

TECHNOLOGY INTEGRATION AND TECHNOLOGY LEADERSHIP IN SCHOOLS AS LEARNING ORGANIZATIONS

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ABSTRACT

The purpose of this study was to investigate technology integration in primary schools from the perspective of leadership in learning organizations. To that end, the study examines two groups: school administrators who play effective roles in technology integration in schools and computer teachers who are mainly responsible for schools' technology integration. In particular, this research focuses on the administrators' attitudes towards technology and the computer teachers' awareness of technological developments. Thirty-eight school administrators and thirty-five computer teachers who work in primary schools in Amasya, Turkey, participated in this study. The administrators completed a questionnaire regarding their attitudes towards technology integration, while the computer teachers were asked about their awareness of Web 2.0 technologies. In addition, interviews were conducted in order to thoroughly understand school administrators and teachers' opinions about technology integration and technology leadership. The questionnaire results showed that, although administrators' attitudes towards technology were largely positive, they gave negative responses for some items. On the other side, although teachers are aware of Web 2.0 technologies, few think to use such these technologies in the classroom.

Key words: Technology integration, computer teachers, technology leadership in learning organization

INTRODUCTION

Technological developments have found their way into almost every area of our lives, and it appears as if the integration of technology into education is inescapable. Given the important place that technology has come to occupy in our lives, schools have a great responsibility to educate individuals who are capable of effectively using technology. Today, educational leaders are making the necessary investments to ensure that technology is integrated into the teaching-learning process. Educators, teachers and researchers consider technology to be an indicator of high quality in education (Ajjan and Hartshorne, 2008; Barron, Kemker, Harnes, & Kalaydjian, 2003; Jonassen, Peck, & Wilson, 1999; Morrison and Lowther, 2004). For this reason, and in order to be able to raise individuals capable of finding and making use of information, teachers need to master the effective use of technology (e.g., computers, Internet, and so on).

While acknowledging that technology has, to a certain extent, been introduced into schools, researchers have stressed the need for teachers to continue to evaluate the possible uses of all available technologies in order to increase student academic achievement (Cradler, 1996; Hew and Brush, 2007). Recent studies provide information on the integration of technology into schools, including the use of desktop computers or laptops; word processing, spreadsheet and other software programs; and web technologies used for educational purposes (Cakir and Yildirim, 2009; Gülbahar, 2007; O'Dwyer et.al, 2005; Russell and Bebell, 2004). According to a study by Cuban et al. (2001), students' use of only basic applications, such as using the Internet to conduct a search, represents a low degree of technological integration, whereas developing multi-media presentations and completing projects that involve collecting and explaining data represent a high degree of integration. Moreover, Yıldırım (2007) has stated that consensus among academicians, decisionmakers and practitioners is a prerequisite for the effective use of technology in the classroom. In order to integrate technology into the school curriculum, it is necessary to identify student needs, existing resources, technology-related educational needs and technology design. It is also necessary to secure guidance and technical support for teachers in their use of technology.

Given the role of technology in student achievement, various national administrations have begun to develop projects to ensure the integration of technology into education (Cuban et al, 2001; Gülbahar, 2007; Yildirim, 2007). For example, in the United States during the 2003-2004 school year, school administrators spent 8 million dollars on technology integration (Quality Education Data, 2004). As a result of this and similar projects, the student-per-instructional-computer ratio dropped to 3.8:1 in 2004, and the student-per-Internet-connected computer ratio dropped to 4.1:1 in the United States (Education Week, 2005). Projects such as these promote students and teachers' effective use of educational technology in their learning and teaching activities.

In Turkey, information technology classrooms are being established in schools connected to the Ministry of National Education (MoNE). As the number of these classrooms increase, educational programs will also need to be strengthened in these schools. Accordingly, a joint project conducted by the MoNE and the World Bank aims to ensure that no school in Turkey will be without an IT classroom. Within the framework of this program, 4,874 IT classrooms have been established in 3,451 schools in Turkey with the aim of increasing the quality of primary schools' technology resources (Yildirim, 2007). These classrooms are equipped with computers, projection equipment and a variety of audio-visual equipment.

When looking at how these types of classrooms are operated in different countries, one notices that the individuals responsible for these classrooms are referred to by various names, including computer coordinator, media expert, and information and communication technology expert (Law and Plomp, 2003). Regardless of their titles, the individuals responsible for school technology classrooms have usually taken courses related to technology either as part of their university educations or as part of a post-university certificate program (Law and Plomp, 2003). The situation in Turkey is slightly different, because primary school IT classrooms fall under the responsibility of teachers who graduate from education faculties' computer education and instructional technology departments. These "computer teachers" play a lead role in the integration of technology into the schools. In addition to introducing students to computer technology for one hour per week, IT classrooms are open to students and to other teachers on an as-needed basis (Cakir, 2008; Göktaş and Topu, 2012).

Developments in information and communication technology are occurring at a dizzying pace, with new products appearing on the market every day, and computer teachers are responsible for closely following these technological developments and seeing that they are used effectively in the teaching-learning environment. Among the new developments that have recently begun to be used in the teaching-learning environment are Web 2.0 technologies such as blogs, wikis, RSS, and so on. Research shows that these technologies have just recently begun to be used for communication in the education environment and have opened up new possibilities in terms of collaboration and information-sharing that can be expected to expand over time (Bryant, 2007). In Turkey, the use of Web 2.0 technology in the teaching-learning environment is an extremely new phenomenon and educational applications include such areas as student workbooks, teacher blogs and more generally, classroom interaction and information management. As mentioned above, it is primarily computer teachers who are responsible for integrating these new technologies into the teaching-learning process in Turkey (Akbaba-Altun, 2004, Cakir and Yildirim, 2009; Seferoğlu, 2009).

In addition to teachers, school administrators also have a major responsibility to integrate technology into education (Bailey, 1997; Dawson and Rakes, 2003; Ertmer, et al., 2002; Testerman et al., 2002; Yee, 2000; Yildirim, 2007). In fact, rapid developments in technology and their increasingly widespread use in schools have led to a reappraisal of the roles and responsibilities of school administrators. According to a study by Hess (2003), the responsibilities of school administrators have changed as a result of the increased use of technology in the schools. Moreover, according to Don Knezek, President of the International Society of Technology Education (ISTE), since school principals have an influential role in the implementation of school reforms, their thoughts regarding technological integration are of crucial importance (ISTE, 2002).

Accordingly, this study aimed to evaluate the integration of technology into primary schools from the perspective of learning organization leadership. Given their important roles in the integration of technology in the schools, this study aimed to identify the attitudes of administrators (principals and assistant principals) towards technology and determine whether or not computer teachers responsible for integrating technology into education are following new technological developments and integrating them into the educational environment.

Learning Organization and Technology Leadership

The concept of the 'learning organization' was first used by Senge (1990) to describe educational institutions that, as organizations, provide individuals with ongoing opportunities for personal development in order to achieve their goals; support new methods of education and thinking that promote individual development; and cooperatively implement learning strategies. Senge (1990) identified five basic elements of a learning organization, namely, 'Systems Thinking', 'Personal Mastery', 'Mental Models', 'Building Shared Vision' and 'Team Learning'. In becoming a learning organization, the greatest responsibility falls on management (Ünal and Gürsal, 2007). In terms of technology integration, the main responsibilities of managers, as leaders (i.e. school administrators and computer teachers), in learning organizations include encouraging learning and securing the development of a rich learning environment in order to present opportunities for teachers and students to obtain new and correct information. Moreover, Senge (1990) highlights the need for leaders to agree to changes and share responsibilities if a school is to become a learning organization. According to Cullen (1999), managers are open to communication, continually involved in oversight and actively participate with

employees in problem-solving processes. When administrators are involved in this manner, employees are more ready and willing to be engaged in the learning process. In line with this, it can be stated that school principals and computer teachers responsible for technology integration have a great deal of influence over whether or not technology can be integrated effectively in schools.

The integration of technology into the curriculum plays an important role in terms of creating a rich teaching and learning environment. In fact, the integration of new technological developments into education should enable students to make use of new technologies just as easily as they make use of other educational tools such as books, maps and pencils (Cakir and Yildirim, 2009; Hew and Brush, 2007). Researchers stress the need for sufficient numbers of computer teachers who embrace their profession and communicate well with other teachers (Cakir, 2008; Göktaş and Topu 2012; Seferoğlu, 2007), as well as the key role school administrators play in the integration of technology into the schools (Afshari et al., 2008; Brockmeier et al., 2005; Kearsley and Lynch, 1992; Seferoğlu, 2009). Whereas computer teachers have a particularly important role in integrating new developments into the educational environment, administrators are responsible for prioritizing the use of new technologies in the schools and ensuring that computer teachers are provided with the support they require.

From the perspective of a learning organization, computer teachers and administrators are in leadership positions with regard to the use of technology in schools. According to Fullan (2001), an effective school leader should possess characteristics such as an understanding of change, an openness to innovation and a willingness to encourage learning and teaching. Not only should administrators expect teachers and students to use technology in their teaching and learning activities, as leaders in innovation, administrators should also embrace technology and make use of it themselves as part of their school's investment in technology (Brockmeier, et al., 2005; Dawson and Rakes, 2003; Rogers, 2003). In other words, a technology leader should model the use of technology for other teachers and students.

Bailey and Lumley (1997) have identified eight important themes for leaders who want to integrate technology effectively: 1) change with developments in technology, 2) budget and planning for technology, 3) professional development of personnel involved in technology, 4) technological infrastructure, 5) technical support in the implementation of technology, 6) learning and teaching with technology, 7) a curriculum in which technology is integrated, and 8) individuals who consider themselves to be technology leaders. These researchers also stress that administrators cannot achieve technology integration without the cooperation of the teachers at their school, which is in line with Senge's (1990) description of 'building shared vision'—i.e, the formation of a common vision shared by everyone in the organization—as one of the important characteristics of a learning organization. Similarly, ISTE has pointed out that technology leaders need to develop a joint vision, secure cooperation and provide the necessary underlying conditions for the effective use of technology in the schools (Anderson and Dexter, 2005). By keeping an open mind regarding technology and innovation and making use of new technologies themselves, computer teachers and administrators will be better able to shape the effective use of technology in their schools.

METHODOLOGY

Recognizing the importance of leadership in learning organizations for technology integration, the study intended to provide answers to the following questions:

- 1) What are the attitudes of primary school principals and assistant principals towards technology?
- 2) How aware are computer teachers of new technologies (e.g., Web 2.0 technologies) and what are their attitudes towards them?
- 3) What are the thoughts of primary school administrators (principals and assistant principals) and computer teachers regarding technology leadership?

In order to answer the above questions, the study employed survey-based quantitative research to examine the attitudes of administrators and computer teachers towards the integration of new technologies in the schools.

Instruments

The attitudes of administrators were examined using a questionnaire which begins with a short explanation and is then divided into two sections. The first asks general demographic questions and the second queries administrators' attitudes about technology. This second section uses the questionnaire "Attitudes Towards Technology" developed by Akbaba-Altun (2002), which has a Cronbach-Alpha reliability of 0.91. This second part of the questionnaire consists of 37 items that are rated using a Likert-type scale from 1 to 5, where 1 represents 'totally disagree' and 5 represents 'totally agree'.

For the computer teachers, a second questionnaire was administered. Similar to the first questionnaire, it begins with a short explanation, followed by demographic questions and then questions about the teachers' awareness of and attitudes towards Web 2.0 technologies. This final section about awareness and attitudes was developed by Ajjan & Hartshorne (2008) and implemented by the researcher. This part of the questionnaire consists of 35 items that are rated using a Likert-type scale from 1 to 5, where 1 represents 'totally disagree' and 5 represents 'totally agree'. The questionnaire was translated into Turkish and reviewed by expert linguists. The reliability and validity of the questionnaire were tested in a pilot study and found to have a Cronbach-Alpha reliability value of 0.83. In addition, semi-structured interviews were conducted by the researchers to more deeply understand participants' views about technology leadership.

Participants

Questionnaires were administered to primary school administrators (principals and assistant principals) and computer teachers at primary schools in the province of Amasya after receiving permission from the Amasya Provincial Directorate of National Education. In total, 38 administrators (male: $n=29$, 76%; female: $n=9$, 24%) and 35 computer teachers (male: $n=21$, 60%; female: $n=14$, 40%) volunteered to participate in the study. In addition, interviews were conducted with 8 administrators (5 male, 3 female) and 10 computer teachers (5 male, 5 female). Interviews consisted of open-ended questions about administrators' and teachers' thoughts regarding technology integration in the schools and technology leadership.

Analysis of the Data

Questionnaire data was analyzed using SPSS (Statistical Package for the Social Sciences) version 15. For the data obtained from the questionnaires, mean and standard deviations, frequency distributions and percentiles were calculated, and variables were compared using t-test. Interviews were transcribed upon completion and coded and analyzed in three stages. These stages are open coding, axial coding and selective coding, according to Strauss and Corbin (1998).

RESULTS

Administrators' attitudes towards technology

Of the 38 participating administrators (21 principals and 17 assistant principals), six had been employed as administrators for over 20 years, fifteen for between 16-20 years, nine for between 11-15 years, five for between 6-10 years and three for between 1-5 years. Furthermore, the majority of administrators had previously worked as classroom teachers ($n=20$, 53%). All of the administrators reported that they had a computer at home, and all but two reported having internet access at home.

The amount of time spent using computers varied among administrators. The majority ($n=21$, 55%) reported spending between 1-5 hours daily using a computer, whereas eleven reported spending between 6-10 hours per day, two reported spending more than 10 hours per day and four reported spending less than one hour per day using a computer. Almost all of the administrators ($n=36$) reported using computers to send and receive email, thirty reported that they used Facebook and twenty eight reported browsing the internet. In addition, all of the administrators reported using word processing, spreadsheet and desktop publishing programs such as Microsoft Word, Excel and PowerPoint, and close to half ($n=16$, 42%) reported knowing how to use Flash and Photoshop. None of the administrators reported familiarity with Web 2.0 technologies (Blogs, Wikis, RSS, and so on.).

When administrators' attitudes towards technology were examined, in general it was found that administrators had a positive attitude towards technology. This was reflected in high mean scores for the questionnaire statements ($\bar{X} = 3.95$). The highest mean scores were found for the statements, "It makes me happy to see new educational technologies being used in my school ($\bar{X} = 4.75$) and, "I want technology to be widely covered in in-service education programs." ($\bar{X} = 4.65$). Other statements received lower mean scores. For example, it was observed that administrators do not think that technology will take the place of human beings ($\bar{X} = 2.09$) and that administrators are indecisive regarding whether or not using technology is the only way to obtain information ($\bar{X} = 2.68$). Assistant principals scored higher than principals; however, the difference between the two groups was not statistically significant ($\bar{X}_{\text{principal}} = 3.93$, $SD = 0.91$, $\bar{X}_{\text{asst.principal}} = 3.98$, $SD = 0.88$, $t(36) = 1.21$, $p > 0.05$). Similarly, although scores for male administrators were higher than those for female administrators, the difference between the two groups was not statistically significant ($\bar{X}_{\text{male}} = 3.97$, $SD = 0.83$, $\bar{X}_{\text{female}} = 3.90$, $SD = 0.78$, $t(36) = 0.96$, $p > 0.05$).

Table 1: Administrators' responses to some items from the questionnaire (means and standard deviations)

Statements	\bar{X}	SD
I encourage others to use technology.	4.40	.69
I enjoy talking to my colleagues about technology.	4.18	.85
I enjoy reading publications about technology.	3.77	1.04
I am happy to receive information about technological developments from teachers.	4.25	1.1
I think that technology reduces interactions between people.	3.42	1.03
I think that the use of educational technology increases learning.	4.5	.82
I like informing people about new technological developments.	3.95	.92
I think that technology will take the place of human beings.	2.09	1.04
It makes me happy to see new educational technologies being used in my school.	4.75	.92
I want technology to be widely covered in in-service training programs.	4.65	1.13
I think that using technology is the only way to obtain information.	2.68	1.09

Technology leadership and expectations

In the interviews conducted with school administrators, the most frequently referenced topics were leadership and expectations of computer teachers. Findings from the interviews indicated that administrators embraced technology and would like it to be more widely used in their schools. Administrators also clearly stated that while they considered themselves the leaders at their school with regard to technology integration, they felt that it was other teachers, particularly computer teachers, who would realize this integration. In the words of one administrator:

“We have every type of technological opportunity, every classroom has a computer and a projector. We even purchased a SMART board using our own resources, and I ask if anyone uses it, but everyone appears to be uneasy about this. As an administrator I do what I can; the rest is up to the teachers.”

Indeed administrators had certain expectations of teachers, particularly computer teachers. For example, the views of one administrator were expressed as follows:

“We have an information technology classroom and a computer teacher in our school. I want our students to use this classroom. I think this classroom could be used more effectively if our computer teacher worked together with other teachers.”

Further referencing expectations of teamwork among teachers, administrators stated that they wanted computer teachers to keep other teachers informed about new technologies and prepare training courses about the use of new technologies in education. As one school principal commented:

“I would like it if from time to time the computer teacher at our school organized courses for the other teachers on how to use technology. We have every type of opportunity at our school, but, regrettably, our teachers do not make use of them. Computer teachers should encourage other teachers to use new technological developments in their classes.”

Finally, administrators mentioned the need for computer teachers to work with students, encouraging them to use technology in their prepared projects. For example, according to one administrator:

“Most of the time students play games in the computer classroom, whereas if the computer teacher would create a project with at least the most talented of the students, it would be very good for them in terms of their personal development.”

Computer teachers' attitudes towards new technology

Of the 35 (21 male, 14 female) computer teachers who participated in the study, the majority (n=19, 55%) had been teaching for more than five years and the remainder for less than five years (n=16, 45%). All teachers reported having computers and Internet access at their homes. The majority (n=18, 52%) reported using the computer for more than 10 hours per day, and another significant proportion (n=13, 37%) for between 5-10 hours per day, whereas only four teachers (11%) said they used the computer for less than five hours per day.

All of the computer teachers noted they used the computer to prepare material for their lessons, browse the Internet, send and receive emails and chat using Facebook and MSN Messenger, and 15 (43%) stated they used the computer to conduct research outside of class. Moreover, all of the teachers reported being able to use word processing, spreadsheet and desktop publishing programs; 30 (85%) could use web programs like ASP.net; and 23 (65%) could use Flash and Photoshop. Only 12 computer teachers (35%) reported being able to use Web 2.0

technologies like Blogs, RSS, Wikis, etc., and while computer teachers were found to be aware of and have positive attitudes towards Web 2.0 technologies the mean for the questionnaire addressing this issue was not particularly high ($\bar{X} = 3.16$, $SD = .72$).

Among those statements with the highest mean scores were, “I think it is a good idea to use Web 2.0 technologies” ($\bar{X} = 3.81$), and, “I think using Web 2.0 technologies is better than not using them” ($\bar{X} = 3.79$). In spite of this, some of the lowest mean scores were found for the statements, “I can plan how to use Web 2.0 technologies in the classroom,” and, “Administrators think it is important for me to use Web 2.0 technologies in my classroom” ($\bar{X} = 2.7$ and $\bar{X} = 2.68$, respectively).

Table 2: Teachers’ responses to some questionnaire statements (means and standard deviations)

Statements	\bar{X}	SD
I can plan how to use Web 2.0 technologies in the classroom.	2.7	1.08
I am thinking of adding Web 2.0 technologies to my courses next semester.	2.85	1.07
Web 2.0 technologies are useful in teaching.	3.55	1.2
I think using Web 2.0 technologies is better than not using them.	3.79	.98
It is a good idea to use Web 2.0 technologies.	3.81	.93
Using Web 2.0 technologies will increase students’ enjoyment of the class.	3.6	.94
Using Web 2.0 technologies will increase students’ grades in the class.	3.25	.97
Administrators find it important that I use Web 2.0 technologies in my classroom.	2.68	1.13
I am knowledgeable about and capable of using Web 2.0 technologies.	3.5	1.15
Using Web 2.0 technologies fit well with the way I teach	3.15	1.18

Although the overall mean score of male teachers was higher than that of female teachers, the difference between the two was not statistically significant ($\bar{X}_{\text{male}} = 3.18$, $SD = 0.96$, $\bar{X}_{\text{female}} = 3.13$, $SD = 0.81$, $t(33) = 0.71$, $p > 0.05$). However, the attitude towards and awareness of new technologies was significantly higher among novice teachers (between 1-5 years’ teaching experience) when compared to more experienced teachers (more than 5 years’ teaching experience) ($\bar{X}_{1-5 \text{ years' experience}} = 3.19$, $SD = 0.86$, $\bar{X}_{5+ \text{ years' experience}} = 3.11$, $SD = 0.99$; $t(33) = 0.45$, $p < 0.05$).

Technology leadership and expectations

Interviews with teachers supported the findings of the questionnaire regarding technology integration and technology leadership. The findings from interviews emphasized that computer teachers considered the integration of technology into schools to be important and felt they had an important responsibility in this regard. In particular, the computer teachers focused on expectations—for themselves, for administrators, and for other teachers—and leadership.

Sometimes computer teachers fell short of their own expectations. For example, although computer teachers were generally aware of Web 2.0 technologies, they confessed that they did not know how they could be used in the IT classroom. One teacher’s views were expressed as follows:

“During my years in university I heard about Web 2.0 technologies, but we did not use them. I know that nowadays they’ve become popular, but I worry about using them. I don’t know how I’ll be able to use them. Other teachers at school who are interested in the subject ask questions, but frankly, I brush them off. I think that in-service courses should be organized on such new topics.”

The interviews also highlighted computer teachers’ expectations of and need for support from other teachers and, more importantly, from administrators in implementing new technology. In the words of one teacher with four years of teaching experience:

“The computer room at my school is equipped with enough computers, and it is open to students, but occasionally I clash with administrators. For example, when I want to purchase a new program that I think will benefit students, or when I want to give seminars to students and teachers, I don’t get support from the school administrators.”

Computer teachers also think that schools have too many expectations for them and that school administrators and classroom teachers need to embrace technology and use it in the classroom just as much as they do. As one teacher stated:

“There are unreasonable expectations that as the school’s computer teacher, I need to do everything that has to do with computers, especially the technical things. However, other teachers

know how to use computers, too, and so they should be using computers in the classroom as part of the teaching process. I keep the computer laboratory open for everyone's use, but I can't say that there is a lot of demand."

Regarding technology leadership, computer teachers consider themselves to be technology leaders at their schools and feel that they should take leadership positions regarding the dissemination of technology in their schools. However, they also stress that school administrators have as great a role as themselves in the effective use of technology in education. They view administrative support as necessary for the effective integration of technology in the schools. For example, as one female teacher, who has been teaching for five years, put it:

"I see myself and the school administrators as the people responsible for closely following technological developments and making sure that technology is used at school; however, I also think that the first people who need to attend in-service training on technological developments are the school administrators."

DISCUSSION

The findings of this study clearly showed that school administrators, who have the primary responsibility for technology integration in the schools, and computer teachers, who play an important role in the integration of technologies in the classroom, have a high degree of interest in and a positive attitude towards technology. Previous studies in Turkey and in other countries have also found that school administrators have positive attitudes toward technology (Akbaba-Altun, 2008; Bailey, 1997; Dawson and Rakes, 2003; Flanagan and Jacobsen, 2003; Maxwell, 2001; Serhan, 2007). Given the importance of leadership for learning organizations, when schools are considered as learning organizations, these findings have important implications for the effective integration of technology in the schools, since it is the administrators and computer teachers who are the schools' technology leaders. A study by Ertmer et al (2002) states that being a technology leader should entail responsibilities such as acting as a role model, providing encouragement and direction and sharing knowledge and information. In other words, not only are technology leaders expected to have positive attitudes towards technology, they are also expected to be highly proficient in using technology. Ultimately, as technology leaders, school administrators and computer teachers share a large part of the responsibility for adopting and using new technologies in the schools. As previous studies have pointed out, school technology leaders are responsible for ensuring that as schools make significant investments in technological infrastructure, hardware and software, this equipment is installed appropriately and is made available in line with the needs of teachers and students (Dawson and Rakes, 2003; Maxwell, 2001).

Administrators are not only managers, but they are also teachers, and as such, as previous studies have shown, their support to teachers, position as role models, and progressive attitudes are important factors in the effective integration of technology in the schools (Baylor and Ritchie, 2002; Hasselbring, et al., 2000). According to ISTE standards, as leaders, school administrators should be sources of inspiration and leadership in the implementation of the organization's shared vision and the effective integration of technology for personal development (ISTE, 2009). It is not considered enough for those in positions of responsibility to maintain a positive attitude towards innovation; rather, they must also encourage teachers and students to incorporate innovation into the teaching-learning process. In terms of a 'learning organization', this type of involvement may be interpreted as developing the school's vision and providing students with a more effective learning environment.

The findings of this study also highlighted mutual expectations of administrators and computer teachers with regard to their roles in integrating technology in the schools. In line with Seferoğlu's (2009) study that specifically mentions administrators' expectations from computer teachers regarding technology integration, this study found administrators expected computer teachers to organize training courses at school, create projects with students, follow cutting-edge technology and work together with other teachers to integrate technology into the classroom. On the other hand, computer teachers expected administrators to become familiarized with new technology through in-service training, facilitate the use of technology at the school, purchase new technology, as necessary, and encourage students and other teachers at the school to use technology. However, in a study that evaluated the perceptions of primary school administrators regarding learning organizations, Ünal and Gürsal (2007) stressed the need for management (school administrators) and employees (teachers) to work together cooperatively. These observations highlight two of the five basic principles of the learning organization, namely, 'building a shared vision' and 'team learning' (Senge, 1990). According to Senge, participating in a 'work team', identifying a shared vision, and sharing information through group discussions lead to self-development. Not only does a learning organization make learning easier for all members (Balay, 2004), the process of team learning is essential, given that it is the team, not the individual that is the basic unit of learning in the modern organization; in other words, if the team doesn't learn, the organization doesn't learn (Senge, 1990). Moreover, the findings of the present study stressed the important roles that administrators and computer

teachers have in the dissemination of technology. Because of their roles as leaders in the effective use and integration of technology, school administrators and computer teachers are closely watched by students and other teachers at the school and may be called upon for assistance, when necessary. For this reason, it is important that school administrators and computer teachers work in a coordinated manner and make joint decisions if technology is to become more widely and effectively used in the schools. Administrators should encourage teachers to use new technologies, and computer teachers should keep other subject teachers informed regarding technological developments.

Finally, previous studies have stressed the need for computer teachers, who are responsible for integrating technology into school, to keep up with innovations and adapt them for use in the educational environment in order to provide students opportunities to use new technologies (Cakir and Yildirim 2009; Göktaş and Topu 2012; Seferoğlu, 2007). Computer or ICT teachers should be able to keep up with cutting-edge technology by receiving regular inservice trainings (Göktaş and Topu 2012; Seferoğlu, 2009, Watson, 2001). Similarly, in order for school administrators to be technology leaders, they need to keep up with technological developments as well (Afshari et al., 2008, Brockmeier et al., 2005; Davis, 2008). For this to happen, administrators need to be supported with in-service training seminars that provide information about how new technological developments can be integrated into the schools and stress the need for administrators to be prepared for their roles as technology leaders in the schools (Flanagan and Jacobsen, 2003). In this regard, the MoNE and/or universities can develop in-service training programs to familiarize administrators and computer teachers with new technologies and help them to integrate them into the educational environment.

In conclusion, it should be noted that the generalizability of the results of the present study was limited by the small number of participants and the use of a self-reporting questionnaire. It is recommended that additional studies with larger populations be conducted in order to be able to generalize the results and provide a more detailed understanding of the factors that underlay effective technology integration in terms of leadership in the schools.

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