

Full Length Research Paper

Investigating the relationship between innovation competencies of school principals and innovation level of schools

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The purpose of this study is to determine the relationship between level of innovation competence of school principals and innovation level of schools with the opinions of teachers working in Vocational and Technical Anatolian High Schools. The research was designed with the correlational survey model. The research population consists of 306 teachers working in the Vocational and Technical Anatolian High Schools in the center of Giresun in the 2019/2020 academic year. According to results obtained from the research, the relationship between innovation competence of the school principals and innovation levels of the schools is at the middle level. There are statistically significant differences in the views of teachers about the sub-dimensions of innovation competencies of school principals according to gender and age variables. There is no statistically significant difference in terms of branch, educational background, professional seniority and duty duration variables. According to the teachers' opinions, it was found that the innovation level of schools did not differ significantly according to age, branch, education level, professional seniority and duty duration at school. Statistically significant difference was found in the teachers' opinions regarding the organizational barriers sub-dimension of the innovation levels of the schools according to the gender variable. At the end of the research, it is recommended that studies be conducted on the innovation competencies of school administrators and the innovation level of schools and to support innovative applications especially for vocational and technical education.

Key words: Innovation, innovation competence, innovative school, vocational and technical high school teachers and principals.

INTRODUCTION

The world is a place of constant change, transformation and revolutions. This rapid change not only affects systems but also affects social structures including schools, education systems and methods significantly.

Therefore, schools and education systems that cannot keep up with the changes lose their being effective day by day. Therefore, schools and education system must take necessary steps to be compatible with the ongoing

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changes experienced (Öztemel, 2018, p. 27).

As a result of rapid change in society and technology, there is need for innovation in educational organizations and the idea of innovation has started to prevail among professionals in the field of education. In the context of educational organizations, innovation is an expression of the process of realizing a new change together with the components and stakeholders of the school (Aslan and Kesik, 2016, p. 465). Practices such as changes made to improve educational programs, in-service trainings for educators, measuring their effects by applying renewed teaching methods and techniques, updating educational buildings and classrooms according to the development levels and characteristics of students are considered as examples of innovation (Keleşoğlu, 2017, p. 54).

Educators are now aiming to teach skills such as informed citizenship, problem solving, entrepreneurship, informed communication, problem solving skills, critical thinking, information and media literacy. At this point, it has become an important necessity to carry out innovative studies in all education levels and to carry out the innovation management properly (Öztemel, 2018, p. 27). By increasing the quality of vocational and technical education, it is possible to raise up-to-date, creative, productive individuals who are successful and special in practice as well as their technical knowledge.

Educational institutions, especially vocational and technical education institutions have an important and effective function in the economic and social development of a country. In vocational and technical education institutions, students are aimed to be occupied with knowledge, skills, attitudes and professional ethics in the field they choose in line with their interests and abilities (Eraslan, 2014). Vocational and technical education students are expected to follow and apply developing technology, to be creative and have the ability to solve problems, so they can effectively contribute workforce needed by the society. For this reason, schools must be sufficiently innovative to educate students as required by millennial requirement.

In this context, the opinions of the teachers working in vocational and technical educational institutions, on innovation competencies of school principals and the innovation levels of schools is important to understand the current innovative studies in those institutions where the manpower is trained to meet the needs of today.

When related literatures were examined, there were limited studies on the innovation competencies of school principals and the innovation levels of schools. (Beycioğlu, 2004; Top, 2011; Bülbül, 2012a, b Göl and Eraslan, 2012; Ömür, 2014; Özkan, 2015; Kurt, 2016, Aslan and Kesik, 2016; Erdemet, 2017). The research indicated that to carry out innovation studies in schools and to transform schools into innovative organizations, the social environment must have a supportive structure. Besides a formal environment with personnel support in providing resources, to create an innovative school

culture, conditions such as shared leadership and vision, a motivating climate and ensuring the participation of all stakeholders in the innovation process are required (Aslan and Kesik, 2016, p. 465). At this point, school administrators have an important role in recognizing employers needs with innovation opportunities, initiating and implementing innovation studies.

Innovation levels of schools may vary according to the innovation competencies of school principals. This is an important finding that will enable the reconsideration, review, planning and updating of school management processes. Therefore, this study aims to determine the relationship between the innovation competencies of Vocational and Technical Anatolian High School principals and the innovation levels of the schools. Consequently, the following research questions were sought to be answered.

1. What are the innovation competencies of school principals based on the opinions of Vocational and Technical Anatolian High School teachers?
2. Do the opinions of Vocational and Technical Anatolian High School teachers on innovation competencies of principals significantly change based on gender, age, educational background, major, professional seniority?
3. What are the innovation levels of schools according to the opinions of Vocational and Technical Anatolian High School teachers?
4. Do the opinions of Vocational and Technical Anatolian High School teachers on innovation levels of schools significantly change based on gender, age, educational background, major, professional seniority?
5. Is there a statistically significant relationship between the innovation competencies of Vocational and Technical Anatolian High School principals and the innovation levels of the schools they work?

METHODS

Design

Research models aimed to determine whether there is a relationship between two or more variables and the degree of relationship are called correlational studies (Karasar, 2012, p. 81). The current research aim to determine the relationship between innovation competencies of school administrators in Vocational and Technical Anatolian High Schools and the innovation levels of schools. Therefore, this study is a cross sectional correlational study.

Participants

The scope of the research consists of 306 teachers working in Vocational and Technical Anatolian High Schools in Giresun city center in the 2019-2020 academic year. There are 7 Vocational and Technical Anatolian High Schools in Giresun city center.

Due to availability of the research population, we planned to run the study over the whole population without sampling. Research

data were collected from 7 Vocational and Technical Anatolian High Schools in the city center. However, 220 out of 306 teachers completed the measurement tools on a voluntary basis. In this way, the population of the research was determined as 220. Research analyzes were carried out in this direction.

Most of the participants were female 117 (53.2%) and 103 (46.8%) of the participants were male. Most of the participants were between the age group 41-45 and over the age of 51. Of the 220 participants, 12 (5.5%) were in the 26-30 age range, 12 (5.5%) in the 31-35 age range, 44 (20.0%) in the 36-40 age range, 56 (25.5%) in the 41-45, 40 (18.2%) in the age range of 46-50, 50 (25.5%) were in the age range of 51 and over. 220 participants (69.1%) had bachelor's degree, and 68 (30.9%) of them had master's degree or higher. 108 (49.1%) participants were teaching vocational classes, and 112 (50.9%) were teaching general course classes. Eight (3.6%) participants had a seniority of 1-5 years, 20 (9.1%) had a seniority of 6-10 years, 16 (7.3%) had a seniority of 11-15 years, 44 (20.0%) had 16-20 years seniority, 52 (23.6%) had 21-25 years seniority, and 80 (36.4%) had 26 years or more. 76 (34.5%) participants reported to work in the same school between 1-5 years, 44 (20.0%) were between 6-10 years, 40 (18.2%) were between 11-15 years, 6 (7.3%) were between 16-20 years, (9.1%) were between 21-25 years and 24 (10.9%) were for 26 years or more.

Procedures

After ethical approval was obtained from the respected organizations (Giresun University and Giresun Provincial Directorate of National Education (Annex-1)), the researchers contacted school administrators in regard to the study. The research data were collected in the second term of the 2019-2020 academic year with the help of school administrators. The potential participants were informed about the purpose and importance of the research and how the data set would be answered. It has been stated to the participants that the participation is totally voluntarily and not participating in the study would not have any negative effect on them. Also, it was indicated that the data will be evaluated collectively and no personal information would be collected. The volunteer participants were provided a survey packet to be completed and the response time to complete the survey packet was approximately 15-20 min.

Measurement

The data collection tools used in the study are Personal Information Form, Innovation Competence Scale of School Administrators and Innovative School Scale.

Personal information form

The first data collection tool to be used in the research is the "Personal Information Form" prepared by the researcher and shown in Annex 2. This data collection tool consists of 6 questions in total, asking about gender, the age group, educational status; branch; seniority in the profession, and the duration of service in the institution where they work.

Innovation competence scale of school administrators

In the study, the "Innovation Competencies Scale of School Administrators" developed by Eraslan (2014) was used to examine the opinions of Vocational and Technical Anatolian High School teachers and school administrators on innovation competencies in

the city center of Giresun and how these views differ according to various variables. Necessary permissions were obtained from the researcher who developed the scale (Annex 3).

The data collection tool was developed by Eraslan (2014) using the relevant literature and consists of 25 questions in total. The scale includes five factors. The participants were asked to evaluate using the 5-point Likert scale questions ranging from 1 "I absolutely disagree", 2 "I do not agree", 3 "I have no idea", 4 "I agree", 5 "I absolutely agree".

The scale consists of 5 sub-dimensions, with 7 items in the first sub-dimension, "Sensitivity to Change". These items indicate that school staff are supported in presenting their talents in the process of change, cooperation is the best way of efficiency in school, the need for change is clearly expressed by administrators, and the decisions and practices taken in the change process are consistent and ethical.

There are 3 items in the second sub-dimension "In-School Communication". These items reflect administrators contacting their employees closely and expressing they support team work that they do not let the communication break.

There are 3 items in the 3rd sub-dimension "Out-of-School Communication" dimension. These items express that there is an effective communication between the school and the environment, there is a satisfactory communication in the process of change, and school administrators are sensitive to the environment during the change process.

There are 6 items in the "Leadership" dimension which is the 4th sub-dimension. These items indicate that school administrators have a solid vision in the process of change, that school administrators know their employees sufficiently, that school administrators have the power to influence employees, that employees are actively involved in the process of change, that school administrators help employees to adapt to the change process, and expressing that they share leadership for development.

There are 6 items in the 5th sub-dimension "Motivation". These items are items that express that school administrators support employees' goals for advancement in their careers, appreciate and reward those who fulfill successfully completed tasks and those who are successful in their jobs, try to motivate their employees for change, and help employees in solving the problems they encounter.

The internal consistency reliability coefficients were calculated in order to determine the reliability level of the sum and sub-dimensions of the School Administrators Innovation Competencies Scale. The internal consistency coefficient of the sum of the School Administrators' Innovation Competencies Scale is calculated to be $\alpha = 0.79$. As for its sub-dimensions, the internal consistency reliability level of the sensitivity to change dimension is $\alpha = 0.81$; Internal consistency reliability level of the intra-school communication dimension is $\alpha = 0.67$; Internal consistency reliability level of out-of-school communication dimension is $\alpha = 0.60$; Internal consistency reliability level of leadership dimension is $\alpha = 0.71$; and Internal consistency reliability level of motivation dimension was found as $\alpha = 0.79$. Since the reliability of the total and sub-dimensions of the scale is between $\alpha = 0.60$ and $\alpha = 0.81$ (Sümer et al., 2005, p. 219), it is possible to say that it is reliable.

Innovative school scale

In the study, "Innovative School Scale" developed by Aslan and Kesik (2016) and seen in Annex 2 was used in order to determine the innovation levels of Vocational and Technical Anatolian High Schools located in Giresun city center. Necessary permissions were obtained from the researcher who developed the scale (Annex 3). The scale consists of 19 questions and 3 sub-dimensions. For the 1st, 2nd and 3rd sub-dimensions, the participants were asked to

evaluate using a 5-point likert type scale as 5 "Always", 4 "Most of the time", 3 "Sometimes", 2 "Rarely", 1 "Never".

There are 6 items in the "Innovative Atmosphere" dimension, which is the first sub-dimension of the scale developed to determine teachers' perceptions of their schools' innovativeness. These items express that trust between administrators and staff is high, that all school staff are included in the problem-solving process, common goals are shared by school staff, a shared vision is created to ensure innovation, there is a climate that encourages creativity and that ideas are respected.

There are 7 items in the 2nd sub-dimension "Administrative Support". These items reflect that teamwork is supported for innovation, everyone fulfills their duty to realize innovations, individuals are allowed to try new things, teachers are able to make innovative decisions, everyone is willing about innovations, they are evaluated with the contributions they make to the school, and that every difference is seen as a wealth.

There are 6 items in the 3rd sub-dimension "Organizational Barriers". These items express that school members are afraid of taking risks, that innovation is not an organizational goal based on the school, that employees find it as unknown and scary, that they try to protect the current situation instead of innovation, and that entrepreneurial and innovative people face bureaucratic and organizational obstacles. The internal consistency reliability coefficient of the scale was found to be 0.84.

Data analysis

The obtained data were coded by the researcher and first entered into the Excel 2010 program, and then transferred to the SPSS 22 program and analyzed. For all statistical calculations, the significance value of "0.05" was accepted.

RESULTS AND DISCUSSION

The analyses made on the data collection tools applied to the participants for the sub-objectives of the study, and includes the findings along with comments pertaining to it.

Findings and comments on innovation competencies of school principals

Here, analyzes and findings related to the innovation competencies of school principals are presented according to the opinions of teachers.

Findings and comments on dimensions and items of the school principals' innovation competencies scale

Here, descriptive analyzes are included to determine the innovation competencies of school principals according to the opinions of teachers working in Vocational and Technical Anatolian High Schools, which is the second sub-objective of the study. The analyses are reported separately for the dimensions that make up the scale. In the analyses, the answers given for each item in the "Innovation Competence Scale" It was evaluated as "1- Absolutely disagree, 2- Disagree, 3-No idea, 4- Agree, 5-

Strongly agree". The interpretations regarding the arithmetic mean are made in line with the following explanation: The viewing ranges for each item were determined as follows: Arithmetic mean () for any item of scale; if the arithmetic mean of the relevant item;

is between 1 <1.8, the participants "strongly disagree", "I absolutely disagree",

is between 1.8 <2.6, participants do not agree with the opinion in the related item, "Disagree",

is between 2.6 <3.4, participants "partially agree" about the opinion in the relevant item, "I have no idea",

is between 3.4 <4.2, the participants "agree", "I agree" to the opinion in the relevant item,

is between 4.2 <5.00, it is stated that the participants "strongly agree", "I absolutely agree" with the opinion in the relevant item.

Findings and comments on dimensions of the innovation competence scale of school principals

Within the scope of this study, the average, minimum and highest scores and standard deviation values obtained by combining the answers given to the items that constitute the dimensions of the "Innovation Competencies Scale" of school principals according to the opinions of teachers working in Vocational and Technical Anatolian High Schools are summarized in Table 1.

According to the average values (sensitivity to change cevap = 3.711; In-school communication = 3,684; Motivation = 3,654; leadership = 3,554; Out-of-school communication = 3,497), it is seen that they express their opinions at the level of "I agree" for each of the qualifications of proficiency.

In Table 1, teachers show the characteristics of school principals' sensitivity to change (sensitivity to change = 3.711), in-school communication (= 3,684), motivation (= 3,654), leadership (= 3,554) and out-of-school communication (Out-of-school communication = 3,497) according to their properties.

According to these findings, it can be said that according to the opinions of teachers working in Vocational and Technical Anatolian High Schools, school principals have the characteristics of sensitivity to change, in-school communication, motivation, leadership, and out-of-school communication, respectively.

Examining the opinions of school principals on innovation competencies according to the personal information of teachers working in Vocational and Technical Anatolian High Schools

Here, the opinions of teachers working in Vocational and Technical Anatolian High Schools, which are the 2nd sub-purpose of the research, regarding the innovation competence of school principals are presented. Analysis

Table 1. Descriptive statistical value related to the dimensions and items of the innovation competence scale of school principals according to the opinions of teachers working in Vocational and Technical Anatolian High Schools.

Dimension	N	No. of items	Lowest score	Highest score		Ss
Sensitivity to change	220	7	1.00	4.86	3.711	0.76815
Intramural communication	220	3	1.00	5.00	3.684	0.88603
Out of school communication	220	3	1.00	4.67	3.497	0.75616
Leadership	220	6	1.00	5.00	3.554	0.89763
Motivation	220	6	1.00	5.00	3.654	0.87171
Total	220	25	5.00	24.53	3.636	0.79171

Table 2. Independent sample t test results regarding the differences between the innovation competence scores of school principals according to the gender of teachers working in Vocational and Technical Anatolian High Schools.

Dimension	Group	N	\bar{X}	Ss	t	df	p
Sensitivity to change	Male	103	3.8419	0.59540	2.441	204.999	0.015
	Woman	117	3.5971	0.87975			
Intramural communication	Male	103	3.7994	0.71300	1.847	208.779	0.066
	Woman	117	3.5840	1.00659			
Out of school communication	Male	103	3.5275	0.69784	0.561	218	0.575
	Woman	117	3.4701	0.80605			
Leadership	Male	103	3.6117	0.74110	0.902	210.937	0.368
	Woman	117	3.5043	1.01626			
Motivation	Male	103	3.6812	0.56404	0.441	179.973	0.660
	Woman	117	3.6311	1.07408			

*Significant at p <0.05 level.

of results and comments on whether there is a statistically significant difference according to the variables of gender, age, education level, branch, seniority and working time at school are included.

Findings and comments on examination of school principals' innovation competencies according to the gender variable

Independent samples test was conducted in order to make comparison according to gender in five dimensions of the scale for the opinions of teachers working in Vocational and Technical Anatolian High Schools and school principals on innovation competence. The results of the test are given in Table 2.

In Table 2, among the opinions of the teachers participating in the research on the innovation competence of the school principals, according to gender, it was observed that there was no statistically

significant difference in the characteristics of in-school communication ($p>0.05$), out-of-school communication ($p>0.05$), leadership ($p>0.05$) and motivation ($p>0.05$). A statistically significant difference was found in the sensitivity to change feature ($p <0.05$). Looking at the average scores of male and female teachers (Female = 3.5971; Male = 3.8419), it can be said that school principals are more susceptible to change according to the views of male teachers.

Findings and comments on examination of managers' opinions on innovation competencies according to the age variable

According to the age variable, a one-way ANOVA was performed to determine whether there was a statistically significant difference between the opinions of the teachers participating in the study and the school principals' innovation competencies. The mean scores of

Table 3. Descriptive statistical values of the scores of teachers working in vocational and technical anatolian high schools regarding innovation competencies of school principals according to their ages.

Dimension	Age (years)	N		S _s
Sensitivity to change	26-30	12	3.1905	1.62235
	31-35	12	3.3810	0.73435
	36-40	44	4.0390	0.53396
	41-45	56	3.7347	0.60880
	46-50	40	3.6000	0.85298
	Over 50	56	3.6939	0.65348
	Total	220	3.7117	0.76815
Intramural communication	26-30	12	3.4444	1.61641
	31-35	12	3.2222	0.59175
	36-40	44	3.9697	0.85610
	41-45	56	3.5952	0.54203
	46-50	40	3.5333	0.99228
	Over 50	56	3.8095	0.89636
	Total	220	3.6848	0.88603
Out of school communication	26-30	12	3.0000	1.47710
	31-35	12	3.4444	0.43423
	36-40	44	3.3939	0.78511
	41-45	56	3.4762	0.47079
	46-50	40	3.6000	0.83785
	Over 50	56	3.6429	0.71310
	Total	220	3.4970	0.75616
Leadership	26-30	12	3.1667	1.61433
	31-35	12	3.2222	0.53811
	36-40	44	3.9091	0.86075
	41-45	56	3.5238	0.66926
	46-50	40	3.4000	0.97021
	Over 50	56	3.5714	0.87089
	Total	220	3.5545	0.89763
Motivation	26-30	12	3.1667	1.48392
	31-35	12	3.3333	0.98473
	36-40	44	3.8939	0.77183
	41-45	56	3.7381	0.65045
	46-50	40	3.6333	0.93918
	Over 50	56	3.5714	0.86156
	Total	220	3.6545	0.87171

the school principals' opinions on innovation competencies according to the age of teachers are presented in Table 3. One-way ANOVA results for determining whether the differences between teachers' mean scores are significant or not are shown in Table 3.

According to the age variable, a one-way ANOVA was conducted to determine whether there was a statistically significant difference between the views of the teachers participating in the study and the school principals'

innovation competencies. The average scores of the school principals' opinions on innovation competencies according to the age of teachers are presented in Table 3. One-way ANOVA results for determining whether the differences between the teachers' mean scores are significant or not are shown in Table 4.

According to the age of teachers working in Vocational and Technical Anatolian High Schools (20-25 years old, 26-30 years old, 36-40 years old, 41-45 years old, 46-50

Table 4. One-way ANOVA results regarding the differences between the innovation competence scores of school principals according to the ages of teachers working in Vocational and Technical Anatolian High Schools.

Dimension	Variance Source	Sum of Squares	SD	Mean Squares	F	p
Sensitivity to change	Between groups	481,752	5	96,350	3.525	0.004
	Within groups	5850,175	214	27,337		
	Total	6331,927	219			
Intramural communication	Between groups	81,633	5	16,327	2.384	0.039
	Within groups	1465,713	214	6,849		
	Total	1547,345	219			
Out of school communication	Between groups	45,941	5	9,188	1.819	0.110
	Within groups	1081,041	214	5,052		
	Total	1126,982	219			
Leadership	Between groups	348,689	5	69,738	2.486	0.033
	Within groups	6003,747	214	28,055		
	Total	6352,436	219			
Motivation	Between groups	266,826	5	53,365	1.995	0.081
	Within groups	5724,010	214	26,748		
	Total	5990,836	219	96,350		

years old, 51 years old and over), one-way ANOVA results were given to determine whether there is a statistically significant difference between the opinions about the competencies. In the results obtained, according to the age of the teachers, no statistically significant difference was found between school principals' views on innovation competencies, out-of-school communication ($p>0.05$) and motivation ($p>0.05$) sub-dimensions. However, a significant difference was found between the dimensions of sensitivity to change ($p <0.05$), intra-school communication ($p <0.05$) and leadership ($p <0.05$). Considering average scores of these three groups, it can be said that teachers between the ages of 26-30 ($M = 3.190$) and teachers between the ages of 31-35 ($M = 3.381$) report less positive opinions on the sensitivity of school principals to change than other age groups. In the in-school communication dimension, it can be said that teachers in the age group of 31-35 ($M = 3.222$) report less positive opinions than teachers in the other age group. In the leadership dimension, it can be said that teachers between the ages of 26-30 ($M = 3.166$) and teachers between the ages of 31-35 ($M = 3.222$) report less positive opinions about the leadership behaviors of school principals than other age groups.

Findings and comments on examination of school principals' innovation competencies according to the educational status variable

A one-way ANOVA was planned to determine whether

there was a statistically significant difference between the teachers' views on innovation competencies of the school principals, but independent sample t test was applied between the language and master's variables since there was no participation from the participants at associate degree and doctorate level. Independent samples t test results to determine whether the difference between the mean scores are significant or not are shown in Table 5.

As regards educational status of teachers participating in the research in Table 5, and among the opinions of the school principals on innovation competence, there was no statistically significant difference in the characteristics of sensitivity to change ($p>0.05$) and school communication ($p>0.05$). A statistically significant difference was found in out-of-school communication ($p<0.05$), leadership ($p<0.05$) and motivation ($p<0.05$) dimensions. Considering the average scores of teachers with undergraduate and graduate degrees in all three dimensions, it can be said that teachers with a master's degree think that school principals have more out-of-school communication, leadership and motivation characteristics than graduate teachers.

Findings and comments on examination of school principals' opinions on innovation competencies according to the branch variable

Independent samples test was conducted in order to make comparisons according to branches in five

Table 5. Independent sample test results for the innovation competencies of school principals according to the educational status of teachers working in Vocational and Technical Anatolian High Schools.

Dimension	Group	N	\bar{X}	Ss	t	df	p
Sensitivity to change	License	152	3.6767	0.78895	-1.010	140.537	0.297
	Post graduate	68	3.7899	0.71895			
Intramural communication	License	152	3.6404	0.93460	-1.114	155.853	0.231
	Post graduate	68	3.7843	0.76352			
Out of school communication	License	152	3.4298	0.82958	-1.982	191.065	0.021
	Post graduate	68	3.6471	0.53371			
Leadership	License	152	3.4605	0.92104	-2.347	145.264	0.015
	Post graduate	68	3.7647	0.81050			
Motivation	License	152	3.5702	0.87701	-2.164	134.797	0.032
	Post graduate	68	3.8431	0.83551			

Table 6. Independent sample t test results regarding the differences between the innovation competence scores of school principals according to the branches of the teachers working in Vocational and Technical Anatolian High Schools.

Dimension	Group	N	\bar{X}	Ss	t	df	p
Sensitivity to change	Vocational courses	108	3.5820	0.83224	-2.488	206.767	0.064
	Culture lessons	112	3.8367	0.68145			
Intramural communication	Vocational courses	108	3.5556	0.88837	-2.143	217.272	0.053
	Culture lessons	112	3.8095	0.86959			
Out of school communication	Vocational courses	108	3.3827	0.79825	-2.220	212.024	0.077
	Culture lessons	112	3.6071	0.69923			
Leadership	Vocational courses	108	3.3889	0.89303	-2.727	217.341	0.057
	Culture lessons	112	3.7143	0.87663			
Motivation	Vocational courses	108	3.5556	0.91486	-1.661	213.547	0.098
	Culture lessons	112	3.7500	0.82078			

dimensions of the scale for the opinions of teachers working in Vocational and Technical Anatolian High Schools and school principals on innovation competencies. The results of the test performed are given in Table 6.

As regards branch variable, among the opinions of the teachers participating in the study on the innovation competence of the school principals in Table 6, a statistically significant difference in the dimensions of sensitivity to change ($p>0.05$), intramural communication ($p>0.05$), out-of-school communication ($p>0.05$), leadership ($p>0.05$) and motivation ($p>0.05$) has been observed.

Findings and comments on examination of school principals' innovation competencies according to seniority variable

According to the seniority variable, a one-way ANOVA was performed to determine whether there was a statistically significant difference between the views of the teachers participating in the study and the school principals' innovation competence. Table 7 shows the one-way ANOVA results regarding the differences between innovation competence scores of the school principals according to the seniority of the teachers working in Vocational and Technical Anatolian High

Table 7. One-way ANOVA results on the differences between the innovation competence scores of school principals according to the seniority of teachers working in Vocational and Technical Anatolian High Schools.

Dimension	Variance Source	Sum of Squares	SD	Mean Square	F	p
Sensitivity to change	Between groups	10,502	5	2.100	3.786	0.053
	Within groups	118,721	214	0.555		
	Total	129,223	219			
Intramural communication	Between groups	12,816	5	2.563	3.447	0.055
	Within groups	159,111	214	0.744		
	Total	171,927	219			
Out of school communication	Between groups	13,582	5	2.716	5.207	0.070
	Within groups	111,638	214	0.522		
	Total	125,220	219			
Leadership	Between groups	14,249	5	2.850	3.760	0.093
	Within groups	162,208	214	0.758		
	Total	176,457	219			
Motivation	Between groups	10,547	5	2.109	2.896	0.075
	Within groups	155,865	214	0.728		
	Total	166,412	219			

Schools.

In Table 7, according to the seniority of teachers working in Vocational and Technical Anatolian High Schools (1-5 years, 6-10 years, 11-15 years, 16-20 years, 21-25 years, 26 years and above), one-way ANOVA results were given in order to determine whether there is a statistically significant difference between their views on innovation competencies. When the obtained results are examined, according to the seniority of the teachers, it was observed that there was no statistically significant difference between school principals' views on innovation competencies (sensitivity to change $p>0.05$; in-school communication $p>0.05$, out-of-school communication $p>0.05$, leadership $p>0.05$, and motivation $p>0.05$).

Findings and comments on examination of school principals' opinions on innovation competencies according to the variable of working time at the school where they work

A one-way ANOVA was conducted to determine whether there is a statistically significant difference between the views of the teachers participating in the study and the school principals' innovation competencies, according to the variable of working time at the school. One-way ANOVA results regarding the differences between the innovation competence scores of the school principals according to the tenure of the teachers working in the Vocational and Technical Anatolian High Schools are

given in Table 8.

Table 8 shows the terms of office of the teachers working in Vocational and Technical Anatolian High Schools (1-5 years, 6-10 years, 11-15 years, 16-20 years, 21-25 years, 26 years and above) one-way ANOVA results were given to determine whether there is a statistically significant difference between school principals' views on innovation competencies. In the results obtained, according to the seniority of the teachers, no statistically significant difference was found between the views of school principals on innovation competencies (sensitivity to change $p>0.05$; in-school communication $p>0.05$, out-of-school communication $p>0.05$, leadership $p>0.05$, motivation $p>0.05$).

Findings and comments on innovative school scale

Here, analysis and findings related to the innovation level of schools are presented according to the opinions of teachers.

Findings and comments on the dimensions and items of the innovative school scale

Here, descriptive analyses for determining innovation levels of schools according to opinions of teachers who work in Vocational and Technical Anatolian High Schools, which is the 4th sub-objective of the research, are

Table 8. One-way ANOVA results regarding the differences between the innovation competence scores of the school principals according to the tenure of the teachers working in Vocational and Technical Anatolian High Schools.

Dimension	Variance Source	Sum of Squares	SD	Mean Square	F	p
Sensitivity to change	Between groups	4,333	5	0.867	1.485	0.196
	Within groups	124,890	214	0.584		
	Total	129,223	219			
Intramural communication	Between groups	5,439	5	1.088	1.398	0.226
	Within groups	166,488	214	0.778		
	Total	171,927	219			
Out of school communication	Between groups	8,369	5	1.674	3.066	0.071
	Within groups	116,851	214	0.546		
	Total	125,220	219			
Leadership	Between groups	3,511	5	0.702	0.869	0.503
	Within groups	172,945	214	0.808		
	Total	176,457	219			
Motivation	Between groups	3,695	5	0.739	0.972	0.436
	Within groups	162,717	214	0.760		
	Total	166,412	219			

Table 9. Descriptive statistical value of the dimensions and items of the Innovative School Scale according to the opinions of the teachers working in Vocational and Technical Anatolian High Schools.

Dimension	N	Item numbers	Lowest score	Highest score	\bar{X}	Ss
Innovative Atmosphere	220	6	1.33	5.00	3.6818	0.76866
Managerial Support	220	7	1.71	5.00	3.6468	0.78275
Organizational barriers	220	6	1.33	5.00	3.0485	0.77222

included. The analyses are reported separately for the dimensions and items that make up the scale. Answers are presented in the "Innovative School Scale" 1-13 for substances; 1- Never, 2- Rarely, 3- Sometimes, 4- Most of the time, 5- Always "; 14-19. For the items, they were reverse-coded as 1- Always, 2- Most of the Time, 3- Sometimes, 4- Rarely, 5- Never. The interpretations regarding the arithmetic mean are made in line with the following explanation.

To determine the standard viewing ranges for each item, the formula $4/5 = 0.8$ was used. Later, the viewing ranges were determined as follows: the arithmetic mean of any scale item ();

- (i) If it is between $1 < <1.8$, the participants "strongly disagree with the opinion in the relevant item", "Never",
- (ii) If it is between $1.8 < <2.6$, participants' opinion in the relevant item, "Rarely",
- (iii) If between $2.6 < <3.4$, the participants' opinion in the relevant item, "Sometimes they agree",

- (iv) If it is between $3.4 < <4.2$, the participants' opinion in the relevant item, "Most of the time they agree",
- (v) If it is between $4.2 < <5.00$, the opinion of the participants in the related item is expressed as "I always agree".

Findings and comments on the dimensions of the innovative school scale

According to the opinions of the teachers working in Vocational and Technical Anatolian High Schools, the average, lowest and highest scores and standard deviation values obtained by combining the answers given to the items that make up the three dimensions of the innovative school scale are summarized in Table 9.

When we look at the average values formed by combining the responses given to the items in Table 9, the teachers' level of "Most of the time" agree for each of the innovative school characteristics in the sub-dimensions of Innovative atmosphere ($= 3.6818$) and Managerial support ($= 3.6468$). It is seen that they

Table 10. Descriptive statistical values of the items that make up the innovative atmospheric feature dimension.

Item no.	N		Ss
1	220	3.8364	0.80554
2	220	3.5818	0.91043
3	220	3.7636	0.89573
4	220	3.6909	0.91408
5	220	3.3818	0.90641
6	220	3.8464	0.84968

Table 11. Descriptive statistical values of the items that make up the administrative support dimension.

Item no.	N		Ss
7	220	3.8727	0.81211
8	220	3.7091	0.88977
9	220	3.6909	0.91408
10	220	3.6545	0.94058
11	220	3.3636	0.99979
12	220	3.6364	0.86248
13	220	3.6000	1.02213

express their opinions at the level of "Sometimes" in organizational barriers dimension ($M = 3.0485$).

In Table 9, teachers stated that the Innovative Atmosphere ($M = 3.6818$) and Managerial Support ($M = 3.6468$) features were higher than the organizational disability ($M = 3.0485$) characteristics in the schools they work. According to the teachers who participated in the study, it is seen that the schools they work with have innovative atmosphere, administrative support, and organizational barriers, respectively.

Innovative atmosphere dimension

In Table 10, the arithmetic mean and standard deviation values regarding the responses given to the innovative atmosphere-sized substances are given.

When the average of the answers given in the dimension of innovative atmosphere is examined, it is seen that the answers given by the teachers participating in the research are concentrated in the "Most of the Time" option. Based on this finding, it can be said that schools have an innovative atmosphere.

When the averages of the items are examined in Table 10, it is seen that the item with the lowest average is the 5th item with an average of $M = 3.3818$. According to this, it is seen that the teachers at least agree with the view "There is a climate that encourages creativity". It is seen that the item with the highest average is the 6th item with an average of $M = 3.8464$. According to this, it is seen that teachers mostly agree with the view "Everyone's

ideas are respected".

Managerial support dimension

In Table 11, arithmetic mean and standard deviation values are given regarding the answers given to the items in the administrative support dimension.

When the average of the responses given in the administrative support dimension is examined, the lowest value (Item 11, $M = 3.3636$) is "Everyone is willing to realize innovations." It is seen that there is an option and teachers participate at the "Sometimes" level. It is observed that the answers given by the teachers for the other items are concentrated in the option "I mostly agree". According to this, it is seen that schools often have the administrative support feature.

Organizational barriers

In Table 12, arithmetic mean and standard deviation values are given regarding the responses given to items in organizational barriers among the innovativeness characteristics of schools.

When the average of the responses given in the organizational barriers feature was examined, it was seen that the answers given by the teachers participating in the research are concentrated in the "Sometimes" option, and that the schools deal with organizational obstacles, cannot take risks and resist change. When the averages

Table 12. Descriptive statistical values of the items that make up the organizational barrier dimension.

Item No.	N		Ss
1	220	2.8545	0.84222
2	220	3.3455	0.97864
3	220	3.0000	0.99313
4	220	2.9455	0.96360
5	220	3.2364	0.99246
6	220	2.9091	1.06882

Table 13. Results of correlation analysis showing the relationship between innovation competencies of school principals and innovation levels of schools.

Correlation		Innovation competencies of managers	Innovative school level
Innovation competencies of managers	Pearson correlation	1	0.578**
	Sig. (2-tailed)		0.007
	N	220	220
Innovative school level	Pearson correlation	0.578**	1
	Sig. (2-tailed)	0.007	
	N	220	220

**: Correlation is significant at the 0.01 level (2-tailed).

of the items in Table 12 are examined, it is seen that the item with the lowest average is the 14th item with an average of = 2.8545. It is seen that the item with the highest average is the 15th item with = 3.3455. Based on this finding, for the schools of teachers participating in the study, "Our school members are afraid of taking risks." While his vision remains low; "Innovation is not a basic organizational goal." It can be said that there is more participation in his opinion.

Findings and comments on the relationship between the innovation competencies of school principals and the innovation level of schools

Here, correlation analysis of findings regarding whether there is a significant relationship between innovation competencies of school principals, which is the 5th sub-objective of the research, and the innovation levels of schools, are given. In correlation analysis, the coefficient value expressing the relationship between variables varies between +1 and -1. A positive coefficient indicates that an increase in one variable and a negative increase in the other variable indicate a decrease in the other variable when there is an increase in another variable. A correlation coefficient of ± 1 indicates a perfect relationship, and 0 indicates no relationship at all. If the correlation coefficient is less than 0.30, the relationship is weak; If it is between 0.30 and 0.70, it is at medium level;

if it is greater than 0.70, it is high (Büyüköztürk, 2015, p. 185). The results of the correlation analysis made are presented in Table 13.

Table 13 shows the results of the Pearson Moments Coefficient Analysis technique, which was made to determine the relationship between the innovation competencies of school principals and the innovation levels of their schools according to the opinions of the teachers participating in the study. In Table 13, it was determined that there is a moderately positive and significant relationship ($r = 0.578$, $p < 0.01$) between the innovation competencies of the school principals of the teachers participating in the research and the innovation levels of the schools. In line with these results, it can be said that as the innovation competencies of school preservatives increase, the innovation levels of the schools increase.

Conclusions

Here, the findings obtained helped to answer the questions regarding the sub-objectives of the research and the suggestions developed in line with these results are included.

The results obtained in this study, in which the effect of the innovation competencies of the principals of Vocational and Technical Anatolian High Schools in Giresun City Center on the innovation levels of the

schools were examined according to the opinions of the teachers, are summarized below.

The results obtained from the analysis to determine the opinions of the teachers of Vocational and Technical Anatolian High School, which is the second sub-objective of the study, on the innovation competencies of school principals, according to the variables of gender, age, education level, branch, professional seniority and tenure at school are as presented.

When looking at the average values of the answers given by the teachers participating in the study to the innovation competencies of the school principals, the sensitivity to change is $M = 3.711$; intra-school communication $M = 3.684$; out-of-school communication

$M = 3.497$; leadership $M = 3.554$; and motivation was found to be $M = 3.654$. Accordingly, teachers expressed the view that school principals showed the most sensitive to change feature and the least out-of-school communication competence. According to the opinions of the teachers working in Vocational and Technical Anatolian High Schools, it was stated that school principals have the characteristics of sensitivity to change, in-school communication, leadership, motivation and out-of-school communication, respectively.

The results of the analysis to determine whether the opinions of Vocational and Technical Anatolian High School teachers and school principals on innovation competencies, which are included in the second sub-purpose of the study, show a statistically significant difference according to gender, age, education level, branch, professional seniority and tenure at school are as explained:

According to the gender of the teachers participating in the study, there was no difference in school principals' views on innovation competence in terms of in-school communication, out-of-school communication, leadership and motivation dimensions. A significant difference was found in the sensitivity to change dimension. According to this, the mean score ($M = 3.8419$) of male teachers' views on school principals' sensitivity to change is significantly higher than the average score ($M = 3.5971$) of female teachers' opinions. It has been determined that this difference is in favor of male teachers.

According to the age of the teachers participating in the study, their views of the school principals on innovation competence did not show a statistically significant difference in terms of out-of-school communication and motivation dimensions. Accordingly, a statistically significant difference ($p < 0.05$) was observed between the 26-30 age group teachers and the 31-35 age group teachers in the dimension of sensitivity to change. It has been determined that teachers between the ages of 26-30 ($M = 3.190$) report less positive opinions about school principals' sensitivity to change than teachers between the ages of 31-35 ($M = 3.381$). It has been determined that this result is in favor of teachers between the ages of 31-35. In the in-school communication dimension, it was

observed that there was a statistically significant difference ($p = <0.05$) between opinions of teachers in the 31-35 age group and teachers in the other age group. Considering the average scores of these groups, it can be said that teachers between the ages of 31-35 ($M = 3.222$) report less positive opinion than teachers in the other age group. These results were found to be in favor of teachers aged 26-30, 36-40 and 41-45, 46-50 and over 50. In the leadership dimension, it was observed that there is a statistically significant difference ($p = <0.05$) between the 26-30 age group teachers and the 31-35 age group teachers. Considering the averages of these two groups, it was determined that teachers whose ages were between the ages of 26-30 ($M = 3.166$) reported less positive opinions on the leadership characteristics of school principals than teachers who were between 31-35 years ($M = 3.222$). These results were found to be in favor of teachers aged 36-40, 41-45, 46-50, and over 50.

According to the educational status of the teachers participating in the research, no statistically significant difference could be determined between the views of school principals on innovation competencies in terms of sensitivity to change, in-school communication and dimensions. A statistically significant difference was found in out-of-school communication ($p < 0.05$), leadership ($p < 0.05$) and motivation ($p < 0.05$) dimensions. Considering the average scores of undergraduate ($M = 3.4298$) and postgraduate ($M = 3.6471$) in the out-of-school communication dimension, it can be said that teachers with a master's degree are of the opinion that school principals have more out-of-school communication characteristics compared to teachers with graduate degrees. Considering the average scores of undergraduate ($M = 3.4605$) and master's ($M = 3.7647$) in the leadership dimension, it can be said that graduate teachers think that school principals have more leadership qualities than graduate teachers. Considering the average scores of undergraduate ($M = 3.5702$) and graduate ($M = 3.8431$) in the motivation dimension, it can be said that teachers with a master's degree are of the opinion that school principals are more sensitive to motivation than teachers with undergraduate degrees.

According to the branches of the teachers participating in the study, no statistically significant difference was found between the views of school principals on innovation competencies in terms of sensitivity to change, in-school communication, out-of-school communication, leadership, and motivation.

According to the professional seniority of the teachers participating in the study between the views of school principals on innovation competencies, no statistically significant difference was found in terms of sensitivity, in-school communication, out-of-school communication, leadership and motivation dimensions.

According to the incumbency of the teachers in their schools participating in the study no statistically significant difference could be determined between the

views of school principals on innovation competencies in terms of sensitivity to change, in-school communication, out-of-school communication, motivation and leadership dimensions.

The results obtained from the analysis of the opinions of Vocational and Technical Anatolian High School teachers, which are the 4th sub-objective of the study, on the innovation levels of the schools are as presented.

Considering the average values of the answers given by the teachers participating in the study regarding the innovation levels of the schools, innovative atmosphere was = 3.6818; administrative support was = 3.6468; and organizational barriers was = 3.0485. According to this, the teachers stated that the schools have the most innovative atmosphere managerial support feature and the least organizational barriers regarding the innovation levels of the schools. According to the opinions of the teachers working in the Vocational and Technical Anatolian High Schools, it was seen that the schools had an innovative atmosphere, administrative support and organizational barriers, respectively.

As regards answers to the items belonging to the innovative atmosphere dimension given by the teachers participating in the research, the item with the highest average was the one stating that everyone's opinions are respected; the lowest average was the item indicating the existence of a climate that encourages creativity.

The item with the highest average according to the answers to the items of the administrative support dimension given by the teachers participating in the research was the item expressing that teamwork is supported to ensure innovation while the item with the lowest average was the one that everyone is willing to innovate.

According to the answers given by the teachers participating in the research on items belonging to the organizational barrier dimension, the item with the highest average was the one that states that item innovation is not a basic organizational goal; the item with the lowest average was the item stating that school members were afraid of taking risks.

The results obtained from the findings to determine whether there is a significant relationship between the innovation competencies of the Vocational and Technical Anatolian High School principals and the innovation levels of the schools are as described.

According to the views of the teachers participating in the study, which was made to determine the relationship between the innovation competencies of the school principals and the innovation levels of the schools, the innovation competencies of the school principals and the innovation levels of the schools ($r = 0.578$, $p < 0.01$), it has been determined that there is a moderately positive and significant relationship according to the Pearson Moments Coefficients Analysis technique. In line with these results, it can be said that as the innovation competencies of school preservatives increase, the

innovation levels of the schools also increase.

RECOMMENDATIONS

Here, suggestions are outlined for application by practitioners and for researchers according to the research findings. In addition, while considering the suggestions, the limitations of the study should not be ignored.

Applications for practitioners

It has been determined that compared to female teachers, male teachers have more positive opinions about the dimension of sensitivity to change from innovation competence of school principals. School principals can clearly and understandably express that they are sensitive to change, that they support change and innovation, that they give employees the opportunity to present their talents in the process of change, that they support cooperation, that decisions and practices in the change process are consistent and ethical, and at an equal distance to all stakeholders (Buyruk, 2018).

It has been concluded that teachers between the ages of 26-30 and 31-35 years have less positive views on the dimensions of sensitivity to change, in-school communication and leadership. The reason for the difference between age groups may be due to the increase or decrease in the awareness levels of teachers caused by the change in age ranges. In order to change teachers' negative opinions about these dimensions, activities and trainings can be organized in which school staff will be included to improve their in-school communication and leadership competencies. In relation to leadership dimension, principals can exhibit leadership behaviors in a way that includes teachers of all age groups. In addition, trainings can be organized for teachers of all age groups to increase the awareness of school administrators about leadership and effective communication skills that they should have in line with the needs of the age (MEB, 2018).

It was determined that the teachers participating in the study gave the lowest score to the school administrators' out-of-school communication dimension. To improve out-of-school communication, parent-teacher association activities, advisory boards, cultural activities and media can be used as tools to help. To improve out-of-school communication, school-family and environment communication should be carried out in a balanced way. To do this, parent-teacher-student meetings with joint participation can be organized. Families can be included in the process in order to provide family support to social and cultural activities in the school. To improve communication with the external environment, attempt can be made to increase motivation of the students for

the future by contacting well-known people who have graduated from the relevant school types and succeeded in life (Aslan and Kesik, 2016).

Especially for students in vocational high schools, school administrations can provide opportunities to students to get to know the institutions and to receive more applied education in the institutions by providing the necessary communication with the institutions and organizations where students can improve their professional competencies.

When considered in the context of vocational and technical education, certified education which is planned to be implemented for individuals and graduates of vocational education within the framework of the 2023 Education Vision, ensuring the acquisition of courses that are nano-credited and accredited by industry and academia collectively, organizing curriculum in accordance with the digital transformation alongside qualities that the industry demands, reviewing workshop and laboratory equipment in line with updated curriculum and needs, planned practices in relation to working fund, school administrators who are expected to initiate innovation studies for the changing needs of the society may be provided with professional training so as to implement current activity plans like transition from secondary education to relevant higher education fields and on-the-job training.

Recommendations for researchers

Similar studies examining the relationship between innovation competencies of school principals and innovation levels of schools can be carried out with different samples.

Studies can be conducted to determine the reasons of the dimensions that have significant differences between themselves statistically according to the results of the research.

Similar to this study which examined teachers' views on innovation competencies of school principals, studies can be conducted to investigate teachers' own opinions and competencies on innovation.

Education is a process that takes place in the triangle of student, teacher and school; therefore, it would not be wrong to say that all stakeholders of education will be affected by the changes and developments created by innovations. In this respect, the innovation level of schools can be detailed within the framework of these stakeholders in the following studies.

Unlike this study that was conducted in quantitative model to examine the effects of innovation competencies of school principals in Turkey as well as the innovation levels of the schools, qualitative or mixed design studies can be conducted to obtain new indepth data.

Findings of the studies conducted in the literature and research findings in relation to the innovation

competencies of school principals and the innovation levels of the schools are not consistent in terms of some variables. More research can be done on populations and samples with similar characteristics to reach a consensus on this issue.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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