

Investigation of Relationship between Prospective Teachers' Need for Cognition Level and Individual Innovativeness State

Research Article

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ABSTRACT

The aim of this study is to examine the relationship between prospective teachers' need for cognition level and state of individual innovativeness. The correlational survey method has been used in this study and the study group is comprised of 507 prospective teachers 351 (69.2 %) of whom are female and 156 (30.8 %) of whom are male. The data of the study has been collected via "Need for Cognition Scale" developed by Cacioppo, Petty & Kao, (1984), adopted to Turkish by Gülgöz & Sadowski (1995) and "Individual Innovativeness Scale" developed by Hurt, Joseph and Cook (1977) and adapted to Turkish by Kılıçer & Odabaşı (2010). The results of analysis have showed that prospective teachers have a moderate level of need for cognition while their individual innovativeness state is determined to be in category of interrogators. In addition, a positive relation has been observed between prospective teachers' need for cognition level and their individual innovativeness state. Finally, prospective teachers' need for cognition level has been determined to be a significant predictor of their individual innovativeness state.

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Keywords:

Individual innovativeness, need for cognition, prospective teachers.

Introduction

The world has witnessed a major change in the transition from the industrial society of the 20th century to the information society of the 21st century. With this change, the skills needed to survive in the 20th century are no longer sufficient for the 21st century. In order to keep up with the knowledge and technology forces of 21st century, a change in the way of individuals' learning, teaching, assessing and working is required (Simmel, 2009: 10). As the 21st century has made it necessary for individuals to have more innovative skills like problem solving, creativity, communication, collaboration and innovation called 4C of Education

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(Partnership for 21st Century Skills, 2010), this urges 21st century individuals to care about students and teachers to be trained as innovative individuals.

Innovativeness, though has been described and defined in different ways, the most accepted approach is that deals with how much earlier or later an individual adopt an innovation in a social system when compared with others (Blake et al., 2003: 156). According to this approach, innovativeness is regarded as a willingness to change and is regarded as a basic personality structure that has normally distributed to the universe (Hurt et al., 1977: 59). Rogers stated that there are a few people who are open to a new idea or situation in a social system, which is an innovative segment of society representing about 2.5% of the population in the normal distribution curve and these people spread new ideas and situation to the rest of the society through verbal communication (Kaminski, 2011: 1). In the process of spreading the new idea and product in society, the fact that each individual adopts innovation at different times and stages shows that people have different levels of individual innovativeness. According to this, while 2.5% of the individuals who make up a society are in the *innovators* category who takes risks and adopts the innovation first, 13.5% of the society are leaders who stand as a role model for the rest of the society and called *early adopters* as a result of their leader role. After the pioneers come the *early majority* constituting the 34.5% of the society and being attentive about innovations and then come the *late majority* making up the 34.5% of the society and tending to be skeptical and prudent towards innovations. Finally, the *laggards* who make up the remaining 16% of the society and showing strong resistance to innovation and expect to observe their possible consequences before trying innovation (Rogers, 2003: 37).

Rogers also stated that in the diffusion of innovation process the level of adoption depends upon such characteristics of innovation as (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability and (5) observability (Rogers, 2002: 990). Rogers stated that while 4 of these 5 concepts affecting the process of innovation have a positive effect, only the concept of complexity have a negative impact on the diffusion process (Völlink et al., 2002: 334). The spread of innovations takes place in a social process that requires the individual to decide on innovation. In this process, the individual (1) obtains information about innovation, (2) takes an attitude towards innovation, (3) makes a decision about accepting or rejecting innovation, (4) applies innovation or a new idea and (5) confirms its decision (Rogers, 2002: 990). This points to the existence of a process in which an individual thinks upon or needs for cognition about the innovation before adopting it.

Developed during their study on individual differences in cognitive motivation by Cohen, Stotland and Wolfe, the concept of *Need for Cognition* is defined as “the need for an individual to organize his experience in a meaningful way”, “the need to construct relevant situations in meaningful and integrated ways” and “the need to reasonably understand the experiential world” (Cohen et al., 1955: 291). Cacioppo and Petty (1982) suggested that the need for cognition is a stable individual difference, which shows a tendency to be engaged in activities that require cognitive effort in a wide range of areas and being satisfied with this engagement. The need for cognition refers to a stable intrinsic motivation that develops over time rather than a traditional need. The word of “need” in this concept means statistical (probability or tendency) rather than biological sensation (tissue deprivation) (Cacioppo & Petty, 1982: 189). For this reason, the concept of need for cognition refers to the state of being willing to think about learning process and being satisfied with thinking about something, problem solving and using one’s mind actively (Goodman, 2017: 853). The need for cognition, should not be considered as an independent element as it is related to such mental activities as problem solving and thinking (Gülgöz & Sadowski, 1995: 16). Individuals with a high need for cognition show extremely high motivation capacity to learn and think about (Coutinho et al., 2005: 322) and tend to search, acquire, think and reflect information in the world to understand the events, stimuli and relationships (Cacioppo et al., 1996: 198). On the other hands, individuals with a low need for cognition do not prefer dealing with complex and demanding

considerations and tend to rely on less-demanding environmental signs, such as cognitive intuitions or advice from others (Petty et al., 2009: 319). Therefore this idea brought the question of whether individuals with high and low level need for cognition reacted to innovations in a similar way as a result of their similar thinking process.

When the related literature is examined, there are many studies conducted on individual innovativeness and need for cognitions topics. The studies on individual innovativeness have been determined to investigate the teachers and prospective teachers' state of innovativeness and both teachers and prospective teachers' have moderate innovativeness levels which is called as interrogator (Kert and Tekdal, 2012; Özgür, 2013; Yılmaz-Öztürk, 2015; Akdeniz and Kadı, 2016; Parlar and Cansoy, 2017; Yorulmaz, Çokçalışkan and Önal, 2017). Furthermore, Bitkin (2012) mentioned that there is a medium level of relationship between prospective teachers' individual innovativeness state and knowledge acquisition skills, Özbek (2014) stated that individual innovativeness is an important predictor of TPACK education competencies. Erdoğan and Güneş (2013) found that there is a positive correlation between prospective teachers' individual innovativeness and openness to change states. Yılmaz and Bayraktar (2014) found a positive relationship between the prospective teachers' attitudes using educational technologies and individual innovativeness state but Abbak (2018) concluded that there is no significant difference between the teachers' individual innovativeness state and lifelong learning competencies. As for the studies on need for cognition, Tok (2010) mentioned that despite prospective teachers are aware of the vital importance of thinking, their need for cognition level is low. Polat and Tümkaya (2010) did not find a significant relationship between prospective teachers' need for cognition level and problem solving skills.

Finally, Demirtaş-Madran (2012) concluded that there is no relationship between university students' need for cognitions levels and gender or gender orientations. As seen from the literature, the study based on the relationship between prospective teachers' individual innovativeness state and need for cognitions levels hasn't been searched yet. From this point of view, we tried to determine the relationship between the prospective teachers' individual innovativeness levels and their need for cognition. In this regard, this study aims to examine the relationship between prospective teachers' need for cognition level and their individual innovativeness state. In relation to this general aim, following questions related to study have been explored:

1. What are the levels of prospective teachers' need for cognition level and their individual innovativeness state?
2. How do individual innovativeness categories of prospective teachers distribute?
3. What is the relationship between prospective teachers' need for cognition level and their state of individual innovativeness?
4. Does the prospective teachers' need for cognition level predict their individual innovativeness state significantly?

Method

Research model

This study is conducted on the basis of correlational survey method as it aims to investigate the relationship between prospective teachers' need for cognition level and their state of individual innovativeness. Correlational survey method attempts to establish the relationships and effects occurring between the variables as they exist in their natural situation (Wiersma, 1995: 15).

The Study Group

The study group of this study consists of prospective teachers studying in an education faculty of a state university in 2017-2018 academic year. The study group consisted of 351 (% 69.2) female and 156 (%30.8) male totally 507 prospective teachers selected randomly from the different departments of the Ziya Gökalp Education Faculty of Dicle University. The distribution of the prospective teachers in relation to grade and department was presented in Table 1.

Table 1. The Distribution of the Prospective Teachers Participated in Study in relation to Grade and Department

		n	%
Department	Preschool Teachers	68	13.4
	Classroom Teachers	69	13.6
	Turkish Language Teachers	91	18.0
	English Language Teachers	57	11.2
	Turkish Language and Literature	27	5.3
	History Teachers	37	7.3
	Science Teachers	31	6.1
	Mathematics Teachers for Primary Schools	50	9.9
	Chemistry Teachers	4	.8
	Social Sciences Teachers	49	9.7
	German Language Teachers	24	4.7
	Grade	1 st Grade	84
2 nd Grade		149	29.4
3 rd Grade		191	37.7
4 th Grade		83	16.4
Total	Total	507	100.0

Data Collection Instrument

In this study "Need for Cognition Scale" and "Individual Innovativeness Scale" have been used as data collection instruments.

Individual Innovativeness Scale (IIS): Individual Innovativeness Scale (IIS) was developed by Hurt, Joseph and Cook (1977) and adapted to Turkish Language by Kılıçer and Odabaşı (2010). The scale is comprised of 4 dimensions named "Resistance to change", "Opinion leadership", "Openness to experiences" and "Risk taking" and 20 items; 12 of which are positive and 8 are negative. In the adaptation study of the scale to Turkish Language, the internal consistency coefficient of the whole scale was calculated as .82, while the test-retest reliability coefficient was calculated as .87 (Kılıçer and Odabaşı, 2010). In this study Cronbach Alpha reliability coefficients of IIS were calculated as .79 for "Resistance to change", .78 for "Opinion leadership", .76 for "Openness to experiences" and .53 for "Risk taking" dimensions and as .69 for the whole scale.

Need for Cognition Scale (NCS): Need for Cognition Scale (NCS) was developed by Cacioppo and Petty (1984) adapted to Turkish Language by Gülgöz and Sadowski (1995). NCS is a 9 Point Likert type scale scored from (+4) to (-4) and comprised of 18 items half of which is positive and the other half is negative. In the adaptation study of the scale to Turkish Language, the internal consistency coefficient of the whole scale was calculated as .69 for the first stage and .78 for the second stage. As for the test-retest reliability coefficient, it was calculated as .55 ($p < .001$) (Gülgöz & Sadowski, 1995). In this study, Cronbach Alpha reliability coefficients of NCS was calculated as .79.

Raines-Eudy (2000: 126) mentions that reliability coefficients above .50 are accepted as reliable so the two scales used in this study and their dimensions can be accepted to be reliable.

Data Analysis

The data obtained were analyzed using the SPSS 20.0 package program. In order to determine prospective teachers need for cognition level the mean and standard deviation values were calculated. The mean values in relation to need for cognition were formed by the researchers for this study and mean values were interpreted based on the score ranges and levels shown in Table 2.

Table 2. Score Ranges and Levels Used to Interpret Mean Values

Score ranges	Levels
(-72) – (-24)	Low
(-23.9) – (+24)	Medium
(+24.1)– (+72)	High

For the scoring of the IIS scale as a whole, the scoring system of “Individual Innovativeness Score = 42 + (total scores of the positive items) – (total scores of the negative items)” suggested by Kilicer and Odabasi (2010) for the scoring of the scale items was used. In this regard, if the score taken from the scale is 80 or over, then the person is accepted as “innovator”; if it is between 69 and 80, then the person is accepted as “pioneer”; if it is between 57 and 68, then the person is accepted as “interrogator”; if it is between 46 and 56, then the person is accepted as “skeptic” and if it is 46 or lower, then the person is accepted as “traditionalist” (Kılıçer and Odabaşı, 2010; <http://www.jamescmcroskey.com/measures/innovation.htm>,_24.09.2018).

Percentages and frequencies of the prospective teachers in each category were calculated in order to determine the how the individual innovativeness categories of prospective teachers are distributed. For the third research question, Pearson correlation coefficients and for the fourth research question of the study simple regression analysis techniques were used. According to Büyüköztürk (2011) if the calculated correlation coefficient is between .70-1.00, it is interpreted to have a high correlation, if it is between .30- .70 then interpreted to have a medium correlation and if it is between .00- .30 then interpreted to have a low correlation. Significance degree in the analysis was tested at .05 level.

Findings

The findings obtained through this study are presented in line with research questions. Findings regarding the prospective teachers’ need for cognition levels and their individual innovativeness state are presented in Table 3.

Table 3. Mean and Standard Deviation Values Regarding to Prospective Teachers’ Need for Cognition Levels and Their Individual Innovativeness State

	n	\bar{X}	Sd	Level
Individual Innovativeness	507	65.57	10.52	Interrogator
Need for Cognition	507	14.66	19.04	Medium

Table 3 shows that prospective teachers’ need for cognition level is at medium level. Moreover, prospective teachers’ innovativeness level is determined to be in *Interrogator* category. Distribution of individual innovativeness state of prospective teachers is presented in Table 4.

Table 4. Distribution of Prospective Teachers in terms of Individual Innovativeness State.

State	n	%
Traditionalist	17	3.4
Skeptic	66	13.0
Interrogator	227	44.8

Pioneer	159	31.4
Innovator	38	7.5

Table 4 shows that prospective teachers' individual innovativeness state is determined to be mostly in interrogator category (44.8%) and at least in traditionalist category (3.4%). The finding of the correlation analysis to determine the relationship between prospective teachers' need for cognition level and individual innovativeness state is presented in Table 5.

Table 5. The Findings of Correlation Analysis Regarding the Relationship between Prospective Teachers' Need for Cognition Level and Individual Innovativeness State

	Need for Cognition
Individual Innovativeness	.453**

**p<.01

Table 5 shows that a positive and medium level of significant relationship is observed between prospective teachers' need for cognition level and their individual innovativeness state. Finding of whether prospective teachers' need for cognition level is a significant predictor of individual innovativeness state of their own is presented in Table 6.

Table 6. The Findings of the Simple Regression Analysis Regarding the Prediction of Individual Innovativeness State of Prospective Teachers.

Variable	B	Standard Error	β	t	p
Fixed	61.903	.526	.453	117.666	.000
Need for Cognition	.821	.022		11.431	.000

R = .453, R² = .204, F = 130.662, P = .00

Table 6 shows that prospective teachers' need for cognition level is a significant predictor of their individual innovativeness state. Additionally, prospective teachers' need for cognition level account for about 20% of the variance of individual innovativeness state.

Conclusion and Discussions

The findings obtained in this study revealed that the prospective teachers have a medium level of need for cognition while their individual innovativeness state is determined to be mostly in interrogator category and at least in traditionalist category. Moreover, positive and medium relationship is observed between prospective teachers' need for cognition level and their individual innovativeness state. Thus, prospective teachers' need for cognition level is determined to be a significant predictor of their individual innovativeness state,

When the findings related to first research question are examined, it is seen that the prospective teachers have a medium level of need for cognition while their individual innovativeness state is determined to be mostly in interrogator category and at least in traditionalist category. The fact that prospective teachers' individual innovativeness state is mostly in interrogator category is supported by other research findings. Adıgüzel, (2012); Kert and Tekdal, (2012); Özgür, (2013); Çuhadar et al., (2013); Erdoğan and Güneş (2013); Korucu and Olpak, (2015); Yılmaz-Öztürk (2015); Parlar and Cansoy (2017); Yorulmaz et al., (2017) also in their studies have reached the finding that individual innovativeness state of prospective teachers is in interrogator category. This suggests that prospective teachers do not want to take risks by being attentive towards innovations rather than adopting innovations immediately. However, this kind of approach to innovations is not desirable situation for the 21st century information society so prospective teachers and teachers in schools

are expected to have more innovative way of working and teaching (Keleşoğlu, 2017). As the school environments rapidly change due to such reasons as student diversity, expansion of knowledge areas, inclusion of new responsibilities and higher social expectations (OECD, 2005). This change necessitates the development of both professional development and innovative activities of teachers in terms of sustainable education. For this reason, innovative practices in teacher training should be encouraged so that teachers can have high levels of innovative features (Tyunnikov, 2017: 167-168).

Another result obtained in the study is that there is a positive and medium relationship observed between prospective teachers' need for cognition level and their individual innovativeness state. What is more; prospective teachers' need for cognition level is determined to be a significant predictor of their individual innovativeness state. These results show that individuals' need for cognition level in the process of learning or acquiring information is also used by these individuals in the face of a new situation or object, which affects the individual innovativeness state as well. The literature studies conducted on the topic of individual innovativeness also supports this finding. For instance, Katz (1961) stated that innovation should be characterized in relation to patterns of thought and actions of the people to whom it is directed (cited in Hurt et al., 1977: 58). Wattanasupachoke (2012) mentions that creative thinking process is stimulate divergent thinking in that way contribute to innovation. Thus, creative thinking is accepted as a start point for the innovations (Addis, 2009: 78). With these statements a categorization involving people's thinking processes was emphasized. When we look at the individual innovativeness categories determined following the development of the theory, an emphasis on the personal characteristics that point to the thinking processes before adopting the innovation in each category is observed. For example, *innovators* can understand and apply complex technical information to deal with uncertainties, while *pioneers* and *interrogators* may choose to be more cautious and lead ideas in the following stages. In this process, individuals apply the innovation mentally at present or in the future and make a decision about whether to try it or not (Kaminski, 2011: 3-4). In this process, the tendency of the individual to think on many things including his own thoughts will increase as the need for cognition increases. This increase in the thinking process sometimes produces more lasting results and judgments, while protecting the person from stereotypes but in some cases may worsen the prejudices of the person (Petty et al., 2009: 318). This can easily be observed in individuals in the category of *skeptics* and *traditionalist* who tend to be skeptical and cautious against innovations and show strong resistance to innovation (Rogers, 2003: 37). From this point of view, it can be said that the prospective teachers' need for cognition level is a variable that predicts the individual innovativeness state.

Recommendations

Based on the research results, the following recommendations were proposed:

- The course contents in teacher training faculties should be enriched with activities, which is going to improve prospective teachers' thinking and mental processes to promote prospective teachers' individual innovativeness state because of the statistically significant and positive relationship observed between prospective teachers' need for cognition level and their individual innovativeness state.
- The course contents in teacher training faculties should be enriched with the innovative learning and teaching approaches which will broaden the mental and thinking process.
- Experimental studies investigating effect of different independent variables on the prospective teachers' need for cognition level should be conducted.

GENİŞLETİLMİŞ ÖZET

Araştırmanın Amacı

20. yüzyılın sanayi toplumundan 21. yüzyılın bilgi toplumuna geçerken dünya büyük bir değişime tanıklık etmiştir. Bu değişimle birlikte 20. yüzyılda yaşamak için gereken beceriler artık 21. yüzyıl için yeterli olmamaktadır. Bilgi ve teknoloji güçleriyle yönetilen 21. yüzyıl şartlarına ayak uydurabilmek için de bireylerin öğrenme, öğretme, ölçme-değerlendirme ve çalışma şartlarında değişikliğe ihtiyaç duyulmaktadır (Semmel, 2009: 10). Çünkü 21. yüzyıl, bireylerden problem çözme, yaratıcılık, iletişim, işbirliği ve yenilikçilik gibi eğitimin 4 C'si olarak adlandırılan daha yenilikçi becerilere sahip olmasını gerekli kılmıştır (Partnership for 21st Century Skills, 2010). Bu noktadan hareketle 21. yüzyıl insanın yenilikçi bireyler orak yetiştirilmesi önemsenmeye başlanmıştır.

Yenilikçilik, değişime isteklilik olarak ifade edilip evrene normal dağılım gösteren temel bir kişilik yapısı olarak kabul edilmektedir (Hurt, Joseph & Cook, 1977: 59). Rogers, toplumsal bir sistemde yeni bir fikre veya duruma açık birkaç kişinin bulunduğunu ki bunun normal dağılım eğrisinde yaklaşık olarak toplumun % 2,5'lik kısmını temsil eden yenilikçi bir kesimin olduğunu ve bu kişilerin de sözel iletişim aracılığıyla yeni fikir ve durumu toplumun geri kalan kesimine yaydığını belirtmiştir (Kaminski, 2011: 1). Düşünme ihtiyacı ise bireyin kendi deneyimini anlamlı bir şekilde düzenleme ihtiyacı", "ilgili durumları anlamlı, bütünleşik yollarla yapılandırmaya duyulan ihtiyaç" ve "deneyimsel dünyayı makul bir şekilde anlama ve anlama ihtiyacı" olarak tanımlanmaktadır (Cohen, Stotland & Wolfe, 1955: 291). Düşünme ihtiyacı, geleneksel anlamda bir ihtiyaçtan ziyade zaman içinde gelişen istikrarlı bir içsel motivasyonu ifade etmektedir. Bu durum da bize yüksek ve düşük düzeyde düşünme ihtiyacına sahip bireylerin öne sürülen yenilikler karşısında benzer düşünme ihtiyaçlarından kaynaklı bir tepki verip vermediği sorusunu gündemimize getirmiştir. Bu düşünceden hareketle de öğretmen adaylarının bireysel yenilikçilik düzeyleri ile düşünme ihtiyaçları arasında ne tür bir ilişki olduğunu saptamaya çalıştık. Bu genel amaç çerçevesinde bu çalışmada öğretmen adaylarının düşünme ihtiyaçları ile bireysel yenilikçilik düzeyleri arasındaki ilişkiyi incelemek amaçlanmıştır. Bu amaç doğrultusunda ise aşağıdaki sorulara yanıt aranmıştır.

1. Öğretmen adaylarının düşünme ihtiyaçları ve bireysel yenilikçilikleri hangi düzeydedir?
2. Öğretmen adaylarının bireysel yenilikçilik kategorileri nasıl bir dağılım göstermektedir?
3. Öğretmen adaylarının düşünme ihtiyaçları ile bireysel yenilikçilik düzeyleri arasında nasıl bir ilişki vardır?
4. Öğretmen adaylarının düşünme ihtiyaçları, bireysel yenilikçilik düzeylerini anlamlı bir şekilde yordamakta mıdır?

Yöntem

Bu çalışmada öğretmen adaylarının öğrenmeye yönelik inançları ile bireysel yenilikçilik düzeyleri arasındaki ilişkiyi incelemeyi amaçlandığından ilişkisel tarama modeli kullanılmıştır. Araştırmanın örneklemini 2017-2018 öğretim yılı bahar döneminde bir devlet üniversitesinin eğitim fakültesinde kayıtlı ve rastgele seçilmiş 351 kadın (% 69.2) ve 156 erkek (% 30.8) olmak üzere toplam 507 öğretmen adayı oluşturmaktadır. Araştırma verilerini toplamak için ise "Bireysel Yenilikçilik Ölçeği" ve "Düşünme İhtiyacı Ölçeği" kullanılmıştır. Araştırmada elde edilen veriler SPSS paket programı kullanılarak analiz edilmiştir.

Sonuç, Tartışma ve Öneriler

Araştırma sonucunda öğretmen adaylarının düşünme ihtiyaçlarının orta düzeyde, bireysel yenilikçilik kategorilerinin ise en çok *sorgulayıcı* en az ise *gelenekçi* kategorisinde yer aldığı belirlenmiştir. Ayrıca öğretmen adaylarının düşünme ihtiyaçları ile bireysel yenilikçilik düzeyleri arasında pozitif yönlü ve orta düzeyde

anlamli bir ilişkinin olduđu ve öğretmen adaylarının düşünme ihtiyaçlarının, bireysel yenilikçilik düzeylerinin anlamli bir yordayıcısı olduđu bulgusuna ulaşılmıştır. Bu durum da bize bireylerin öğrenme veya bilgi edinme sürecindeki düşünme ihtiyaçlarını, yeni bir durum veya obje karşısında da kullandıkları ve bunun bireylerin bireysel yenilikçilik düzeylerini etkilediğini göstermektedir. Bu bulgulardan hareketle öğretmen adaylarının yenilikçilerini geliştirmek için derslerde öğretmen adaylarını düşünmeye ve zihinsel işlemlere yönlendirecek etkinliklere yer verilmesi, böylece öğretmen adaylarının yenilikçi öğrenme ve öğretme etkinliklerinde yer alarak düşünce dünyasını zenginleştirebilecek düşüncel süreçlere girmesi önem arz etmektedir.

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