Critical Thinking in Higher Education: Unfulfilled Expectations

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Abstract

Success in adult life and effective functioning in education depends among other things on critical thinking. The present study consisted of two parts. First, critical thinking (CT) skill of a group of 68 students majoring in education in Islamic Azad University, Kermanshah Branch was evaluated. The participants, divided into two experimental and control groups, received California Critical Thinking Skills Test (CCTST) which is a 34 item Multiple-Choice test. The students in the control group were freshmen and the experimental group, junior students. To the researchers' dismay, junior education students did not perform significantly better than did the freshman students. Using a qualitative method of research, another study was conducted to see whether the university instructors in the education department who had the responsibility of teaching different courses to the same students were aware of the principles of CT. A semi-structured interview was conducted and eight volunteering faculty members in the department of education took part in the interview. Result revealed that, although these instructors highly valued CT and were aware of its tenets, there were some constraints which did provide a situation to let the students practice CT in their classrooms, and much had to be done to help instructors implement CT in their classrooms.

Key words: critical thinking, instructors' belief, top down educational system, inductive reasoning

1. Introduction

With everyday advancement and progress in different areas of technology in the world today, especially in the area of communication and information technology, one may assume that students must be merely trained to be able to cope with this progress in technology; however, success in adult life depends on, among other things, the capacity for (CT); purposeful and goal-directed cognitive skills or strategies that increase the likelihood of a desired outcome (Halpern, 2002). Put another way, human beings, especially students must be trained CT skills to be able to think critically for their future career (Badri and Fathi Azar, 2006). As Hongladarom (2002) holds, "It is widely recognized nowadays that CT has become a necessary ingredient in all levels of education. Educators and educational policy makers agree that one of the desirable goals of education is that students are able to think critically" (P. 1). There are some other scholars (e.g., Yeh, 2002) who put more emphasis on CT skills and suggest that success in school greatly depends on CT skills. Accordingly, extensive bodies of literature focus on CT (e.g., Browne & Keeley, 2001; Ennis, 1987; Resnick, 1987) and applications of CT in education (e.g., Henderson, 2001; O'Tuel & Bullard, 1993; Pogrow, 1990, 1994; Raths, Wasserman, Jonas, & Rothstein, 1986; and Torff, 2003). Last but not least, Paul and Nosich (1991) believe that developing CT skills in educational settings engenders intellectual empowerment. Students use their minds as thinking instruments. In fact, they change into more effective readers, writers, speakers, and listeners. These skills and abilities are also highly transferable to work place.

As to what CT is and what its role can be in education, Bauerlein (2011) notes,

> Instruction in CT is to be designed to achieve an understanding of the relationship of language to logic, which should lead to the ability to analyze, criticize, and advocate ideas, to reason inductively and deductively, and to reach factual or judgmental conclusions based on sound inferences drawn from unambiguous statements of knowledge or belief. . . including an understanding of the formal and informal fallacies of language and thought (p. 2).

However, if CT is not practiced at schools, students may not have the opportunity to learn the skills from any other source. This means that they will lose the chance to get the necessary skills for their future life and career. In that case, they will not be well-prepared or even prepared enough for what is waiting for them in the future. Weil (2009) believes, "It is dangerous to neglect CT. An inability to assess information critically, especially in an Internet age of massive information and misinformation, leads to an inability to participate honestly and realistically in a democracy." (p. 2). Too, in another part of her paper, she very briefly states, "… an absence of CT in educational settings will lead to a lack of academic rigor." (Weil, 2009, p. 3).

Duron, et al., (2006) argued that despite the fact that thinking as a natural process is taken for granted, but "when left to itself, it can often be biased, distorted, partial, uninformed and potentially prejudiced; excellence in thought must be cultivated" (p. 160). In the same vein, Black (2005) states that students' thinking skills can be improved if they are instructed to do so. However, it seems that instructors' assumptions regarding the importance and practicality of CT are critical in this regard.

For the past fifteen years, the concept of instructors' belief has come into favor in education. Based on Yin (2006), there are a number of sources which influence instructors' traits and greatly affect the development of their personalities. The first source comes from instructors' personal experience and understandings as an individual. Every individual develops his own understanding and interpretation of the world after birth. A second source of instructors' beliefs is the experience each one has obtained from his own experience when he was a student. Instructors, as human beings, seldom forget the school days and the kind of education they had in schools. Sometimes these are so vivid that can be a model for an instructor's instruction. A third origin of instructors' beliefs is their formal knowledge acquired through training whether in in-service sessions or in instructor education centers. The fourth source of beliefs is instructors' contexts of work. The context in which instructors practice, has a great influence on their philosophy of teaching and instructional approaches. There is a great pressure in schools on naïve instructors to conform to the practice of more experienced ones.

Lauer (2005) notes that instructors who conceive their roles as disseminators of knowledge may have different ideas about CT and the way it should be incorporated into classroom activities than those who play the role of mediators and perceive teaching as enabling students to think for themselves and identify their own duties as imparting necessary skills and strategies to students. Whenever an instructor has the role of the mediator, based on Williams and Burden (1997), interaction happens between the learner and him/her and the learner becomes an active participant of the learning process. On the contrary, when an instructor perceives his/her role as disseminator of information, there is less attention to students' input and feedback. In such a situation the instructor is solely in control of the teaching situation.

What is CT

In traditional teaching classes, instructors often use didactic instruction in their teaching process. In this kind of instruction, information and facts are transmitted to students, the whole class is teacher-centered, and students are assumed to be passive participants (Qing, et al., 2010). As the sole authority, the instructor is entrusted with the responsibility of taking care of everything. With the minimum amount of interaction, students passively receive the lectures copy down. In this kind of instruction, students know nothing. Instructors think, while students are taught. Instructors talk, while students listen. Students have to comply with whatever instructors choose. As Duron, et al., (2006) notes, "Passive thinkers suffer from a limited and ego-centric view of the world; they answer

questions with yes or no and view their perspective as the only sensible one and their facts as the only ones relevant" (p. 160).

Such a view of education is regarded detrimental to students' learning since the role of learner is regarded to be passive. What has assumed to liberate students from the passive state, in the current views of education (Erkilic, 2008) is thought to be CT (Lang, n.d.).

There is no consensus regarding the exact definition of the term 'CT'. It is often linked with creative thinking, problem-solving, and decision-making as well as inductive and deductive reasoning. However, Howe (2004) believes that terms such as creative thinking, problem-solving and decision-making refer to the circumstances in which CT may occur. Conversely, some educational philosophers argue that CT is inductive, encompassing, divergent, and creative thinking skill. Others recognize it as primarily deductive, convergent, and logical in nature. Halpern (2002) defines CT as:

> Cognitive skills and strategies that increase the likelihood of a desired outcome…thinking that is purposeful, reasoned, and goal-directed; the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions. (p. 4).

Duron, et al., (2006) identify CT as a scientific endeavor:

> CT is, very simply stated, the ability to analyze and evaluate information. Critical thinkers raise vital questions and problems, formulate them clearly, gather and assess relevant information, use abstract ideas, think open-mindedly, and communicate effectively with others. (p. 160).

Based on the literature, a person who thinks critically, asks appropriate questions. In order to answer the question, he gathers relevant information, reasons logically from this information, and comes to conclusions which are reliable. Such a discipline of thinking not only enables students to be successful at school but also improves their thinking skills and thus better prepares them for after-school life.

Birjandi & Bagherkazemi (2010) hold that a critical thinker has the following features:

- has a strong intention to recognize the importance of good thinking;
- identifies problems and focuses on relevant topics and issues;
- distinguishes between valid and invalid inferences;
- suspends judgments and decisions in the absence of sufficient evidence;
- understands the difference between logical reasoning and rationalizing;
- is aware of the fact that one's understanding is limited and that there are degrees of belief;
- differentiates between facts, opinions and assumptions;
- watches out for authoritarian influences and specious arguments;
- anticipates the consequences of alternative actions. (p. 137).

CT cannot be learned by direct teaching (Howe, 2004). However, as Howe (2004) notes, it can be incorporated into all different subject areas. Since as he maintains, "CT often requires imagining possible consequences, generating original approaches, or identifying alternative perspectives" (p. 508). Any form of human activity may involve CT. Moreover, in different cultures, people may have different conceptions of CT, though there may exist commonalities among them regarding what CT is. It seems that while there are different definitions for CT in the world, one of the purposes of education in all modern systems of education is preparing students for after-school life.

Instructors' perception of learning has a great influence on their behaviors in the classrooms (Choy & Cheah, 2009). Instructors who are not aware of the effectiveness of CT, as well as those who cannot implement it in their classrooms may have to comply with the traditional perspectives of education and have passive students who are not active participants in the classrooms. Browne

and Freeman (2000) hold that CT comes in different forms; however, those classrooms which encourage CT have some distinguishing features as follows:

a) Frequent questions: One of the students' activities which most likely develops CT is a classroom in which frequent questions are asked and answered. Of course by questions Browne and Freeman (2000) do not surely mean the questions which are solely related to fact questions and therefore are part of low critical activity (Torff, 2005). According to Browne and Freeman (2000) "CT can be usefully conceptualized as … knowing how to seek answers to questions and enjoying the process of asking them at appropriate times" (p. 303).

b) Developmental tension:

Sometimes a little uneasiness and tension may foster learning. Thinking sometimes is accompanied with uncertainties and doubt. Such an uncertainty may encourage students to seek solutions and find appropriate ways out of the dilemma. The authors emphasize that "the process of value change depends on learners' awareness of contradictions, tension and confusion in their current belief system" (Browne and Freeman, 2000, p. 305).

c) Fascination with the contingency of conclusions

Students have to learn to be open to different opinions and critically appraise the possible truth in them. Classrooms which develop CT encourage commitment, but also give the insight to students to frequently re-examine those commitments to their own ideas as they encounter new logic, evidence, and different accounts.

d) Active learning:

Most lecturers, especially those at universities, tend to be transmitters of body of facts or knowledge to the audience who passively are supposed to acquire those facts. However, those who favor CT have different approach and try to develop active learning in students by letting them have active participation. Too, they provide a situation in which students are affectively involved in the discussions.

CT is an important life skill for people today (Mimbs, 2005). Instructors need to model CT skills to their students and explicitly teach them to think critically. Instructors can be transformed in their teaching and students can be transformed in their learning through continued and consistent use and application of CT skills.

Since instructors are decision-makers in classrooms, and they are mainly responsible for students' learning, exploring certain issues regarding their beliefs about CT seems to be necessary. Instructors in different contexts in Iran have valued didactic system of education and have been expected to do so. Research regarding instructors' beliefs, especially university instructors, about CT is scarce. The impetus for this study was that one of the present researchers had a long contact with some of the PhD students of this study who in numerous informal contacts with the researcher showed to be knowledgeable in their field of study; however, based on the informal interview of the researcher with the head of department, these two instructors' teaching was lecture-based and they gave little opportunity to students to participate in classroom discussion, seek answer to the question and even worse, they were given no chance to critically appraise what they study. A cursory look at the final exams, given by these two instructors revealed the fact that nearly all items were directed toward assessing students' shallow learning.

1. Is there any significant difference between CT skills of Freshman and Junior education students?
2. What are university instructors' perceptions of CT?
3. What constrains, if any, impedes instructors from implementing CT in their classrooms?

2. Method

The design of the research was both qualitative and quantitative since both a test and an interview were employed.

2.1. Participants

To do the present study, 8 completely and well-educated university instructors (5 PhD holders and 3 PhD students) with a high command of CT skills were selected. All of the instructors were either holding PhD or they were studying for their PhD in Education. They were, to the researcher's knowledge, very studious and knowledgeable in their related fields and in informal meetings held in the department (the researcher's department and those of the instructors' were in the same place) they showed to know enough about the philosophy of education and current views on education. From among these 8 instructors' classes which had been taught for three consecutive semesters, some 36 subjects were randomly selected. Then 32 students in the department (freshmen) who were new to the university were selected randomly to form a control group.

2.2 Instruments

In this study, the authors used a 34 item multiple-choice test together with a an interview.

The first one was California Critical Thinking Skills Test (CCTST) Facione & Facione (1992). The test contains 34 multi-choice questions with a correct answer in the five CT cognitive skills domain. The reliability and validity of the test were reported to be reasonable. In fact, the test coefficient for reliability was .62. Factor Analysis indicated that CCTST has been formed from 5 factors (elements), namely: Analysis, Evaluation, Inference, Inductive and Deductive Reasoning (Khallli & Hossein Zadeh, 2003).

The second instrument was a semi structured interview based on Choy and Cheah's (2009) questionnaire. The modified questions were as follows:

1. From your perspective, what is CT?
2. Do you think that CT happens in your classroom when you are teaching your students? If so, how do you know?
3. How do you think you could bring about CT among students? Specifically, what are some things you do or could do to get your students to think critically?
4. What are the problems faced by students when you are trying to teach them CT? If so identify them.
5. Do you think you need to give all the information to your students in order for them to learn your subject? Why and why not?
6. Do you think you would be able to implement CT into your lessons if you were required to do so? Why and why not?

2.3. Procedures

The 34 item Multiple-Choice test was given to all of the subjects (both control group subjects who were new to the university and the experimental group subjects who have had at least three consecutive classes with the same instructor).

An interview was also held in which eight participants were required to answer a total of 6 questions. All the instructors who voluntarily took part in the study had taught some courses in the Islamic Azad University, Kermanshah branch. They accepted to answer the questions at the university and felt free to add any comments and express their ideas freely.

3. Results

To see if there was any difference between the experimental and control groups regarding their responses to the 34 item multiple-choice test (CCTST), the authors used an independent samples t-test. The results show that there was no specific difference between the mean and standard deviation of the experimental and control groups. (See Table 1).

Table 1. Descriptive Statistics of Exp. & Control Groups for Multiple-Choice Test

	MCTestGroup	N	Mean	Std. Deviation	Std. Error Mean
MCTest	Experimental	36	8.39	2.309	.385
	Control	32	8.00	2.794	.494

As Table 1 shows, the mean and standard deviation of the experimental groups are 8.39 and 2.309, while the mean and standard deviation of the control group are 8.00 and 2.794. It can be seen that there is no specific difference between the two groups regarding their mean and standard deviation. Too, the researchers used an independent samples t-test to see if the difference between the two groups was meaningful. (See Table 2)

Table 2. Independent Samples t-test for Experimental & Control Groups in Multiple-Choice Test

	Levenes's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of Difference	
	F	Sig.	t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	Lower	upper
Equal Variances assumed	.413	.523	.628	66	.532	.389	.619	-.847	1.625
Equal Variances Not Assumed			.621	60.356	.537	.389	.626	-.863	1.641

According to Table 2, the amount of observed t with 66 degree of freedom and 95% confidence interval of difference is .628, which is not meaningful at all. This means that there is no meaningful difference between the experimental and control groups regarding their answers to the Multiple-Choice test of CT. In other words, those students who were in the aforementioned classes for three consecutive semesters were not better than the freshmen who were new to the university in answering the MC test of CT. But, what can be the reason for this. To answer this question, we went to our second instrument, i.e., the interview. In fact, the interview was a modified form of Choy and Cheah's (2009) questionnaire. As mentioned above, the interview consisted of six questions. Below are the responses given by the instructors to the six questions.

Instructors' perception of CT

All instructors gave comprehensive definitions of CT. Six out of eight participants wrote that CT is the ability to ask appropriate questions about different phenomena and find answer to the questions. They noted that to find answers to the questions one has to look for relevant information and interpret the information in light of inductive and deductive reasoning. The others, who had nearly the same opinion, held that in order to be a critical thinker one has to distinguish facts from opinions. What was the distinguishing characteristic of a critical thinker to his opinion was the power of ration as they believed. One of the participants remarked that CT has to do with higher order thinking and problem solving activities.

Does CT happen in the instructors' classroom when they are teaching their students? If so, how do they know?

Seven respondents explicitly and implicitly indicated that they did not have CT in real sense in their own classrooms. However, as they explained whenever they ask students to look at facts from a new perspective, a sort of CT happens in the classroom. Six of the instructors were more critical of their own teaching and explained that since their teaching was predominantly lecture-based and they did not give students enough opportunity to freely express themselves and above all, since there was little democracy in the classroom, no CT occurred in the course they taught.

How do instructors think they could bring about CT among students? Specifically what are some of the things they did or could do to get their students to think critically?

All the participants answered that asking students to do research or project works is the best activity to encourage learners think critically and go through the stages of CT. They also emphasized posing questions to the students and asking them to find answers to the questions. Three of the participants wrote that providing a suitable environment improves the situation to have CT in the classrooms; however, they did not mention how such an environment should be established. One of the instructors answered this question by saying that establishing democracy in the classroom is very crucial for having critical thinkers. He wrote that "whenever the instructor is the sole speaker who does not allow students to express themselves, have their voice in the course, and takes the floor for the time he is in class, there is no likelihood of developing CT". Another participant believed that students should be problem solvers, asked to seek the solution via books, internet and different sources available.

What are the problems faced by students when an instructor is trying to teach CT?

Five participants expressed that they felt a pressure to cover the content in a short time; therefore, they had to lecture in order to cover more content in a shorter time.

Two of the instructors wrote that most of their students lacked the skills of judgment and enquiry and that they had accustomed to being given the most straightforward answers by the authorities. One of these two added that if they were left to themselves, they had no ability to decide how to study on their own.

One of the respondents answered that from the first days of schooling, his students "were not taught how to think", and they had been only "asked to cram materials in their heads for the exam". Therefore, as he believed "they resist higher order thinking."

Do the instructors think they need to give all the information to their students in order to learn the subject? Why and why not?

All the participants unanimously agreed that there is no need to provide their students with all the facts and information. All identified the CT as a process of enquiry in which students have to seek the answers to the questions posed by themselves or others.

Do the instructors think they would be able to implement CT in their lessons if they were required to do so? Why and why not?

Six out of eight participants argued that with the current state of affairs they were not able to implement CT in their classrooms. They believed that unless from the first days of schooling students are taught to think critically and solve problems, they would not to think critically. Moreover, they knew the system of education responsible for such a problem. They asserted that the curriculum is top down, assessment is based on memorization of materials, and pre-service instructor education universities do not seriously involve instructors in such a process.

Two other respondents agreed that it would be possible to incorporate CT in different degrees in their courses. As they believed such a shift toward CT may be slow and difficult but possible. They argued that such a shift could begin with instructor education centers and teaching materials. They insisted that workshops, seminars, pre-service and in-service courses for instructors can make instructors aware of the importance and process of CT.

4. Discussion and conclusion

CT is of great importance in education, and it should be taught to students in all educational settings (Black, 2005; Yeh, 2002); however, the findings of this study showed that while junior students of education were expected to be familiar with the skills of CT, it was not so at all. Thus, to find the reason, the study intended to investigate instructors' familiarity and view regarding the

issue. To this aim, an interview with six questions was held with the eight instructors with the following results.

As to the first question of the interview which asked the definition of CT, it seemed that all the participants were familiar with the term. However, what is not clear is whether they were familiar with the components of CT as well as its characteristics. Furthermore, further research is needed to see if the instructors are aware of how to implement practically CT in their usual courses. Despite lack of such information for the researcher, from the answers provided by the instructors and use of terms such as low CT activities, appraisal, and scientific inquiry by the instructors, it could be understood that they were aware of the related literature.

It is evident from the answers that nearly none of the instructors believed that CT happens in their classrooms. It is not surprising that though all the participants in the study were familiar with the concept in the field, they themselves may have been subjected to the same top down educational system in which students were well informed about the theories; however, had no power to implement what they had learned in the new contexts. Based on the responses, it was clear that the instructors were compelled to cover the content. To do so, they felt that they did not have enough time to *teach* what they taught to be the features of CT. Although in Iranian universities instructors are somehow free to choose the books and specify the content based on the guidelines prescribed by Ministry of Science and Technology, they have to cover some pre-specified goals and objectives of the courses especially for courses which are prerequisite for other university courses.

As the instructors reported, one of the barriers which was hard to tackle was that from the first days of schooling students in Iran have learned to be passive listeners whose freedom to have voice in the classrooms is very limited. Therefore, they lacked eagerness and were reluctant to spend extra mental effort required by high level thinking. Such a way of thinking in a class as a mini-society may be due to the cultural norms in the country. Davidson (1998) points out that that CT must be clearly defined and adapted culture-wise. If CT is not valued in the society, it may be likely to meet with opposition in schools and universities. Such an attitude even has molded instructors' expectations who would like to have everything under their control and not to overload students who prefer to be given the most straightforward information. Moreover, students in all years of schooling may already have experienced a pedagogy that rewards note taking and good recall of facts (Peirce, 1998). The consequence of such an education, as Peirce (1998) notes, is having students be more interested in the right answer than the way the answer is obtained.

It seems that instructors view CT as an activity which needs more time than the conventional methods of teaching. Perhaps, students need enough time to think about and explore the answers to the questions, raise their own questions, discover information, and construct their own models since CT as other approaches to constructivism, as Marlowe and Page (1998) note, "is about thinking and the thinking process rather than about the quantity of information a student can memorize and recite" (p. 11).

Wang (2009) notes that CT "is an ability that allows students to freely express their own ideas". As one of the instructors mentioned, students rarely have freedom to express themselves. Of course creating a condition in which students are able to have their say and participate in the process of decision-making may help them get more involved in deep learning.

To change such a situation and implement CT, as the instructors mentioned, are not easy. As van Gelder (2004) points out, while "…it can seem quite basic, it [CT] is actually a complicated process, and most people are just not very good at it (p. 2). It needs unanimous endeavor from the side of those responsible for developing curriculum, instructor education centers to give enough practical insights to the instructors, and workshops to maintain such an attempt.

CT effectively helps students to perform well both at educational settings and in after school life. It contributes to better decision making in the social and interpersonal contexts; therefore, attempts should be made to resolve the problems and constraints encountered by instructors to teach critically.

Further research with a sample of more instructors is needed to see if the instructors' beliefs are compatible with that of students. Instructors who took part in the study may not have

implemented CT only because they may have had wrong assumptions about their students' beliefs. They even my not have been aware of the techniques to implement CT.

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