0.000, df=21). Therefore, the first hypothesis of the research can be confirmed according to these results.

Forth Hypothesis: The proposed features of the evaluation method of desired curriculum for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists.

Table 11. Chi square test results on the subjects' scores in the desired curriculum evaluation variable

The proposed features of the desired	Freedom degree	X ²	Significance level	result
	12	216.07	0.000	Rejection of null hypothesis

curriculum evaluation for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view.

The null hypothesis is rejected according to the results of chi-square test and the significance level given in Table 11 and its comparison with the allowed error at level 0.05. it means that the proposed features of the desired curriculum evaluation for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view (sig=0.000, df=12). Therefore, the first hypothesis of the research can be confirmed according to these results.

Fifth Hypothesis: The proposed features of the curriculum pattern for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists.

Table 12. Chi square test results on the subjects' scores in the curriculum pattern

The proposed features of the curriculum pattern for developing critical thinking based on the upper documents of Iran education in the first-grade high school are appropriate from Iranian curriculum specialists' point of view.	Freedom degree	X ²	Significance level	result
	44	178.46	0.000	Rejection of null hypothesis

The null hypothesis is rejected according to the results of chi-square test and the significance level given in Table 12 and its comparison with the allowed error at level 0.05. it means that the proposed features of the curriculum pattern for developing critical thinking based on the upper documents of Iran education in the

first-grade high school are appropriate from Iranian curriculum specialists' point of view (sig=0.000, df=44). Therefore, the first hypothesis of the research can be confirmed according to these results.

Table 13. General Results

Research variables	chi-square	Significance level	Result
Desired curriculum objectives	293.64	0.000	Rejection of null hypothesis
Desired curriculum content	308	0.000	Rejection of null hypothesis
Desired curriculum learning activities	249.86	0.000	Rejection of null hypothesis
Desired curriculum evaluation	216.07	0.000	Rejection of null hypothesis
curriculum pattern	178.46	0.000	Rejection of null hypothesis

5. Discussion

In this research, five hypotheses were analyzed using Chi-square statistical method. The results are: A) According to the result of analyzing the first hypothesis, the proposed features of the desired curriculum objectives for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists. B) According to the result of analyzing the second hypothesis, the proposed features of the desired curriculum content for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists. C) According to the result of analyzing the third hypothesis, the proposed features of the learning activities of desired curriculum for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists. D) According to the result of analyzing the fourth hypothesis, the proposed features of the evaluation method of desired curriculum for developing critical thinking based on the upper documents of education in Iran in the first-grade high school is appropriate from the perspective of Iranian curriculum specialists. E) According to the result of analyzing the fifth hypothesis, the proposed curriculum model for developing critical thinking based on the upper documents of Iran education first-grade high school is valid from the perspective of Iranian curriculum specialists. F) Accordingly, it can be argued that the proposed curriculum model and its sub-scales for developing critical thinking based on the upper documents of Iran's education in the first-grade high school is desired from Iranian curriculum specialists' point of view. According to the results of the research, the following suggestions can be proposed: 1) Reviewing the objectives, content, learning activities and evaluation practices in Iranian first-grade high school education system with emphasis on developing the critical thinking in students. 2) Training the qualified specialists with the ability to think critically in the field of the first-grade high school curriculum planning in Iran. 3) Training the critical teachers and having the ability to think critically in order to coordinate and align with the new education system, emphasizing the development of critical thinking in the first-grade high school students of Iran. 4) Incorporating suggestions presented in the form of critical thinking development model in the first-

grade high school education system 5) According to the results of the research, we can propose a model for developing critical thinking in the. first-grade high school students of Iran education system.

It is recommended that the proposed model for developing critical thinking in the first-grade high school students of Iran education system be investigated in a quasi-experimental method. It is suggested that similar research be done in other educational courses. As a research project, it can be measured the level of knowledge and interest of experts, teachers and students about the critical thinking. It is suggested that the content of textbooks be analyzed in all educational courses according to the components of critical thinking.



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