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Designing a Curriculum Model Based on Critical Thinking and Examining Its Application among Undergraduate Students at the University Of Isfahan (A Mixed Method Design)

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Abstract

The present study aimed to design a curriculum pattern on the basis of critical thinking and its use among the undergraduate students of Isfahan University. This research is applied in terms of purpose using a mixed method in data collection. The research method in the qualitative part is content analysis and the tool used to collect data was note-taking. As the statistical population of this study, in the qualitative section, of all written sources gathered by targeted sampling method, only critical- thinking related sources were selected as the research samples. In the quantitative part, the research method was descriptive-survey and the tool was a researcher-made questionnaire whose content validity was examined by experts and its reliability using Cronbach's alpha was 0.94. The statistical population in this section included the faculty members of the University of Isfahan, and based on Morgan and Krejcie tables, 230 of them were selected by sampling method appropriate to the size of the statistical population. According to the results of this study in the qualitative part, the characteristics of the elements of the curriculum model based on critical thinking were extracted and in the quantitative part the results showed that the curriculum model on the basis of critical thinking is used by faculty members among undergraduate students.

***Keywords**:* Content, critical thinking, evaluation method, goal, teaching method

Introduction

One of the main goals of any educational system is to train conscious and knowledgeable people who base their thinking on correct and logical reasoning, in dealing with the world around them with comprehensive and deep thoughts to examine various aspects of affairs and have a high degree of flexibility in dealing with life issues. Undoubtedly, the most important difference between human beings and other creatures at first sight is their power and way of thinking because thinking is a complex form of human behavior and the highest form of intellectual and mental activity that is determined in the form of a cognitive process with the help of symbols. Therefore, the value of every human being is to think well of him. Therefore, thinking and the skill of thinking correctly is one of the important issues that have always occupied the minds of thinkers for a long time (Karimian, Nateghi & Seifi, 2017). One of the priorities of educational systems in fostering thinking is critical thinking. Critical thinking and the rule of dialogue help people to avoid extremism and conservatism and to analyze life issues logically and empathetically. The common characteristic of extremist intellectuals is that they see the current situation as a time of tensions and difficulties, and are extremely concerned about the gap between what is and what is not. Conservative thinkers, on the other hand, accept the status quo without engaging in constructive dialogue and making any critical assessments. But critical thinkers and those who adhere to the principles and foundations of dialogue try to find an empathetic way to recognize and change the logic of life by avoiding extremist discouragement

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and despair and avoiding conservative stagnation and happiness (Sharifi et al, 2018). Critical thinking has emerged as one of the most highly coveted skills to enable education, life and work success in the innovation age and there are many definitions related to it, for example: Zapalska et al. (2018) believed critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. Giancarlo and Facione (2001) defined critical thinking as 'purposeful, self-regulatory judgment, a human cognitive process. As a result of this non-linear recursive process, a person forms a judgment about what to believe or what to do in a given context (Erikson & Erikson, 2019). In the introduction to Critical Thinking in Psychology, Alan Bensley emphasized the teachability of critical thinking (Karimian, Nateghi & Seifi, 2017), but to achieve critical thinking, one must transfer insights and thinking skills from one content to another. It is clear that critical thinking is not easy to cultivate without planning; therefore, it is very important to address critical thinking through curricula. Also, due to environmental changes, learners need to solve problems, evaluate hypotheses and different content, for this purpose, critical thinking should be considered in the curriculum, throughout the education. The curriculum refers to formal and informal content, process, content, overt and covert instruction through which the learner, under the guidance of the school, acquires the necessary knowledge, acquires skills, and tendencies, appreciations, and it changes values in itself (Talib & Ostad Abbas, 2017).

The results of a study by James and Hartzler (2016) entitled "Assessing the Progress of Critical Thinking Skills in the Columbus University of Ohio Pharmacy Curriculum" showed that based on math scores, students in particular have developed innovative and problem-solving skills that show they implement new ideas and multifaceted approaches when solving problems. In a study by Pascarella et al. (2014) and Steve (2015) to design a critical curriculum for high school, it was concluded that intellectual skills should be considered and In its design, attention should be paid to cognitive and emotional goals, horizontal and vertical organization of content, teaching methods, and evaluation tools. Paul (2014) in a Delphi study on the evaluation of nursing students' critical thinking in the clinical setting concluded that there is a relationship between curriculum and the development of critical thinking skills of nursing students, provided that the curriculum should be designed in a way to enhance students' critical thinking skills. Also, Alipour et al. (2013) in a study entitled "Reflections on Barriers to Critical Thinking in High School Curriculum" concluded that lack of attention to skills' analysis, composition, evaluation, judgment and summarizing this lack of attention in the Curriculum program elements (purpose, content, teaching method and evaluation) can be seen as one of the obstacles to critical thinking in high school curriculum.

Critical thinking is one of the basic dimensions of human existence and its cultivation causes human growth and can be achieved through human intellectual characteristics and learner activity (Blaghat, Haidarzadegan & Islami, 2017). The critical mind can think and examine instead of repeating what previous generations did, and it matters. According to Beer, critical thinkers are also skeptical; they have a chest; think freely; are valuable; value evidence and reasoning; emphasize the accuracy and clarity of the argument; they look at the issue from different angles; if they find reasons to change their position and intellectual position, they change them and use different methods such as questioning, arguing, identifying and questioning the hypotheses (cited in Karimian, Nateghi & Seifi, 2017). Therefore, in this research, the researchers felt the need to design a curriculum model based on critical thinking and to examine its application among undergraduate students. Thus, the main question that arises in the qualitative part of this research was:

What are the characteristics of each of the elements of the curriculum model based on critical thinking (purpose, content, teaching method and evaluation method)?

And in quantitative part of this study, the attempt was to see if the curriculum model (goal, content, teaching method, and evaluation method) based on critical thinking is applicable among undergraduate students.

Method

This research is divided into three categories according to its purpose: basic research, research and development, and applied research (Taybi Abul Hassani, 2019). However, in terms of the method of data collection, this research uses a mixed method, in which the researcher first collects qualitative data and

then quantitative data and prioritizes data collection with qualitative data (Sajjadi et al, 2013).

Participants

The statistical population in the qualitative part of the study were written sources and the statistical sample includes written sources that are related to critical thinking, which have been selected using targeted sampling method and the members participating in the quantitative research section are 569 faculty members of the University of Isfahan using Morgan and Krejcie tables (Khoi Nejad, 2001), 230 of them were selected by Sampling method appropriate to the size of the statistical population that due to the non-return of the questionnaire by some sample members and the distortion of a number of questionnaires, the data on 205 sample members were finally analyzed. Among the members participating in the study, 35 are female professors and 170 are male professors. 110 professors were selected from the humanities department, 57 from the basic sciences department and 38 from the technical and engineering department. In terms of teaching experience, 36 people with one to five years of teaching experience; 66 people with six to ten years; 34 people with eleven to fifteen years old; 29 people with sixteen to twenty years old; 14 people with twenty-one to twenty-five years old and 26 people with teaching experience of 26 years and older and based on academic rank, 124 people with the academic rank of assistant professor; 60 people were associate professors and 21 people were professors.

Table 1.
Demographic Characteristics of Sample Members

Variable	Classes	frequency	Frequency percentage
Gender	**Female**	35	17.1
	Male	170	82.9
Department of Education	**human Sciences**	110	53.7
	Basic sciences	57	27.8
	Technical and engineering	38	18.5
Teaching Experience	**One to fifty years**	26	17.6
	Six to ten years	66	32.2
	Eleven to fifteen years	34	16.6
	Sixteen to twenty years	29	14.1
	Twenty to twenty-five years	14	6.8
	Twenty-six years and older	26	12.7
Academic Rank	**Assistant Professor**	124	60.5
	Associate	60	29.3
	Full Professor	21	10.2

Instruments

The tool used in the qualitative part of research is inductive content analysis, which the researchers used to go beyond counting words alone or extracting the objective content that existed in the quantitative analysis, and moved towards receiving meanings from texts, patterns and themes and in the quantitative part to collect data, a researcher-made questionnaire in the form of a five-point Likert scale ranging from strongly agree (5) to strongly disagree (1) was used. Prior to its distribution among the sample members, the validity of its content was reviewed and confirmed by experts and its reliability calculated using Cronbach's alpha for the whole questionnaire was 0.93 and for the goal scales was 0.91, the content was 0.78 , Teaching method, 0.85 and evaluation method, 0.80 which is shown in Table 1.

Table 2.
Cronbach's Alpha Coefficient of the Research Questionnaire and Questionnaire Scales

Questionnaire Type	Scale	Number of items	Alpha coefficient
Questionnaire on the application of the curriculum model based on critical thinking for undergraduate students	**goal**	10	0.88
	content	10	0.72
	teaching method	10	0.83
	Evaluation method	10	0.83
	Total	40	0.94

Procedure

In order to answer the questions of the qualitative part of the research in content analysis, the note taking tool was used, which is used to write a summary of written sources in order to easily extract textual data and to classify and codify that data in a short time. In the quantitative part, in order to analyze the data, SPSS software and one sample t-test were used to answer the question of whether the elements of the curriculum model based on critical thinking are applicable among undergraduate students.

Findings

Question 1: What are the characteristics of goal based curriculum model on the basis of Critical Thinking?

Table 3.
Characteristics of Goal Based Curriculum Model on the Basis of Critical Thinking

characteristics of goal curriculum model based on critical thinking	Statements related to the goal curriculum model based on critical thinking
-Effective and skillful thinking.	- Critical thinking is effective and skillful thinking (Beyer, 1985).
-Deep vision and logical questioning of any subject.	- Critical thinking means accepting the fact that others have beliefs that are different from ours (Razavian Shad & Sultan Al-Qaraei, 2010).
-Ready to face the competitions and challenges of today's highly volatile world.	- Critical thinking creates a mental-physical power in a person that prepares her for the highly challenging competitions and challenges of the current changing world (Paul, 1993).
- Meaningful learning. - Motivation to learn.	- Usually in the process of critical thinking, the individual mind inevitably uses meaningful learning to understand a new phenomenon. (Mirz, 1942) - Teaching critical thinking leads to motivation to learn (Stoner, 1999).
-Freedom from coercion. - Enlightenment.	- Critical thinking is the ability to recognize expose abuses of power (Haj Hosseini, 2014). - In critical thinking, we want to be clear (Seifuri, 2009).
-Collect new information. -Evaluate previous information with new information. -Combining deductive and inductive reasoning and achieving a new solution.	- The ability to think critically, process and evaluate previous information with new information and is the result of combining deductive and inductive reasoning in the problem-solving process (Mohammadi Mehr, 2014).
- Having a balanced view. -Listening and getting to know the views of others. -Achieve a comprehensive view.	- Enniss (1985) considers one of the characteristics of critical thinking as not having prejudice and listening to the views of others and achieving a comprehensive view.
- Self Confidence. - Efficacy. - Questioning	- Learning critical thinking and applying it builds confidence in people (Enniss, 2002). - It provides the necessary ground for the development of critical thinking of people with high self-efficacy (Jafari & Rasoulzadeh, 2015). - the core of critical thinking skills is questioning (Paul, 2007)
- Creativity. - Hypothesized. - Risk taking.	- Critical thinking includes actions such as creativity (Baker, Rudd & Pomeroy 2001) hypothesizing (Razavian Shad & Sultan Al-Qaraei, 2010) and having a spirit of risk-taking (Emir, 2009).
-Awareness of one's point of view and its evaluation and correction.	- Hashemiannejad (2001) in defining critical thinking says: It is a logical thinking in order to review and revise his ideas.

According to Table 3, goal based curriculum model on the basis of Critical Thinking includes components such as effective and skillful thinking, insight, readiness to face challenges, meaningful learning, freedom, problem solving, lack of prejudice and rationality, self-confidence - self-efficacy, questioning,

creativity-hypothesis-risk-taking, recognizing and recognize and correct your point of view.

Question 2: What are the characteristics of content-based curriculum model on the basis of Critical Thinking?

Table 4.
Characteristics of Content-Based Curriculum Model on the Basis of Critical Thinking

characteristics of content curriculum model based on critical thinking	**Statements related to the content curriculum model based on critical thinking**
-Use a variety of resources.	-Critical thinking must be included in the curriculum in order to access a variety of resources (Echhorn, 2002).
- Open content, analyzed and tailored to learners' understanding.	-The content of the curriculum based on critical thinking should be open, analyzed and appropriate to the learners' understanding (Talebzadeh, Moosapour & Hatami, 2009).
-Use concise and practical content.	- Reducing the content of the course and providing more discussion among learners provides the ground for further development of critical thinking (Bijnvand, Zarghami Hamrah, Ghaedi & Mahmoudnia, 2013).
-Using up-to-date and real community topics in content.	-Common teaching methods deliver people with a lot of theoretical information to the society who are unable to solve the smallest problems of the society in the future (Ghasemi, Mohajeri, Eskandari & Ab Roshan, 2013).
-Learners' participation in choosing curriculum content.	-According to Farireh, learners contribute to the selection of educational content (Raji, 2012).
-Do not use definite and unchangeable content.	- According to Giroux, knowledge of curriculum in critical education should not be considered a sacred text (Giroux, 2003).
- Challenging content.	- In a critical thinking curriculum, content should be a problem for learners (Hosseini Rad & Alamdari, 2011).
-The relationship between new content and cognitive construction of learners.	- Critical curriculum content should be designed to support what is being learned (Mashayekh, 2012).
-Organizing and communicating the components and concepts of content.	- In order to cultivate critical thinking, all teachers at all different levels of education are advised to emphasize the correlation of content concepts (Shabani & Mehr Mohammadi, 2000).
- Coordination of content with intellectual processes.	- The development of thought processes while providing content leads to the development of critical thinking skills (Javidi & Abdoli, 2010).

According to Table 4, the content-based curriculum model on the basis of Critical Thinking include components such as diverse content, content tailored to learners 'understanding, concise and practical content, content relevant to the topic of the day, learners' participation in content selection, and content that can be changed, Challenging content, content tailored to learners' cognitive construction, coherent content, and content tailored to thought processes.

Question 3: What are the characteristics of teaching-based curriculum model based on Critical Thinking?

Table 5.
Characteristics of Teaching-Based Curriculum Model Based on Critical Thinking

characteristics of teaching method curriculum model based on critical thinking	Statements related to the teaching method curriculum model based on critical thinking
-Applying guidance method in teaching. -Using the learner's interaction with the environment in teaching.	- In teaching critical thinking, the teacher should facilitate learning and not be a content (Maghsoudi, Etemadifar & Haqqani, 2010).
-Using discussion, dialogue and questions and answers in teaching.	-Eisner (1983), arguing that the sole purpose of education should be to strengthen the discourse and debate of learners in the classroom.
-Using the conceptual mapping method in teaching.	- Conceptual mapping is also a way to develop thinking skills that expand high levels of thinking and lead to the development of critical thinking skills (Seif, 2009).
-Using problem solving methods in teaching.	- Cognitive psychologists associate critical thinking with problem-solving (Halpern, 1998).
-Applying the teaching method of teacher caliphs in teaching.	-Using non-skilled learners along with a more skilled learner can provide a breeding ground for critical thinking for these learners (Maghsoudi, Etemadifar & Haqqani, 2010).
-Application of experimental knowledge and evidence in teaching.	-Evidence-based education provides the ground for cultivating critical thinking (Pudineh Moghaddam et al., 2015).
-Forming working groups. -Using a research project in learning. - Exercising the members of the group.	- The teaching method of curriculum based on critical thinking should include elements of forming working groups (Lowenstein & Bradshow, 2001), research (Seif, 2009) and playing the role of group members (Simpson & Courtney, 2002).
-Application of information technology in teaching.	- The results of McMahon's study (2009) suggest that there is a statistically significant correlation between study in a technology-rich learning environment and the development of critical thinking skills.
-Application of case study method in teaching.	- Young Blood and Bates (2001) clarified that active learning techniques, including case studies, had a positive effect on students' critical thinking.
-Using the learning cycle in teaching.	- Learning cycles, through the application of the principles of empirical and collaborative learning theory, develop critical thinking (Maghsoudi, Etemadifar & Haqqani, 2010).

According to Table 5, the teaching method curriculum model based on critical thinking includes components such as guiding and research teaching method, dialogue-based teaching method, conceptual mapping teaching method, problem-solving teaching method, caliphate teaching method, evidence-based teaching method, teamwork teaching method, information technology-based teaching method, case study-based teaching method and application of learning cycle in teaching.

Question 4: What are the characteristics of Evaluation-based curriculum model on the basis of Critical Thinking?

Table 6.
Characteristics of Evaluation-Based Curriculum Model on the Basis of Critical Thinking

characteristics of goal curriculum model based on critical thinking	Statements related to the evaluation method curriculum model based on critical thinking
-Evaluation based on what has been learned.	- evaluation based on memorization forces learners to parrot-like memorize and does not develop any critical thinking skills in them (Talebzadeh, Musapour, & Hatami, 2009).
-Evaluation of important and practical materials.	- Critical thinking-based evaluation should be based on important and practical content (Vajdani, 2015).
-Evaluation based on work report and practical activities.	- In the critical thinking curriculum, evaluation is done in the form of project and project reports (Yousefzadeh, 2010).
-Evaluation based on objective observation and behavioral changes.	in evaluating students' critical thinking, changes in their attitudes and skills should be evaluated (Ennis, 2002).
-Evaluation based on thoughtful processes and solving real and up-to-date issues of society.	- In order to foster critical thinking, students can be asked in an evaluation session to try to find a solution to the real problems of society (Silva, 2009).
-Evaluation based on reason, evidence and logical evidence.	- In the Critical thinking-based evaluation emphasizes the use of reason to support oral and written statements (Simpson, 2002).
-Applying short and frequent evaluation.	- Shorter tests, problem-solving exercises, and brief simulations more than articles and tests that are returned weeks and months after they are done provide the basis for critical thinking (Billings & Hulsted, 2009).
-Evaluation based on retrospective and descriptive questions.	- In Salimi's study, Balandemtian and Yari (2016) entitled Curriculum and Critical Thinking, 'Evaluation methods' based on open-ended questions and analytical questions in order to cultivate critical thinking skills gained the most points and were approved.
-Using the working folder method in evaluation.	- The Work folder is used as a way to improve critical thinking skills (Bijnvand, Zarghami Hamrah, Ghaedi & Mahmoudnia, 2013).
-Using analytical questions and asking how to analyze a situation.	- In critical thinking evaluation, it is better to ask students to explain the processes and rules used to arrive at the answer (Brandt, 2005).

According to Table 6, the evaluation-based curriculum model on the basis of Critical Thinking includes components such as learning-based evaluation, evaluation based on important and practical content, evaluation based on practical activities, evaluation based on behavioral changes, evaluation based on real solving problem, evaluation based on reason and evidence, short and frequent evaluation, evaluation based on open-ended questions, the use of a workbook in evaluation, and the use of analytical questions in evaluation.

Question 5: Is the curriculum model (purpose, content, teaching method and evaluation method) based on critical thinking applicable among undergraduate students?

Table 7.
The Results of the One Sample T-Test of the Application Critical Curriculum Model Elements Based on Critical Thinking by Faculty Members Among Undergraduate Students

Variable	Average	standard deviation	t	df	sig
Goal	4.0976	0.53600	29.318	204	0.000
Content	3.6486	0.49265	18.855	204	0.000
teaching method	3.7644	0.57193	19.136	204	0.000
Evaluation method	3.6834	0.57626	16.980	204	0.000

According to Table 7, in the application of the elements of the curriculum model based on critical thinking, in the goal element: t = 29.318 and sig = 0.000; in the content: t = 18.855 and sig = 0.000; in the teaching method: t = 19.136 and sig = 0.000 and in the evaluation method: t = 16.980 and sig = 0.000,

therefore, it can be concluded that the application of elements of the curriculum model based on critical thinking by faculty members is significant among undergraduate students.

Discussion and Conclusion

Critical thinking is one of the most important goals of higher education, which allows students to gain the ability not only to be easily influenced by the vast amount of data but also to distinguish between right and wrong information due to advances in technology and information explosion. But before taking any action to achieve this goal, we need a curriculum model in order to pass this skill to students, therefore, in this study the design of the curriculum model based on critical thinking and its application among undergraduate students of the University of Isfahan was selected to provide a tool for teaching critical thinking and to examine whether this model is applicable among undergraduate students, the results of which are as follows:

As illustrated in Table 3, content analysis showed that in the curriculum model based on critical thinking, attention should be paid to goals such as effective and skillful thinking, independent thinking, organized thinking, exploratory thinking, and logical thinking. Also, in the model of critical thinking-based curriculum, we should seek to create a profound view and investigate the logic of each subject and something in the learners. Learners need to be prepared to face the competitions and challenges of today's highly variable world. Creating meaningful learning and motivation in learners should be regarded as a goal. It is also necessary to cultivate a spirit of freedom from coercion and enlightenment in learners. Developing the skills of gathering new information, evaluating previous information with new information, and combining deductive and inductive reasoning and achieving a new solution should be regarded as a goal. Creating a balanced view of students and strengthening the ability to listen and to get acquainted with the views of others and achieve a comprehensive view should be considered as a goal. Self-confidence, self-efficacy, and questioning are among the goals of a Curriculum based on critical thinking, and fostering hypothesizing skills, creativity, and risk-taking are among the components of a Curriculum based on critical thinking.

The method of content analysis of written sources showed that in the curriculum model based on critical thinking, one should look for content that has been prepared by referring to various sources. Also, the content of the curriculum model based on critical thinking should be considered as open, analyzed content and appropriate to the learners' understanding. The use of concise and practical content is another feature of content of the curriculum based on critical thinking. The next feature of content of the curriculum based on critical thinking is the use of up-to-date and real community topics in the content. Learners' participation in choosing curriculum content is another feature of content of the curriculum based on critical thinking. The next feature of the content of the curriculum based critical thinking is non-use of definite and unchangeable content for learners. Another feature of this scale of curriculum model based on critical thinking is the selection of challenging content. Other features of the curriculum based on critical thinking include the relevance new content to learners' cognitive structure. The next feature of the content scale is the organization and relationship of the components and concepts of the content to each other, and the last feature of the content of the curriculum model based on critical thinking is that this type of content must be consistent with thought processes.

Also, the qualitative method of research showed that in the teaching method based on critical thinking, guiding methods should be used in teaching and the learner's interaction with the surrounding environment. Students should receive the teaching method based on discussion and question and answer. Also the conceptual mapping method, the problem solving method, and the caliphate method or substitution should be used in teaching trying to combine knowledge and empirical evidence in teaching. In teaching, the formation of group works, the use of a research project in learning and the role of the members of the group should be emphasized together with the use of information technology and demonstration methods in teaching. A case study method should be prescribed for students to learn and the teaching cycle method should be used in teaching.

Furthermore, the content analysis method showed that in the curriculum model based on critical thinking, evaluation should be based on what has been learned. In evaluation based on critical thinking, evaluation should be done with important and practical materials. Evaluation should be based on students' work reports and practical activities. In this type of evaluation, the objective observation of learners and the changes made in them should also be considered. Another feature of this type of evaluation is to perform evaluation based on thoughtful processes and solving real and up-to-date problems in society. Another feature of this scale is the curriculum model based on critical thinking, evaluation based on reason, evidence

and regional evidence. The next feature of the curriculum model based on critical thinking is the use of short and frequent evaluations. The use of open-ended and descriptive questions is one of the solutions to the critical thinking-based evaluation method. The folder method is one of the methods used in this type of evaluation, and the use of analytical questions and the question of how to analyze a situation is characteristic of this type of evaluation. These results are consistent with the results of Yousefzadeh (2010) studies because he concluded that in order to develop intellectual skills, including critical thinking, in designing the curriculum we should consider cognitive goals (knowledge, understanding, application, analysis, synthesis and evaluation), horizontal content organization (discipline parallelism, interdisciplinary and transdisciplinary), vertical content organization (simple to difficult, whole to except, spiral, knowledge structure, interest in disciplines, objective to subjective and Problem to discovery), teaching method (group problem solving method, lecture, question and answer, exploratory and demonstration) and evaluation tools (written and oral tests, project and plan reports, classroom behavior observation, group and self-evaluation Evaluation). Also, Talib and Ostad Abbas (2017) in a study concluded that in order to develop critical thinking skills among high school students more attention should be paid to the elements of their curriculum including purpose, content, teaching method and evaluation method from the perspective of critical thinking.

Data analysis showed that faculty members use elements of curriculum model based on critical thinking in undergraduate students' curriculum based on thr results of the one sample t-test at the goal scale with a value of t= 29. 318 and P= 0/000< 0/05 (significant level), the content scale with a t value of = 18. 855 and P= 0/000< 0/05 (significant level), the scale of teaching method with the amount of t= 19.136 and the value of P= 0/000< 0/05 (significant level), and the scale of the evaluation method with the value of t= 16.980 and P= 0/000< 0/05 (significant level). Therefore, it can be concluded that the components of each element of the curriculum model based on critical thinking are used by faculty members in undergraduate student curriculum and they seek to develop this skill in undergraduate students to deliver challenging people with critical thinking skills. Instead of dealing with the problems of the society, they seek to find a way to solve these problems. Hatami, Ahmadzadeh and Fathi Azar (2012) in their study on the views of Payame Noor University professors on the application of critical thinking in the teaching process concluded that these professors in the teaching process of the elements that cultivate critical thinking consider critical thinking skills to include skills such as comprehensiveness of thought, flexibility in thinking, being an analyst, and having listening skills.

Research Suggestions

Finally, all professors of the education system, especially the higher education system, are advised to do more research in their field of study on how to use critical thinking in the curriculum, not only in the goal element. It should also be used in other elements of the curriculum, including content, teaching methods and evaluation methods. They should familiarize with all new methods and techniques for using critical thinking in the curriculum as much as possible, incorporate critical thinking skills into the curriculum and teach students that these skills are appropriate to the values and culture of our society, and according to the importance of critical thinking, the authorities should provide sufficient facilities for faculty members to use critical thinking in the curriculum.

The researchers were very careful in conducting the present study, however, some factors have been out of the researchers' control, which have caused limitations in the research including that the application of the curriculum model based on critical thinking among undergraduate students of the University of Isfahan is limited to students of this level and it is not possible to generalize the results to students of other levels or other universities. Therefore, future researchers are recommended to design the curriculum model for other intellectual skills and to examine the application of critical thinking skills in other universities and educational levels.

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