

## **Comparison Of Individual Innovativeness Perception Of Students Attending Different Education Faculties**

### **Farklı Eğitim Fakültelerine Devam Eden Bireylerin Yenilikçilik Algılarının Karşılaştırılması**

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#### **Abstract**

The purpose of this research is to compare individual innovativeness perception of senior students from different education faculties. The participants of the study consists of the senior students attending to the Yıldız Technical University and Cukurova University's department of Computer Education and Instructional Technologies. These two universities are in Turkey and different geographical regions away from each other. Total number of participants was determi

ned as 124. The Individual Innovation Inventory developed by Hurt, Joseph and Cook (1977) and adopted in Turkish by Kılıçer and Odabaşı (2010) were used for obtaining data. At the end of the study, it was emerged that the individual innovativeness perception of the students enrolled in same department of two different education institutions differs according to one factor. Also, The survey points of all participants were found as an indicator of "early majority" character of the senior students of education faculties. The "early majority" characteristic of the teacher candidates was analyzed in the study.

**Keywords:** Individual Innovativeness, Teacher Candidates, Higher Education, Education Faculties.

#### **Özet**

Bu çalışmanın amacı farklı eğitim fakültelerinde okumakta olan son sınıf öğrencilerinin bireysel yenilikçilik algılarının karşılaştırılmasıdır. Çalışmanın katılımcıları Yıldız Teknik Üniversitesi ve Çukurova Üniversitesi Bilgisayar ve Öğretim Teknolojileri

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Öğretmenliği Bölümleri son sınıf öğrencilerinden oluşmuştur. Bu iki Üniversite Türkiye’de birbirinden uzak coğrafi bölgelerde yer almaktadırlar. Toplam katılımcı sayısı 124 olarak belirlenmiştir. Verilerin toplanması amacıyla Hurt, Joseph ve Cook(1977) tarafından geliştirilen, Kılıçer ve Odabaşı (2010 ) tarafından Türkçe uyarlaması yapılan bireysel yenilikçilik ölçeği kullanılmıştır. Çalışma sonunda, farklı eğitim fakültelerinin aynı bölümlerine devam etmekte olan öğrencilerin bireysel yenilikçilik algılarının bir faktör bakımından farklılaştığı ortaya çıkmıştır. Bununla birlikte, tüm katılımcıların büyük oranda “*sorgulayıcı*” karakter gösterdikleri belirlenmiş, öğretmen adaylarında ortaya çıkan bu özellik çalışma içerisinde yorumlanmıştır.

**Anahtar Kelimeler:** Bireysel Yenilikçilik, Öğretmen Adayları, Yüksek Öğretim, Eğitim Fakülteleri.

## I. INTRUDUCTION

The globalization and change process emerging on the world since the beginning of 2000s, brought about the rapid flow of information and technological development. Today, on the basis of to become a knowledge society and to take necessary steps to achieve this goal lies social innovation request. In order to define the meaning of desire for innovation, it is primarily necessary to establish a theoretical infrastructure regarding to innovation concept. Adair (2007), has stated the concept of innovation, as to reveal or introduce a new idea, method or tool. The innovation may be formative like creating a children's toy or may be a developer such as a snapshot technology for still image (Curtis & William, 2006. In this context, innovativeness covers to adopt an innovation and its application process (Adair, 2007).

The scope of the process sizes from individual level to organizational and social level. The social regeneration is the result of individualistic adaption of innovation and innovativeness contents in a society. The audiences which couldn't gain the social regeneration desire, can stay outside of all kinds of scientific, sociological, economic development, and are subject to the frustrations about their expectations in future. The important role of innovativeness phenomenon in the progression of the society makes essential the research of innovation in scientific terms. The studies related to Innovation may have multi-faceted structure covering different occupational groups and individual characteristics. In this sense, the scientific innovativeness studies appear as the research branches which contain interdisciplinary content varieties. The universities with their students and academic staff are the institutions focused on these kinds of studies, because these schools, with a point of view widely accepted in each passing day, undertakes a key role in foundation of economic development and innovativeness.(Mowery & Sampat, 2005). The developed countries all around the world look for to establish a relationship with the universities predisposed to industrial innovativeness researches (Isaksen & Karlsen, 2010). Interdisciplinary characteristic of innovativeness researches cover psychology, sociology, organizational behavior, economics and trade (Jin, Hewitt-Dundas & Thompson, 2004). Especially the

understanding of organizational innovation are discussed and analyzed in many academic studies (Ramstad, 2009; Howorth, Mueller, & Harvey, 2002; Alegre, Chiva & Lapiedra, 2009, Castro, Montoro-Sanchez, & Ortiz-De-Urbine-Criado, 2010; Marshall, 2010). In the innovative approach of any organization, individuals' attitude in the organization plays an important role. In this context, the relationship between individuals and the organizations and the impact of the individuals in overall innovation understanding appear in literature as an important area of study (Casanueva & Gallego, 2010). There is an important link between organizational innovativeness and the individual values, may be said. In the establishment of the relation between the innovative point of view in organization culture and goals is mediated by the innovative individual values.

In order to understand the individual processes in the innovation facts, the researchers examined the emotional and behavioral responses of individuals against the innovation. As an example, the technological acceptance model (Davis, 1989), an individual's tendency to adopt an innovation or two fully embrace it, are explained by two basic factors and these factors are expressed in the form of (a) the perceived ease of use of an innovation, (b) perceived usefulness. There are some researchers who affirm that the perception of innovation emerged with influence of internal and external factors. For example, Ajzen (1991), explains the behaviors developed for innovation, as personal attitudes and social norms formed to promote the innovation. Choi (2004), combining a holistic view of these different opinions subsumed under three headings the factors which reveal the individual's attitude towards innovation:

- Innovative organizational culture and innovative personal values
- supportive norms and positive attitudes towards innovation
- Technical support and the necessary technological capability for innovation.

Choi (2004), examined independently these three factors and emphasized also the relationship between them and the roles related to formation of innovation usage behavior, and as shown in Figure 1 these links have been expressed on a relational table.

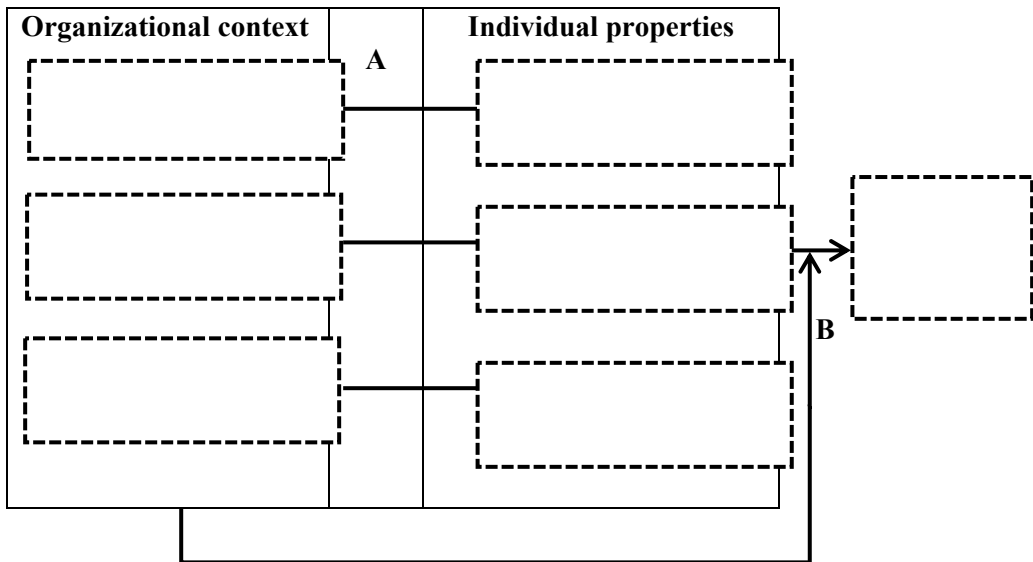


**Figure 1:** Relationship Between The Factors Revealing The Individual's Attitude Towards Innovation (Choi, 2004)

In Figure 1, the sub-dimensions of the items are presented in two main areas as "organizational context" and "individual properties". The flow "A" shown in the figure, indicates the emergence of innovation usage behavior with the individual characteristics which mediating the organizational factors; Flow "B" shows the reforming of the perception created towards innovation usage behavior with the organizational effects in the course. This link between the individual and societal perceptions of innovation is essential in order to put forward the assumptions regarding to the development of society and perform studies related to the perception of individuals working in different occupational groups.

The teaching profession affects directly or indirectly the development of individuals within all the professional branches in the community. The teacher to be candidates' perception of innovation will enable to retain individual innovation data associated with all segments of the community. The individual innovativeness understanding has emerged the innovative applications and field studies in student-centered learning processes. The innovativeness and creativity are useful for both students and teachers in teaching the processes (Jaskyte, Tylor & Smariga, 2010). Ritchhart (2004) has listed the effects of innovative point of view on teachers and students as follows:

- Helps to maintain teachers' professional interests and development,
- Increases the number of domains present in the curriculum which the students attend,
- The student is motivated to be active,
- Help to students and teachers to defeat the built-habits in their minds
- Increases the interest of the student against the course content.

In terms of learning theories, the perception of individual innovation is associated with forward looking expectations and self-efficacy especially within the scope of social cognitive theory (Choi, 2004). Learners' characteristics such as self-efficacy, goal focus, assigning a value to the subject are the characteristics differing according to their profiles related to their motivational beliefs. (Bong, 2008). Self-efficacy is the belief of an individual is capable of successfully fulfilling in order to increase his performance by organizing needed events (Bandura, 1994). Self-efficacy affects also self-editing phenomenon and leads the individual motivation in this regard. Garcia and Pintrich (1994) has expressed that self-regulation covers the knowledge, beliefs and strategies and their results. The knowledge and beliefs imply personal and conceptual knowledge and beliefs, the strategies; imply motivational and cognitive strategies, the results include the qualitative and quantitative efforts. Boekaerts (1997) has proposed a self-regulatory model consists of six components: these six-components are classified under two main sub-dimensions defined as cognitive self-regulation and motivational self-regulation, and under each sub-dimension are listed three components. Under the cognitive self-regulation subtitle there are the cognitive regulatory strategies, cognitive strategies and content area, while under the motivational self-regulation are listed the motivational regulatory strategies, motivational strategies, metacognitive knowledge and motivational beliefs. When these theoretical innovation relationships and evaluations are closely examined, the relationship between the education and learning processes and cases of innovativeness can be seen as systematic.

In this context, the individual innovation perceptions of the teacher candidates who will take part in the process of training are crucial. The characteristics of the teacher candidates in terms of individual innovation and its lower dimensions who continue their study in different regions and institutions will play an important role on their efficiency of active teaching. In this study, the variation of innovativeness perception between the senior students (year 4) who are attending department of Computer Education and Instructional Technology Teaching in two different region of our country is examined and interpreted by analysis.

## **II. METHOD**

### **1.Study Group**

The study group consists of the senior students (year 4) who are attending to the fall semester of the 2010-2011 school year of Yildiz Technical University and Cukurova University's department of Computer Education and Instructional Technology Teaching. These two universities are situated in different geographical regions of Turkey. Two education faculties apart one from other, in different geographical regions are chosen as a study group for a meaningful comparison process. In order to ensure the research equivalence, the scale has been simultaneously applied on the groups for a 2-week period over the same semester.

Total number of participants was determined as 124 and the data related to the participants shown in Table 1.

**Table 1.** Distribution Of Students Participated In The Study Based On The University And Gender Variables

| Group                       | Gender   |       |          |       |          |       |
|-----------------------------|----------|-------|----------|-------|----------|-------|
|                             | Female   |       | Male     |       | Total    |       |
|                             | <i>f</i> | %     | <i>f</i> | %     | <i>f</i> | %     |
| Yildiz Technical University | 27       | 21.78 | 33       | 26.61 | 60       | 48.39 |
| Cukurova University         | 14       | 11.29 | 50       | 40.32 | 64       | 51.61 |
| <b>Total</b>                | 41       | 33.07 | 83       | 66.93 | 124      | 100   |

As it's shown in table 1, the students participated to the study from Cukurova University; 50 (40.32%) were male and 14 (11.29%) female for a total number of 64 students (51.61 %), and from Yildiz Technical University 33 (26.61%) of the students were male and 27 (21.78%) were female for a total number of 60 (48.39%) who have participated.

When analyzed the characteristics of the participants, the intense number of female students in the group from Cukurova University, whereas the high number of male students in the group from Yildiz Technical University is conspicuous. In this context, adding the analysis of the effect of gender variable to scale scores in the process of analysis between to group scores was eligible.

## 2.Measure

In this study the Individual Innovation Inventory developed by Hurt, Joseph and Cook(1977) and adopted in Turkish by Kılıçer and Odabasi (2010) has been used . The original language of the scale is English. The scale composed of 20 expressions in total, as a result of factor analysis has been transformed to a form with four factors. The four factors included in the scale has been defined by headers, "resistance to change", " opinion leadership ", " openness to experience "and" risk taking ". The variance refers to the quality measured by the four factors scale is determined as 55.52%. 12 of scale items were positive (1, 2, 3, 5, 8, 9, 11, 12, 14, 16, 18 and 19), 8-negative were items (4, 6, 7, 10, 13 , 15, 17 and 20).

The innovativeness score calculated by means of the scale: is obtained by subtracting the total score of negative items from the total score of positive items and adding 42 points to that result. By means of the scale can be scored at lowest 14, highest 94 points.

The Individuals can be categorized in terms of innovativeness according to scores calculated on the scale. According to these, individuals who score 80 points and higher than as "innovators", between 69 and 80 points as "early adopters", between 57 and 68 points as "early majority", between 46 and 56 points as "late

majority", under 46 points as "laggard" are interpreted. (Kılıçer & Odabasi, 2010). The validity and reliability analysis of the scale in the Turkish form was conducted on 343 university students. The internal consistency coefficient of the form is determined 0.82 determined, whereas the consistency coefficients of scale's sub-factors are determined 0.81, 0.73, 0.77 and 0.62 respectively. The test - retest reliability coefficient of the scale form is determined 0.87. In the light of the analysis can be stated that the Turkish version of the scale to be used in scientific studies have a valid and reliable structure (Kılıçer & Odabaşı, 2010).

### 3. Data Analysis

In this study, the difference between the points scored on individual innovativeness by the participants was examined according to gender and type of university. The two-factor MANOVA statistics were used for variation analysis. MANOVA is a multivariate statistic used in experimental research and screening, and its effect on the dependent variable can be defined by the number of factors (Büyüköztürk, 2004). The effect of two or more independent variables on one or more than one dependent variable is examined by two-factor MANOVA statistics. While dependent variables are consist of continuous data such as scale data, the independent variables consists of more than one level such as sex and occupational group. The analysis of two or more dependent variables is executed in order to avoid the testing error. (Ozer, 2010). The SPSS 17.0 statistical package program was used for all the analysis, and significant coefficient of all the measurements is determined as of .05.

### III. RESULTS

In this section, the data obtained from research has been analyzed by using statistical analysis methods and findings have been shown on data tables. During the analysis stage, first of all, in order to project entirely the study, the individual innovativeness scale scores of participants have been categorized according to university, gender and scale sub factors and shown in Table 2.

**Table 2.** Distribution Of Individual Innovativeness Scale Scores According To University And Gender Variants.

|                            | Sub factors of Individual Innovativeness scale | Male         |              | Female       |              |
|----------------------------|------------------------------------------------|--------------|--------------|--------------|--------------|
|                            |                                                | $\bar{X}$    | Sd           | $\bar{X}$    | Sd           |
| <b>Çukurova University</b> | Resistance to change                           | 20.70        | 5.69         | 21.64        | 4.82         |
|                            | Opinion leadership                             | 18.52        | 3.45         | 17.85        | 4.16         |
|                            | Openness to experience                         | 19.88        | 3.54         | 19.71        | 3.22         |
|                            | Risk taking                                    | 7.02         | 1.84         | 7.28         | 1.48         |
|                            | <b>Total</b>                                   | <b>66.12</b> | <b>11.94</b> | <b>66.50</b> | <b>10.87</b> |
| <b>Yıldız Technical</b>    | Resistance to change                           | 17.54        | 5.53         | 17.40        | 5.46         |
|                            | Opinion leadership                             | 18.57        | 3.24         | 17.59        | 2.77         |

|                   |                        |              |             |              |             |
|-------------------|------------------------|--------------|-------------|--------------|-------------|
| <b>University</b> | Openness to experience | 19.39        | 2.92        | 18.92        | 2.57        |
|                   | Risk taking            | 7.33         | 1.97        | 6.44         | 1.96        |
|                   | <b>Total</b>           | <b>62.84</b> | <b>9.89</b> | <b>60.37</b> | <b>9.25</b> |

Table 2 indicates that, the scale scores of all groups vary between 60.37 and 66.50 points. These points are the indicator of the “early majority” character of the signor students of education faculties in survey. The “early majority” characteristic of the teacher candidates has been analyzed in the discussion and conclusion chapter. The intergroup assessments’ results are; the overall scale scores of Cukurova University, are higher than Yildiz Technical University’s overall scale scores. In other words, the individual innovativeness scale scores of the groups differ in favor of Cukurova University. When two separate groups examined based on intra- group gender variables, has been found that, the scale scores in Cukurova University differ in favor of Female students, while this variation is in favor of male students in Yildiz Technical University. The MANOVA analysis method has been implemented for the data obtained, in order to be able to analyze the significance of variation in the scale scores together with the scale sub-dimensions. The three assumptions for the implementation of MANOVA analysis; normal distribution curve of data, homogeneity of matrices, equality of error variances the have been tested first. The normal distribution of the variances ( $p > .05$ ) has been found by using Wilk Sahpiro analysis and then Box’s M test has been done for the homogeneity of matrices assumption. The results obtained are shown in Table 3.

**Table 3.** The Result Of Equality Of Error Variances Assumption Test (Box’s M Test)

| Box’s M | F     | df1 | df2       | p    |
|---------|-------|-----|-----------|------|
| 43.498  | 1.336 | 30  | 10773.690 | .104 |

Table 3 shows the equality of matrices related to individual innovativeness scale( $p > .05$ ). Following to the verification of homogeneity of matrices, the homogeneity of error variances test has been performed. The results obtained are shown in Table 4.

**Table 4.** The Results Of Homogeneity Of Error Variances Test. (Levene Test)

| Dependent variable     | F    | df1 | df2 | p    |
|------------------------|------|-----|-----|------|
| Resistance to change   | .132 | 3   | 120 | .941 |
| Opinion leadership     | .560 | 3   | 120 | .643 |
| Openness to experience | .235 | 3   | 120 | .872 |
| Risk taking            | .689 | 3   | 120 | .561 |

Table 4 indicates that, Individual Innovativeness scale sub dimension scores' error variances are equal. ( $p>.05$ ). According to the result may be deduced that the group scores have normal distribution.

Following to the verification of two factors MANOVA analysis' 3 assumptions, the group data obtained has been tested with MANOVA statistics. The analysis result is shown in table 5.

**Table 5.** Individual Innovativeness Scale Scores Two Factors MANOVA Analyze Results.

|                        | Dependent variable     | Sum of Squares | df  | Mean Square | F      | P           | Eta Kare ( $\eta^2$ ) |
|------------------------|------------------------|----------------|-----|-------------|--------|-------------|-----------------------|
| Modal                  | Resistance to change   | 372.835        | 3   | 124.27      | 4.090  | <b>.008</b> | .093                  |
|                        | Opinion leadership     | 20.969         | 3   | 6.990       | .622   | .602        | .015                  |
|                        | Openness to experience | 17.060         | 3   | 5.687       | .570   | .636        | .014                  |
|                        | Risk taking            | 13.155         | 3   | 4.385       | 1.247  | .296        | .030                  |
| Gender                 | Resistance to change   | 4.080          | 1   | 4.080       | .134   | <b>.715</b> |                       |
|                        | Opinion leadership     | 17.065         | 1   | 17.065      | 1.518  | .220        |                       |
|                        | Openness to experience | 2.530          | 1   | 2.530       | .253   | .616        |                       |
|                        | Risk taking            | 2.446          | 1   | 2.446       | .696   | .406        |                       |
| University             | Resistance to change   | 343.972        | 1   | 343.972     | 11.320 | <b>.001</b> |                       |
|                        | Opinion leadership     | .275           | 1   | .275        | .024   | .876        |                       |
|                        | Openness to experience | 10.230         | 1   | 10.230      | 1.025  | .313        |                       |
|                        | Risk taking            | 1.755          | 1   | 1.755       | .499   | .481        |                       |
| Gender *<br>University | Resistance to change   | 7.359          | 1   | 7.359       | .242   | .624        |                       |
|                        | Opinion leadership     | .646           | 1   | .646        | .057   | .811        |                       |
|                        | Openness to experience | .576           | 1   | .576        | .058   | .811        |                       |
|                        | Risk taking            | 8.397          | 1   | 8.397       | 2.389  | .125        |                       |
| Error                  | Resistance to change   | 3646.41        | 120 | 30.387      |        |             |                       |
|                        | Opinion leadership     | 1348.77        | 120 | 11.240      |        |             |                       |
|                        | Openness to experience | 1197.86        | 120 | 9.982       |        |             |                       |
|                        | Risk taking            | 421.837        | 120 | 3.515       |        |             |                       |
| Total                  | Resistance to change   | 49969.0        | 124 |             |        |             |                       |
|                        | Opinion leadership     | 42706.0        | 124 |             |        |             |                       |
|                        | Openness to experience | 48483.0        | 124 |             |        |             |                       |
|                        | Risk taking            | 6525.00        | 124 |             |        |             |                       |

Table 5 shows that there is a significant variation between sub dimensions of individual innovativeness scale scores in terms of "resistance to change" ( $F(1-120)=4.090$ ,  $p<.05$ ). On the other hand, has been found that there is no significant variation between the groups in terms of "opinion leadership", "openness to experience", "risk taking" ( $F(1-120)=.622$ ,  $p>.05$ ;  $F(1-120)=.570$ ,  $p>.05$ ;  $F(1-$

120)=1.247,  $p>.05$ ). In order to find the reason of significant variation between the "resistance to change" scores, when the university and gender sections were examined on the table, has been determined that, there is no link between the variation and gender variance but  $F(1-120)=.134$ ,  $p>.05$ ), in contrary there is a link between variation and university variance ( $F(1-120)=11.320$ ,  $p<.05$ ).

The effect ratio of dependent variable to total variance has been analyzed with Eta Kare ( $\eta^2$ ) value. Eta square values obtained from analysis of variance have been interpreted according to the index of Cohen (1988). Cohen (1988) has set specific cut-off points for Eta Square and ranked the effect size at  $d = .02$  "small", at  $d = .05$  "medium", and at  $d = .08$  the "big" as level domain. Accordingly, the biggest impact on total variance is made by "resistance to change" dimension ( $\eta^2>.08$ ).

#### IV. DISCUSSION AND CONCLUSION

In the light of the analyzes findings came up with the result that the total group scores of the sample group ranged between 60.37 and 66.50, so the teacher candidates have the "early majority" characteristics. The participant group scores studied in two separate universities varies in terms of "resistant to change", one of the sub factors of individual innovativeness scale. "Resistance to change" factor, in general, to measure individuals' reactions to the innovators, while other items, the reactions of individuals to reflect more specific situations (Kılıçer & Odabasi, 2010). In this context, the resulting variations in the scale scores of participants emphasize the differences in perceptions in the general innovation, can be stated.

Approaching in terms of gender and university, the scale scores of the participants ranged between 60.37 and 66.50. Those who scored between 57 and 68 are classified as from the early majority (Early Majority) (Kılıçer & Odabasi, 2010). Early majority individuals are who adopt new ideas before other individuals within the social structure, even though they are in contact with their peers rarely will have a leading position, because of the important position of the early majority individuals between very early adoption of an idea and the late adoption of important issues assign them a key role in process of spreading ideas. Since the early majority individuals are not the first to adopt a new idea, they never become the last to adopt. (Rogers, 1995).

The variations between the scores of participants involved in different organizations may be handled in terms of regional or organizational differences. The variation resulting from organizational can be defined as a symptom that institutional change also alters the concept of innovation. In this study, the individual innovativeness perception of the students enrolled in same department of two different education institutions differs according to one factor, has emerged. This result is attributed to organizational differences or regional differences. In this context, it is seen that results parallel with findings of study in literature are reached. (Ramstad, 2009; Howorth, Mueller, & Harvey, 2002; Alegre, Chiva & Lapiedra, 2009; Castro, Montoro-Sanchez, & Ortiz-De-Urbine-Criado, 2010).

Organizational innovation approach affects directly the institution's performance. (Jin, Hewitt-Dundas & Thompson, 2004), Jin, Hewitt-Dundas and Thompson who studied this interaction, (2004) in their analysis found that the institutions that implement strict or flexible innovative applications achieve to higher success performance than the institutions which not adopt these practices. This relationship between performance and innovation reveals clearly the importance of innovation that should be given by the teacher training institutions.

The organizational innovativeness practice of the teacher candidates in education processes is a necessary examination field. In future studies related to this subject, in order to clearly reveal the relationship between corporate performance and innovation, working with larger groups in long terms is considered necessary. Thus, reaching to more efficient and significant results and guiding the faculties of education with significant innovative approaches will be possible.

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