

The effect of individual innovativeness on critical thinking disposition in first and emergency aid program students

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Abstract

Aim: This cross-sectional study aims to examine the effect of individual innovativeness on critical thinking disposition in first and emergency aid program students.

Materials and Methods: The study was conducted between September and October 2019 with first and emergency program students studied in the 2018-2019 academic year. The population of the study was composed of students enrolled in the first and emergency aid program at Kovancilar Vocational School of Elazığ Firat University. No sampling method was used in the study by aiming to reach the entire population. As a result, 95% of the population was reached, whereby a total of 121 students included in the study. Data were collected using an introductory information form, the Individual Innovativeness Scale (IIS), and the California Critical Thinking Disposition Inventory (CCTDI). Data were analyzed using the SPSS 23.0 package program and evaluated using percentage, mean, standard deviation, independent samples t-test, Mann Whitney U test, Kruskal-Wallis test, correlation analysis, and linear regression analysis.

Results: The students' IIS and CCTDI mean scores were 68.4±9.5 and 260.2±29.9, respectively. The individual innovativeness level of the students affected their critical thinking disposition. A statistically significant difference was found between the students' individual innovativeness according to gender, status of keeping up with current issues and field-related developments, and status of believing in the necessity of using technological devices in education ($p < 0.05$).

Conclusion: As the individual innovativeness level of first and emergency program students increased, their critical thinking disposition increased.

Keywords: Critical thinking; first and emergency aid; individual innovativeness; student

INTRODUCTION

Along with the developing technology, the information is renewed and updated by each passing day. Innovation has taken its place in the health sector as in every sector. Especially increased variety of diseases, number of chronic diseases and expectations of both patients and their relatives also accelerate innovative process in health sector. New discoveries, inventions and knowledge in health sector change constantly (1). The OECD argues that an increase in a country's development and employment levels depends on its ability to innovate, adopt and accept innovations (2). Now, information has a flexible form instead of being in solid molds like the old thoughts. Individual innovativeness is defined as the extent to which the individual at the center of innovation accepts and adapts to innovations. Individual innovativeness includes situations in which the individual tolerates, accepts and adapts the new, is open to experience innovation, and takes risks (3,4).

Individual innovativeness progresses in parallel with evaluation, judgment, discernment and critical thinking. Because a person with critical thinking is open to innovation and other ideas, prejudice-free, and rational (5). Ennis (2001) defines critical thinking as "reasonably reflective thinking that is focused on deciding what to believe or do", whereas Paul and Elder (2013) define it as self-management and self-regulation, including problem-solving and effective communication skills (6,7). People with critical thinking have positive aspects such as questioning innovations and accepting and implementing them immediately if they are suitable for their field. As a result of continuous and complex changes in health sector, critical thinking of health workers plays a key role in providing safe care based on cognitive and logical processes in clinical practices (8). There are lots of work to do for educational institutions in emphasizing the importance of two main issues, including critical thinking and individual innovativeness, in health sector. Education and innovation follow a parallel path. Giving

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educational information through technological tools and visual techniques, especially simulation training in health education, plays a key role in the effectiveness of learning, permanence and practice. As the new technologies, especially information and communication technologies, increasingly enter our lives, education systems should be open to innovations, analyze the necessities of the time, and update it in accordance with the contemporary needs (9,10). Therefore, it is important to raise young minds that research, question and aim to reach the most accurate, in institutions where health foundations are laid.

In the literature, although there are studies conducted to determine the innovative behaviors of university students and show the relationship of these behaviors with different variables, there are no such studies on first and emergency aid program students. Therefore, this study can make a significant contribution to the literature. In addition, as first and emergency aid technicians make the first intervention to the patient, this study can be guidance for them to make medical interventions with critical thinking, to test the applicability of medical innovations in health practices, and internalize these innovations. This study can also give tips to first and emergency aid educators and managers about innovative strategies. In line with this information, the study was conducted to examine the effect of individual innovativeness on critical thinking disposition in first and emergency aid program students.

MATERIALS and METHODS

Study type

This is a cross-sectional study.

Study place and time

This study was conducted between September-October 2019 at Kovancılar Vocational School of Fırat University in Elazığ, Turkey.

Population and sample

The population of the study was composed of students enrolled in the first and emergency aid program at Kovancılar Vocational School of Elazığ Fırat University. No sampling method was used in the study by aiming to reach the entire population. However, students who were not at school during the research (3), those who did not want to participate in the study (2), and foreign students who did not fully understand the questions due to lack of Turkish language competency were excluded from the study (2). As a result, 95% of the population was reached, whereby a total of 121 students included in the study.

Data collection

Data were collected using face-to-face interview technique in the class during the hours of theoretical courses. The students were explained the purpose of the study, distributed the survey forms, and provided with sufficient time to fill out the forms. Necessary explanations were made about the questions they did not understand. Empty forms were taken back from students who did not want to participate in the study and those who had lack of Turkish language competency. Data were collected using an introductory information form, the Individual

Innovativeness Scale, and the California Critical Thinking Disposition Inventory.

Introductory Information Form: The form consists of questions about the students' socio-demographic characteristics (age, gender, grade, parents' education level, and willingness to choose the program) and status of following innovations (such as reading daily newspapers, watching daily news, and following current issues and developments)

Individual Innovativeness Scale (IIS): The scale was developed by Hurt et al. (1977), and its Turkish validity and reliability study was performed by Sarıoğlu Kemer and Altuntaş (2017). The scale consists of 18 items and 3 subscales, including "opinion leadership" (7 items), "resistance to change" (7 items) and "risk taking" (4 items). This is a five-point Likert type scale, scoring from "1= strongly disagree" to "5= strongly agree". The scale has 11 positive (1-4,7,8,10,11,14,16,17) and 7 negative (5,6,9,12,13,15,18) items, whereby negative items are scored in reverse. Both total scale and subscales scores are calculated by summing the scores obtained from each item. Total score ranges from 18 to 90. Individual innovativeness is classified according to the scores obtained. Accordingly, individuals who score above 82 are "innovative", those who score between 75 and 82 are "pioneer", those who score between 66-74 are "interrogator", those who score between 58-65 are "Skeptical", and those who score below 57 are "traditional". The internal consistency reliability coefficient of the scale was found to be 0.82 (11). In this study, the internal consistency reliability coefficient of the scale was found as 0.85

California Critical Thinking Disposition Inventory (CCTDI): The scale was developed by Facione et al. (1988), and its Turkish validity and reliability study was performed by Kökdemir. The scale consists of a total of 51 items, including 28 positive and 23 negative items, and 6 subscales, including "open-mindedness", "analyticity", "systematicity", "self-confidence", "inquisitiveness" and "truth-seeking". This is a six-point Likert type scale, scoring from "1 = strongly disagree" to "6 = strongly agree". Accordingly, individuals whose score 240 and below have low general critical thinking disposition, while individuals whose score above 300 have high general critical thinking disposition. The internal consistency coefficient of the scale was found to be 0.88 (12). In this study, the internal consistency coefficient of the scale was found as 0.85.

Data evaluation

Data were analyzed using the IBM SPSS 23.0 package program, and evaluated using descriptive statistics in number and percentage for the students' socio-demographic characteristics. The students' scores on the scales were presented using mean, standard deviation, and minimum-maximum values. Independent samples t-test, Mann Whitney U test, Kruskal-Wallis test were used to compare the students' scale mean scores according to their demographic characteristics. Correlation and linear regression analysis was performed to evaluate the relationship between the two scales. In the study, the level of statistical significance was set at $p < 0.05$.

Ethical considerations

For conducting the study, an ethical approval was obtained from the Bingol University Scientific Research and Publication Ethics Committee (no: 8502) and institutional permissions from the Directorate of Kovancilar Vocational School. Verbal and written consent was obtained from students who participated in the study after they were provide with necessary explanations.

RESULTS

The mean age of the students was 19.6 ± 1.4 years, 70.2% of them were female, and 56.2% were first grade. Of their parents, 73.6% were illiterate or primary school graduates and 29.8% were high school graduates. In addition, 90.9% of the students willingly attained to the first and emergency aid program, 59.5% watched daily news, 71.9% kept up with current issues and developments, 93.4% followed field-related developments, and 52.9% considered that the use of technological devices (such as simulation models) in education was beneficial (Table 1).

Table 1. Distribution of the Students' Socio-Demographic Characteristics			
Socio-demographic characteristics		Number	Percentage
Age	19.6 ± 1.4		
Gender			
Female		85	70.2
Male		36	29.8
Grade			
1		68	56.2
2		53	43.8
Mother's education level			
Illiterate		89	73.6
Primary education		19	15.7
High school		10	8.3
Undergraduate and above		3	2.5
Father's education level			
Illiterate		35	28.9
Primary education		32	26.4
High school		36	29.8
Undergraduate and above		18	14.8
Voluntarily selecting the department			
Yes		110	90.9
No		11	9.1
Status of watching daily news			
Yes		72	59.5
No		49	40.5
Status of keeping up with current issues and developments			
Yes		87	71.9
No		34	28.1

Status of following field-related developments (publication, article reading)		
Yes	113	93.4
No	8	6.6
Status of believing in the necessity of using technological devices (such as simulation model) in education		
Yes	64	52.9
No	57	47.1

The students' mean score was 68.4 ± 9.5 for the Individual Innovativeness Scale, and 28.6 ± 4.8 , 19.6 ± 4.0 and 10.7 ± 2.1 for the subscales of "opinion leadership", "resistance to change" and "risk taking", respectively. Accordingly, the students had moderate individual innovativeness, and categorized as "interrogator". They obtained the highest and lowest mean scores on the subscales of "opinion leadership" and "risk taking", respectively.

The students' mean score was 260.2 ± 29.9 for the California Critical Thinking Disposition Inventory, and 54.1 ± 5.2 , 51.2 ± 3.4 , 34.5 ± 5.6 , 28.6 ± 4.6 , 55.4 ± 6.2 and 36.4 ± 4.9 for the subscales of "open-mindedness", "analyticity", "systematicity", "self-confidence", "inquisitiveness" and "truth-seeking", respectively. Accordingly, the students had moderate critical thinking disposition and high inquisitiveness and open-mindedness (Table 2). Inquisitiveness refers to one's desire to obtain information and learn new things, and open-mindedness means one's tolerance to different views and approaches and sensitivity to his/her own mistakes (12). Inquisitive and open-minded students are expected to be more sensitive to changes and developments.

Table 2. Distribution of the Students' Individual Innovativeness Scale and California Critical Thinking Disposition Inventory Mean Scores		
Scale/Subscale	Min-Max	X \pm SD
Opinion Leadership	16.0-33.0	28.6 ± 4.8
Resistance to Change	13.0-27.0	19.3 ± 4.0
Risk Taking	6.0-15.0	10.7 ± 2.1
IIS Total Score	40.0-81.0	68.4 ± 9.5
Open-mindedness	40.0-62.0	54.1 ± 5.2
Analyticity	37.0-59.0	51.2 ± 3.4
Systematicity	29.0-40.0	34.5 ± 5.6
Self-confidence	24.0-32.0	28.6 ± 4.6
Inquisitiveness	46.0-62.0	55.4 ± 6.2
Truth-seeking	30.0-45.0	36.4 ± 4.9
CCTDI Total Score	192.0-310.0	260.2 ± 29.9
X: Mean, SD: Standard Deviation		

The correlation analysis revealed a statistically significant positive relationship between the students' individual innovativeness levels and critical thinking dispositions ($r: .404$, $p < 0.001$). In addition, there was a statistically significant positive relationship among their mean

scores on the subscales of "open-mindedness" ($r=.504$, $p<0.001$), "analyticity" ($r=.346$, $p<0.001$), "systematicity" ($r=.402$, $p<0.001$), "self-confidence" ($r=.384$, $p<0.001$), "inquisitiveness" ($r=.401$, $p<0.001$) and "truth-seeking" ($r=.430$, $p<0.001$). On the other hand, a statistically significant negative relationship was found between their mean scores on the IIS "resistance to change" subscale and the Critical Thinking Disposition Inventory ($r=-.390$, $p<0.001$). Accordingly, resistance to change negatively affected critical thinking, open-mindedness, analyticity, systematicity, self-confidence, inquisitiveness and truth-seeking characteristics of the students (Table 3).

Table 3. The Relationship between the Students' Individual Innovativeness Levels and Critical Thinking Dispositions

	IIS	Opinion Leadership	Resistance to Change	Risk Taking
CCTDI	.404**	.306**	-.390**	.376**
Open-mindedness	.504**	.313**	-.204**	.530**
Analyticity	.346**	.254**	-.220**	.440**
Systematicity	.402**	.198**	-.178*	.187**
Self-confidence	.384**	.506**	-.307**	.400**
Inquisitiveness	.401**	.345**	-.270**	.208**
Truth-seeking	.430**	.455**	-.105*	.179**

* $p<0.05$, ** $p<0.001$

A linear regression (enter model) analysis was performed to evaluate the effect of individual innovativeness on critical thinking disposition in first and emergency aid program students. Accordingly, the students' individual

innovativeness level affected their critical thinking disposition ($R=.540$, $R^2=.245$), whereby their individual innovativeness explained 24.5% of the total variance in their critical thinking disposition and the result was statistically significant ($p<0.001$). The students' individual innovativeness level had a positive effect on their critical thinking disposition (Table 4).

Accordingly, the students' individual innovativeness level affected their critical thinking disposition ($R=.540$, $R^2=.245$), whereby their individual innovativeness explained 24.5% of the total variance in their critical thinking disposition and the result was statistically significant ($p<0.001$). The students' individual innovativeness level had a positive effect on their critical thinking disposition (Table 4).

Table 5 compares the students' socio-demographic characteristics and scale mean scores. Accordingly, there was a weak positive relationship between the students' age and IIS mean scores, but the difference was not statistically significant ($r=.108$, $p>0.05$). A statistically significant difference was found between their IIS mean scores in terms of gender ($p<0.05$), where male students had higher individual innovativeness than female ones. No statistically significant difference was found between their IIS mean scores according to grade, parents' educational level, and willingness to choose the program ($p>0.05$). However, second grade students, students whose parents had bachelor's degree and above, and those who chose the program willingly had higher IIS mean scores. In addition, students who watched daily news, kept up with current issues and developments, and believed in the necessity of using technological devices in education had higher IIS mean scores, where the difference between them was statistically significant ($p<0.05$).

Table 4. The Effect of the Students' Individual Innovativeness Levels on their Critical Thinking Dispositions

Model	Unstandardized Coefficients		Standardized Coefficients				F	Sig	R	R ²
	B	SE	Beta	t	Sig.					
Constant	26.180	.783		34.421	.000					
IIS	4.323	.042	.563	10.235	.000	46.720	.000 ^b	.540 ^a	.245	

^a Dependent variable: CCTDI total score; ^b Predictors: (Constant): IIS total score

Table 5. Comparison of the Students' Socio-Demographic Characteristics and Scale Mean Scores

	Individual Innovativeness Scale	Test and significance	CCTDI	Test and significance
Age	$r=.108$ $p=.250$		$r=.095$ $p=.345$	
Gender				
Female	85	64.7±10.5	t:4.754	259.8±39.7
Male	36	69.1±8.7	p:.000*	260.3±49.8
Grade				
1	68	68.0±10.1	t:-1.360	260.6±46.0
2	53	68.7±9.5	p:.730	261.9±37.9

Mother's education level					
Illiterate	89	66.8±10.1		255.0±42.1	
Primary education	19	67.9±7.4	KW:2.924	259.3±49.7	KW:1.896
High school	10	68.3±11.0	p=.177	259.1±41.3	p:.594
Undergraduate and above	3	69.6±4.9		260.6±18.8	
Father's education level					
Illiterate	35	66.8±12.1		258.9±56.5	
Primary education	32	66.0±9.4	KW:1.868	260.6±35.3	KW:1.402
High school	36	66.4±8.3	p=.760	259.1±31.8	p:.493
Undergraduate and above	18	68.3±9.2		260.0±43.9	
Voluntarily selecting the department					
Yes	110	64.9±9.9	Z:-.768	265.8±44.0	Z=-.636
No	11	63.6±8.7	p:.654	264.6±25.8	p=.450
Status of watching daily news					
Yes	72	69.2±4.5	t:2.104	262.6±30.6	t:-.905
No	49	66.5±6.8	p:0.04*	263.1±45.3	p:.345
Status of keeping up with current issues and developments					
Yes	87	70.8±9.7	t:5.251	267.8±41.7	t=4.892
No	34	65.3±10.3	p:.003*	262.7±44.9	p=.024*
Status of following field-related developments (publication, article reading)					
Yes	113	71.6±8.8	Z:5.493	269.3±38.5	Z=8.742
No	8	67.3±9.5	p:.035*	260.0±76.9	p=.008*
Status of believing in the necessity of using technological devices (such as simulation model) in education					
Yes	64	69.9±6.7	t:7.102	264.4±40.1	t:1.987
No	57	64.7±5.4	p:.000*	263.8±33.4	p:.204

t: T-Test, Z:Mann-Whitney Test, KW: Kruskal-Wallis Test

In this study, there was a weak positive relationship between the students' age and CCTDI mean scores, but the difference was not statistically significant ($r: .95$, $p>0.05$). In addition, no statistically significant difference was found between their CCTDI mean scores in terms of gender, grade, parents' educational level, willingness to choose the program, status of watching daily news, and status of believing in the necessity of using technological devices in education ($p>0.05$). However, students who followed current issues and field-related developments had higher CCTDI mean scores, where the difference between them was statistically significant ($p<0.05$) (Table 5).

DISCUSSION

In this study, the students' IIS and CCTDI mean scores were 68.4 ± 9.5 and 260.2 ± 29.9 , respectively. Accordingly, they had moderate individual innovativeness and were categorized as "interrogator". "Interrogators" are cautious towards innovations and think for a long time before adopting innovations (13). Tarhan and Doğan determined that the students' IIS mean score was 65.2 ± 8.6 , and they were categorized as "interrogator" (14). Different studies

have reported that students are interrogators in general (15-17). This result suggests that first and emergency aid program students are eager to search for and experience innovations but are cautious about adopting them. Students should be supported to adopt and implement effective and successful innovations.

This study found that the students had moderate critical thinking disposition and there was a strong relationship between their individual innovativeness and critical thinking disposition. Arslan and Ancin reported that the students' CCTDI mean score was 216.6 ± 20.3 , disposition, which was lower than the mean score found in this present study (18). Different studies have reported that students have moderate critical thinking disposition (19,20).

This study also found that individual innovativeness was a predictor of critical thinking disposition (24.5%) and the difference between them was statistically significant ($p<0.001$). Interrogative students' thinking on a topic for a long time contributes positively to their critical thinking disposition. Özgür has determined that critical thinking disposition is a predictor of individual innovativeness in teacher candidates. More clearly, increased critical

thinking disposition may have positively affected teacher candidates to become more innovative, open to change and risk-taking individuals (21). Although these two studies examined the interaction between individual innovativeness and critical thinking disposition from different perspectives, both of them suggested a positive interaction between individual innovativeness and critical thinking disposition. Like all healthcare professionals, first and emergency aid program students should have high critical thinking disposition, individual innovativeness, and inclination to keep up with innovations. It is important for them to become innovators in order to provide higher quality of healthcare services especially to risky patients.

This study found a statistically significant difference between the students' IIS total mean scores according to gender ($p < 0.05$), whereby male students had higher individual innovativeness. In consistent with the result of this study, some studies found that male students had higher individual innovativeness than female ones, where the difference between them was statistically significant (22-24). However, there are also studies suggesting that female students are more innovative (16,25,26). These different results in the literature prevent making definitive comments on the relationship between gender and individual innovativeness. The result of the present study suggesting higher individual innovativeness in male students may be due to their individual characteristics.

This study was found a weak positive relationship between the students' age and IIS mean scores, which was not statistically significant ($p > 0.05$). One study also found a weak positive correlation between the nurses' age and individual innovativeness (27). The result of this study suggesting no significant relationship between the students' age and individual innovativeness may be because their ages were close to each other. In addition, this study determined no significant difference between the students' IIS mean scores according to grade, parents' educational level, and willingness to choose the program ($p > 0.05$). Ertuğ and Kaya also found no significant difference between the nursing students' IIS mean scores in terms of independent variables including grade, participation in seminars/conferences on innovation, and parents' education level (16). The result of this study suggesting no significant difference between the students' IIS mean scores according to grade may be because the first and emergency aid program is a two-year program and has only two grades. Although no significant difference was found between the education level of parents and innovativeness, the students whose parents had bachelor's degree and above had higher individual innovativeness. It is thought that access to information and technological facilities will be easier as educational level increases, and this will contribute to the personal development of children raised in families with high educational level.

This study found a statistically significant difference between the students' IIS mean scores with respect to status of following daily news, status of keeping with

current issues and field-related developments, status of believing in the necessity of using technological devices in education ($p < 0.05$). Tarhan and Doğan found that nursing students who followed care innovations had higher individual innovativeness, which was statistically significant (Tarhan & Doğan, 2018). Another study also found that nurses who involved in scientific researches were more innovative (Baksi et al., 2020). The result of this study suggesting that status of watching news, following current issues and technological developments and participating in field-related scientific researches affected the students' individual innovativeness may be because they focused on the subject and read publications about the subject from many different sources.

This study found no statistically significant difference between the students' CCTDI total mean scores according to gender, grade, parents' education level, status of watching daily news, and willingness to choose the program ($p > 0.05$). However, there was a weak positive relationship between the students' age and critical thinking disposition, but the difference between them was not statistically significant ($p > 0.05$). One study, which examined the relationship between students' demographic characteristics and critical thinking power, found a statistically significant relationship between their age and critical thinking power. The study found that students aged 16 years had lower critical thinking power than those aged 17 and 18 years (28). Another study found a statistically significant difference between the nursing students' critical thinking power with respect to age, suggesting that critical thinking power increased by age (29). The results of this present study is consistent with those in the literature. Critical thinking increases along with maturation and richness of life (30). Considering that experiences of each passing day contribute to one's physical, emotional, social and spiritual development, critical thinking disposition is expected to increase by age.

In this study, the status of keeping up with current issues and field-related developments caused a statistically significant difference in the students' critical thinking disposition ($p < 0.05$). Critical thinking ability is one of the important skills that healthcare professionals should have in providing quality health services. The fact that there was no significant difference among the students in terms of demographic variables and that they had similar critical thinking dispositions is a satisfying result.

CONCLUSION

In this study, the first and emergency aid program students had moderate individual innovativeness and critical thinking disposition. The students' individual innovativeness positively affected their critical thinking disposition. A statistically significant difference was found between their individual innovativeness and critical thinking disposition according to various demographic variables. Students, who will be the pioneers of the future, should be supported and guided by institutions and instructors in order to increase their critical thinking skills and encourage them to follow innovations closely.

Conflict of interest : The authors declare that they have no competing interest.

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