

The Evaluation of Education Faculty Students' Critical Thinking Skills

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Abstract

The purpose of this study is to figure out accurate critical thinking level of students by determining whether students are well-cultivated critical thinkers, have alternative systems of thoughts, are able to come to well-reasoned conclusions and solutions. The research was conducted by sampling 3rd grade students of fall semester in 2014-2015 academic year studying at Departments of PSE-6-Primary Teaching, Social Studies Teaching, Science Teaching, Preschool Teaching and Mathematics Teaching of Education Faculty of Pamukkale University. By considering equal number of students in each departments, the study was realized through 100 students voluntarily participated in the study. Developed by Faciona and Faciona, Holistic Critical Thinking Scoring Rubric was used to determine critical thinking skills and levels of students. To analyze data, t-test and one-way analysis of variance (ANOVA) were employed. In the Rubric, students were asked to write an essay on a practice put into effect in primary schools in Turkey. Students' critical thinking skills were analyzed with respect to gender and department variables. Quantitative data were analyzed through SPSS .22 and content analysis were utilized to analyze qualitative data. According to research result, whereas department variable of candidate teachers did not affect critical thinking skills, gender variable were significantly different and in favor of female students. Findings demonstrated that 54 percent of candidate teachers were in the first level of six level rubric scales using their critical thinking.

Keywords: *Thinking, Critical Thinking, Critical Thinking Skills*

1. Introduction

In 21st century, the aim of societies is to raise individuals in accordance with their skills and interests. In our era, it is generally assumed that individuals brought up as to their interests and abilities are individuals with self-confident, self-respect and more importantly, they meet needs of participatory democracy. On the other hand, individuals with productive and efficient decision making skills are possible by cultivating critical thinkers. Therefore, critical thinking education is becoming increasingly important today. As Fisher (2001) stresses out, critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do.

Today, there are different definitions of critical thinking. For instance, Ennis (1985, 1993) defines critical thinking as reasonable reflective thinking that is focused on deciding what to believe or do while Rudd (2007) defines it as the formation of logical inferences, developing careful and logical reasoning, deciding what action to take or what to believe through reasonable reflective thinking. According to Ozdemir (2005), 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.

The most general definition of critical thinking is defined in wake of studies in 1990 by the leadership of American Psychological Association (APA) with the participation of 46 experts within the US and Canada. According to APA, critical thinking is "the process of purposeful, self-regulatory judgment. This process reasoned consideration to evidence, context, conceptualizations, methods and criteria."

An individual should have certain abilities to reach purposeful judgments. Demirel (1999) underlines that there are five main steps in critical thinking: consistency, combining, performing, sufficiency and communicating. Consistency is related to critical thinker who becomes self-aware of contradictions in thoughts and eliminates them. Combining refers to individuals building relations between dimensions of thoughts. As to performing step, it involves individuals having ability to practice their thoughts on a model. On the other hand, dimension of sufficiency refers to individuals having ability to ground their experiences and collected results on the reality. Communicating means sharing of thoughts through efficient and clear communication by critical thinker.

Critical thinkers always question information, conclusions, and points of view. They strive to be clear, accurate, precise, and relevant. They seek to think beneath the surface, to be logical, and fair. They apply these skills to their reading and writing as well as to their speaking and listening. They apply them in history, science, math, philosophy, and the arts; in professional and personal life. (Paul and Elder, 2006).

However, although individuals have certain abilities, they have difficulty in demonstrating these abilities when necessary. In fact, researches indicates that students often fail to use their thinking skills they are taught. (Perkins, Farady ve Bushey, 1991; Tishman, Jay ve Perkins, 1992; Wendy, 1992).

Individuals who lack critical thinking skills are not able to distinguish what they do and why. When they become aware of and are faced with conflicting thoughts, they seek ways to silence who defend that idea. They don't feel the need to innovate themselves. They stay in certain patterns. These people cannot be truly constructive and creative (Ozden, 2005).

According to Paul and Elder, a well-cultivated critical thinker raise vital questions and problems, formulating them clearly and precisely, gather and assess relevant information, using abstract ideas to interpret it effectively, come to well-reasoned conclusions and solutions, testing them against relevant criteria and standards; think open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and communicate effectively with others in figuring out solutions to complex problem.

The study assesses critical thinking aspects of students by determining their accurate critical thinking level and whether they are well-cultivated critical thinkers, have alternative systems of thoughts, able to come to well-reasoned conclusions and solutions. For this purpose, education faculty students' critical thinking skills are specifically assessed. One of the significant changes in 2005 primary school program in Turkey is the newly added statement to program's vision, namely, gaining critical thinking skills to students. Thus, the primary object of the study is to determine how candidate teacher think and then analyze their critical thinking levels who will be teaching critical thinking skills in the future. To make assessment, candidate teachers were asked to write their opinions on a topic comprehensively. As cited from Wade (1995) by Doğanay, Taş and Erden, writing helps students to handle the topic from a broader perspective, to improve their self-regulation skills and to learn actively. Writing is a powerful tool for students so as to express, elaborate, exemplify and define their opinions and thoughts on a disputable topic (Paul ve Elder, 2006). Rubrics are efficient assessment tools in evaluation of written texts. (Bers, 2005).

In this study, candidate teachers were asked to write an essay on a relevant topic in their fields expressing their opinions from different viewpoints. The students were asked to write an essay concerning the following question "What are your opinions on Non-uniform dressing practice in Ministerial schools in Turkey and its effect on political and cultural values?"

Purpose: The general purpose of the research is able to determine critical thinking levels of candidate teachers in the context of their competent in dealing with a specific issue in their branches socially, culturally, economically and in terms of child psychology. In line with this general purpose, following sub goals are presented:

Does critical thinking level of candidate teachers differentiate by gender?
 Does critical thinking level of candidate teachers differentiate by branch?
 What is the critical level of candidate teachers?

The Importance of the Study: The aim of the current 2004-2005 primary school program in Turkey is to encourage individuals for active learning putting aside passive learning and to raise individuals responsible for their own learning process. For this purpose, 2005 primary school program focuses on such skills as critical thinking, creative thinking, and communication, problem-solving, decision-making, entrepreneurial, respecting individual and social values.

To upskill students, teachers are expected to equipped with these skills. According to OECD (2009) reports, teachers do not meet these skills sufficiently. In this context, this study is considered important to find out whether candidate teachers meet these skills, to prepare result-oriented training programs and to fulfill the purpose of cultivating critical thinkers in 2005 program of Ministry of Education.

2. Method

Both quantitative and qualitative research methods were used in this study. The education faculty students were asked to write an essay on “Non-uniform dressing practice in Ministerial schools in Turkey and its effect on political and cultural values”. To determine effects of data on variables, quantitative research techniques were instrumented. Qualitative data were analyzed by using content analysis. Accordingly, written essays were analyzed to determine critical thinking aspects of faculty education students.

According to recent researches, such variables as educational level, gender, age, academic field, academic success, socio-economic level, participating in scientific and social activities, educational level of parents, parent’s occupation have an impact on critical thinking development. (Tüm kaya ve Aybek, 2008; Akar, 2007; Kaloç, 2005; Dam ve Volman, 2004; Gülveren, 2001). On the other hand, this research is based on such variables as student’s departments and gender.

Population and Sampling

The research participants are composed of 1003rd grade students voluntarily participated in fall semester of 2014-2015 academic year studying at Departments of Primary Teaching, Social Studies Teaching, Science Teaching, Preschool Teaching and Mathematics Teaching of Education Faculty of Pamukkale University. Equal number of students from each department was included.

Table 1: Distribution of Sample Group

Variable	Group	Frequency	%
Department	Primary Teaching	20	20
	Social Studies Teaching	20	20
	Science Teaching	20	20
	Preschool Teaching	20	20
	Mathematics Teaching	20	20
Gender	Female	76	76
	Male	24	24
Total		100	100

Data Collection Tools and its Implementation

Research data were collected through essays written by students. The questionnaire was divided into two parts. The first part involved questions about personal information and in the second part, the students were asked to write an essay concerning the following question “What are your opinions on Non-uniform dressing practice in Ministerial schools in Turkey and its effect on political and cultural values?”

The questionnaire was administered to 20 students for pilot scheme in the first place. As a result of pilot scheme, the administered was finalized and implementation proceeded.

Before implementation, the students were well informed about the topic and were given one hour course to state their opinions.

Developed by Faciona and Faciona (1994), Holistic Critical Thinking Scoring Rubric was used to determine critical thinking skills and levels of students. The Rubric was created utilizing from California Critical Thinking Skills Test (CCTST) and Critical Thinking Disposition Inventory (CCTDI) developed via Delphi Technique. The Rubric involves such elements as analysis, interpretation, evaluation, deduction, explanation and cognitive awareness. (Faciona ve Faciona (1994) op.cit., Doğanay, Akbulut-Taş ve Erden, 2007). The Turkish version of The Rubric and language validity were realized by Doğanay, Akbulut-Taş and Erden (2007). The Rubric has six levels as follows:

The first level is the level which opposite judgment is not stated; but individual's own opinion is presented without any justification or evidence and closed minded and bias are dominant.

The second level is the level which opposite judgments are taken into consideration yet underlying reason of these opposite judgments are not explained or appropriately explained, evidences are not indicated, bias continues and there are wrong inferences.

The third level is the level which individuals take a step to present evidence and justification for both their opinions and opposite claims, yet individuals fail to express and organize their thoughts, handle issues only from their point of view and there is one-sided inference.

The fourth level is the level which individuals state positive and negative thoughts on their own opinions and opposite opinions by presenting justification and evidence. Yet, individuals do not reach a balanced result embracing both views. Empathic and multiviewpoint are seen on this level.

The fifth level is the level which individuals state positive and negative thoughts on both their opinions and opposite opinions by presenting justification and evidence and reach a balanced in his/her evaluation. Favorable and unfavorable arguments, justifications and evidences are handled open-mindedly and interpret them accurately.

The sixth level is the level which individuals state positive and negative thoughts on both their own opinions and opposite opinions by presenting justification and evidence and reach a balanced in his/her evaluation. Favorable and unfavorable arguments, justifications and evidences are handled open-mindedly and interpret them accurately. (Doğanay, Akbulut-Taş ve Erden, 2007).

Data Analysis:

Having collected data, essays were evaluated in line with criteria previously determined. Another expert was asked to make an independent evaluation and it was concluded that there were not any difference of opinion.

In the research, gender and department are independent variables; on the other hand critical thinking levels are dependent variables. SPSS 22 is utilized for analysis. T-test and one-way analysis of variance (ANOVA) were carried out. Codes acquired from content analysis were saved to in a computer program, namely, Word program. Since themes were previously determined socially, politically, culturally, economically and in terms of child psychology in content analysis, codes brought together under mentioned aspects. Codes obtained from essays were classified based on 6 levels on Holistic Critical Thinking Scoring Rubric. To control conformability of codes with themes, two more experts were consulted and necessary revisions were fulfilled.

3. Findings and Discussion

To find out whether total average Rubric scores of candidate teachers have a considerable significance by gender, independent group's t-test results are provided in Table 2 below.

Table 2: Independent T-test results of candidate teachers' critical thinking levels by gender

Groups	N	Xort	S	t	p
Male	24	0.40	.14	0.46	.00
Female	76	2.42	.90		

*p<,05

According to Table 2, there is a significant difference by gender in students' level of critical thinking. The difference was in favor of female students (Xort=2.42), suggesting that female students use their critical thinking skills more than male students. This finding demonstrates us gender affects critical thinking. Although there are some research findings indicating the effects of gender variables on teacher and candidate teachers' critical thinking skills, other research findings predominantly put forward gender variable is not determinant. To set an example, as a result of Bağcı and Sahbaz's analysis (2012) on Turkish Teachers, it was seen gender is not an effective variable. Another investigation conducted by Ersan and Güney (2012) on Vocational High School students, shows the same result as well. In view of Ekinci's analysis results (2009) on candidate teacher, Tümkaya and Aybek's investigation (2008) on critical thinking dispositions and Ozdemir's analysis (2005) on university students' critical thinking skills, it was concluded gender variable does not affect critical thinking skills. These various results could be resulted from differences in sample groups.

There are other studies which coincide with this study's findings suggesting that gender variable is a determinant in terms of identification of critical thinking skills. Doğanay, Taş and Erden reached to the conclusion that there is a difference by gender yet the difference is in favor of men. Gülveren (2007) illuminated that candidate teachers' critical thinking skills differentiate in favor of females. Other conclusions drawn by Ying-shan and Yan (2009) and Chisholm (1999) were the effectiveness of gender variable. In Ying-shan and Yan's research on transformational leadership skills of different genders in terms of critical thinking, the effectiveness of gender variable is based on the fact that men's and women's brains work differently. According to Ying-shan and Yan (2009), gender is a predictor variable in shaping intellectual skills. In this study, gender is a predictor variable as well.

To conduct to figure out whether total Rubric average of candidate teachers differentiates by departments, one way ANOVA test is presented in Table 3.

Table 3: Annova results of total average of candidate teachers' critical thinking levels by departments

Variance Source	Total Squares	sd	Mean Squares	F	p
Between-Groups	10.110	2	3.370	4.454	.006
Within-Groups	72.640	97	.757		
Total	82.750	99			

p>.005

According to Table 3 data, there is no difference in critical thinking skills of candidate teachers by departments they are taught. In this study, education faculty students constituted sampling group. Critical thinking levels of candidate teachers who are studying at the same faculty but in different departments were compared. However, it was observed department type variable is not an effective variable in critical thinking. As in this finding, Ozdemir (2005) classifies students statically and verbally by their

departments to identify critical thinking level of students and he drew a conclusion that there is no considerable difference in critical thinking levels of students.

Korkmaz (2009) reached the same finding in his research on teachers in different branches as well. On the other hand, regarding to similar study carried out by Doğanay, Taş and Erden (2007), different findings were obtained. There were meaningful differences in terms of critical thinking skills of students by their departments. Yet, sample group of Doğanay, Taş and Erden (2007) is composed of students in different faculties. There is a difference among faculties. Doğanay, Taş and Erden (2007) pointed out the difference is due to the fact that courses differs according to faculties, more particularly, some departments have courses related to critical skills in their curriculum. However, as to departments of education faculties, courses in critical skills are not available.

Student's average data from Rubric were compared by using SPSS. To analyze data in a detailed way, content analysis was utilized. Frequency and percentage levels of students by their competence in using critical thinking skills are shown in table 4 below.

Table4: Distribution of Students by theircriticalthinking levels

Critical Thinking Levels	f	%
1.level	54	54
2. level	26	26
3. level	13	13
4. level	7	7
5. level	-	
6. level	-	
Total	100	100

As seen in table 4, the highest level of students using critical thinking is in the first level (%54). The highest level of students in terms of critical thinking is in the fourth level (7%) and then the third level (13%) follows. According to content analysis result, 54 percent of students is in the first level. Examples concerning content analysis results data are shown in Table (Annex 1). According to critical thinking Rubric scale, it is stated that students at the first level make bias comments on different viewpoints, evidences, statements, graphics, questions etc, ignore sound opposite opinions in a hurry or fail to recognize, evaluate explicit or logical viewpoints at random or ignore them, argue using fallacious, irrational reasons or claims without justification, do not verify results or procedures, object reasons or act close-minded behaviors. In content analysis result, students' opinions on non-uniform dressing practice in Ministerial schools in Turkey and its effect on political and cultural values are handled from following five different categories: economy, school discipline, school security, social community and child psychology. In level 1, students do not adopt a positive approach to non-uniform dressing practice. Students expressing negative statements stressed out non-uniform dressing practice distinctively reflect economic status of parents, and accordingly, it poses problems such as grouping among students. For example, first student in the questionnaire states that "due to fact that each student has different economic conditions, it poses a challenge for students. It pushes students to grouping among themselves. Owing to non-uniform practice, no one could prevent trespassing to school from other schools." Another statement expressed by 46th student is "non-uniform dressing practice is unfavorable in every aspect. While some of students could afford to buy and wear new clothes due to their economic conditions, other students will not always be able to afford new clothes. This will cause discrimination among students." Students underlined that labeling of different economic levels will negatively affect child psychology. 21st student explains this situation as follows: "I believe non uniform clothing influences on acceptance and adaptation. In our era, people are judged by their appearance. They may experience mocking among their friends. According to students, another negative aspect of non-uniform dressing practice is it is hard to distinguish parents outside of the school from students inside the school. Thus, it complicates school

discipline. 68th student utters “.....wandering around like rainbow. It is inappropriate in terms of sense of school discipline.”

In conclusion, students did not see any favorable results of non-uniform practice and they expressed such negative statements as labeling class distinctions, complicating school discipline and therefore threatening school security, declining students' self-esteem psychologically, leading the students to feel jealous and reluctant to go to school without any reason or justification.

4. Conclusions

Results showed that there was a significant difference by gender in students' level of critical thinking. The difference was in favor of female students ($X_{ort}=2.42$), suggesting that female students use their critical thinking skills more than male students. It was found out there was no significant difference in students' critical thinking skills by departments. During research, as sample group, critical thinking levels of student from different departments of education faculty were compared. Yet, it was observed that department variable is not an efficient variable in critical thinking.

According to content analysis result, the highest level of students using critical thinking is in the first level (%54). The highest level of students in terms of critical thinking is in the fourth level (7%) and then the third level (13%) follows. It was understood that students are not able to handle current issues from different aspects and analyze them both positively and negatively.

5. Recommendations

The research is limited to students studying at Education Faculty of Pamukkale University. A comparison could be fulfilled through an extensive sampling group including universities and faculties located at different regions all across Turkey.

To develop students' multidimensional thinking and reasoning skills, different courses promoting critical thinking could be incorporated into curriculum.

Education faculty instructors should be equipped with critical thinking skills so as to cultivate teachers in terms of analyzing, reasoning and being critical thinker. Additional researches could be carried out to determine critical thinking level of instructors.

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