

Individual Innovativeness Levels of University Student

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Abstract

Aim:This study prepared for analyzing the individual innovativeness levels of the students who participate in interuniversity Badminton competition.

Research sample consists total of 469 students who participate in interuniversity Badminton competition in 2018.

Innovativeness scale, which was developed by Hurt et al (1), and made adaptation in Turkish by Kilicer and Odabasi, used for determining individual innovativeness levels of the students (2).

Material and Methods:The data obtained in this study statistically analysed by using SPSS 22.0 package software in data evaluation; frequency, percentage, standard deviation used as statistical method, student t-test used for two independent groups, ANOVA and Tukey multiple comparison tests used for comparing more than two independent groups.

Results:As a result of the study, it is concluded that university students are mostly high level of innovativeness; there is a significant difference between their gender and department and also between sub-dimensions of innovativeness which are; opinion leader&openness to experience; there is a significant difference between age and total point of innovativeness and all its sub-dimensions. University students who plays Badminton, take place respectively in categories of Initiator, Interrogator, Sceptical and Traditionalist.

Key words: Innovation, Individual innovativeness, Sport, University

INTRODUCTION

Innovativeness is derived from the Latin "innovatus", which, when considering its lexical meaning, is defined as the use of new methods in social, cultural and official environments (3). Innovativeness is the accommodating of an individual or a group to new ideas before other members of the system in which they live (4), it is being an innovator (5). Innovativeness can be defined by one or all of these verbs: producing new ways to do something, testing a produced way and using it in economical and social activities related to humans and adopting it (6). It is also the reactions given to innovations (7).

Innovativeness is the producing or developing of ideas, periods, products and services which are perceived as new by the relevant person or department (8). Innovativeness is a skill and is the ability to think critically and creatively, to problem

solve and to look at things from a broad perspective (9,10). It can be defined as keeping people in step with changes and developments, and as the behavior modification process of individuals (11). The concept of inventiveness is sometimes a thing, idea or implementation in itself, but sometimes it is part of an innovation, and refers to the cognitive and behavioral reactions of the adopter (7). As well as being new, it also works over the existing one (12).

Innovativeness is occupied with innovation (1) and is a tendency to support new products, services and new ideas which are concluded by a technological process, experience or creative process (13). Innovativeness is defined as new ways to find success, new organizational structures which can dominate social change and find new solutions to traditional problems, lifestyles and the rules organizing life (14).

Individual innovativeness is the willingness of individuals to adopt new things, use them and benefit from them. It is the individual being disposed to innovation, adopting it, having a positive attitude to innovation, and using and benefiting from it (2). It is finding solutions to improving standards of living by establishing a connection between new ideas and uncovered needs (15).

Innovativeness is the accommodating of an individual to innovation before the other members of the system in which they live. It is the differentiation of the level at which every individual in society adopts developing technology (4).

Individual innovativeness concerns the individual's willingness to innovate and create difference by reacting positively to innovations as a behavior, while corporate innovativeness relates to creating value by using new products, services, methods and processes before ones rivals. Individual innovativeness is the level at which an individual embraces innovation (16).

Consequently; Creating innovations in order to keep pace with the ever-changing social and economic conditions has become a necessitate both an individual and social level. It is necessary to make essential improvements according to the changing times, science and technology, create solutions, modify ones vision and mission and find new ways of doing things.

Simply having a common vision or management philosophy and an outlook on the topic is undoubtedly insufficient for performing innovation management. Especially where educational innovation is concerned, making sure all educational institutions' visions, missions and individuals are open to innovation is the first necessary step.

MATERIALS AND METHODS

The research model, population, data collecting tools, and statistical methods used in the analyzing of data will be discussed in this chapter.

Research Model

The scanning method was used for determining the individual innovativeness levels of university students who play badminton and the category in which they belong. The scanning method attempts to determine the environment, properties and

relation between the incidents rather than the reasons for the incidents (17).

Population and Sample

The population consists of university students who participated in an interuniversity badminton competition across Turkey in the 2017-2018 academic year. The number of students included in the research is shown in Table 1. The random sampling method was used when choosing samples. Every person in the population had a fair chance of being selected in the random sampling method. 469 students were included in the sample through the random sampling method.

Table 1: Personal characteristics of the research group

Variable	Groups	N	Percentage(%)
Gender	Female	241	51.4
	Male	228	48.6
Age	Age 17-19	157	33.5
	Age 20-22	224	47.8
	Age 23 and over	88	18.8
Department	Physical Education and Sports	399	85.1
	Other departments	70	14.9

n=469

The distribution of the given answers regarding personal characteristics in the research group are seen in Table 1. Accordingly; 51.4%(241 people) of the participants were female, 48.6% (228) of the participants were male, 47.8% (224 people)of the participants were in the 20-22 age range and most of the participants (85.1%, 399 people) studied Physical Education and Sports.

Preparation of Data Collection Tool

The Individual Innovativeness Scale whose original source language is English, which was improved by Hurt et al. (1), and adapted into Turkish by Kılıçer and Odabaşı (2),was used to determine the individual innovativeness levels of the university students playing badminton and the category in which these students belonged. Validity and reliability studies made by Kılıçer and Odabaşı were used.

The scale consists of 20 expressions which represent five different individual's characteristics in the innovation category indicated by Rogers . The items on the scale were analyzed using a five-point Liker scale.

The innovativeness scale consists of a total of 4 sub-dimensions; resistance to change (4,6,7,10,13,15,17,20), opinion leadership

(1,8,9,11,12), openness to experience (2,3,5,14,18), and risk taking (16,19). The scale consists of 12 positive items (1,2,3,5,8,9,11,12,14,16,18,19) and 8 negative items (4,6,7,10,13,15,17,20).

The data was statistically analyzed by the SPSS 22.0 program. KMO analysis was carried out to test the sample size in the study. Accordingly, it is seen that the KMO (Kaiser-Meyer-Olkin) test is higher than 0.60 (0.847) and the Barlett test is significant ($p < 0.001$). Thus, it is seen that the sample is sufficient and its existence is determinable. The reliability co-efficient of the innovativeness scale were examined and a Cronbach Alpha value of 0.70 was obtained.

Analysis of Data

SPSS for Windows 22 package program was used for the quantitative analysis of the study. The items of the Individual Innovativeness Scale were prepared using the five-point Likert scale. The Cronbach Alpha internal consistency co-efficient, which was calculated for testing the reliability of the scale, was found to be 0.70.

The scale was analyzed on the basis of items that would find a solution to the first problem of the study. Afterwards it was attempted to determine the students' individual innovativeness dimensions using the average points given to the scale by the participants. While calculating innovativeness points, positive items' points (1, 2, 3, 5, 8, 9, 11, 12, 14, 16, 18 and 19) were added at first and negative items' points (4, 6, 7, 10, 13, 15, 17 and 20) were added in the second step. The 42+ total points of positive items-total points of negative items formula was used in calculating individual innovativeness points. Teachers were categorized according to the total obtained points; if they got over 80 points, they were classified as innovators, if they got between 69-80 points, they were classified as Early adopters, if they got between 57-68 points, they were classified as Early majority, if they got between 46-56 points, they were classified as late majority, and if they got under 46 points, they were classified as laggards (1). The individual innovativeness levels of the participants were calculated and their innovativeness categories determined according to the score interval in the scale. Besides this, it is also possible to categorize participants according to scale points. Participants who got 68 points and overage high level innovators, while participants who got 64 points and less are low level innovators (2).

The data obtained in this study was statistically analyzed using SPSS 16.0 package software. The Kolmogorov Smirnov Test was used in testing the conformance of the continuous variable with normal distribution in data analyzing. The Student T-Test was used for two independent groups having variables with normal distribution, the ANOVA and Tukey Multiple Comparison Tests were used for comparing more than two independent groups having variables with normal distribution and frequency, percentage and average values given as informative statistics. The significance level was considered as $p < 0.05$ in the statistical analysis.

FINDINGS

Table 2. Descriptive Statistics Values Regarding Innovativeness Levels

Innovativeness Level	\bar{X}	Frequency (f)	Percentage (%)
High Innovativeness	68<	229	48.8
Medium Innovativeness	68-64	29	6.2
Low Innovativeness	64>	211	45.0
Total	64.43	469	100

When examining the innovativeness points in Table 2, it can be seen that 48.8% of the students are high level innovators, 6.2% are medium level innovators, and 45% are low level innovators. When considered generally, the innovativeness average points ($\bar{X} = 64.43$) of the students is between 68-64, which is classified as medium level innovator. It is seen that most of the students are high level innovators (48.8%).

Table 3. Comparison of Individual Innovativeness Scale Points According to Gender

		<i>n</i>	\bar{X}	<i>SS</i>	<i>sd</i>	<i>t</i>	<i>p</i>
Resistance to Change	Female	241	20.55	7.14	467	4.58	0.00*
	Male	228	23.58	7.14			
Opinion Leadership	Female	241	18.95	2.74	467	0.48	0.62
	Male	228	18.82	3.22			
Openness to Experience	Female	241	20.18	2.34	467	4.12	0.00*
	Male	228	19.18	2.90			
Risk Taking	Female	241	5.75	2.03	467	1.30	0.19
	Male	228	6.00	2.10			
Total Innovativeness Points	Female	241	65.44	8.60	467	2.44	0.15
	Male	228	67.58	10.30			

When we examine the total average points of the participants according to gender in Table 3, the average points for males was \bar{X} =67.58, while the average points for females was \bar{X} =65.44. There is no statistically significant difference between the total points of the students according to gender variable ($t=2.44$ $p>0.05$). Considering the sub-dimensions; there is a significant difference between Resistance to Change ($t=4.58$ $p<0.05$) and Openness to Experience ($t=4.12$ $p<0.05$), while there is no significant difference between gender and other sub-

dimensions. Opinion Leadership points are $t=0.48$ $p>0.05$ and Risk Taking points are $t=1.38$ $p>0.05$.

There is a significant difference between the gender of the students and the innovativeness sub-dimensions of Resistance to Change and Openness to Experience, while there is no significant difference between gender and the other sub-dimensions of Total Points, Opinion Leadership and Risk Taking. According to these results, males resist innovativeness more than females and they are less open to experience.

Table 4. Comparison of Individual Innovativeness Scale Points According to Departments

		<i>n</i>	\bar{X}	<i>SS</i>	<i>sd</i>	<i>t</i>	<i>p</i>
Resistance to Change	Physical Education and Sports	399	21.66	7.17	.359	.259	0.00*
	Other departments	70	24.10	7.68			
Opinion Leadership	Physical Education and Sports	399	18.96	2.74	.150	1.35	0.62
	Other departments	70	18.44	3.00			
Openness to Experience	Physical Education and Sports	399	19.72	2.84	.134	.430	0.00*
	Other departments	70	19.57	2.90			
Risk Taking	Physical Education and Sports	399	5.75	2.03	.101	3.02	0.19
	Other departments	70	6.55	2.17			
Total Innovativeness Points	Physical Education and Sports	399	66.10	9.50	475	2.08	5.91
	Other departments	70	68.67	9.38			

When we look at Table 4 according to department variables, it is seen that the average total points of the students is \bar{X} =66.10 for those who study in the Department of Physical Education and Sports, while the other departments' average points was \bar{X} =68.67. There is no statistically significant difference between the total points obtained from the scale according to department variable ($t=2.08$,

$p>0.05$). Considering sub-dimensions, there is a significant difference between the department of the students and Resistance to Change ($t=.259$, $p<0.05$) and Openness to Experience ($t=.430$, $p<0.05$), while there is no significant difference between other sub-dimensions. Opinion Leadership points is $t=1.35$, $p>0.05$ and Risk Taking points is $t=3.02$, $p>0.05$.

There is a significant difference between the department of the students and the innovativeness sub-dimensions of Resistance to Change and Openness to Experience, while there is no significant difference between the department and other sub-dimensions of Total Points, Opinion Leadership and

Risk Taking. According to these results students who study in the Department of Physical Education and Sports resist innovativeness more than students from the other departments and they are less open to experience.

Table 5. Comparison of Individual Innovativeness Scale According to Age

	Age	N	Average	S.s.	f	p	Significant Difference
Resistanc to Change	(a) Age 17-19	157	20.14	6.24			
	(b) Age 20-22	224	22.91	7.29	7.34	0.00*	a-b, a-c
	(c) Age 23 and over	88	23.14	8.38			
Opinion Leadership	(a) Age 17-19	157	19.39	2.34			
	(b) Age 20-22	224	18.31	3.06	8.12	0.00*	b-a, b-c
	(c) Age 23 and over	88	19.44	3.51			
Openness to Experience	(a) Age 17-19	157	20.12	1.99			
	(b) Age 20-22	224	19.39	2.70	3.51	0.03*	a-b
	(c) Age 23 and over	88	19.71	3.47			
Risk Taking	(a) Age 17-19	157	5.15	1.82			
	(b) Age 20-22	224	6.34	1.97	16.41	0.00*	a-b, a-c
	(c) Age 23 and over	88	5.94	2.36			
Total Innovative Ess Point	(a) Age 17-19	157	66.53	8.02			
	(b) Age 20-22	224	63.14	8.91	4.27	0.01*	a-c
	(c) Age 23 and over	88	63.95	8.70			

Participants aged between 17-19 resist innovation significantly less than the other participants whose age range is between 20-22 and 23 and over in the sub-dimension of Resistance to Change.

Participants aged between 20-22 exhibit less opinion leadership behavior than the other participants whose age range is between 17-19 and 23 and over in the sub-dimension of Opinion Leadership.

Participants aged between 17-19 are significantly more open to experience than the other

participants aged 20-22 in the sub-dimension of Openness to Experience.

Participants aged between 20-22 exhibit more risk taking behaviors than the other participants whose age range is between 17-19 and 23 and over in the sub-dimension of Risk Taking.

Participants aged between 17-19 exhibit more innovativeness behavior than the other participants whose age range is between 23 and over according to total innovativeness points.

Table 6. Distribution of Innovativeness Categories

Categories of Innovativeness	Frequency	Percentage%
Innovators	-	-
Early adopters	229	48.8
Early majority	122	26
Late majority	107	22.8
Laggards	11	2.3
Total	469	100

When examining Table 6, it is seen that most of the participants are within the category of Leaders (f=229, 48.8%), and after that they are classified in order of frequency as Early majority

(f=122, 26%), Late majority (f=107, 28.8%), and Laggards (f=11, 2.3%). It is seen that none of the students were categorized as innovators.

DISCUSSION AND CONCLUSION

When examining the innovativeness points of the students, it can be seen that 48.8% of the students are high level innovators, 6.2% are medium level innovators, and 45% are low level innovators. It is seen that most of the students are high level innovators (48.8%).

Other studies have proven to have similar results, such as Kılıcer (1), who determined the average individual innovativeness points of a Physical Education and Sports Department's prospective teachers as being at 67.54 (high level innovators), Yılmaz Öztürk, who determined primary school teachers as being 43.3% high level of innovators in his study which examines individual innovativeness levels of the primary school teachers and influencing factors (17), Kosterelioglu and Demir, who determined the average individual innovativeness points of teachers as being 74.62 (18), Ozgur, who determined the average individual innovativeness points of prospective teachers as being at 67.04 (19), and Van Braak, who determined in his study that teachers who use computers in education have a higher innovativeness levels than those who do not (20).

Studies whose results differ from those of this study include Kılıc H. (2015), who determined 10.3% of subject teachers to be high level innovators, 20.3% to be medium level innovators, and 69.3% to be low level innovators, and Yılmaz, who determined in his study that more than half of preschool teachers are low level innovators (21).

The total average points for males was $\bar{X} = 67.58$, while the average points for females was $\bar{X} = 65.44$. There is no statistically significant difference between the total points of the students according to gender variable ($t=2.44$ $p>0.05$). Considering the sub-dimensions; there is a significant difference between Resistance to Change (male $\bar{X} = 23.58$, female $\bar{X} = 20.55$) and Openness to Experience (male $\bar{X} = 19.18$, female $\bar{X} = 20.18$). When considering other studies, there is a significant difference in the sub-dimensions of Resistance to Change and Openness to Experience, while there is no significant difference in Total Points and other sub-dimensions.

Studies having similar results to this study are Cuhadar et al., who determined that there is no significant difference between the individual innovativeness characteristics of prospective teachers and gender (22) and Yılmaz Öztürk, who indicated that the total average points for males is $\bar{X} = 66.97$, while women's average points are $\bar{X} = 66.71$ according to gender variable (17). There is no statistically significant difference between the points of teachers according to gender variable. Kılıcer indicated that the innovativeness points of prospective female teachers is ($\bar{X} = 67.53$), while the innovativeness points of prospective male teachers is ($\bar{X} = 67.55$) (2). proved that there is no statistically significant difference between the points of preschool teachers and preschool prospective teachers according to gender variable. In his study, Innovation Diffusion. Rogers concluded that there is no significant difference between innovativeness and gender variable (4).

Rogers and Wallace concluded that there is no significant difference between innovativeness and gender variable in their study "Teacher's Technology Integration in Education: Preparation Concern and Innovativeness". In a comparison of the innovativeness perception of individuals who are studying at different departments (23), Kert and Tekdal deduced that the individual innovativeness levels of teachers are similar for both genders (24). Cuhadar, Bulbul and Ilgaz (22).

deduced the same result in their study, Examining the Relation between Individual Innovativeness Characteristics of Prospective Teachers and their Techno Pedagogic Education Competence.

Studies with different results to this study include Demirsoy, who researched adaptation towards internet banking and concluded that gender is an important factor for early adaptation and late adaptation and also that men adapt earlier compared to women (25), Shim and Kotsiopoulos, who researched textile retailers in terms of technological innovativeness within the scope of spreading innovations and concluded that gender is an important factor in terms of innovativeness categories and adaptation towards technological innovations (26), and Ozbek, who researched the effect of gender variable on the chronologic pedagogic field information competence of teachers'

innovation levels and concluded that it has a significant effect and that the competence of male teachers is higher than the competence of female teachers (27). As a result of the study conducted by Jang and Tsai regarding whiteboard usage of Taiwanese primary math and science teachers, it was concluded that the competence of male teachers is higher than the competence of female teachers (28). As a result of the study conducted by Jordan regarding the competence of Australian teachers in computer-assisted learning, it was determined that the competence of male teachers is higher than the competence of female teachers (29).

According to the innovativeness variable, the average total points of the students who study in the Department of Physical Education and Sports is $\bar{X} = 66.10$, while the other departments' average points is $\bar{X} = 68.67$. There is a statistically significant difference between total points obtained from the scale according to department variable.

Considering sub-dimensions, there is a significant difference between Resistance to Change and Openness to Experience, while there is no significant difference between Innovativeness Total Points and other sub-dimensions.

Studies having similar results to this study include Yalcın and Yanpar, who determined that there is no significant difference in their study, Innovativeness Levels of Primary Prospective Teachers (30), and Yılmaz, Sogukcesme, Ayhan, Tuncay, Sancar and Deniz, who determined that there is no significant difference in their study "Analysis of Occupational Tendencies among Primary Prospective Teachers in term of Various Variables" (31). Studies having different results to this study include Bitkin's "The Relation between Individual Innovativeness Levels of Prospective Teachers (32) and Knowledge Acquisition Ability", in which it was determined that the individual innovativeness levels of the students studying classroom teaching is higher than the students studying other subjects. It was concluded that there is a significant difference between the age of the students participating in the study and their total innovativeness points and between other sub-dimensions.

Studies with similar results to this study include Yılmaz Öztürk, who determined that there is a significant difference between the Resistance to

Change points of primary school teachers and their educational background (17). Studies with different results to this study include, who determined that there is no statistically significant difference between the total points of preschool teachers and prospective preschool teachers obtained from the scale according to age variable. It is seen that most of the participants are within the category of Early adopters and are then Early majority, late majority and laggards, in order of frequency. It was determined that none of the students were classified in the innovators category.

Studies with different results from this study include Gunes (2010), who determined that participants' adaptation towards innovation was distributed as 21% leaders, 16.6% early adopters, 32.9% early majority, and 24.4% late majority (33). As a result of the study conducted by Sahin and Thompson on instructors regarding the distribution of instructors according to innovativeness categories, it was concluded that they mostly fall into the category of Early majority (34). According to a study conducted by Ozbek, most teachers think of themselves in terms of individual innovativeness as being in the group of Early majority (39.7%) and leaders (37.3%), while the remaining teachers think of themselves as being innovators (11.6%) and late majority (11.4%), demonstrating an equal distribution (27).

CONCLUSION

Technology is developing rapidly in today's living conditions and people integrate these technological innovations according to their personal characteristics. Some individuals welcome these innovations with great eagerness and comply with them, while others resist change. This situation results from people having different points of views and it has caused the term "individual innovativeness" to be coined. 416 university students who played badminton in 2015 in Turkey participated in this study, which researched the individual innovativeness levels of students. It was seen that students who play badminton like to experience new ideas, search for different ways to do something, develop new methods while solving a problem, are not sceptical to new inventions, try to be creative in their thoughts and behaviors, have creative personalities, like to take responsibility

related to leadership, are open to new ideas and are not sceptical to new ideas.

SUGGESTIONS

It is seen that university students are open to innovation and exhibit positive behaviors towards innovation. Universities are the places where science is produced and developed, so giving students a chance to improve their innovativeness will contribute to the success of the country, of society, and of the individuals themselves.

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