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ANALYSING THE RELATIONSHIP BETWEEN PRIVATE SCHOOL ADMINISTRATORS' PERCEPTIONS OF TECHNOLOGICAL LEADERSHIP COMPETENCIES AND INNOVATION MANAGEMENT COMPETENCIES (A MIXED METHOD STUDY)[1]

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ABSTRACT

This study was carried out using a mixed research method to analyze the relationship between private school administrators' technology leadership competencies perceptions and innovation management, with the aim of improving professional skills of school administrators in Turkey's Education Vision 2023. This research was designed as Sequential Explanatory Design. The population of the quantitative part of the research consisted of 216 administrators working in private schools in Avcılar and Kartal, İstanbul in 2020-2021 academic year. In this research 149 administrators participated and by not taking a sample in the study, it was tried to reach all school administrators in the universe. The qualitative data of the study was collected through semi-structured interviews with 20 school administrators. Parametric statistical analysis techniques were used in the analysis of quantitative data and content analysis method was used in the analysis of qualitative data. In the quantitative part of the research, the relational scanning model, one of the general scanning models, was used. According to the results of the quantitative part of the study, the mean score of school administrators that participated in-service training related to information technologies were significantly higher than school administrators that didn't participate. A positive and moderate correlation was found between school administrators' technology leadership and innovation management competencies. In this study, it was concluded that there was a similarity between quantitative and qualitative findings. In this context, it was seen that school administrators give importance to the use of educational technologies in the education and support professional development in educational technologies.

Keywords: Education management, administrator, leader, technology, Turkey's education vision 2023.

[1] This study was presented at the 13th International Conference on Education and New Learning Technologies (Online Conference in Spain) 5th of July 2021 as a report and then it's reviewed and expanded.

INTRODUCTION

In the 21st century we live in, information has undoubtedly become very important. While machine power was important in the past (in the industrial society), nowadays; the power of knowledge is very important. In this period, which is also referred to as the information society, changes occur in almost every aspect of society, from economy to health. Another important area that is at the forefront of the areas affected by this change is undoubtedly education (İhtiyaroğlu, 2020: 320).

As a result of rapid changes and innovations emerging all over the world, digitalization appears in every field (İhtiyaroğlu, 2020: 320). In line with technological developments, virtual trainings and virtual meetings are gaining importance in daily life (Koçel, 2018: 439). In this context, in the light of the changes and developments emerging today, the necessity of restructuring every level of education arises (Gümüşeli, 2001; Bursalıoğlu, 2012: 73-77; İhtiyaroğlu, 2020: 320).

When the literature is examined, the competence areas of the leaders are very important for the organizations to be successful (Güçlü, 2016: 1). Leadership is explained as the ability to influence and mobilize others to achieve certain goals (Şişman, 2012: 3; Güçlü, 2016: 13; Robbins & Judge, 2013: 368; Northouse, 2018: 43). In this context, it is stated that school administrators have important duties to integrate educational technologies with educational activities and educational institutions to achieve their goals (Akbaba, Altun & Gürer, 2008; Anderson & Dexter, 2005; Günbayı, 2016; Yahşi, 2020).

Technology Leadership

In the information society, the working environment and working culture are changing drastically with the effect of technological developments. In the light of technological developments, information technology competencies have gained importance for the actors in the organizations (Mattila, 2015).

Technological leadership is an indication of managing all technology usage in schools and so, a quite essential component of effective educational administration. Technological leadership represents all activities about the technology in school, including organizational decisions, policies and implementation of technology within the boundaries of the school environment (Anderson & Dexter, 2005).

Studies on technology leadership in the world have mostly been carried out in the context of International Society for Technology in Education (ISTE) standards (ISTE, 2002, 2009 & 2018). In the following years, the National Educational Technology Standards for Administrators (NETS-A) were accepted. This NETS-A standards has identified 5 sub-dimensions of competencies necessary for school administrators to be an effective technology leader (ISTE, 2009). These are:

1. **Visionary Leadership:** School administrators lead the establishment of a common vision that supports the integration of technology with education and transformation for the institution.

2. **Digital Age Learning Culture:** School administrators attach importance to creating an interactive learning culture that offers education appropriate to their level for all students in the digital age.

3. **Excellence in Professional Practice:** School administrators support technological changes and digital tools with an innovative approach within the scope of improving the learning environment.

4. **Systematic Development:** School administrators lead for effective and efficient use of information technologies and sustainable organizational development.

5. **Digital Citizenship:** School administrators give importance to issues such as social, ethical, legal issues and responsibilities within the scope of digital culture (Hacıfazlıoğlu, Karadeniz & Dalgıç 2011a).

When the literature was examined, there were various studies within the scope of technology leadership and competencies of school administrators in the field of educational administration. According to ISTE 2018, which is one of these studies, education administrators with leadership characteristics should give importance to defending equal citizenship, having a vision in planning, empowering leadership, being a system designer and continuous learning (ISTE, 2018).

One of the most comprehensive projects carried out by the Ministry of National Education to promote the use of technology in educational institutions is the FATIH Project, which started in 2010. FATIH Project is one of the most important projects implemented in the world in the field of educational technologies (MEB, 2020).

Today, as a result of the changes in the world, distance/online education has become very important. The Ministry of National Education (MoNE) has developed some content with the aim of enabling innovative applications in the 2023 Education Vision Document. In this context, thanks to the renewed Education Information Network (EBA) supplementary resources and documents can be easily accessed. The Ministry of National Education's digital education platform, EBA, has fulfilled a very important task in the distance/online education process especially in the pandemic term (MEB, 2018a; 2020).

Innovation Management

In terms of educational institution management, the concepts of instructional leadership and change leadership gained importance in the last part of the 20th century (Williams, 2004; as cited in Gümüşeli, 2014: 7). The explanations on the historical evolution of the role of school administration show that as long as the changes and developments in the school environment continue, the changes in the roles expected from the school administrators will continue (Gümüşeli, 2014: 17). Today, some studies show that most students (about 65 percent) who have just started education and training, will work in such professions in the future that the educational curriculum they learn now cannot adequately prepare them for the future (Davison, 2012). In this context, school administrators have important responsibilities to achieve the goals of education (Günbayı, 2016).

In order to determine the features that affect innovation management, some studies have been carried out in the form of literature review. Seven models were determined according to the study by Adams, Bessant and

Phelps (2006: 21-26). These were determined as input management, innovation strategies, organizational culture and structure, knowledge management, project management, portfolio management and commercialization. Later, in the study by Smith, Busi, Ball, and Meer (2008: 656-668), nine dimensions were revealed: These are management style, leadership, resources, organizational structure, collaboration strategy, technology, knowledge management, employees and innovation process. It was concluded that organisational culture is a key factor in the management of innovation. It is a factor that impacts all others and is also impacted upon by changes in the other factors. Therefore, we can conclude that organisational culture emerges and develops through changes in the other factors.

In this context, Bülbül (2012a) adapted the innovation management scale into Turkish according to the perceptions of school administrators, who are among the most important actors in educational institutions. For a successful innovation management, it is very important that the corporate culture has this understanding, that the leader internalizes the concept of innovation and that employees who adopt innovation as a working principle (Bülbül, 2017). In educational organizations, in order for change and innovation to take place, the school administrator must have sufficient qualifications in terms of innovation management (Şişman, 2012: 95). Today, Educational administrators are expected to show leadership characteristics (Koçel, 2018: 91). It is emphasized the importance of keeping up with the innovations of these administrators, who have leadership characteristics. Especially, it is very important to motivate all stakeholders in the organization, in order to realize innovation (Adair, 2015: 51-71).

Innovation is multidimensional. Paying attention when implementing a new program or policy there are at least three components required: First, new use of materials (teaching, such as curriculum materials or technologies). The second is the use of new teaching approaches (new teaching strategies and activities). And the third is the change of existing beliefs (a certain new pedagogical assumptions and theories underlying policies or programs). All three aspects of change are necessary as they represent the means of achieving educational goals (Fullan, 2007: 30).

When the literature is examined; the number of studies examining technology leadership competencies in the world and in Turkey has been increasing, especially in recent years (Can, 2003 & 2008; Akbaba, Altun & Gürer, 2008; Sincar, 2009; Banoğlu, 2011; Sincar & Aslan, 2011; Hacıfazlıoğlu, Karadeniz & Dalgıç, 2010 & 2011b; Bülbül & Çuhadar, 2012; Gün & Çoban 2019; Çalık, Çoban & Özdemir , 2019; Polat, Yahşi & Hopcan, 2020; Yahşi 2020; Cormican & O'Sullivan, 2004; Oke, 2004, Anderson & Dexter, 2005; ISTE, 2002, 2009 & 2018; Yu & Durrington, 2006; Afshari et al., 2009 and Vlok (2012).

In recent years, it is seen that the researches on the innovation management competencies of school administrators in Turkey and in the world have been increasing gradually: Top (2011); Bülbül, 2012b; Göl & Bülbül, 2012; Boydak & Karabatak 2013; Ömür, 2014; Argon, İsmetoğlu & İşeri 2015; Karataş, Gök & Özçetin 2015; Esen, 2016; Öztürk, 2017; Görgel, 2018; Aydoğar, 2018, Karaca, 2019; Adams, Bessant & Phelps 2006; Smith, Busi, Ball & Meer, 2008.

Yıldız, Tüysüz & Öztürk (2021) made a research about the relationship between technology leadership and innovation management competencies of school administrators in the public schools in a quantitative research model. However, no research has been found that tries to determine the relationship between technology leadership and innovation management competencies of school administrators in private schools.

The aim of this study was to determine the relationship between technology leadership competencies and innovation management competencies of school administrators according to the perceptions of school administrators working in private schools in Avcılar and Kartal, in İstanbul, to determine their opinions within the scope of technology leadership and innovation management self-efficacy and whether there was a significant difference according to some demographic variables. In order to achieve this aim, answers to the following questions were sought:

1. What is the level of technology leadership competencies and innovation management competencies according to the perceptions of private school administrators?
2. According to the perceptions of private school administrators, do technology leadership competencies and innovation management competencies differ significantly according to some demographic variables?
3. According to the perceptions of private school administrators, is there a significant relationship between technology leadership competencies and innovation management competencies?
4. What are the opinions of school administrators within the scope of technology leadership and innovation management self-efficacy?

It is thought that this research will shed light on similar studies in this field by proposing scientific research and development of technology leadership and innovation management competencies of educational institution administrators. It is thought that the technology leadership and innovation management competencies of school administrators will be comprehensively revealed and understood according to their self-efficacy perceptions in private schools. In line with the data obtained as a result of the research, school administrators will contribute to the in-service training activities aimed at training and improving professional development of school administrators in the 2023 Education Vision Document of the Ministry of National Education.

METHOD

Model of the Research

This research, which examines the relationship between technology leadership and innovation management competencies according to the perceptions of private school administrators, was conducted in a mixed model. In this research, in which mixed method was followed, firstly the quantitative method was followed, and then the qualitative method was followed based on the findings of the quantitative phase. For this reason, the research was designed as an explanatory sequential design. Content analysis method was used in the analysis of qualitative data, and parametric statistical analysis techniques were used in the analysis of quantitative data.

It was aimed to produce a more comprehensive picture of the research topic, to answer different research questions and to explain the findings obtained by the quantitative method (Robson, 2015).

Since the second stage, in which the qualitative stage was realized, was carried out by following the results of the first (quantitative) stage (Creswell & Plano Clark, 2011), the research was conducted in a sequential explanatory design. In order to generalize the findings and to investigate the subject in more detail, a mixed research design was followed (Johnson, Onwuegbuzie & Turner, 2007), which combines various elements of quantitative and qualitative research approaches with an in-depth understanding and verification.

In the quantitative part of the research, the correlational survey model, one of the general survey models, was used in this research, which examines the relationship between technology leadership and innovation management competencies according to the perceptions of private school administrators. In this context, the correlational survey model was used, which aims to determine the existence, direction and degree of change between two or more variables (Karasar, 2016: 114).

Population and Sample

The population of the quantitative part of this research consisted of 216 administrators working in private schools in Avcılar and Kartal in Istanbul in the 2020-2021 academic year. Within the scope of the research, 149 private school administrators were reached out of 216 administrators. The saturation (total population sampling) technique was used because the number of all private school administrators working in the population was sufficient to generalize to the population of the study and because of the ease of access to the whole universe in the region. The Saturation Technique is a sample selection technique in which every unit in the population participates in the sampling. The Saturation Technique is more suitable for population that are small and geographically concentrated in a specific area.

The qualitative data of the study were collected through semi-structured interviews with 20 school administrators (10 principals and 10 assistant principals) working in schools where quantitative data were collected.

The qualitative part of this research was conducted as a case study through face-to-face interviews, from qualitative research designs made with an interview form prepared with reflective listening and semi-structured questions. According to Glaser (1978), qualitative research is a modeling study based on theory-building that explains some previously unknown findings with the collected data in relation to each other. It is an approach that is based on research and understanding of social realities within their bounds.

While forming the study group in the qualitative aspect of the research, criterion sampling, one of the purposive sampling methods, was used. According to Marshall & Rossman (2014), this method is to include all cases that meet a predetermined criterion in the study (as cited in Baltacı, 2018). While forming the study group within the scope of this research, the school administrators who have at least 10 years of professional

seniority and who have taken at least one in-service training/course in the field of information technologies were determined as criteria. In addition, the participants to be interviewed in the research were determined by using the snowball sampling method, one of the purposive sampling methods. The snowball approach is also particularly effective in identifying individuals or situations that can be a rich source of information regarding the research problem. The demographic information of the private school administrators, whose opinions were consulted in the quantitative aspect of the study, according to the variables of gender, education level, branch, type of school, job title and in-service training in the field of information technologies are given in Table 1.

Table 1. Frequency and Percentage Values of Demographic Characteristics of Participants (Quantitative Research)

Factor	Level	*f*	%
School Level	Pre-School/Primary School	63	42,3
	Middle-School	37	24,8
	High School	49	32,9
Position	Principal	96	64,4
	Assistant Principal	53	35,6
Branch	Pre-School/Class Teacher	34	22,8
	Branch Teacher	115	77,2
Gender	Male	63	42,3
	Female	86	57,7
Education Status	Associate Degree	0	0
	Bachelor's Degree	111	74,5
	Master's Degree	38	25,5
	Doctorate	0	0
Status of receiving in-service	Yes	44	29,5
training on information	No	105	70,5
Technologies			
	Total	149	100

According to Table 1, 42.3% of the private school administrators participating in the research work in pre-school and primary schools, 24.8% in secondary schools and 32.9% in high school education institutions. 64.4% of the participants work as principals and 35.6% as assistant principals. 22.8% of the participating school administrators are pre-school and classroom teachers, and 77.2% are branch teachers. 42.3% of the school administrators are male and 57.7% are female administrators. 74.5% of the participants have a bachelor's degree, 25.5% of the participants have a master's degree. In addition, 29.5% of school administrators received in-service training on information technologies but 70.5% did not receive in-service training on information technologies.

Study Group

The participants consisted of 20 private school administrators (10 principals and 10 assistant principals) who have worked for 10 years or more in Avcılar and Kartal, in Istanbul in the 2020-2021 academic year and were selected on a voluntary basis. In addition, opinions were received from 5 public school principals who have an EBA (Education Information Network) support point in their school.

Table 2. Information on Participating Private School Principals

Item No	Principal	Gender	Branch	Educational Background	School Type	Professional Seniority	Status of Receiving In-Service Training within the Scope of Information Technologies
1	M1	Male	Branch	Bachelor's Level	High School	16	Yes
2	M2	Male	Branch	Master's Degree	High School	15	Yes
3	M3	Female	Branch	Master's Degree	High School	12	Yes
4	M4	Female	Branch	Bachelor's Degree	High School	20	Yes
5	M5	Male	Branch	Master's Degree	Primary School	18	Yes
6	M6	Male	Branch	Master's Degree	Primary School	10	Yes
7	M7	Female	Branch	Bachelor's Degree	Secondary School	14	Yes
8	M8	Male	Branch	Bachelor's Degree	High School	43	Yes
9	M9	Male	Class Teacher	Bachelor's Degree	Primary School	12	Yes
10	M10	Female	Pre-School	Master's Degree	Kindergarten	11	Yes

When Table 2 is examined, it is seen that the school principals participating in the research were (f=6) male and (f=4) female; have graduate (f=5) and undergraduate (f=5) education; (f=8) branch teachers and (f=2) preschool/primary school branch teachers. According to the same table, the school principals participating in the research work at high school (f=5), secondary school (f=1) and school/pre-school/primary school (f=4). When Table 2 is examined, it is understood that all of the school principals (100%) participating in the research have a professional seniority of 10 years or more and receive in-service training within the scope of information technologies.

Table 3. Information on Participating Private School Assistant Principals

Item No	Assistant Principal	Gender	Branch	Educational Background	School Type	Administrator's Total Experience	Status of Receiving In-Service Training within the Scope of Information Technologies
1	MY1	Male	Branch	Bachelor's Degree	Secondary School	12	Yes
2	MY2	Male	Class Teacher	Master's Degree	Primary School	15	Yes
3	MY3	Male	Branch	Bachelor's Degree	Primary School	20	Yes
4	MY4	Female	Branch	Master's Degree	Secondary School	17	Yes
5	MY5	Female	Branch	Bachelor's Degree	Primary School	13	Yes
6	MY6	Female	Branch	Bachelor's Degree	High School	11	Yes
7	MY7	Male	Branch	Bachelor's Degree	High School	12	Yes
8	MY8	Male	Branch	Bachelor's Degree	High School	18	Yes
9	MY9	Female	Branch	Master's Degree	High School	10	Yes
10	MY10	Female	Pre-School	Master's Degree	Kindergarten	12	Yes

When Table 3 is examined, it is seen that the school assistant principals participating in the research were (f=5) male and (f=5) female; have graduate (f=4) and undergraduate (f=6) education; (f=8) branch teacher and (f=2) preschool/primary school branch. According to the same table, the school principals participating in the research work at high school (f=4), secondary school (f=2) and school/pre-school/primary school (f=4). When Table 3 is examined, it is understood that all of the school assistant principals (100%) participating in the research have a professional seniority of 10 years or more and have received in-service training within the scope of information technologies.

Table 4. Information on Participating Public-School Principals

Item No	Assistant	Gender	Branch	Educational Background	School Type	Professional Seniority	Status of Receiving In-Service Training within the Scope of Information Technologies
1	DM1	Male	Branch	Bachelor's Degree	Secondary School	19	Yes
2	DM2	Male	Branch	Master's Degree	High School	22	Yes
3	DM3	Female	Branch	Master's Degree	Secondary School	17	Yes
4	DM4	Female	Branch	Bachelor's Degree	High School	20	Yes
5	DM5	Male	Class Teacher	Bachelor's Degree	Primary School	30	Yes

When Table 4 is examined, it is seen that the public-school principals participating in the research were (f=3) male and (f=2) female; have graduate (f=2) and undergraduate (f=3) education; (f=4) branch teacher and (f=1) pre-school/primary school branch. According to the same table, the school principals participating in the research work in high school (f=2), secondary school (f=2) and school/pre-school/primary school (f=1). When Table 4 is examined, it is understood that all of the public-school principals (100%) participating in the research have a professional seniority of 10 years or more and receive in-service training within the scope of information technologies.

Data Collection Tools

The researchers who adapted the scales into Turkish, and developed the scales applied within the scope of the research were contacted and permissions for use of the scales in the research were obtained. Necessary permissions were obtained from the Istanbul Provincial Directorate of National Education, with the approval of the Governor's Office, regarding the applicability of the surveys. Ethics committee approval of the study was obtained from İstanbul Aydın University Ethics Committee about this study (Decision No. 03.03.2021/2).

In order to obtain the data in the study, the Personal Information Form developed by the researchers was used to determine some demographic information of school administrators. In this study, the Technology Leadership Competence Scale developed by Hacıfazlıoğlu, Karadeniz & Dalgıç (2011a) and the principal form of the Innovation Management Scale at Schools developed by Bülbül (2012a) were used to collect data. There are 21 items in the Technology Leadership Competence scale and and five sub-dimensions. There is a five-point rating between "1=very little" and "5=very adequate". The scale of Innovation Management in Schools, whose validity

and reliability studies were conducted by the researcher (Bülbül, 2012a), consists of 32 items and four sub-dimensions.

Cronbach's Alpha (α) Coefficients of the Sub-Dimensions of the Technology Leadership Efficacy Perceptions Scale for the Total Scale, 975; Visionary leadership 918, Digital Age Learning Culture 956, Excellence in Professional Practice 932, Systematic Development 945 and Digital Citizenship was determined as 933. Cronbach's Alpha (α) Coefficients for the Sub-Dimensions of the Innovation Management Scale for Educational Organizations were determined as 953 for Input Management, 840 Innovation Strategy, 897 Organizational Culture and Structure, 964 Project Management and 961 for the Total Scale. As a result of the reliability analysis conducted in this study, it was seen that the answers given to the statements measuring all sub-dimensions of the scales are reliable (Gliem & Gliem, 2003:76).

Data Analysis

SPSS 22 statistical package program was used to analyze the data obtained from the scales. Normality test was performed to determine whether the obtained data were suitable for normal distribution. Parametric tests were applied because the obtained results showed normal distribution.

In order to determine whether the scores of the Technology Leadership Competence Perceptions Scale differ according to the variable of gender, education status, branch, job title and in-service training in information technologies, Independent Sample t-Test, one-way analysis of variance (ANOVA) and Welch test were applied to determine whether it differs according to the variable of school type, and it was investigated whether there was a statistically significant relationship between the groups at the 95% confidence interval. Post hoc tests were used to make comparisons between the groups that showed a significant relationship within the variable of school type where Anova test and Welch test were applied. Scheffe test was used to determine the source of the differences found in the analysis of variance, and the Games – Howell test was used to determine the source of the differences found in the Welch test.

The Independent Sample t-Test was used to determine whether the scores of the School Administrators on the Innovation Management Scale in Educational Organizations differ according to the variable of gender, education status, branch, job title and in-service training in the field of information technologies.

In the qualitative aspect of the research, a semi-structured interview form developed by the researcher was used as a data collection tool. While preparing the interview form, a conceptual framework for the questions and the boundaries of the research questions were determined based on this, taking into account the Innovation Management Competencies of Managers in Educational Institutions, ISTE 2009 National Educational Technologies Standards for Managers (NETS-A) and ISTE 2018 Education Leaders Standards. In this context, by creating a semi-structured form, 5 main themes were determined for the questions. These themes are;

1. The importance of educational technologies in education and training processes
2. Determining what needs to be done for the proper management of educational technologies
3. Developing teachers' professional skills in innovation management
4. Ensuring equality of opportunity and opportunity for students in innovation management
5. Developing the professional skills of school administrators in innovation management

These determined themes were transformed into question statements and a semi-structured interview form consisting of 5 questions was obtained. The interview questions, within the scope of technology leadership and innovation management competencies of school administrators:

1. What are their views on the use of educational technologies in education and training processes?
2. What are their views on the correct management of educational technologies?
3. What are their views on improving the professional skills of teachers in innovation management?
4. What are their views on the needs of students in innovation management?
5. What are the opinions of school administrators regarding the development of professional skills in innovation management?

Three field experts were interviewed to get an opinion on the content validity of the questions, and an academic member in the field of Turkish education was interviewed to get an expert opinion on language validity. As a result of the feedback from the experts, the interview form was finalized. Before starting the data collection process, the questions in the semi-structured interview form had been asked to three school principals. The findings obtained at the end of this preliminary interview were simultaneously analyzed by the researcher and two different field experts, and it was decided that the data collection tool was functional and suitable for the research.

During the data collection process, data were collected through face-to-face interviews with 20 school administrators who declared that they could participate in the research voluntarily and were made an appointment in advance. The purpose and content of the research were clearly explained to the school principals participating in the research beforehand. The interviews lasted approximately 25-30 minutes. The answers given by the participants to the questions were noted by the researcher, and at the end of the research, they were submitted to the approval of the participants and their approval was obtained. The study was started by first scanning the literature on the subject. In the study, the interviews with the participants were analyzed and interpreted. Content analysis technique, one of the qualitative research methods, was used in the analysis of the data. The study data were analyzed in the following four stages, as stated by Şimşek & Yıldırım, 2018.

a) Coding of the interviews transferred to the computer environment by reading.
b) Finding themes according to the common features of the codes
c) Reviewing and arranging the suitability of codes and themes
d) Description and interpretation of the results.

FINDINGS

In this section, answers to the research questions are sought in order. Perceptions of School Administrators on the Technology Leadership Competence Scale are shown in Table 5.

Table 5. Perceptions of School Administrators' on the Technology Leadership Competence Scale

Technology Leadership Competence Perceptions Sub-Dimensions	$\bar{X}$	ss
Visionary Leadership	3,9709	,887
Digital Age Learning Culture	4,0322	,839
Excellence in Professional Practice	4,1527	,778
Systematic Development	4,0040	,848
Digital Citizenship	4,0789	,801
Total	4,0486	,741

According to Table 5, it is seen that the scores on Technology Leadership Efficacy Perceptions of the private school administrators participating in the research are sufficient at the total scale level (X: 4.05).

Table 6. Descriptive Statistics on Innovation Management Competencies of School Administrators' in Educational Organizations

Innovation Management Sub-Dimensions in Educational Organizations	$\bar{X}$	ss
Input Management	3,8013	,819
Innovation Strategy	4,3535	,664
Organizational Culture and Structure	4.5638	,621
Project management	4,5150	,538
Total	4,3823	,490

According to Table 6, it is seen that the scores on the Perceptions of Innovation Management in Educational Organizations of the private school administrators participating in the research are very sufficient at the total scale level (X:4.38).

Table 7. Independent Sample t-Test Results of School Administrators' Technology Leadership Efficacy Perceptions Scale Scores According to Gender Variable

Sub-Dimensions	Gender	N	$\bar{X}$	ss	sd	t	p
Visionary Leadership	Male	63	3,915	,877	147	-,653	,515
	Female	86	4,011	,898			
Digital Age Learning	Male	63	4,047	,811	147	,191	,849
Culture	Female	86	4,020	,864			
In Professional Practice	Male	63	4,095	,813	147	-,770	,443
Excellence	Female	86	4,194	,753			
Systematic Development	Male	63	4,012	,863	147	,106	,915
	Female	86	3,997	,841			
Digital Citizenship	Male	63	4,134	,770	147	,729	,467
	Female	86	4,037	,825			
Total	Male		4,046	,754	147	-,035	,972
	Female		4,050	,736			

p<0.05

As can be seen in Table 7, as a result of the Independent Sample t-Test of Technology Leadership Efficacy Perceptions scale scores according to the gender variable, No significant difference was found in the scores of the participants' "visionary leadership" [t(147)=-,653; p>0.05], "digital age learning culture" [t(147)=,191; p>0.05], "excellence in professional practice" [t(147)=-,770; p>0.05], "systematic development" [t(147)=,106; p>0.05], "digital citizenship" [t(147)=,729; p>0.05] and "total" [t(147)=-,035; p>0.05].

Table 8. Independent Sample t-Test Results of School Administrators' Technology Leadership Efficacy Perceptions Scale Scores According to Job Title Variable

Sub-Dimensions	Title	N	X̄	ss	sd	t	p
Visionary Leadership	Principal	96	3,916	,907			
					147	-1,004	,317
	Assistant Principal	53	4,069	,850			
Digital Age	Principal	96	3,952	,884			
					147	-1,575	,117
Learning Culture	Assistant Principal	53	4,177	,737			
Excellence in	Principal	96	4,104	,776			
					147	-1,024	,308
Professional Practice	Assistant Principal	53	4,240	,781			
	Title	**N**	**X**	**ss**	**sd**	**t**	**p**
Systematic Development	Principal	96	3,995	,877	147	-,158	,875
	Assistant Principal	53	4,018	,799			
Digital Citizenship Principal	96	4,010	,827	147	-1,407	,162	
	Assistant Principal	53	4,202	,745			
	Principal	96	3,997	,760	147	-1,133	,259
Total	Assistant Principal	53	4,141	,703			

p<0.05

As seen in Table 8, as a result of the Independent Sample t-Test, according to the job title variable of the Technology Leadership Efficacy Perceptions scale scores, no significant difference was found (p>0.05). in the participants' "visionary leadership" [t(147) =-1.004; p>0.05], in "digital age learning culture" [t(147)=-1.575; p>0.05], in "excellence in professional practice" [t(147)= -1,024; p>0.05], in "systematic improvement" [t(147)= - ,158; p> 0.05], in "digital citizenship" [t(147)= -1.407; p>0.05] and in "total" [t(147)= -1,133; p>0.05] scores.

Table 9. Independent Sample t-Test Results of School Administrators' Technology Leadership Efficacy Perceptions Scale Scores According to the Variable of Educational Status

Sub-Dimensions	Education Status	N	X̄	ss	sd	t	p
Visionary Leadership	Bachelor's Degree	111	3,900	,950			
					147	-1,999	**,048***
	Master's Degree	38	4,175	,637			
Digital Age Learning	Bachelor's Degree	111	3,983	,897			
Culture					147	-1,426	,157
	Master's Degree	38	4,173	,631			
In Professional Practice	Bachelor's Degree	111	4,105	,810			
Excellence					147	-1,257	,211
	Master's Degree	38	4,289	,666			
Systematic Development	Bachelor's Degree	111	4,000	,834			
					147	-,099	,921
	Master's Degree	38	4,015	,897			
Digital Citizenship	Bachelor's Degree	111	4,049	,800			
					147	-,762	,448
	Master's Degree	38	4,164	,810			
Total	Bachelor's Degree	111	4,011	,771			
					147	-,1,041	,299
	Master's Degree	38	4,156	,641			

***p<0.05**

As seen in Table 9, as a result of the Independent Sample t-Test, according to the educational status variable of the Technology Leadership Efficacy Perceptions scale scores, the participants' "visionary leadership"

[t(96,028)=-1,999; p=0.048<0.05], the difference between the arithmetic means of the groups was significant (p<0.05). As seen in Table 5, in the "visionary leadership" sub-dimension, the mean score of the participants who did master's degree (X=4.175) is higher than the mean score (X=3.900) of the participants who got a bachelor's degree. As seen in Table 5, as a result of the Independent Sample t-Test according to the educational status variable of the Technology Leadership Efficacy Perceptions scale scores, no significant difference was found in the scores of the participants' "digital age learning culture" [t(91,292)=-1,426; p>0.05], "excellence in professional practice" [t(147)=-1.257; p>0.05], "systematic improvement" [t(147)=-,099; p>0.05], "digital citizenship" [t(147)=-,762; p>0.05] and in "total" [t(147)= -1.041; p>0.05] (p>0.05).

Table 10. Independent Sample t-Test Results of School Administrators' Technology Leadership Competence Perceptions Scale Scores According to Branch Variable

Sub-Dimensions	Branch	*N*	$\bar{X}$	*ss*	*sd*	*t*	*p*
Visionary Leadership	Pre-School/Class Teacher	34	3,803 ,991	147	-1,251	,213	
	Branch Teacher	115	4,020 ,853				
Digital Age Learning	Pre-School/Class Teacher	34	3,876 ,969	147	-1,233	,220	
Culture	Branch Teacher	115	4,078 ,796				
In Professional Practice	Pre-School/Class Teacher	34	4,044,824	147	-,925	,356	
Excellence	Branch Teacher	115	4,184,765				
Systematic	Pre-School/Class Teacher	34	3,770,942	147	-1,842	,068	
Development	Branch Teacher	115	4,073,809				
Digital Citizenship	Pre-School/Class Teacher	34	3,823,880	147	-2,139	**,034***	
	Branch Teacher	115	4,154,764				
Total	Pre-School/Class Teacher	34	3,862,831	147	-1,674	,096	
	Branch Teacher	115	4,103,707				

***p<0.05**

As seen in Table 10, as a result of the Independent Sample t-Test of Technology Leadership Efficacy Perceptions scale scores according to the branch variable, the difference between the arithmetic mean scores of the groups was significant in the participants' "digital citizenship" [t (147)=-2,139; p=0.034<0.05], (p<0.05). As seen in Table 6, in the "digital citizenship" sub-dimension, the mean score of the branch teachers participating in the research (X =4.154) is higher than the mean score of preschool/classroom teachers (X =3.823). As seen in Table 6, as a result of the Independent Sample t-Test of Technology Leadership Efficacy Perceptions scale scores according to the branch variable, no significant difference was found in the scores of the participants' "visionary leadership" [t(147)=-1.251; p>0.05], "digital age learning culture" [t(147)=-1,233; p>0.05], "excellence in professional practice" [t (147)=,925; p>0.05], "systematic development" [t(147)=-1,842 ; p>0.05] and "total" score. [t (147)=-1,674; p>0.05], (p>0.05).

Table 11. One-Way Analysis of Variance (ANOVA) and Welch Test Results, regarding the School Type Variable, of School Administrators' Technology Leadership Competence Perceptions Scale Scores

Sub-Dimensions	School Type	*N*	$\bar{X}$	ss	Levene Test	Test Type	F	p	Significant Difference
Visionary Leadership	Pre-Sch./Prim. Sch.	63	3,740	,964	,048	Welch	-	**,032***	1-3
	Middle School	37	4,117	,712					
	High School	49	4,156	,852					
	Total	149	3,970	,887					
Digital Age Learning Culture	Pre-Sch./Prim. Sch.	63	3,854	,962	,030	Welch	-	**,004***	1-3
	Middle School	37	3,940	,713					2-3
	High School	49	4,330	,676					
	Total	149	4,032	,839					

Excellence in Professional Practice	Pre-Sch./Prim. Sch.	63	4,023	,830	,905	ANOVA	2,584	**,079**	yok
	Middle School	37	4,108	,793					
	High School	49	4,352	,665					
	Total	149	4,152	,778					
Systematic Development	Pre-Sch./Prim. Sch.	63	3,831	,896	,330	ANOVA	4,468	**,013***	1-3
	Middle School	37	3,918	,862					
	High School	49	4,289	,703					
	Total	149	4,004	,848					
Digital Citizenship	Pre-Sch./Prim. Sch.	63	3,900	,844	,767	ANOVA	3,469	**,034***	1-3
	Middle School	37	4,094	,710					
	High School	49	4,295	,770					
	Total	149	4,078	,801					

***p<0.05**

As seen in Table 11, "visionary leadership" p value was found as p =,048<0.05 and "digital age learning culture" p value was found as p=, 0.30 <0.05 as a result of Levene test. Accordingly, the equality of variance of the "visionary leadership" and "digital age learning culture" groups was not accepted. Welch and Brow - Forsythe tests can be applied alternatively in cases where group variances are not equal. Between the two tests, the Welch test is more powerful and used more frequently (Durmuş at all., 2013: 133).

As seen in Table 11, according to the school type variable of the "visionary leadership" and "digital age learning culture" mean scores, as a result of the Welch test, the difference between the group means of the participants' "visionary leadership" (p=0.032<0.05) and "digital age learning culture" (p=0.004<0.05) 0.05) were found statistically significant.

As a result of the Welch test, the Games–Howell test was used to determine the difference between groups. This test was preferred because the group variances were not homogeneous (İslamoğlu & Alnıaçık, 2013: 313).

As a result of the Welch test, the Games–Howell test was used to determine which groups had these differences. In Table 11, no statistically significant difference was found between the group means in the sub-dimension of "excellence in professional practice" (F=2.584; p=0.079>0.05) (p>0.05). As a result of (ANOVA) one-way analysis of variance which was done to determine whether the mean scores of the participants “systematic development” (F=4.468; p=0.013<0.05) and “digital citizenship” (F=3.469; p=0.034<0.05) differ significantly according to the school type variable, the difference between group means was found statistically significant. Complementary post-hoc analysis techniques were used to determine which groups caused the significant difference determined after ANOVA. In case the variances were homogeneous, the widely used Scheffe multiple comparison technique was preferred. Games – Howell and Scheffe multiple comparison analysis results are presented in Table 12 below.

Table 12. Post-Hoc Games-Howell and Scheffe Test Results Regarding the School Type Variable of Technology Leadership Competence Perceptions Scale Scores

Scheffe Test			**Mean**	**sh**	**p**	**%95 Conf.**	**Interval**
Dependent Variable	**(I) School Type**	**(J) School Type**	**Diff. (I-J)**			**Sublimit**	**Uplimit**
Systematic Development	Pre/Primary School	Middle School	-,08717	,17167	,879	-,5117	,3374
		High School	**-,45805**	**,15787**	**,017***	-,8485	-,0376
	Middle School	Pre/Primary School	,08717	,171167	,879	-,3374	,5117
		High School	-,37088	,18052	,125	-,8173	,0756
	High School	Pre/Primary School	**,45805**	**,15787**	**,017***	,0676	,8485
		Middle School	,37088	,18052	,126	-,0756	,8173
Digital Citizenship	Pre/Primary School	Middle School	-,19380	,16336	,496	-,5978	,2102
		High School	**-,39512**	**,15023**	**,034***	-,7667	-,0236
	Middle School	Pre/Primary School	-,19380	,16336	,496	-,2102	,5978
		High School	-,20132	,17178	,505	-,6261	,2235
	High School	Pre/Primary School	**-,39512**	**,15023**	**,034***	,0236	,7667
		Middle School	,20132	,17178	,505	-,2235	,6261
Games-Howell Test			**Mean**	**sh**	**p**	**%95 Conf.**	**Interval**
Dependent Variable	**(I) School Type**	**(J) School Type**	**Diff. (I-J)**			**Sublimit**	**Uplimit**
Visionary Leadership	Pre/Primary School	Middle School	-,37638	,16875	,071	-,7783	,0256
		High School	**-,41572**	**,17206**	**,045***	-,8246	-,0068
	Middle School	Pre/Primary School	,37638	,16875	,071	-,0256	,7783
		High School	-,03935	,16900	,971	-,4426	,3640
	High School	Pre/Primary School	**,41572**	**,17206**	**,045***	,0068	,8246
		Middle School	,03935	,16900	,971	-,3640	,4426
Digital Age Learning Culture	Pre/Primary School	Middle School	-,08657	,16869	,865	-,4884	,3152
		High School	**-,47664**	**,15508**	**,007***	-,8451	-,1082
	Middle School	Pre/Primary School	-,08657	,16869	,865	-,3152	,4884
		High School	**-,39007**	**,15193**	**,032***	-,7533	,0268
	High School	Pre/Primary School	**,47664**	**,15508**	**,007***	,1082	,8451
		Middle School	**,39007**	**,15193**	**,032***	,0268	,7533

***p<0.05**

In Table 12, as a result of the post-hoc Games–Howell test performed after the Welch test to determine between which subgroups the “visionary leadership” mean scores differ according to the school type variable, it was found a statistical difference between the Preschool/Primary School group and the High School group in favor of the high school group. (p=0.045; p<0.05). There was no statistically significant difference between the other school type groups (p>0.05).

In Table 12, a statistically significant difference was found between the Preschool/Primary School group and the High School group (p=0.007; p<0.05) and between the Secondary School and High School group (p=0.032; p<0.05) in favor of the High School group as a result of the post-hoc Games-Howell test after the Welch test, which was conducted to determine between which subgroups the "digital age learning culture" mean scores differed according to the school type variable. There was no statistically significant difference between the other school type groups. (p>0.05).

In Table 12, a statistically significant (p=0.017; p<0.05) difference was found between the Preschool/Primary School group and the High School group in favor of the High School group as a result of the post-hoc Scheffe test after one-way analysis of variance (ANOVA), which was conducted to determine between which subgroups

the "systematic development" mean scores differed according to the school type variable. There was no statistically significant difference between the other school type groups (p>0.05).

As seen in Table 12, a statistically significant (p=0.034; p<0.05) difference was found between the Preschool/Primary School group and the High School group in favor of the High School group as a result of post-hoc Scheffe test after one-way analysis of variance (ANOVA), which was conducted to determine between which subgroups the “digital citizenship” mean score differed according to the school type variable. There was no statistically significant difference between the other school type groups (p>0.05)

Table 13. Independent Sample t-Test Results Related to the Variable of School Administrators’ Technology Leadership Competence Perceptions Scale Scores and Receiving In-Service Training in Information Technologies

Sub-Dimensions	Education Status	*N*	$\bar{X}$	*ss*	*sd*	*t*	*p*	
Visionary Leadership	Yes	44	4,098	,805	147	1,137	,258	
	No	105	3,917	,918				
Digital Age Learning	Yes	44	4,240	,615	116,773	2,311	**,023***	
Culture	No	105	3,944	,906				
In Professional Practice	Yes	44	4,306	,662	147	1,572	,118	
Excellence	No	105	4,088	,816				
Systematic Development	Yes	44	4,272	,680	147	2,550	**,012***	
	No	105	3,891	,887				
Digital Citizenship	Yes	44	4,318	,663	147	2,396	**,018***	
	No	105	3,978	,835				
Total	Yes	44	4,255	,573	147	2,334	**,027***	
	No	105	3,961	,787				

***p<0.05**

As seen in Table 13, as a result of the Independent Sample t-Test, according to the variable of having received in-service training in the field of information technologies, the scores of the Technology Leadership Efficacy Perceptions scale, the difference between the arithmetic means of the groups was significant (p<0.05) in participants' “digital age learning culture” [t (116,773)=2,311 ; p=0.023<0.05], “systematic improvement” [t(147)=,550; p=0.012<0.05], “digital citizenship” [t(147)=2.396; p=0.018<0.05] and “total” score [t(147)=2.234; p=0.027<0.05].

As seen in Table 13, In the "digital age learning culture" sub-dimension, the mean score of the participants who received in-service training in the field of information technologies (X=4.240) is higher than the average score of the participants who did not receive in-service training (X=3.944); in the "systematic development" sub-dimension, the mean score of the participants who received in-service training (X=4.272) is higher than the average score of the participants who did not receive in-service training (X=3.891); in the "digital citizenship" sub-dimension, the mean score of the participants who received in-service training (X=4.318) is higher than the mean score of the participants who did not receive in-service training (X=3.978) , and the mean score of the participants who received in-service training in the "total" points (X=4.255) is higher than the mean score of the participants who did not receive in-service training (X=3.961). As seen in Table 8, according to the variable of having received in-service training in the field of information technologies, the scores of the Technology Leadership Efficacy Perceptions scale were determined as "visionary leadership" [t(147)=1.137; p>0.05] and

"excellence in professional practice" [t (147)=1.572; p>0.05], no significant difference was found between the arithmetic mean of the groups (p>0.05).

Table 14. Independent Sample t-Test Results of School Administrators' Innovation Management Scale Scores in Educational Organizations According to the Variable of Educational Status

Sub-Dimensions	Education Status	N	$\bar{X}$	ss	sd	t	p
Input Management	Bachelor's	111	3,776	,820			
	Degree				147	-,629	,530
	Master's 38	3,873	,824				
	Degree						
Innovation Strategy	Bachelor's	111	4,316	,680			
	Degree				147	-1,151	,252
	Master's 38	4,460	,614				
	Degree						
Organizational Culture	Bachelor's	111	4,528	,634			
And Structure	Degree				147	-1,185	,238
	Master's	38	4,666	,577			
	Degree						
Project Management	Bachelor's	111	4,514	,558			
	Degree				147	-,011	,992
	Master's	38	4,515	,480			
	Degree						
Total	Bachelor's	111	4,364	,507			
	Degree				147	-,741	,460
	Master's 38	4,433	,441				
	Degree						

***p<0.05**

As can be seen in Table 14, as a result of the Independent Sample t-Test, the scores of the School Administrators' Innovation Management in Educational Organizations scale according to the variable of educational status, no significant difference was found the in the scores of "input management" of the participants [t(147)=-,629; p>0.05], "innovation strategy" [t(147)=-1,151; p>0.05], "organizational culture and structure" [t(147)=-1,185; p>0.05], "project management" [t(147)=-.011; p>0.05] and "total" [t(147)=- .741; p>0.05] (p>0.05).

Table 15. Independent Sample t-Test Results of School Administrators' Innovation Management Scale Scores in Educational Organizations by Branch Variable

Sub-Dimensions	Branch	N	$\bar{X}$	ss	sd	t	p
Input Management	Pre-School/Class Teacher	34	3,635	,930	47,596	-1,226	,226
	Branch Teacher	115	3,850	,781			
Innovation	Pre-School/Class Teacher	34	4,387	,727	147	-336	,737
Management	Branch Teacher	115	4,343	,648			
Organizational Culture	Pre-School/Class Teacher	34	4,485	,796	43,143	-,695	,491
and Structure	Branch Teacher	115	4,587	,561			
Project Management	Pre-School/Class Teacher	34	4,511	,674	44,005	-,034	,973
	Branch Teacher	115	4,515	,494			
Total	Pre-School/Class Teacher	34	4,346	,601	44,800	-,416	,679
	Branch Teacher	115	4,392	,455			

***p<0.05**

As can be seen in Table 15, as a result of the Independent Sample t-Test of School Administrators' Innovation Management in Educational Organizations scale scores according to the branch variable, no significant

difference was found in the scores of the "input management" of the participants [t(47,596)=-1,226; p>0.05], “innovation strategy” [t(147)=,336; p>0.05], “organizational culture and structure” [t(43,143)=-,695; p>0.05], “project management” [t(44,005)=-,034 ; p>0.05] and “total” [t (44,800)=-,416; p>0.05] scores, (p>0.05).

Table 16. Independent Sample t-Test Results of School Administrators’ Innovation Management Scale Scores in Educational Organizations according to Job Title Variable

Sub-Dimensions	Title	*N*	$\bar{X}$	*ss*	*sd*	*t*	*p*
Input Management	Principal	96	3,756	,797			
					147	-,903	,368
	Assistant Principal	53	3,883	,860			
Innovation	Principal	96	4,335	,702			
Management					147	-,453	,651
	Assistant Principal	53	4,386	,596			
Organizational Culture	Principal	96	4,583	,61			
and Structure					147	,516	,606
	Assistant Principal	53	4,528	,629			
Project Management	Principal	96	4,469	,586			
					135,143	1,521	,131
	Assistant Principal	53	4,597	,431			
Total	Principal	96	4,354	,508			
					147	-,942	,348
	Assistant Principal	53	4,433	,457			

***p<0.05**

As can be seen in Table 16, as a result of the Independent Sample t-Test, the scores of the School Administrators' Innovation Management in Educational Organizations scale according to the job title variable, no significant difference was found in the scores of the "input management" of the participants [t (147)=-,903; p>0.05], “innovation strategy” [t(147)=-.453; p>0.05], “organizational culture and structure” [t(147)=,516; p>0.05], “project management” [t(135,143)=-1,521; p>0.05] and “total” [t(147)=- .942; p>0.05], (p>0.0 5).

Table 17. Independent Sample t-Test Results of School Administrators’ Innovation Management Scale Scores in Educational Organizations by Gender Variable

Sub-Dimensions	Gender	*N*	$\bar{X}$	*ss*	*sd*	*t*	*p*
Input Management	Male	63	3,720	,824			
					147	-1,029	,305
	Female	86	3,860	,816			
Innovation	Male	63	4,201	,670			
Management					147	-2,434	**,016***
	Female	86	4,465	,642			
Organizational Culture	Male	63	4,449	,642			
and Structure					147	-1,936	,055
	Female	86	4,647	,594			
Project Management	Male	63	4,425	,586			
					147	-1,751	,082
	Female	86	4,580	,493			
Total	Male	63	4,277	,501			
					147	-2,256	**,026***
	Female	86	4,458	,471			

***p<0.05**

As seen in Table 17, as a result of the Independent Sample t-Test, the scores of the School Administrators' Innovation Management Scale in Educational Organizations according to the gender variable, a statistically

significant difference was found in the scores of the "innovation strategy" of the participants [t(147)=-2,434; p=0.0 16<0.05] and "total" [t(147)=- 2.256; p=0.026<0.05], (p< 0.05).

In the "innovation strategy" sub-dimension, the mean score of female participants is higher than (X=4.465), the mean score of male administrators (X=4.201), and in "total" the mean score of female administrators (X=4.458), is higher the mean score of male administrators (X= 4,277).

As can be seen in Table 17, as a result of the Independent Sample t-Test, the scores of the School Administrators' Innovation Management scale in Educational Organizations according to the gender variable, no significant difference was found in "input management" [t(147)=-1,029; p>0.05], "organizational culture and structure" [t(147)=-1,936; p>0.05] and "project management" [t(147)=-1,751; p>0.05], scores of the participants (p>0.05).

Table 18. One-Way Analysis of Variance (ANOVA) and Welch Test Results Regarding School Type Variable of School Administrators' Innovation Management Scale Scores in Educational Organizations

Sub Dimensions	**School Type**	**N**	**$\bar{X}$**	**ss**	**Levene Test**	**Test Type**	**F**	**p**	**Significant Difference**
Input Management	Pre/Primary School	63	3,657	,901					
	Middle School	37	3,832	,645	0,58	ANOVA	1,983	,141	No
	High School	49	3,963	,808					
	Total	149	3,801	,819					
	School Type	**N**	**X**	**ss**	**Levene Test**	**Test Type**	**F**	**p**	**Significant Difference**
Innovation Strategy	Pre/Primary School	63	4,304	,727					
	Middle School	37	4,270	,581	,173	ANOVA	1,350	,262	No
	High School	49	4,479	,633					
	Total	149	4,353	,664					
	School Type	**N**	**X**	**ss**	**Levene Test**	**Test Type**	**F**	**p**	**Significant Difference**
Organizational Culture and Structure	Pre/Primary School	63	4,505	,683					
	Middle School	37	4,455	,666	**,004**	Welch	-	**,049***	No
	High School	49	4,721	,461					
	Total	149	4,563	,621					
	School Type	**N**	**X**	**ss**	**Levene Test**	**Test Type**	**F**	**p**	**Significant Difference**
Project Management	Pre/Primary School	63	4,561	,593					
	Middle School	37	4,326	,539	**,044**	Welch	-	**,41***	2-3
	High School	49	4,597	,427					
	Total	149	4,515	,538					

***p<0.05**

No statistically significant difference was found between the mean scores of the groups as a result of the one-way analysis of variance (ANOVA), which was performed to determine whether the mean scores of the participants in the "input management" (F=1.983; p=0.141>0.05) and "innovation strategy" (F=1.350; p=0.262>0.05) in Table 18 show a significant difference according to the school type variable (p>0.05).

As seen in Table 13, as a result of Levene test, p value of "organizational culture and structure" has been found as p=,004<0.05 and p value of "project management" has been found as p=.044<0.05. Accordingly, the equality of variance of "organizational culture and structure" and "project management" groups was not accepted.

In Table 18, in the results of the "organizational culture and structure" and "project management" mean scores of the Welch test, according to the school type variable, show that the difference between "organizational culture and structure" (p=0.049<0.05) and "project management" (p=0.041<0.05) group means was statistically significant.

As seen in Table 18, since the p value of "input management" is p=,058>0.05 and the p value of "innovation strategy" is p=,173>0.05, the equality of variance of the groups was accepted as a result of Levene's test and a prerequisite is provided for One-Way Analysis of Variance.

Complementary post-hoc analysis techniques were used to determine which groups caused the significant difference determined after the Welch test. In case the variances were not homogeneous, the Games – Howell multiple comparison technique was preferred and presented in Table 19 below.

Table 19. Post-Hoc Games-Howell Test Results Regarding the School Type Variable of Organizational Culture and Structure and Project Management Scores

Games-Howell Test							
Dependent Variable	**(I) School Type**	**(J) School Type**	**Mean Diff. (I-J)**	**sh**	**p**	**%95 Conf. Interval Sublimit**	**Uplimit**
Organizational Culture and Structure	Pre/Primary School	Middle School	,05034	,13936	,931	-,2827	,3834
		High School	-,21580	,10583	,120	-,4737	,0421
	Middle School	Pre/Primary School	-,05034	,13936	,931	-,3834	,2827
		High School	-,26613	,12788	,102	-,5733	,0411
	High School	Pre/Primary School	,21580	,10853	,120	-,0421	,4737
		Middle School	,26613	,12788	,102	-,0421	,5733
Project Management	Pre/Primary School	Middle School	,23578	,11599	,111	-,0411	,5127
		High School	-,03537	,09654	,929	-,2647	,1940
	Middle School	Pre/Primary School	-,23578	,11599	,111	-,5127	,0411
		High School	**-,27115**	**,10775**	**,037***	-,5294	-,0129
	High School	Pre/Primary School	,03537	,09654	,929	-,1940	,2647
		Middle School	**,27115**	**,10775**	**,037***	,0129	,5294

***p<0.05**

In Table 19, as a result of the post-hoc Games – Howell test after the Welch test, which was conducted to determine between which subgroups the "project management" score means differ according to the school type variable, a statistically significant (p=0.037; p<0.05) difference was found between the secondary school group and the high school group in favour of the high school group. There was no statistically significant difference between the other school type groups (p>0.05). In Table 19, there was no statistically significant difference as a result of the post-hoc Games-Howell test after the Welch test, which was conducted to

determine between which subgroups the average score of "organizational culture and structure" differed according to the school type variable.

Table 20. Independent Sample t-Test Results on the Variable of School Administrators' Innovation Management Scale Scores in Educational Organizations and Receiving In-Service Training in the Field of Information Technologies

Sub-Dimensions	Education Status	*N*	$\bar{X}$	*ss*	*sd*	*t*	*p*
Input Management	Yes	44	4,004	,678			
					101,497	2,178	**,032***
	No	105	3,716	,861			
Innovation	Yes	44	4,477	,660			
					147	1,477	,142
Management	No	105	4,301	,663			
Organizational Culture	Yes	44	4,590	,595			
and Structure					147	,344	,731
	No	105	4,552	,633			
Project Management	Yes	44	4,454	,524			
					147	-,887	,377
	No	105	4,540	,544			
Total	Yes	44	4,414	,517			
					147	-509	,611
	No	105	4,369	,481			

***p<0.05**

As seen in Table 20, according to the variable of the School Administrators' Innovation Management in Educational Organizations scale scores and the status of receiving in-service training in the field of information technologies, as a result of the Independent Sample t-Test, a significant difference was found between the arithmetic means of the groups in the "input management" scores [t(101,497)=2,178; p=0.032<0.05] of the participants (p<0.05).

As seen in Table 20, in the "input management" sub-dimension, the mean score of the participants who received in-service training in the field of information technologies (X = 4.004) is higher than the mean score (X=3.716) of the participants who did not receive in-service training.

As seen in Table 20, no significant difference was found in the scores of "innovation strategy" [t(147)=1,477; p>0.05], "organizational culture and structure" [t(147)=,344; p>0.05], "project management" [t(147)=-,887; p>0.05] and "total"[t(147)=,509 ; p>0.05]according to the variable of the participants' in-service training in the field of information technologies. (p>0.05).

Table 21. Correlation between Technology Leadership Strategies of School Administrators' and Perceptions of Innovation Management Competence

		Innovation Management Competencies	Technology Leadership Strategies	Visionary Leadership	Digital Age Learning Culture	Excellence in Professional Practice	Systematic Development	Digital Citizenship
Innovation	r							
Management	P							
Competencies	N	149						
Technology	r	,444						
Leadership	P	,000						
Strategies	N	149	132					

Visionary Leadership	r	,444	,833					
	P	,000	,000					
	N	149	149	149				
Digital Age Learning Culture	r	,427	,916	,771				
	P	,000	,000	,000				
	N	149	149	149	149			
Excellence in Professional Practice	r	,399	,892	,702	,776			
	P	,000	,000	,000	,000			
	N	149	149	149	149	149		
Systematic Development	r	,395	,910	,664	,735	,778		
	P	,000	,000	,000	,000	,000		
	N	149	149	149	149	149	149	
Digital Citizenship	r	,369	,895	,643	,771	,731	,824	
	P	,000	,000	,000	,000	,000	,000	
	N	149	149	149	149	149	149	149

*(The correlation was calculated as low between 0-0.29, medium between 0.30-0.69 and high above 0.70.) As seen in Table 21, a positive and moderate correlation was found between the technology leadership competency perceptions of educational institution administrators and their innovation management competencies.

As can be seen in Table 21, according to the findings obtained as a result of the correlation analysis performed, it was observed that there is a certain relationship between each sub-dimension that constitutes the technology leadership of school administrators and innovation management perceptions. Accordingly, first of all, it is seen that there is a positive and moderate relationship between technology leadership strategies and input management (r=0.439; p<.01), innovation strategy (r=0.427; p<.01) and organizational culture and structure (r=0.380; p<.01) sub-dimensions. However, there is a low level of correlation between the project management (r=0. 254; p<.01) sub-dimension and technology leadership.

Table 22. The Relationship between School Administrators' Perceptions of Innovation Management Competence and Technology Leadership Competencies

		Innovation Management Competencies	Technology Leadership Strategies	Visionary Leadership	Digital Age Learning Culture	Excellence in Professional Practice	Systematic Development	Digital Citizenship
Innovation Management Competencies	r							
	P							
	N	149						
Technology Leadership Strategies	r	,444						
	P	,000						
	N	149	132					
Visionary Leadership	r	,379	,833					
	P	,000	,000					
	N	149	149	149				
Digital Age Learning Culture	r	,427	,916	,771				
	P	,000	,000	,000				
	N	149	149	149	149			
Excellence in Professional Practice	r	,399	,892	,702	,776			
	P	,000	,000	,000	,000			
	N	149	149	149	149	149		
Systematic Development	r	,395	,910	,664	,735	,778		
	P	,000	,000	,000	,000	,000		
	N	149	149	149	149	149	149	
Digital Citizenship	r	,369	,895	,643	,771	,731	,824	
	P	,000	,000	,000	,000	,000	,000	
	N	149	149	149	149	149	149	149

As seen in Table 22, a positive and moderate correlation was found between the innovation management competencies of educational institution administrators and their technology leadership competency perceptions. In this context, it was concluded that there is a significant relationship between the innovation management competencies of school administrators and technology leadership competencies in total and all sub-dimensions.

As seen in Table 22, according to the findings obtained as a result of the correlation analysis performed, it was observed that there is a certain relationship between the innovation management perceptions of school administrators and each sub-dimension constituting their technology leadership competencies. Accordingly, it is seen that there is a positive and moderate relationship between innovation management and digital age learning culture (r=0.427; p<.01), excellence in professional practice (r=0.399; p<.01), systematic development (r=0.395; p<.01), visionary leadership (r=0.379; p<.01) and digital citizenship (r=0.369; p<.01) sub-dimensions.

In the content analysis made after the research, data were written down, 5 main themes were determined in line with the sub-problems of the study. These themes are;

THEME 1. The Importance of Educational Technologies in Educational Processes

SUB-PROBLEM	THEME	CODE
1. What are the opinions of school administrators on "the use of educational technologies in educational processes"?	**Theme 1.** The Importance of Educational Technologies in Educational Processes	• Educational Technologies • Information Technologies • Information Management • Change • Innovation • Education • Teaching • Distance Education • Distance Teaching

According to the opinions of all school administrators participating in this study (f=20/20), "Using educational technologies in education and training processes" is very important.

"In the 21st century we live in, *technology is developing rapidly. We, as school administrators and teachers, must be open to innovations in order to access information quickly and keep up with this change, because our students use the technologies of this age very well.* In order to increase the motivation of our students, we should be able to use educational technologies appropriately, timely and effectively. *Especially in the distance education process, the use of educational technologies outside the school environment has provided great convenience in terms of increasing the quality of education.* In this context, we use a "mobile application" developed by our own institution for student, parent and school cooperation. In addition, I think that it is very important to create a secure common platform, such as the Education Information Network (EBA), where all activities can be shared and tracked" (Interview with School Principal 3, February 10, 2021).

In this context, a school vice principal expressed his/her opinion as follows:

> *"I think we have saved a lot of time thanks to our online meetings with both administrators and teachers. Because we can join the meeting from wherever we want. Thus, we are not affected by factors such as being late for meetings due to traffic problems or experiencing stress" (Interview with Assistant Principal of School 2 February 2, 2021).*

THEME 2. Determining What Needs to Be Done for the Correct Management of Educational Technologies

SUB-PROBLEM	THEME	CODE
2. What are the opinions of school administrators on "the correct management of educational technologies"?	**Theme 2.** Determining What Needs to Be Done for the Correct Management of Educational Technologies	• School, Student and Parent Cooperation • Seminar • Information • Cooperation with universities • Educational Technologies • Information Management

According to the opinions of all school administrators participating in this study (f=20/20), It is emphasized that teachers, students, parents and administrators should act together at the point of determining what needs to be done for the correct management of educational technologies. In this context, a school principal expressed his/her opinion as follows:

> *I think it would be beneficial to organize regular seminars for all actors in educational institutions for the proper management of educational technologies. In this context, I think that it is necessary to get support from the Guidance and Psychological Counselors at the school and from experts in their fields in cooperation with universities. In addition, I think that it would be beneficial to integrate courses such as Scientific Literacy into the curriculum in order to develop 21st century skills and use educational technologies correctly for our children, who are the future of our country today" (Interview with School Principal 2, February 9, 2021)*

In addition, according to the opinions of the majority of the school administrators participating in this study (f=20/17), it was stated that the intensive use of educational technologies is a matter to be considered in terms of technology addiction and screen addiction.

A school principal emphasized the importance of this situation as follows:

> *"Intensive use of technological tools (computer, tablet, interactive phones, television, etc.) can lead our students to technology addiction and screen addiction. Regarding this, parents often inform us that their children spends too much time with technological tools" (Interview with School Principal 4, 11 February 2021).*

However, two school principals and a assistant principal expressed a different view on the use of educational technologies. In this context, the opinion of a school principal can be summarized as follows:

> *"I do not think that using educational technologies will turn into technology or screen addiction. Actually, I think that not educational technologies, but various games and other applications affect our students more and make them addicted" (Interview with School Principal 1 February 8, 2021).*

THEME 3. Developing Professional Skills of Teachers in Innovation Management

SUB-PROBLEM	THEME	CODE
3. What are the opinions of school administrators on "improving the professional skills of teachers in innovation management"	**Theme 3.** Developing Professional Skills of Teachers in Innovation Management	• In-service training • Online Education • Distance Education • Cooperation with universities • Educational Technologies • Information Management

According to the opinions of all school administrators who participated in this study (f=20/20), it was stated that in-service courses would be beneficial for "Developing Teachers' Professional Skills in Innovation Management". A school principal stated the importance of this situation as follows:

> *"As I think that technology changes and develops very rapidly today, I think that regular and systematic in-service courses will be beneficial. These courses can sometimes be online and sometimes face to face. In this context, these trainings should be given by experts in the field in cooperation with universities. For example, these trainings are given regularly by our institution, first to the administrators and then to the teachers, students and parents, and I think that they are very beneficial (interview with the School Principal 4, February 11, 2021).*

THEME 4. Ensuring Equality of Opportunity and Opportunity for Students in Innovation Management

SUB-PROBLEM	THEME	CODE
4. What are the school administrators' views on the needs of students in innovation management?	**Theme 4.** Ensuring Equality of Opportunity and Opportunity for Students in Innovation Management	• Change • Innovation • Education, equity • Teaching • Distance Education • Distance Teaching • Information

According to the opinions of the majority of the private school administrators who participated in this study (f=20/18) "It was stated that they did not experience any significant difficulties in providing equal opportunities for students in the innovation management process. In this context, a private school principal shared his/her opinion as follows:

> *"The socio-economic situation of the families of our students who come to our private schools is quite good. In this way, our students do not experience any significant difficulties in accessing educational technologies. In fact, many of our parents, like our students, continued their business life by using technological tools and equipment in this process. At this point, I would like to underline that our parents are conscious (interview with School Principal 2, February 9, 2021).*

According to the views of the majority of the public-school principals who expressed their views within the scope of this study (f=5/4), it was stated that "There were some difficulties especially in the beginning period in terms of providing equal opportunities for students in the innovation management process. In this context, a public-school principal expressed his/her opinion as follows:

> *…Parents informed us that some students had difficulties in accessing educational technologies and the internet in the beginning of distance education. Later on, I think that these difficulties have been largely overcome as a result of the studies and support of the Ministry of National Education. In this context, I would like to emphasize that many of our students easily follow and watch their lectures thanks to easy access to EBA television channels and internet website. In*

particular, I think that EBA Support Points, which serve both at schools and with mobile devices, fulfill a very important task for students who cannot access educational technologies. In addition, I would like to point out that these difficulties were tried to be overcome by distributing a large number of tablets to the students. … (Interview with school principal 3 February 24, 2021).

THEME 5. Developing Professional Skills of School Administrators in Innovation Management

SUB-PROBLEM	THEME	CODE
5. What are the opinions of school administrators on the development of professional skills in innovation management?	**Theme 5.** Developing Professional Skills of School Administrators in Innovation Management	• In-service training • Online Education • Distance Education • Cooperation with universities • Educational Technologies • Information Technologies • Information Management

According to the opinions of all school administrators who participated in this study (f=20/20), it was stated that in-service courses would be beneficial for "improving the professional skills of school administrators in innovation management".

A school principal expressed the importance of this situation as follows:

"School administrators have important duties to increase the quality of education. In this context, I would like to express that the practice-oriented courses are beneficial, especially in order to develop the professional skills of school administrators in innovation management. However, these courses should be done regularly and systematically because technology changes extremely quickly. As a school principal, I think that these trainings are very useful in terms of accessing information quickly and information management (Interview with Head of School 6 February 15, 2021).

In addition, according to the opinions of all school administrators who participated in this study (f=20/20), it was stated that it would be beneficial to cooperate with public and private institutions, universities and NGOs in order to "develop the professional skills of school administrators in innovation management". A school principal expressed the importance of this situation as follows:

"Cooperating with universities, public and private institutions and NGOs in order to continuously support the professional development of school administrators would be very beneficial" (Interview with School Principal 7, February 16, 2021).

CONCLUSION and DISCUSSION

1. In the research, it was concluded that private school administrators generally see themselves as sufficient according to the technology leadership scale. In support of the result of this study, when the literature is examined, it is seen that there are studies that support the high technology leadership competencies of school administrators (Banoğlu, 2011; Bülbül & Çuhadar, 2012; Doğan, 2018; Çalık, Çoban, & Özdemir, 2019; Yahşi, 2020). According to a study conducted by Gün & Çoban in 2019, it was concluded that school administrators' self-efficacy perceptions of technological leadership are at a moderate level.

2. In the study, it was concluded that the innovation management competence perceptions of school administrators were very sufficient. Similar to the result obtained in this study, Bülbül (2012b) using the same

measurement tool revealed that school administrators' perceptions of innovation management self-efficacy are very high.

3. It was concluded that, among the sub-dimensions of technology leadership competencies of school administrators, the dimension of excellence in professional practice had the highest score, followed by the dimensions of Digital Citizenship, Digital Age Learning Culture, Systematic Development and finally Visionary Leadership.

When the literature is examined, similar to the results of this study, Bülbül & Çuhadar (2012); Gultekin, 2013; As a result of their study in Çalık, Çoban & Özdemir (2019), it was found that the Digital Citizenship dimension among the sub-dimensions of technology leadership self-efficacy of school administrators had the highest score, followed by the Excellence in Professional practice; It was concluded that the Systematic Development sub-dimension was at the lowest level.

4. It has been determined that Organizational Culture and Structure dimension among the sub-dimensions of innovation management competencies has the highest score, followed by Project Management, Innovation Strategy and finally Input Management.

Similar to the results of this study, in the Organizational Culture and Structure sub-dimension, it was concluded that the Input Management sub-dimension was the most, followed by the Project Management and Innovation Strategy sub-dimension according to the results of the research conducted by Bülbül (2012b), who tried to determine the perceptions of the administrators towards the innovation management scale in schools, and Öztürk (2017), who tried to determine the perceptions of the teachers towards their principals. In addition, according to the results of the study conducted by Esen (2016) to determine the perceptions of teachers towards their principals, it was concluded that there are Project Management sub-dimensions, Innovation Strategy, Organizational Culture and Structure, and lastly Input Management dimensions, respectively. Göl & Bülbül (2012) and Karataş, Gök & Özçetin (2015) in their studies, according to the perceptions of teachers, school administrators perceive the most satisfactory in Innovation Strategy, Organizational Culture and Structure sub-dimension, Project Management sub-dimension and, at the lowest level, Input Management sub-dimension. When the literature is examined, it can be said that school administrators are perceived as competent at the highest level in the Organizational Culture and Structure sub-dimension according to both teacher and administrator perceptions, but less sufficient in the input management sub-dimension. In this context, it can be said that school administrators should work in cooperation with both public and private institutions and organizations to get support from experts in the field of education management by collaborating with universities and should give more importance to meeting the necessary needs for the educational institution, for the change and innovation process to be successful.

5. While there was no significant difference in terms of gender and job title according to the school administrators' technology leadership efficacy perception scale; A significant difference was found according to the variable of education status, branch, school type and in-service training in the field of information technologies.

A significant difference was found in the visionary leadership sub-dimension according to the educational status variable of the technology leadership efficacy perceptions of school administrators. Technology leadership efficacy perceptions of school administrators who have a graduate education status are higher than those who do not have a graduate education status. A significant difference was found in the digital citizenship sub-dimension, according to the branch variable of school administrators' technology leadership efficacy perceptions. Technology leadership efficacy perceptions of school administrators who are branch teachers are higher than those of school administrators who are preschool and classroom teacher. A significant difference was found in the visionary leadership and digital age learning culture sub-dimensions according to the school type variable of school administrators' technology leadership efficacy perceptions. Technology leadership efficacy perceptions of school administrators working in high school are higher than school administrators working in preschool/primary school and secondary school.

A significant difference was found in the total scale score, digital age learning culture, systematic development and digital citizenship sub-dimensions, according to the variable of receiving in-service training in the field of information technologies of the technology leadership competence perceptions of school administrators. The mean score of school administrators who received in-service training in the field of information technologies is higher than those who did not receive in-service training. In this context, it can be said that the skills of school administrators within the scope of integrating Educational Technologies with educational activities have increased with the increase in applications related to the use of technology in education, such as the in-service trainings in the field of Technology Leadership Self-efficacy and the use of Educational Technologies, which they received by the Ministry of National Education within the scope of the FATIH Project.

While there was no significant difference in terms of educational status, branch and job title according to the innovation management efficacy perception scale of school administrators; a significant difference was found according to gender, school type and in-service training in the field of information technologies.

According to the gender variable of the innovation management competence perceptions of school administrators, a significant difference was found in the total scale score and innovation strategy sub-dimension. The innovation management competence perceptions of female school administrators were higher than male school administrators. A significant difference was found in the project management sub-dimension according to the school type variable of the innovation management competence perceptions of school administrators. The innovation management competence perceptions of school administrators working in high schools were higher than those of school administrators working in secondary schools.

A significant difference was found in the input management sub-dimension according to the variable of receiving in-service training in the field of information technologies of the innovation management competence perceptions of school administrators. The mean score of school administrators who received in-service training in the field of information technologies were higher than those who did not receive in-service training.

As a result of the examination of the technology leadership self-efficacy of the school principals according to the variable of receiving education in the field of Information Technologies (T), it was concluded that there is a significant difference in favor of the managers who received in-service training in the field of IT. These results overlap with similar studies in the literature (Demiracan, 2019; Yahşi, 2020).

When the literature is examined, Bülbül & Çuhadar (2012); according to the results of the studies conducted by Gün & Çoban (2019) on the Technological Leadership Self-Efficacy of School Administrators, similar to the results of this study; no significant difference was found in terms of gender, type of institution and educational status variables.

6. In the study, it was concluded that there is a positive and moderate correlation between technology leadership and innovation management competencies according to the perception of private school administrators. It has been determined that there is a certain correlation between private school administrators' perceptions of technology leadership and all sub-dimensions of innovation management competencies. In this context, it has been determined that there is a positive and moderate relationship between technology leadership competencies and the sub-dimensions of input management, innovation strategy, and organizational culture and structure. However, it was concluded that there was a low level of relationship between the project management sub-dimension and technology leadership.
When the literature is examined, similar to the results of this study, Yıldız, Tüysüz & Öztürk (2021) concluded that there was a positive and high correlation between technology leadership and innovation management competencies according to the perception of school administrators in public schools.

7. In the study, it was concluded that there is a positive and moderate correlation between innovation management and technology leadership competencies according to the perception of school administrators. It has been determined that there is a certain correlation between the innovation management perceptions of educational institution administrators and all sub-dimensions of technology leadership competencies. In this context, it has been determined that there is a positive and moderate relationship between innovation management and digital age learning culture, excellence in professional practice, systematic development, visionary leadership and digital citizenship sub-dimensions.
Supporting the result of this study, Demiracan (2019), concluded that there is a positive and moderate relationship between the technology leadership strategies of school administrators and their innovation management efficacy beliefs, according to the results of the study.

The qualitative findings of the study show that school administrators care about the use of educational technologies in the education process, aim to ensure the continuation of the curriculum, increase the motivation of students with content that is appropriate for their level, and support the professional development of teachers and administrators in educational technologies. In the distance education process, it was concluded that some teachers initially showed resistance to change because they had difficulty in using

educational technologies, but their professional skills improved, and they kept up with the change thanks to in-service training.

The qualitative findings of this study are similar to the results of the qualitative study titled Technological Leadership of School Principals in the Covid-19 Process by Turan (2020). Research findings also show that state school administrators provide printed resources to students without internet, provide technological tools, and provide assistance with EBA support points for the use of Education Information Network (EBA) in order to ensure equal opportunity and opportunity for students to access technological resources. According to the opinions of private school administrators, students did not experience any significant problems in accessing technological resources.

When the literature is examined, in parallel with the results of this study, Yıldız & Doğan (2021) concluded that participant teachers' attitudes towards EBA were generally at a positive level, according to the results of the research about investigation of digital transformation applications in education according to teacher attitudes during the pandemia (Covid 19) Process: Example Of EBA. And also, the decisions taken at the National Education Councils and the targets for the appointment and training of administrators in the MEB 2023 Education Vision Document overlap with this research (MEB, 2018a, 2019a & 2019b). In this context, postgraduate education plays an important role in the appointment and training of school administrators in developed countries. Doctoral degrees in management are required for educational administration at the provincial and district level. In addition, training programs for school administrators are mostly practice-oriented and it's quite important for their professionalism (Aypay, 2016: 2).

In terms of personal and professional development of current school administrators, the importance of cooperation between universities and MEB is emphasized. In this context, it is thought that it would be beneficial to implement collaborations through face-to-face or distance/online education in accordance with the content of the education (MEB, 2019a & 2019b).

RECOMMENDATIONS

It is recommended that in-service training activities for the managers of educational institutions as included in the 2023 Education Vision Document prepared by the Ministry of National Education be transformed into accredited certificate programs in cooperation with universities, instead of the participation-based certification practice. In this context, it is thought that it would be beneficial to cooperate between the Ministry of National Education and Universities within the scope of in-service training. In addition, it is recommended to establish face-to-face, formal and/or distance education cooperations with universities and NGOs in order to continuously support the professional development of educational institution administrators as stated in the 2023 Education Vision Document. A training program can be developed to determine the technology leadership self-efficacy of school administrators and to maximize their skills in this field, and technology leadership self-efficacy skills of school administrators can be increased. In order to improve the quality of

education, it is thought that analyzing the technology leadership and innovation management competencies of school administrators not only according to administrators' perceptions, but also in a way that covers all actors in educational institutions will contribute to the literature.

ETHICAL TEXT

In this article, journal writing rules, publishing principles, research and publishing ethics rules, journal ethics rules were followed. The author(s) are responsible for all kinds of violations related to the article. Ethics committee approval of the study was obtained from İstanbul Aydın University Ethics Committee about this study (Decision No. 03.03.2021/2).

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