

Examination of School Principals' Use of Technology and Individual Innovation Behaviors from the Perspectives of Female Teachers

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ABSTRACT

Concepts related to information and communication technologies such as technology use and individual innovation have recently become important concepts to increase educational effectiveness. Therefore, this study aims to examine school principals' use of technology and individual innovative behaviours of female teachers. The qualitative research method and phenomenology design were used in the research. The data were collected through semi-structured interviews, and twenty female teachers working in secondary schools in Ümraniye, Üsküdar, and Ataşehir participated in the study. The data were analysed with content analysis. The main themes resulting from the determined codes are 'technological goals', 'pioneering behaviours', 'non-innovative behaviours', 'creative behaviours', 'traditionalist behaviours', and 'encouraging behaviours'.

Keywords: *Technology, innovation, female teachers, school principals.*

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INTRODUCTION

The main purpose of education is to increase schools' performance, ensure the school's effectiveness, change and development, and create an efficient learning environment. Some of the tools that support this development in recent years are concepts related to information and communication technologies such as technology use and individual innovation. Emiroğlu (2016) stated that with the developments in information and communication technologies (ICT) after the 2000s, especially at primary and secondary schools, touch screen computers with an Internet connection and interactive boards with large touch screens became important technologies used in classrooms. An article in the Ministry of National Education (2014) states that all degrees and types of curriculum and education methods and course materials and equipment are constantly improved according to scientific and technological principles and innovations, environment, and country needs. Therefore, school principals' responsibilities for training teachers on using new tools increase (Brooks-Young, 2002). A school principal who is a technological leader who promotes, develops, and maintains technology; are leaders who have cognitive, psychomotor, and sensory technological qualities (Bektaş, 2014).

According to Kearsley and Lynch (1992), a leader who uses technology to increase students' activities and academic success within the school contributes to students' professional development, decreases the workload of teachers and staff, increases motivation, and prevents burnout. In today's world, where we are

trying to keep up with innovations in many fields, another concept associated with schools' technological concept is innovation. Innovation is qualitatively different (Lunvell, 2010) as it is formed by the cooperation of many stakeholders (Smith and Fund, 2009) open and willing to create new and different ideas (Rogers, 1995). Individual innovativeness is defined as developing, adopting, and applying innovation and responding positively to innovation (Yuan & Woodman, 2010; Kılıçer, 2011).

According to their acceptance of innovation, Rogers (1995) divided individuals into five groups: innovative, pioneers, interrogators, sceptics, and traditionalists. (i) *Innovative individuals* are eager to try new ideas. They are curious, risk-taking, social, technologically literate, educated, and sociable people (Kılıçer, 2011; Özgür, 2013; Rogers, 1995). (ii) *Pioneers* are open to change. They guide society about change, they are role models, they use communication tools effectively, and are social (Kılıçer, 2011; Özgür 2013; Rogers, 1995). (iii) *Interrogators* go through a long period of thinking about new ideas. They are of medium (49-55 years) age and usually have an average education; therefore, the possible benefits and harms of innovation make them cautious about adopting them. (Kılıçer, 2011; Özgür, 2013; Rogers, 1995). (iv) *Sceptics* need help while trying to keep up with innovations. Their average age is high, and their education level is relatively low compared to other groups (Kılıçer, 2011; Özgür 2013; Rogers, 1995). (v) *Traditionalists* are forced to adopt innovations; they have a biased perspective and depend on their habits. Their social communication is limited, so they usually need help with technology (Kılıçer, 2011; Özgür, 2013; Rogers, 1995).

Teachers should not be distant from innovative thinking. It will be beneficial for students to learn and apply innovative educational theories (Xu & Chen, 2010). Çelik (2013) revealed that teachers with higher individual innovation scores motivate and guide students better. It is thought that high levels of innovative thinking are necessary for teachers to keep up with innovations and raise individuals who can produce and develop innovations in the globalising world's competitive environment. School principals are those who will guide, manage, and develop teachers in acquiring these skills. As Turan (2002) stated, in innovative approaches, the school principal has great responsibilities such as pioneering teachers and students in this field, providing incentives and training on the use of field technologies, and ensuring the effective use of these technologies in school management.

Therefore, this study aims to examine school principals' use of technology and individual innovation behaviours from the paradigm circling female teachers. Studies reveal that male and female teachers' attitudes do not differ in technology use (Türel, 2012; Koçak & Gülcü, 2013; Yörük 2013; Barut, 2015; and Çınarer, Yurttakal, Ünal, and Karaman, 2016). Therefore, female teachers' views were discussed to look at the research in a deeper and detailed way. Additionally, according to teachers' opinions working in technical and industrial vocational high schools, school principals' technological leadership skills (Engür, 2014) and the technological leadership behaviours of technical and industrial vocational high school administrators (Gürkan-Beyaz, 2014) were examined. No previous research has been conducted on school principals' technology use and individual innovation behaviours. Therefore, this research also examined managers' and primary school administrators' technological leadership roles (Öztaş, 2013) based on primary and secondary school teachers' opinions working in secondary schools (Sincar, 2009). For this reason, this research is important as it is expected to identify a different perspective on the matter.

RESEARCH METHOD

In this part of the paper, explanations are given on the research model, study group, data collection, and analysis.

Research Model

The qualitative research method was used in this study. Qualitative research aims to provide the reader with a detailed understanding (with sensitivity to human experiences) (Knafl & Howard, 1984). Additionally, the phenomenological research method was used to describe participants' experiences of school principals' technological use and individual innovative behaviours. The phenomenology pattern focuses on phenomena

that we are aware of, but do not have a deep and detailed understanding of, such as events, experiences, perceptions, and situations (Yıldırım & Şimşek, 2013).

Study Group

Criterion sampling, one of the purposeful sampling methods, was also used in this study (Patton, 2005). In the criterion sampling method, "... the basic understanding is to study all situations that meet a predetermined set of criteria. The criterion or criteria mentioned here can be created by the researcher ... " (Yıldırım & Şimşek, 2013). In this direction, attention was paid to those teachers' who had ten years or more seniority. The data were collected through interviews with female teachers working in secondary schools in Istanbul's Anatolian side, Ümraniye, Üsküdar, and Ataşehir in the 2019-2020 academic year. The interview technique helps determine how individuals make sense of and evaluate the events they encounter (Greasley & Ashworth, 2007). Descriptive information for the study group is given in Table 1 below.

Table 1. Demographic characteristics of the participants

	Age	Seniority	Branch
P1	35	12	English teacher
P2	35	12	Social sciences teacher
P3	45	13	Primary ed. Mathematics teacher
P4	37	11	Music Teacher
P5	32	10	English teacher
P6	33	10	English teacher
P7	34	13	English teacher
P8	34	13	English teacher
P9	38	13	Primary ed. Mathematics teacher
P10	36	13	Social sciences teacher
P11	41	16	Turkish teacher
P12	48	23	Visual Arts Teacher
P13	55	30	Primary ed. Mathematics teacher
P14	46	23	Visual Arts Teacher
P15	50	25	Primary ed. mathematics teacher
P16	48	23	Science and technology teacher
P17	52	25	Social sciences teacher
P18	53	29	Social sciences teacher
P19	52	29	Science and technology teacher
P20	45	20	English teacher

As seen in Table 1 above, 9 of the participants are 30 years and over, 7 are forty years and over, and 5 are 50 years old and over. There are 6 English teachers, 4 social studies teachers, 3 science and technology teachers, 4 elementary mathematics teachers, 1 Turkish teacher, 1 visual arts teacher, and 1 music teacher. Additionally, there are 12 teachers with a seniority of 10-19 years and 10 teachers with a seniority of 20 years or more. Since the answers were repeated, the data were thought to have reached saturation; therefore, the number of participants was sufficient. Due to confidentiality, any information reflecting participants identity is not included in the Study. Instead, each participant is given a code between 'P1' and 'P22'.

Collection of Data

A semi-structured interview form was created by scanning studies on the concepts of technology use in education, technological leadership, and individual innovation and by taking expert opinions. Care was given to ensure that the questions were open-ended. The interviews were conducted online due to the nature of the research subject and the Covid 19 measures. The interviews lasted around 1 hour, and participants expressed more than one opinion in some questions.

Data Analysis

The data collected through interviews were analysed using the content analysis technique. In content analysis, data that are similar to each other are brought together within the framework of certain concepts and themes and organised in a way that the reader can understand (Yıldırım & Şimşek, 2013). Content analysis is a coding process and is done to transform raw data into standard formats (Babbie, 2006). In the research, the raw data obtained from the interviews were repeatedly read, and the codes were obtained. Themes were then identified from codes. Credibility and transferability are very important in qualitative research (Erlandson et al., 1993); therefore, a summary of the participants' statements was made at the end of the interviews and confirmation was obtained regarding its accuracy. Additionally, if the consistency between the codes is more than 80 per cent, it is thought that the study will have high reliability (Miles & Huberman, 2015). Therefore, feedback from two experts was obtained in the data analysis, and the consistency between codes was found to be eighty-five per cent.

FINDINGS

"Do you think your principal is using technology effectively?" The frequency values of the opinions regarding the question are given in Table 2 below.

Table 2. *Frequencies of school principals' use of technology*

Do you think your principal is using technology effectively?	Yes	No
	15	5

"According to you, what are the technological goals of your school principal regarding the school?" The answers the participants gave to the question were collected under the theme of 'technological targets'. Sub-themes related to this theme are presented in Table 3 below.

Table 3. *Sub-themes related to the theme of technological goals*

Main theme	Sub-themes	Participants
Technological targets	Being a role model in using educational technologies	P2 P4 P8 P12 P18 P19 P20
	Purchasing educational technologies	P1 P4 P5 P12 P18 P15 P16
	Creating a school website, setting up a social media page	P7 P17 P9 P10 P14
	Raising individuals who can use information technologies effectively	P6 P12 P13 P11
	I don't think he/she has a target	P1 P3 P7 P5

Some of the participants' responses to "Being a role model in using educational technologies", "Purchasing educational technologies", "Creating a school website, setting up a social media page", "Raising individuals who can use information technologies effectively", and "I don't think he/she has a target" are listed below:

P3: "I don't think he has a technological goal. If he had, he would have done more systematic programmatic studies on this, and he would have included us. There are more general, more classical goals for the school."

P12: "There is even an item related to the effective use of technology and digital literacy of teachers and students among the mission of our school. For example, our manager is very sensitive in this regard; we have a very nice laboratory. Computers are very well maintained and modern. Our manager does not hesitate to spend money on this issue."

P9: "At the request of our school principal, we have our school page in all social media applications; we regularly upload photos and information. We keep our website up to date. Our manager even checks the number of likes."

"What behaviours of your school principal lead you in innovation?" The participants' answers to this question were collected under the theme 'pioneering behaviours'. Sub-themes related to this theme are presented in Table 4 below.

Table 4. Sub-themes related to the theme of pioneering behaviours

Theme	Sub-themes	Participants
Pioneering behaviors	Openness to every view	P2 P8 P9 P16 P17
	Organising projects and activities	P4 P11 P13
	Supporting behaviours	P1 P4 P5 P12 P18
	Good listening	K6 K9
	Take action	P8 P16
	Being aware	P10 P15 P16
	Setting up an environment	P10 P20
	Requesting Innovation	P15
	Not a pioneer	P3 P7 P14 P19

There are 9 sub-categories; "Openness to every view", "Organising projects and activities", "Supporting behaviours", "Good listening", "Take action", "Being aware", "Setting up an environment", "Requesting Innovation", and "Not a Pioneer". Some of the responses given by the participants are listed below:

P4: "Our school principal wants us to be in new plans and projects, organises various projects and events, and supports us to take part in these projects. In meetings, he asks if we have any plans or projects for the school's development."

P10: "Our school principal is very good with technology, and he is very curious. He is aware of technological developments and tells us. It is also related to educational technologies. He also leads us and helps us to use it and prepares the necessary environment. Our school is in a very good place on the district basis in terms of advanced technological equipment."

P16: "Adopts new technologies and approaches related to education and puts them into practice. He is open to new ideas. Two years ago, a friend of ours from school had some innovative ideas for the lab. Taking our opinion at the teachers' board meeting, he found a budget for that idea, and we have a modern designed laboratory."

"How does your school principal behave when closed to the idea of innovations?" The answers of the participants were collected under the theme 'non-innovative behaviours'. Sub-themes related to this theme are presented in Table 5 below.

Table 5. Sub-themes related to the theme of non-innovative behaviours

Theme	Sub-themes	Participants
Non-innovative behaviors	Finds unnecessary	P1 P5
	Behave with traditional approaches	P3 P16
	Does not apply if she/he does not want to	P4 P7 P15
	Not closed to innovations	P6 P8 P11 P12 P13 P14 P17 P18 P19 P20
	He/she rejects	P9 P10

There are 5 categories; "Finds unnecessary", "Behave with traditional approaches", "Does not apply if she/he doesn't want to", "Not closed to innovations", and "He/she rejects". Some of the responses given by the participants are listed below:

P4: "Actually, he is open to innovations, but up to a certain point. If things are too far from what he conceived in his mind, he returns to the way he wants. At that moment, he does not think whether he prevented an innovation or not. It should sit in his head."

P16: "If it does not comply with our cultural and national traditions, he will not implement innovations. He is someone who attaches great importance to values, customs, and traditions. When innovations and traditions clash, he prefers traditions and reflects this to the understanding at school."

P15: "Acts as the only authority in making decisions at school, does not share authority, so when he does not follow a logic of an innovation, he may decide not to implement it."

"What are the topics your school principal is creative?" The answers of participants were collected under the theme 'creative behaviours'. Sub-themes related to this theme are presented in Table 6 below.

Table 6. Sub-themes related to the theme of creative behaviours

Theme	Sub-themes	Participants
Creative behaviours	In artistic and social matters	P4
	Taking action	P5 P17
	About the development of students	P6 P12 P13 P20
	Improving the physical conditions of the school	P7
	Troubleshooting	P9
	School Vision	P10
	Project development	P13 P15
	Student-parent-school communication	P16 P18
	Use of technology	P18

There are 9 categories; "In artistic and social matters", "Taking action", "About the development of students", "Improving the physical conditions of the school", "Troubleshooting", "School Vision", "Project development", "Student-parent-school communication", and "Use of technology". Some of the responses given by the participants are listed below:

P12: "He values the ideas of the students. He involves them in all kinds of events. He tries to make all technological innovations used in education for their development. He encourages and helps us in this direction."

P15: "Behaves very eager to innovate and apply them to the school. His excitement passes on to us, and his eyes shine when a teacher comes up with a good idea."

P18: "Is very creative in technology use and parent-school relations. He plays a constructive role, knows the middle way in school-parent relationships, provides balance, brings creative solutions to problems."

"What are the topics your school principal is a traditionalist on?". The answers of the participants were collected under the theme 'traditionalist behaviours'. Sub-themes related to this theme are presented in Table 7 below.

Table 7. Sub-themes related to the theme of traditionalist behaviours

Theme	Sub-themes	Participants
Traditionalist behaviours	In creating a project	P1
	Not doing different things	P2 P5
	In many subjects	P3 P10 P14 P19
	In Social Relations	P4 P11
	School rules	P6 P7 P9 P13 P15 P17 P20
	Gender roles	P8
	Common values	P11 P16
	Bureaucratic matters	P18

There are 8 categories: “In creating a Project”, “Not doing different things”, “In many subjects”, “Social Relations”, “School rules”, “Gender roles”, “Common values”, and “Bureaucratic matters”. Some of the responses given by the participants are listed below:

P1: *“Everything is in the old order. He did not have an encouraging attitude until now. We cannot go beyond what has been done. It's always the same things.”*

P11: *“Human relations are sensitive to spiritual values. He exhibits this aspect on special days and national holidays. He depends on history and national culture. Therefore, he excludes ideas that contradict his beliefs and values. He avoids applying it.”*

P20: *“Our school principal is a disciplined principal. I find him traditional in this regard. Strictly adheres to school rules. Expects and directs teachers and students to abide by the dress code and general moral norms.”*

"When you find an original and innovative method/invention/project, can you describe the attitude of your school principal?" The responses of the participants were collected under the theme ‘encouraging behaviours’. Sub-themes related to this theme are presented in Table 8 below.

Table 8. *Sub-themes related to the theme of encouraging behaviours*

Theme	Sub-themes	Participants
Encouraging behaviours	Supporter	P1 P5 P6 P10 P11 P12 P16 P17 P20
	He/she Does not care	P2 P3 P13 P19
	Takes action immediately	P4 P6 P7 P9
	Gets enthusiastic	P4 P6 P8
	He/she would be pleased	P6 P11
	He/she applies it if it is reasonable	P14 P15

There are 6 categories; “Supporter”, “He/she Does not care”, “Takes action immediately”, “Gets enthusiastic”, “He/she would be pleased”, and “He/she applies it if it is reasonable”. Some of the responses given by the participants are listed below:

P10: *“He tries to offer opportunities. What can we do? He asks. He listens to the project several times and asks about the places he does not understand. He expresses his own opinion. If it is a project that comes to mind when we meet with teachers, he praises the project among them and motivates them to take an example.”*

P6: *“His eyes get wide open, and we act immediately. He is overly enthusiastic, and his excitement passes on to others. When he does this, it increases our enthusiasm more.”*

P13: *“He stays silent, pretends to think, but doesn't say anything at the end. As soon as the days pass, he says, let's talk when we ask, but that speech does not take place.”*

DISCUSSION, CONCLUSION AND SUGGESTIONS

This study examines school principals' technology use and individual innovativeness through female teachers' eyes, found that school principals are very effective in using technology. There are many studies that parallel this study's results (Ertuğrul, 2014; Afshari et al., 2008; Yu & Prince, 2016; Kurt, 2019). Some studies in the literature reveal that school administrators' technology leadership competencies are moderate (Irmak, 2015; Teke, 2019). On the other hand, Erden and Erden (2007) found that school principals are perceived as ‘less’ adequate by other teachers in the field of technology. The result of the second subject of this study suggests that teachers find school principals innovative. School principals encourage teachers to create and implement projects, although they behave traditionally in matters such as school rules and discipline. Karataş, Gök, and Özçetin (2015) also revealed in their study that teachers find school principals innovative. Çetin and Bülbül (2017) and Başaran and Keleş (2015) stated that individual innovation scores of school administrators are generally at a moderate level. These different results, which were revealed by

studies on both school principals' use of technology and individual innovative behaviours, can be interpreted as being affected by different variables. Therefore, it is necessary to control these variables to ensure that they reach the desired innovative level.

One of the research's important results is that school principals should be role models by using educational technologies. It is in line with Kozloski's (2007) and Bai et al. (2002)'s findings that school principals indicate that they are role models for teachers in using educational technologies. It can be said that school principals are aware that using educational technologies, in general, will improve education. So they try to use these technologies in school management and the teaching-learning processes (Eren & Kurt, 2011). Turan (2002) supports the view that among the school principal's roles, it is necessary to give support and direction to their subordinates to carry out the learning and teaching process effectively. Based on the knowledge that principals who use technology more are more supportive in integrating their schools with technology (Polizzi, 2011), It would be realistic to say that a principal should start using these to achieve the school's technological and innovative goals.

In this study, participating female teachers listed school principals' pioneering behaviours as supporting their ideas and encouraging them to create projects. However, Sincar (2009) revealed that school principals have a "partial" vision, especially in sharing technological visions with school components, developing a long-term technology plan, and directing them to research technological needs. According to McNabb, Valdez, Nowakowski, and Hawkes (1999), the first step in technology planning is to develop a technology vision for the school. For this reason, it is understood that having a technology vision is important for school principals to display pioneering behaviours in technology. While school principals with this vision support and participate in projects actively, it can be thought that those without a technological vision cannot make a breakthrough with any project.

Furthermore, female teachers stated that their school principals encouraged them to innovate new ideas. Pihie, Bagheri, and Asuimiran (2014) stated that the school principal and management have a big share in the teachers' adoption of individual innovation practices. It is observed that entrepreneurial and courageous administrative management positively motivates the instructors and increases the use of new technical equipment. However, teachers need support and in-service training to follow developing technologies and to use these innovations effectively (Çakır & Oktay, 2013). Therefore, innovative goals can only be achieved when the school principal encourages them in this sense.

In this study, school principals' communication-open supportive roles using technological and individual innovations for student development were at the forefront. The leader must first establish good communication with the stakeholders that they will need during the implementation phase to make innovations, become aware of their environment, and adapt the innovations they see fit for their institution (Aydın, 2019). As Seferoğlu (2009) stated, if these are not provided, there may be situations where principals' expectations about technology use are not realistic due to their lack of knowledge. For this reason, the principal must be open to two-way communication and different perspectives.

It is essential that all systems, especially the education system (which is one of the systems that have the biggest role in directing society and social development), are constantly renewed and ready for the new world's needs. Therefore, teachers' knowledge, use of technology, and level of innovation should be high. It is the school principals who will guide and motivate them in developing these skills. To meet these needs of teachers, school principals must be aware of technological innovations, integrate them into educational goals, and be open to different perspectives. In this study, it was revealed that school principals' technological use is open to effective and innovative behaviours. This result, which is very promising in terms of the education system, is predicted to increase education efficiency in these schools. This study investigates the concepts of technology use and individual innovation in depth through the eyes of female teachers who refer to a limited number of school principals. It will be beneficial for researchers working on the concepts of "digitalisation in education" to apply this study, in a broader or even regional sense, and make reasonable generalisations.

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