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ScienceDirect

Procedia - Social and Behavioral Sciences 174 (2015) 199 – 207

Procedia
Social and Behavioral Sciences

INTE 2014

The effect of critical thinking disposition on entrepreneurship levels: A study on future teachers

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Abstract

The aim of this research is to study the relations between Critical Thinking Dispositions and entrepreneurship levels of future teachers and to evaluate them in terms of some demographic variables. Relational scanning model weree used in this study. The California Critical Thinking Disposition Inventory (CCTDI) developed by Facione, Facione &Giancarlo (1998) and adapted to Turkish by Kökdemir (2003), Entrepreneurship Scale (ES) developed by Yılmaz & Sünbül (2009) were used as the data collection tool. The sample of this study is formed by 548 pre-services from Science, elementary school, mathematics, social studies Education, Department of Faculty of Education. In order to analyze the data, ANOVA, independent group t-test, Pearson correlation coefficient analysis, regression analysis were used. Between scales has been found a positive correlation. It has been seen that critical thinking dispositions have a significant effect on entrepreneurship levels. There are statistically significant differences on gender, high school and department variables in terms of CCTDI. Also, statistically significant differences were determined on grades in terms of ES.

Peer-review under responsibility of the Sakarya University

*Keywords:*Critical Thinking Abilities, Entrepreneurship, Future Teachers.

1. Introduction

Entrepreneurship is a comprehensive concept which is an substantial element of all economies in the world. Entrepreneurs are crucial to make contributions to the nations through creating new economic activity. It strengthens

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Peer-review under responsibility of the Sakarya University
doi:10.1016/j.sbspro.2015.01.647

competition between developed economies and has potential economic benefits for society as a whole (Soriano, 2011). Entrepreneurs procure job opportunities for the unemployed, endorse innovation and creativity. Although the origin of the term "entrepreneur" has been traced to famous economist and author Richard Cantillon in 1755, entrepreneurship is still broadly discussed by many scholars. The definition has gone beyond merely creating new businesses (Gartner, 2010) and transformed into a process of seeking opportunities which includes creative, innovative and risk taking individuals, intentions and environmental factors (Stevenson & Jarillo, 1990; McKenzie, Ugbah & Smothers, 2007). Entrepreneurism is to create a value by engendering a novelty, using creative skills or by finding a new production, service, source, technology or markets in other ways (Bird,1989). In this context it can be seen that in entrepreneurism concept factors like: novelty, alteration, flexibility, dynamism, taking risks, creativity and focusing on improvement are affective (Korkmaz,2000). Successful entrepreneurs possess characteristics such as desire for success, creativity, enthusiasm, risk taking, self confidence, locus of control, vision, persuasiveness, adaptability, determination, assertiveness, optimism, imagination, other motivational factors and personal values (Khan, 1986; Raposo, Do Paço & Ferreira, 2008). As it is seen, entrepreneurship requires a unique personality and a mind-set.

Decision making has gained a major significance in the age of information. The way of thinking has been debated over the years and critical thinking abilities came forward in the literature. The term critical thinking refers to the use of cognitive skills or strategies that increase the probability of a desirable outcome, evaluating the outcomes of thought processes, how good a decision is or how well a problem is solved (Halpern, 1998). Critical Thinking can be defined as an effective, organized and operative cognitive period enabling us to improve understanding our own thoughts and others ideas and our skill to explain the opinions (Chaffe, 1994). According to various researches, evidence show that individuals are able to gain critical thinking abilities through proper guidance. Therefore, future teachers' thinking abilities can be enhanced if it is possible to consider notions such as looking for novel approaches and reject myths (Pithers & Soden, 2010).

Considering the fact that entrepreneurship has evolved from mere business meaning into creating innovative ideas and processes, teachers might also benefit from the concept. Considering all these changes, it is necessary that countries should rearrange their educational programs. In this context, in Turkey as well, the updated teaching programs encourage critical thinking, creative thinking, communication, research- questioning, problem solving, information technologies, entrepreneurship and using Turkish language correctly and effectively with an approach that puts the students in focus point (MEB, 2005). One of the basic skills in primary school programs, entrepreneurship is one of the key factors for individuals to reach information, use and apply information in new situations (Aytaç, 2006). Along with this, the entrepreneurship skills of students are related to the personal and occupational qualifications and entrepreneurship skills of their teachers (Bacanak, Ülküdür & Öner, 2012).

2. The Aim of the Research

The aim of this research is to study the relations between critical thinking dispositions and entrepreneurship levels of future teachers and to evaluate them in terms of some demographic variables.

3. Hypothesises

Hypothesis 1: Critical thinking gispositions levels of teacher candidates differentiate according to the varieties of gender, department, class, and graduated secondary school.

Hypothesis 2: Entrepreneurship levels of teacher candidates differentiate according to the varieties of gender, department, class, and graduated secondary school.

Hypothesis 3: Critical thinking dispositions have a significant effect on entrepreneurship Levels of teacher candidates.

4. Methods of the Research

In this study, quantitative research method and relational screening model has been used.

4.1. Sample of the Research

The sample of this study is formed by 548 teacher candidates from departments of science, social studies, elementary school, mathematics at Education Faculty. 167 of participants (30.5%) were from the department of science, 129 of them (23.5%) were from the department of elementary school, 143 of them (26.1%) were from the department of mathematics, 109 of them (19.9%) were from the department of social studies, 397 of the participants (72.4%) were female and 151 of them (27.6%) were male.

4.2. Data Collection Instruments

Data collection tool consists of three parts. In the first part personal data such as the gender, department and graduated secondary school have been collected. Second part includes The California Critical Thinking Disposition Inventory (CCTDI-R) which is developed by Facione, Facione & Giancarlo (1998) and adapted to Turkish by Kökdemir (2003). Third part includes Entrepreneurship Scale (ES) which is developed by Yılmaz & Sünbül (2009)

The California Critical Thinking Disposition Inventory (CCTDI-R): As a data collection tool, The California Critical Thinking Disposition Inventory (CCTDI) was developed by Facione, Facione & Giancarlo (1998) and was translated and validated in Turkish by Kökdemir (2003) has been used. Cronbach's alpha coefficient, which shows internal consistency for the dimensions of the CCTDI-R were calculated as .75 in analycity dimension, .75 in open-mindedness dimension, .78 in inquisitiveness dimension, .77 in self-confidence dimension, .61 in truth-seeking dimension, and .63 in systematicity dimension. Cronbach's alpha coefficient of the latest scale which was translated in Turkish by Kökdemir (2003) and has six dimensions and 51 items was calculated as .88. The scale was prepared as six – point Likert scale. Six-point Likert type scale shows "totally agree" option 6, "disagree" option 1 point. Six-point Likert type scale responses were collected. Raw scores were calculated for total scale and each factor. The raw scores were divided by the number of questions. In this way, the lowest value 1, and the highest value 6 standard scores are obtained. (Kökdemir, 2003).

Entrepreneurship Scale (ES): In the study; "Entrepreneurship Scale (ES)" which is developed by Yılmaz &Sünbül (2009) to determine students' entrepreneurship levels was used as the data collection tool. The scale was prepared as five–point Likert type scale. The factor analysis of the questionnaire responses using Principal Component Analysis resulted in 36 items which loaded on one factor. Cronbach Alpha coefficient was of found to be α=0.90. The minimum and the maximum score that can be taken from the scale are between 36-180. Entrepreneurship points based on the following criteria were included in the evaluation.

Points	ES Evaluation
36-64	Very low entrepreneurship
65-92	low entrepreneurship
93-123	Mid-level entrepreneurship
124-151	High entrepreneurship
152-180	Very high entrepreneurship

3.3. Analyzing Data

SPSS 16.00 is used to analyze the data. ANOVA, independent group t-test, Kruskal-Wallis test have been conducted to monitor the scores taken from the scales in terms of demographic varieties. PEARSON correlation coefficient analysis technique and Regression Analysis are applied in order to observe the relations between scales. In all statistical processes significance at a level of .05 has been seeked.

5. Findings

The sample of this study is formed by 548 students from Education Faculty. In this study, the taken total The California Critical Thinking Disposition Inventory (CCTDI-R) scale score was calculated as 4.1926 . The minimum and the maximum score that can be taken from the Entrepreneurship Scale (ES) are between 36-180. In this study, the taken total Entrepreneurship Scale (ES) score was calculated as 155.4394 (Table 1).

Table 1. Distribution of scores of teacher candidates taken from CCTDI-R scale according to the factors and Entrepreneurship Scale.

Scale		X	SD	SE
CCTDI-R Scale	Analyticity	4.3595	.55778	.02383
	Open-Mindedness	3.9256	.49588	.02118
	Inquisitiveness	4.3112	.55864	.02386
	Self-Confidence	4.2242	.58454	.02497
	Truth-Seeking	4.2500	.66410	.02837
	Systemacity	4.1670	.63790	.02725
	CCTDI-R Scale Total	4.1926	.43277	.01849
	ES Total Score	131.3412	20.25600	.86529

As in table 2, as a result of independent group T-test applied to define whether the scores taken from the CCTDI-R scale and factors differentiate according to the gender variable; for the CCTDI-R scale total score and all factor scores the difference between the arithmetic average of the groups have been found statistically significant. Female students' score average is significantly higher than the Male students ($p<.05$). The result of independent group t-test applied to define whether the scores taken from the Entrepreneurship Scale differentiate according to the gender variable; for the Entrepreneurship Scale total score the difference between the arithmetic average of the groups have not been found statistically significant ($p>.05$).

In this study, independent groups t-test and ANOVA have been used to test the hypothesis 1 and hypothesis 2.

Table 2. The results of Independent group t-test of the scores taken from CCTDI-R scale and factors and Entrepreneurship Scale according to the gender variable of teacher candidates.

Scale		Group	N	X	SD	SE	t-test		
							t	df	p
CCTDI-R Scale	Analyticity	Female	397	4.4552	.53135	.02667	6.773	546	.000
		Male	151	4.1079	.54888	.04467			
	Open-Mindedness	Female	397	3.9652	.48780	.02448	3.048	546	.002
		Male	151	3.8217	.50351	.04098			
	Inquisitiveness	Female	397	4.3602	.54510	.02736	3.358	546	.001
		Male	151	4.1825	.57497	.04679			
	Self-Confidence	Female	397	4.2814	.56761	.02849	3.759	546	.000
		Male	151	4.0738	.60336	.04910			
	Truth-Seeking	Female	397	4.3235	.66151	.03320	4.266	546	.000
		Male	151	4.0568	.63333	.05154			
	Systemacity	Female	397	4.2338	.63007	.03162	4.034	546	.000
		Male	151	3.9912	.62680	.05101			
	CCTDI-R Scale Total	Female	397	4.2551	.41877	.02102	5.634	546	.000
		Male	151	4.0283	.42721	.03477			
	ES Total Score	Female	397	131.7582	20.10822	1.00920	.781	546	.435
		Male	151	130.2450	20.66687	1.68185			

As seen in Table 3 as a result of ANOVA which is done in order to determine whether the scores taken from the Profound Approach and Superficial Approach factors show a significant difference according to the department variable; for the superficial approach factor scores the difference between the arithmetic average of the group has been found statistically significant but the difference has been found to be insignificant for the profound approach factor. Following this process Post-Hoc analysis techniques are started to be applied.

After ANOVA; to determine the changes in CCTDI-R scale and factors among sub-groups, considering the department variable, LSD test has been chosen from among the post-hoc analysis techniques; because of Analyticity, Open-Mindedness, Inquisitiveness, Self-Confidence, Systemacity factors and CCTDI-R Scale group variance are homogen according to the Levene's test (L=1.522, L=.735, L=.725, L=.565, L=.565, L=.859, p>.05), Tamhane test has been chosen from among the post-hoc analysis techniques; because of Truth-Seekingfactor group variance are not homogen according to the Levene's test (L=2.856, p<.05). As a result of this test it has been stated that, Science Education students' score are significantly higher than all other department students' score for Analyticity, Inquisitiveness, Self-Confidence, Truth-Seeking Factors and CCTDI-R Scale total score, Science Education students' score are significantly higher than Elementary School and Mathematics Education department students' score for the Open-Mindedness Factor scores, Science Education students' score are significantly higher than Elementary School and Social Studies Education department students' score for the Systemacity Factor scores.

As a result of non-parametric Kruskal-Wallis test which is done in order to determine whether the scores taken from the Entrepreneurship Scale show a significant difference according to the department variable; for scale scores the difference between the arithmetic average of the group has been found to be insignificant statistically ($\chi 2$=6.525, Sd=3, p>.05).

Table 3. The results of ANOVA applied to define whether the scores taken from CCTDI-R scale and factors differentiate according to the department variable of teacher candidates.

		N, X and SD Values			ANOVA Results					
CCTDI-R Scale and Factors	Group	N	X	SD	Var. K.	SS	df	MS	F	p
Analyticity	Science Education	167	4.5108	.53290	Between	6.224	3	2.075	6.883	.000
	Elementary School Education	129	4.2357	.59841	Within	163.957	544	.301		
	Mathematics Education	143	4.3070	.50262	Total	170.181	547			
	Social Studies Education	109	4.3431	.57015						
Open-Mindedness	Science Education	167	4.0120	.52300	Between	2.097	3	.699	2.872	.036
	Elementary School Education	129	3.8598	.49366	Within	132.407	544	.243		
	Mathematics Education	143	3.8805	.47032	Total	134.504	547			
	Social Studies Education	109	3.9304	.47528						
Inquisitiveness	Science Education	167	4.5090	.53639	Between	9.801	3	3.267	11.045	.000
	Elementary School Education	129	4.1860	.58369	Within	160.907	544	.296		
	Mathematics Education	143	4.2253	.50246	Total	170.708	547			
	Social Studies Education	109	4.2691	.55849						
Self-Confidence	Science Education	167	4.4055	.61541	Between	9.507	3	3.169	9.718	.000
	Elementary School Education	129	4.1849	.56958	Within	177.398	544	.326		
	Mathematics Education	143	4.1868	.53351	Total	186.905	547			
	Social Studies Education	109	4.0419	.54927						
Truth-Seeking	Science Education	167	4.4380	.67992	Between	10.027	3	3.342	7.864	.000
	Elementary School Education	129	4.1008	.64147	Within	231.213	544	.425		
	Mathematics Education	143	4.2468	.56056	Total	241.240	547			
	Social Studies Education	109	4.1429	.72765						
Systemacity	Science Education	167	4.2605	.65516	Between	3.464	3	1.155	2.866	.036
	Elementary School Education	129	4.0943	.64947	Within	219.120	544	.403		
	Mathematics Education	143	4.2016	.55272	Total	222.583	547			
	Social Studies Education	109	4.0642	.68377						
CCTDI-R Scale Total Score	Science Education	167	4.3392	.43846	Between	5.395	3	1.798	10.079	.000
	Elementary School Education	129	4.0964	.43557	Within	97.055	544	.178		

Mathematics Education	143	4.1551	.38411	Total	102.450	547
Social Studies Education	109	4.1313	.42933			

As a result of ANOVA which is done in order to determine whether the scores taken from the CCTDI-R scale and factors show a significant difference according to the class variable; the difference between the arithmetic averages of the group has been found to be insignificant statistically.

As seen in table 4 as a result of ANOVA which is done in order to determine whether the Entrepreneurship Scale show a significant difference according to the class variable; the difference between the arithmetic averages of the group has been found statistically significant.

Following this process Post-Hoc analysis techniques were applied. After ANOVA; to determine the changes in Entrepreneurship Scale among sub-groups, considering the class variable, LSD test has been chosen from among the post-hoc analysis techniques; because of group variance are homogeny according to the Levene's test (L=1.759, p>.05).

As a result of this test it has been stated that senior students' score are significantly higher than all other class students' score for Entrepreneurship Scale total score.

Table 4. The results of ANOVA applied to define whether the scores taken from Entrepreneurship Scale differentiate according to the class variable of teacher candidates.

N,X and SS Values				ANOVA Results					
Group	N	X	SS	Var. K.	SS	df	MS	F	p
1.Grade	161	130.0497	20.89402	Between	8955.104	3	2985.035	7.536	.000
2.Grade	133	128.0000	20.74009	Within	215482.083	544	396.107		
3.Grade	129	129.3178	18.16848	Total	224437.188	547			
4.Grade	125	138.6480	19.38583						

As seen in table 5 as a result of ANOVA which is done in order to determine whether the CCTDI-R scale and factors show a significant difference according to the graduated secondary school variable; for scale total score and Analyticity, Inquisitiveness, Truth-Seeking factors scores the difference between the arithmetic average of the group has been found statistically significant. Following this process Post-Hoc analysis techniques are started to be applied.

After ANOVA; to determine how changed in CCTDI-R scale and factors among sub-groups, considering the graduated secondary school variable, LSD test has been chosen from among the post-hoc analysis techniques; because of Analyticity, Inquisitiveness, Truth-Seeking factors and CCTDI-R Scale group variance are homogeny according to the Levene's test (L=.415, L=.537, L=.009, L=.208, p>.05).

As a result of this test it has been stated that, graduated public high school and anatolian high school students' score are significantly higher than graduated teacher high school students' score for Analyticity, Inquisitiveness, Truth-Seeking Factors and CCTDI-R Scale total score.

As a result, for scale scores the difference between the arithmetic averages of the group has been found to be insignificant statistically.

As a result of Pearson Multiplication Momentum Correlation Analysis, conducted to define the relations between the CCTDI-R scale and factors and Entrepreneurship Scale score have a significant positive relation (Table 6).

In order to determine whether there is a significant effect of CCTDI-R scores on entrepreneurship scale, linear regression analysis has been conducted. Is has been seen that critical thinking dispositions have a significant effect on entrepreneurship levels($R=0.507$, $R_2=0.257$, $F=188.766$, $p<.01$). According to the results, 25.7% of the variation in entrepreneurship levels is explained by the variation in critical thinking dispositions (Table 7) Therefore,

hypothesis 3 is accepted.

Table 5. The results of Independent group t-test of the scores taken from SRLS scale and factors according to the gender variable of students.

		N, X and SD Values			ANOVA Results					
CCTDI-R Scale and Factors	Group	N	X	SD	Var. K.	SS	df	MS	F	p
Analyticity	Public High School	161	4.4267	.54701	Between	3.589	3	1.196	3.907	.009
	Anatolian High School	152	4.4257	.54475	Within	166.592	544	.306		
	Teacher High School	191	4.2524	.54991	Total	170.181	547			
	Others	44	4.3500	.61851						
Open-Mindedness	Public High School	161	3.9705	.51786	Between	.980	3	.327	1.331	.264
	Anatolian High School	152	3.9474	.47089	Within	133.525	544	.245		
	Teacher High School	191	3.8914	.51022	Total	134.504	547			
	Others	44	3.8352	.42244						
Inquisitiveness	Public High School	161	4.3658	.57409	Between	4.715	3	1.572	5.151	.002
	Anatolian High School	152	4.4057	.55049	Within	165.992	544	.305		
	Teacher High School	191	4.1885	.52540	Total	170.708	547			
	Others	44	4.3182	.59164						
Self-Confidence	Public High School	161	4.2724	.61400	Between	1.836	3	.612	1.799	.146
	Anatolian High School	152	4.2707	.57241	Within	185.069	544	.340		
	Teacher High School	191	4.1750	.54912	Total	186.905	547			
	Others	44	4.1006	.64669						
Truth-Seeking	Public High School	161	4.3301	.65839	Between	3.605	3	1.202	2.751	.042
	Anatolian High School	152	4.3073	.66738	Within	237.634	544	.437		
	Teacher High School	191	4.1488	.65479	Total	241.240	547			
	Others	44	4.1981	.67445						
Systemacity	Public High School	161	4.1843	.64269	Between	.615	3	.205	.502	.681
	Anatolian High School	152	4.2061	.62028	Within	221.969	544	.408		
	Teacher High School	191	4.1326	.62933	Total	222.583	547			
	Others	44	4.1174	.72388						
CCTDI-R Scale Total Score	Public High School	161	4.2456	.43980	Between	2.093	3	.698	3.783	.010
	Anatolian High School	152	4.2463	.41946	Within	100.356	544	.184		
	Teacher High School	191	4.1172	.42633	Total	102.450	547			
	Others	44	4.1408	.43949						

Table 6. Pearson Multiplication Momentum Correlation Analysis Results conducted to define factors relations of the scales.

CCTDI-R scale and Factors	Entrepreneurship Scale
Analyticity	r=.286(**)
Open-Mindedness	r=.323(**)
Inquisitiveness	r=.441(**)
Self-Confidence	r=.452(**)
Truth-Seeking	r=.456(**)
Systemacity	r=.387(**)
CCTDI-R scale	r=.507(**)

Table 7. Analysis Results related to entrepreneurship levels

Model	B	Std Error	β	T	P	r
Constant	.885	.202		4.380	.000	
CCTDI-R scale	.659	.048	.507	13.739	.000	.507
R=0.507	R_2=0.257					
$F_{(1,546)}$=188.766	P=0.000					

6. Results

It has been seen that the teacher candidates included to the research have very high entrepreneurship levels with the score of 155.4394. One of the sub-problems of the research is whether there is a differentiation on entrepreneurship levels and critical thinking dispositions according to the varieties of gender, department, class, and graduated secondary school. The statistical evidence shows that or the CCTDI-R scale total score and all factor scores the difference between the arithmetic averages of the groups have been found statistically significant. Female teacher candidates' score average is significantly higher than the male teacher candidates.

On the other hand, for the Entrepreneurship Scale total score the difference between the arithmetic averages of the groups have not been found statistically significant in terms of gender. Furthermore, for critical thinking dispositions scale total score and all factors scores, the difference between the arithmetic averages of the group has been found statistically significant. Science Education students' score are significantly higher than all other department students' score for Analyticity, Inquisitiveness, Self-Confidence, Truth-Seeking Factors and CCTDI-R Scale total score, Science Education students' score are significantly higher than Elementary School and Mathematics Education department students' score for the Open-Mindedness Factor scores, Science Education students' score are significantly higher than Elementary School and Social Studies Education department students' score for the Systemacity Factor scores. This might show the differences between methods and perspectives of those disciplines.

Another important result is that senior students' score are significantly higher than all other class students' score for Entrepreneurship Scale total score. It might be interpreted into the awareness of employment opportunities as students approach to graduation.

It has been stated that, graduated public high school and Anatolian high school students' score are significantly higher than graduated teacher high school students' score for Analyticity, Inquisitiveness, Truth-Seeking Factors and CCTDI-R Scale total score.

As we argued before, the results show that there is a correlation between critical thinking dispositions and entrepreneurship levels of teacher candidates. Also, there is evidence that critical thinking dispositions have a significant effect on entrepreneurship levels.

For further research, other variables related to entrepreneurship levels might be examined. Additionally, teacher candidates in various disciplines might be included to further investigations.

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