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A Study on the Link between Moral Judgment Competences and Critical Thinking Skills

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Although many studies have established a direct link between moral judgment competences and critical thinking skills, none has been found to reveal the nature of the link between these two skills in the national and international literature. The present study looked at biology and primary education teacher candidates' moral judgment and critical thinking skill levels and the link between these skills. It further investigated the impact of the department, gender, and academic performance scores (GPA) on biology and primary education teacher candidates' moral judgment and critical thinking skills. In the study, the correlational and comparative survey model was used. The Moral Judgment Test (MJT) was administered to determine the teacher candidates' moral judgment competences and the Cornell Critical Thinking Tests (Level Z) were used to develop a picture of their critical thinking abilities. A total of 76 final-year teacher candidates at the departments of biology and primary education took part in the study. The results indicated a positive and statistically significant relationship between the moral judgment competences and critical thinking abilities of pre-service primary and biology teachers ($r = .227$ $p < .05$). The participating pre-service teachers' average scores of moral judgment competences and critical thinking abilities were 16.56 and 22.74, respectively. The study also investigated the impact of the department and gender of the pre-service biology and primary teachers on their moral judgment and critical thinking skills, and the data indicated no such impact on the teacher candidates' critical thinking and moral judgment competences. Furthermore, the research findings suggest no statistically significant link between the moral judgment scores and the GPA's. However, a statistically significant, mid-level positive relationship does exist between the critical thinking test scores and the GPA's.

Keywords: informal reasoning, critical thinking, moral judgment, pre-service teachers

INTRODUCTION

In view of modern societies' requirements, the need for individuals who know how to access information, who can apply their knowledge to new situations, who are questioning, critical thinking, problem-solving, and decision-making, and who have 'learnt to think' and acquired the profile of 'democratic citizenship' is ever more evident. In the societies of our age, where scientific knowledge changes and develops with a rapid pace, equipping individuals with these thinking and thinking-

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oriented skills has gained more and more significance.

Researchers studying *critical thinking*, which is accepted as the most developed form of thinking, have proposed various definitions of this concept. According to Beyer (1987, p.32-33), critical thinking is the assessment of the accuracy and precision of information as well as the value of beliefs, arguments, and scientific claims. Paul (1991, p.125) defines critical thinking as drawing conclusions through observation and information, while for Ennis (1996) it is based on observation, inference, generalization, and reasoning, and can be defined as 'reasonable reflective thinking'. Ennis (1996) further suggests that the basic skills of critical thinking are independent of the discipline in question, and can be transferred from one subject onto another. Paul (1982), on the other hand, links critical thinking to skills/processes, and presents the critically thinking individual as 'capable of holistically seeing the big picture and understanding different points of view'.

It can be seen that all the definitions summarized above are aligned with Glaser's (1985) 'three basic aspects of critical thinking'. According to this classification, critically thinking individuals (1) tend to approach problems and issues with an attitude based on foresight and thinking, (2) have the basic knowledge and skills necessary for logical reasoning and questioning, and (3) are capable of applying their knowledge and skills in daily life (Gülkaynak, Üstel & Gülgöz, 2008, p. 2). It follows that critically thinking individuals will also have the responsibility for 'democratic citizenship', one of the basic requirements of today's democratic societies. Looking at the skills necessary for the democratic citizenship profile, one can see that individuals with this profile have a number of qualities such as political and legal literacy, ethical understanding, analysis and use of language, problem-solving, a culture of compromise and peace, decision-making, and application of these decisions (Gülkaynak, Üstel & Gülgöz, 2008, p. 5).

In the context of democratic citizenship, critical thinking could be claimed to have a direct link with moral judgment competences in modern societies. In our age, individuals are expected to have the skills to be aware of universal ethical principles such as rights, justice, and virtue, to tolerate and seek to understand different opinions and values, to consider and analyse different opinions and values, and to make and apply decisions as and when necessary (Irwin, 2001; Kolstø, 2008). For Paul and Elder (2009), moral reasoning and decision-making skills are vital for leading a life by ethical principles and creating an ethical world culture. These skills are directly linked to individuals' 'moral development levels'. In the literature, there are three different approaches to analysing individuals' moral development levels: the Psychoanalytic Approach, the Social Learning Approach, and Cognitive-Developmental Moral Development. Based on Piaget's work Lawrence Kohlberg's Cognitive-Developmental Moral Development Theory defines morality as conscious judgment and decision-making along the lines of right-wrong, good-bad, and claims that the individual behaves in line with this conscious judgment (Kohlberg, 1969). The strongest aspect of this approach is therefore the fact that it places human capacity to reason in the foreground in morality matters. It is for this reason that Baldwin, Piaget, and Kohlberg based this approach on the assumption that humans actively form 'meanings' from their social environment reaching, as a result of this experience, more 'mature' phases in morality (Arnold, 2000). Assuming that humans' moral judgments are representative of their cognitive senses and moral development levels, Kohlberg (1969) explains moral development in stages: (1) pre-conventional stage (obedience and punishment driven, self-interest driven), (2) conventional stage (interpersonal accord and conformity driven, authority and social order driven), and (3) post-conventional stage (social contract driven, universal ethical principles driven). Kohlberg's model presents humans as evolving from a self-centred, self-interest driven perspective towards moral judgments based on broader collaboration and involving a better quality capacity to reason (Çiftçi,

Arıdağ & Yüksel, 2010). For Kohlberg (1986), our moral judgment skills help us decide what to do when conflicting demands are made by different people. However, Kohlberg holds that moral development is not a simple process of maturing that occurs in parallel to the development of the brain. Rather, for moral development, the individual needs to address issues through 'role taking' processes that ensure different perspectives, and to use their reasoning skills (Çiftçi, Arıdağ & Yüksel, 2010). For this reason, many studies suggest that critical thinking is directly linked to moral judgment skills (Bailin, Case, Coombs & Daniels 1999; Çiftçi, 2009; Daly, 2001).

Although many studies underline the link between critical thinking and moral decision-making abilitiess (Norris, 1985; Paul & Elder, 2009; Çiftçi, 2009), none has been found to reveal the nature of the link between these two abilities in the national and international literature. In order to focus on the abilitiess geared towards the current needs of societies in educating future generations and expanding innovative educational approaches, the potentials of teacher candidates preparing to take their first step in the profession are deemed crucial. Starting off from this perspective, the present study seeks to reveal pre-service teachers' moral judgment and critical thinking levels and the link between these abilitiess. In this context, answers were sought to the following research questions:

1. to determine the moral judgment competences and critical thinking abilities of pre-service primary and biology teachers,
2. to determine the relationship between moral judgment competences and critical thinking abilities of pre-service primary and biology teachers,
3. to determine the effects of gender, department, and academic performance scores (GPA) on moral judgment competences and critical thinking abilities of pre-service primary and biology teachers.

METHOD

For the investigation of the link between pre-service biology and primary teachers' 'moral judgment competences' and 'critical thinking skill levels', the present study used the correlational and comparative survey model (Creswell, 2003).

Instruments

The Moral Judgment Test

The Moral Judgment Test (MJT), developed in 1977 by Lind, a leading figure in cognitive moral development theory, was used to determine the teacher candidates' moral judgment competences (Lind, 1999). Based on Lind's concept of experimental scale, the MJT (Lind, 2008) is composed of two ethical dilemmas and 26 items. In the process of addressing the ethical dilemmas in the tests, the participants were first asked to judge the arguments for their acceptability. They were then asked to rate the arguments (six pros and six cons) based on Kohlberg's moral development stages. The main score (the C-index) of the MJT measures the degree to which a subject's judgments about the pro and con arguments are determined by moral points of view rather than by non-moral considerations like opinion-agreement. In other words, the C-index reflects a person's ability to judge arguments according to their moral quality. The value of the C-index that can be scored on the test varies between 0 and 100. The study used the Turkish version of the MJT, which was tested for validity and reliability by Çiftçi (2001), and which yielded validity and reliability findings that were consistent with Lind's.

The Cornell Critical Thinking Test

The Cornell Critical Thinking Test – Level Z (CCTT), developed by Ennis and Millman (1985) and copyrighted by 'Cornell Critical Thinking Company', was used to form a picture of the participating pre-service teachers' critical thinking abilities. The CCTT (Level Z) is composed of a total of 52 items that can measure *deduction*, *induction, semantics, credibility, definition and assumption identification, and assumption identification aspects of critical thinking* (EPODIM, 2014). The CCTT (Level Z) was used for the research following the granting of the necessary permissions.

Process

The CCTT and the MJT were independently administered to the participants on a voluntary basis. The CCTT was administered in 40 to 50-minute sessions, and the MJT in 20 to 30-minute sessions. In the administration process, the participants were given information by the researcher on the inventory points that needed clarification.

Participants

Taking part in the study were a total of 76 fourth- and fifth-year (senior year) teacher candidates at the departments of biology (n=51) and primary education (n=25) at the Faculty of Education of a state university in Turkey. Easily accessible purposive sampling was used for determining the participants.

The demographics of the participants suggest an age range between 21 and 26 years (mean=22.29, SD=1.129), and GPA's varying between 2.30 and 3.78 (mean=2.99, SD=0.365). The gender distribution of the participants was 82.9% female (n=63) and 17.1% male (n=13).

FINDINGS

Pre-service Teachers' Moral Judgment and Critical Thinking Competence Levels

In line with the research problems, the pre-service teachers' moral judgment and critical thinking competence levels were determined. The department-based distribution of the participants' average scores on the CCTT and MJT are presented in Table 1.

Table 1. Department-based distribution of average scores of pre-service teachers' critical thinking and moral judgment levels

Instrument	Department	n	min	max	Mean	SD
CCTT	Primary Education	25	16	31	21.96	4.33
	Biology	51	13	33	23.12	3.79
	Total	**76**	**13**	**33**	**22.74**	**3.98**
MJT (C-Index)	Primary Education	25	0	42.98	16.56	13.39
	Biology	51	0.80	53.29	16.56	11.58
	Total	**76**	**0**	**53.29**	**16.56**	**12.11**

As shown in Table 1, the pre-service teachers' average score on the CCTT was 22.74. Considering that the maximum score that can be obtained on the CCTT is 52, it can be asserted that the participants' critical thinking skills were medium-level. The minimum score of 13 and the maximum score of 33 obtained on the CCTT in this

research show that the participants' critical thinking levels were low. The participants' average score on the MJT (C-index) was 16.56. Considering that the C-index score that can be obtained on this test varies between 0 and 100, the participants' moral judgment levels were also found to be quite low.

Whether the research data was in normal distribution was checked through the Kolmogorov-Smirnov test. The results (Kolmogorov-Smirnov=.094; p=.09 for the CCTT and Kolmogorov-Smirnov=.097 p=.075 for the MJT) indicated that the scores were in normal distribution.

Link between Pre-service Teachers' Moral Judgment and Critical Thinking Skills

The Pearson Correlation test was applied to determine the relationship between the participants' moral judgment competence and critical thinking skills (see Table 2).

Table 2. The link between pre-service teachers' moral judgment competence and critical thinking skills

		Critical Thinking	**Moral Judgment**
Critical Thinking Skills	**Pearson Correlation**	1	.23*
	p		.049
	n	76	76
Moral Judgment Competence (C-index)	**Pearson Correlation**	.23*	1
	p	.049	
	n	76	76

The results suggest the existence of a positive, statistically significant, weak relation between the participants' critical thinking skills and moral judgment competence ($r=.23$, $p< .05$). Considering the determination factor ($r^2=0.053$), it can be asserted that only 5.3% of the total variance in moral judgment competence was due to the critical thinking abilities. The change in the critical thinking skills explaining moral judgment competence is therefore low but still statistically significant.

Impact of Gender, Department, and Academic Achievement Score on Pre-service Teachers' Moral Judgment and Critical Thinking Skills

The study also investigated the impact of pre-service biology and primary teachers' gender, department, and GPA on their moral judgment and critical thinking skills, and the data obtained are presented in Tables 3 and 4.

Table 3. Impact of gender and department on pre-service teachers' moral judgment competence and critical thinking skills

Moral Judgment Competence	**Gender**	**n**	**Mean**	**SD**	**df**	**t**	**p**
	Female	63	15.86	12.45	74	-1.107	.272
	Male	13	19.24	10.04			
	Department						
	Primary Education	25	16.56	13.39	74	0.00	1.00
	Biology	51	16.56	11.58			
Critical Thinking Skills	**Gender**	**n**	**Mean**	**SD**	**df**	**t**	**p**
	Female	63	22.98	3.88	74	1.195	.236
	Male	13	21.54	4.39			
	Department						
	Primary Education	25	21.96	4.33	74	-1.194	.236
	Biology	51	23.12	3.79			

The statistical analysis results show that the participants' moral judgment competence levels did not differ for females (Mean=15.86; SD=12.45) and males (Mean=19.24; SD=10.04). Similarly, no difference was detected in moral judgment competence levels for primary education (Mean =16.56; SD=13.39) and biology (Mean =16.56; SD=11.58) education pre-service teachers.

The statistical analysis results also show that the participants' critical thinking skills did not differ for females (Mean=22.98; SD=3,88) and males (Mean=21.54; SD=4,39). Likewise, no statistically significant difference was detected in critical thinking skills for primary education (Mean=21.96; SD=4.33) and biology (Mean=23.12; SD=3.79) education pre-service teachers. As for the link between pre-service teachers' academic achievement scores and their moral judgment and critical thinking skills, the analysis results are presented in Table 4.

Table 4. The link between pre-service teachers' academic achievement scores and their moral judgment and critical thinking skills

		GPA
Moral Judgment (C-index)	**Pearson Correlation**	.171
	p	.140
	n	76
Critical Thinking	**Pearson Correlation**	.319**
	p	.005
	n	76

Table 4 shows that no statistically significant link exists between the moral judgment scores and the GPA's. However, a statistically significant, medium-level, positive relation does exist between the critical thinking scores and the GPA's. The determination factor (r^2= 0.102) demonstrates that 10.2% of the total variance in critical thinking skills is due to the GPA.

DISCUSSION AND CONCLUSIONS

The developments in current scientific platforms can cause debates and ethical dilemmas that directly reflect upon societies. Research shows that, in preparing individuals for their social roles, scientific field knowledge must be complemented in learning processes by a thorough addressing, from all aspects (social, cultural,

religious, moral, and legal) of the social effects of the application of this knowledge in various fields. There is therefore consensus that, in addition to imparting scientific knowledge at educational institutions, it is necessary to help students evolve into conscious citizens with democratic decision-making skills (Aikenhead & Ryan, 1992, Bybee, 1987; Yager & Hofstein, 1986; Yager & Penick, 1988; Yager & Tamir, 1993; Booth & Garrett, 2004). Individuals need questioning and critical thinking skills so that they are able to discuss from a critical perspective the 'value issues' that they may encounter in their daily lives. These skills require 'higher level cognitive processes' and, as far as social ethical debates are concerned, they are defined as an ability to analyse environmental and moral issues, ask questions, engage in discussion, and apply them to one's own (individual) thinking system (Dori, Tal, & Tsaushu, 2003). From this perspective, leading research centres all over the world emphasize the need to help students improve their skills to construct arguments about ethical debate issues, analyse the problems that they may encounter, and make informed decisions (National Research Council, 1996; Queensland School Curriculum Council, 2001). Undoubtedly, the development of these skills is only possible in appropriate educational settings. As experimentally demonstrated by Rest, Davison, and Robins (1978), and Rest and Thoma (1985), the formal education process, together with the variable of time, has a direct impact on individuals' moral judgment levels. Therefore, important duties befall teachers who create the necessary environment for the improvement of said skills in the learning-teaching process. It is crucial that teachers, who are expected to support their students' critical thinking and moral decision-making skills, should themselves have critical thinking abilities. This is how teachers could serve their students as role models and help them become democratic individuals open to different ways of thinking. In this context, the present study looks at pre-service teachers' moral judgment and critical thinking competence levels and the link between these skills. It further investigates the impact of the department, gender, and academic performance scores on these skills.

Looking at the C-index scores, the average scores obtained by the pre-service teachers can be deemed low (C-index_Mean primary=16.55, SD=13.39; C-index_Mean biology=16.56, SD=11.58). The minimum C-index scores should be 30 so that 'moral maturity' assessments can be made and the link between this skill and other variables can be looked into (Çiftçi, 2001). In this study, only 13.16% of the participants had a C-index score of 30 or above, with 18.42% having scored between 20 and 30, and the rest (68.42%) between 0 and 20. These low scores in moral judgment competence are noteworthy. Similar findings (n=270, C-index_Mean= 17.65) by another study on the link between university students' moral judgment and empathy skills (Çiftçi, Arıdağ and Yüksel, 2010) are cause for concern regarding Turkish university students' moral judgment competence levels. The present study also reached similar findings in critical thinking average scores (Critical Thinking_Mean primary=21.96; SD=4.33; Critical Thinking_Mean biology=23.12, SD=3.79). The highest average score ever reported worldwide for the CCTT (Level Z) is 30 for the 52 items (Norris, 1985). Noteworthy as it is for the low levels of critical thinking, this finding is nevertheless aligned with the rest of the study findings.

The study findings suggest that a weak but statistically significant relationship exists between the pre-service teachers' critical thinking skills and moral judgment competences. The effects of the department and gender on these skills were also investigated. The analyses suggest that these two variables had no effect on the participants' critical thinking skills and moral judgment competences. Another study that used James Rest's 'Defining Issues Test' (DIT) to detect any link between moral development and age, education, and gender found no significant relationship in terms of the variables in question (Cesur & Topçu, 2010). The present study found a medium-level, positive, and significant link between the critical thinking test scores

and academic achievement scores. This corroborates the findings of other studies that highlighted a significant relation between critical thinking skills and gender and GPA (Kintgen-Andrews, 1991; Walsh & Hardy, 1999; Cano & Martinez, 1991).

In conclusion, considering the developmental and competitive environment of the 21st century, critical thinking and moral judgment competences have a key role in shaping and improving societies. The improvement of these skills depends on them being well-defined and investigated in terms of their interaction with other variables. This can then pave the way to studies that can offer guidance in how and at what level these skills can be tackled in learning-teaching processes. The primary duty falls on teachers and pre-service teachers, irrespective of their subject matters, in setting up learning environments that can stimulate students' higher-level thinking abilities and allow them to engage in discussions and debates from different points of view. In this manner, individuals can be raised who have internalized thinking, problem-solving, criticizing, and democratic decision-making in line with the requirements of modern societies.

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