Implementation of Technology Related Professional Development Strategies in an Elementary School in Ankara

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Abstract: Utilizing a systems approach by Toci and Peck (1998), this study is designed to offer some strategies to facilitate teachers' technology use. The present study was conducted in a public elementary school in Ankara, Turkey and the participants involved all the teachers and administrators from this elementary school, including 41 teachers and 3 administrators. The data was collected by the use of multiple methods, involving surveys, interviews and observations. At the beginning of the study, a teacher survey was administered to identify the current state of technology use in the school. After defining the current state of technology use, the researcher took the opinions of the school staff about the most appropriate professional development strategies. Then, using a systems approach by Toci and Peck (1998) as a framework, these professional development strategies were implemented with the help of school administrators. These strategies might be helpful for the school principals and teachers in their struggle during the technology integration process. Moreover, the present study provides suggestions to the policy makers about how to integrate technologies into curriculum and support the schools in technology integration process.
Keywords: Technology integration, systemic change, professional development strategies, elementary schools.

Özet: Ankara'da Bir İlköğretim Okulunda Teknoloji Kullanımına İlişkin Profesyonel Gelişim Stratejileri. Bu çalışmada, öğretmenlerin teknoloji kullanımını arttırmak amacı ile Toci ve Peck (1998) tarafından önerilen sitemik yaklaşım prensipleri kullanılarak çeşitli profesyonel gelişim stratejileri öne sürülmüştür. Çalışma Ankara'daki bir ilköğretim okulunda yapılmış olup, çalışmanın katılımcıları 41 öğretmen ve 3 okul yöneticisinden oluşmaktadır. Çalışma verileri anket, görüşme ve gözlem gibi bir çok farklı yöntemler kullanılarak toplanmıştır. Çalışmanın başında, okuldaki mevcut teknoloji kullanım durumunun belirlenmesi amacı ile öğretmenlere bir anket uygulanmıştır. Daha sonra, okul yöneticileri ve öğretmenlerin de fikirleri alınarak çeşitli profesyonel gelişim stratejileri tasarlanmıştır. Bu stratejiler, okul yöneticilerinin de yardımı ile uygulanmıştır. Bu çalışmada uygulanan stratejiler teknoloji entegrasyonu sürecinde yaşanan sıkıntıların üstesinden nasıl gelinebileceği konusunda okul yöneticileri ve öğretmenlere yardımcı olacaktır. Ayrıca, bu çalışma, teknolojinin müfredata ne şekilde entegre edileceği ve okulların teknoloji entegrasyonu konusunda nasıl desteklenebileceği konularında politika yapıcılara da önerilerde bulunmaktadır.
Anahtar Sözcükler: Teknoloji entegrasyonu, sistemik değişim, profesyonel gelişim stratejileri, ilköğretim okulları.

Introduction

To answer the students' requirements in the information age, there is a need to understand and utilize emerging technologies effectively (Reigeluth, 1994; Reigeluth & Joseph, 2002). In addition to having important influences on teaching and learning, technologies also provide innovative approaches for instruction and curricula (Chen, Y. L., 2008). Further, they have a potential to bring new roles for main stakeholders, by empowering their management, research, communication and teaching skills (Reigeluth, Annelli, & Otto, 1992). Therefore, more emphasis should be given to improve teachers' technology use in educational settings.

Although most schools have been occupied with the necessary technologies, teachers' technology use in their lessons is still low (Ertmer, 2005; Adıgüzel, 2010, Karaca, Can, Yildirim, 2012). In current literature, numerous factors responsible for teachers' limited use of technologies were stated. For instance, Ertmer (1999) proposed one of the well-known categorization, including first order and second order barriers that may impede teachers' use of technologies. First order barriers are extrinsic to teachers and include time, access to technology, institutional support and funding. Second order barriers are intrinsic to teachers and include teachers' beliefs and attitudes about teaching and technology and their willingness to use technology.

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In a recent study, Karaca et al. (2012) disclosed the most important factors affecting elementary school teachers' technology use in their lessons. These factors were computer use in years, teaching experience, lack of time, principal support, colleague support, teachers' technology competencies and their attitude and beliefs towards using technologies. According to the author, technology integration is a complicated process affected by many factors and those factors are highly related to each other. Therefore, to successfully integrate technologies to the lessons, Karaca et al. (2012) suggested that all the factors affecting technology integration should be considered together and some different strategies should be applied for all these interrelated factors.

Since the effective use of technology in schools is a complex, multidimensional issue, it is difficult to integrate information technologies to classroom settings without attending to broader issues of systemic change (Reigeluth, 1992). Therefore, effective integration of technology to educational settings may be possible through a systemic perspective by simultaneously considering all the issues affecting the change process.

There is growing interest in systemic change as it has been "a major force in any school restructuring efforts" (Nelson & Reigeluth, 1995, p.105). It is a large scale change process based on systems theory, which emphasize that change in one part of the system requires change in also other parts (Jenlink et al., 1998). Jenlink, Reigeluth, Carr and Nelson (1998) defined systemic change as an approach to change that:

"(1) recognizes the interrelationships and interdependencies among the parts of educational system, with the consequence that desired changes in one part of the system must be accompanied by changes in other parts that are necessary to support those desired changes… (2) recognizes the interrelationships and interdependencies between the educational system and its community, including parents, employers, social service agencies, religious organizations and much more, with the consequence that all those stakeholders are given active ownership over the change effort"(p.219).

Accordingly, stakeholder participation is a fundamental principle of systemic change. It is also emphasized in the literature that change can be successful when all the stakeholders in the system were collaboratively involved in the change process (Eteokleous-Grigoriou, 2009; Jenlink et al., 1998; Joseph & Reigeluth, 2010; Menchaca & Dara-Abrams, 2003; Nelson & Reigeluth, 1995, Reigeluth, 1993). Nelson and Reigeluth (1995) explained that stakeholder involvement creates a feeling of ownership of the change process and the stakeholders are more likely to implement the decisions they accept. For this reason, the change process in the schools should involve all the stakeholders including teachers, parents, students, administrators, and also community members to design an educational environment that will answer students' requirements (Nelson & Reigeluth, 1995; Reigeluth, 1993). According to Nelson and Reigeluth (1995), it is important to create an environment where high-level group interaction exists among participants, and they should be supported with required professional development. To do this, some outside facilitators might be helpful in guiding all those stakeholders throughout the change process (Reigeluth, 1993).

A systems Approach for Improving Technology Use:

In a long term project, Toci and Peck (1998) proposed a "systems approach" to the design of technology related professional development programs for teachers. In their study, the authors revealed that the effective use of technology in the classroom depends on three important factors: (1) availability of the technologies, (2) ability of educators to use technologies, and (3) willingness of educators to use technologies. Toci and Peck (1998) proposed the below diagram in Figure 1, which illustrates the factors influencing the development and sustenance of factors.

As shown in Figure 1, "Ability" consisted of three main constituents. Besides having necessary knowledge and skills to use computers, teachers should also have some attributes such as "independence, self-discipline, courage, and confidence" (Toci & Peck, 1998, p.22), all of which have a potential to increase their ability to use technologies. Further, some qualified learning experiences, such as "workshops, courses, on-line tutorials, instructional videos, books" (p.23) might also be helpful in improving teachers' abilities to use technologies.

The authors further explained that it is even more difficult to improve teachers' *willingness* since they are very busy professionals, and it is hard to allocate *time* to get technology training, to prepare new technological materials and use them in their lessons. Therefore, it is important to provide adequate *time* and *support* for teachers to use technologies. Furthermore, it might be very helpful to provide teachers with *successful experiences* in their first steps of technology use as it helps to ensure their time and efforts are not lost.

Also, Toci and Peck (1998) point to the *relevance* for increasing teachers' *willingness* to use technologies since the promoted ideas should be related to the things that teachers care about. In addition,

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the authors defined *utility* as the usability of the technologies, where teachers need to feel that it is not much time consuming and it is easily applicable. As shown in Figure 1, *support* and *incentives* might also be very powerful for teachers to increase their *willingness* to use emerging technologies. By this way, they would "make time" to learn about and use technology. Toci and Peck (1998) emphasized that: "incentives increase willingness, willingness increases the time spent in learning, time spent learning improves ability, ability influences willingness, and the cycle continues" (p.28).

After these assessments, Toci and Peck (1998) utilized some professional development strategies. For instance, they provided some tutorials, software tools and Quick Success Classroom Activities. Also, they offered some On-line Projects and a Learning Opportunities Database to increase teachers' access to learning experiences.
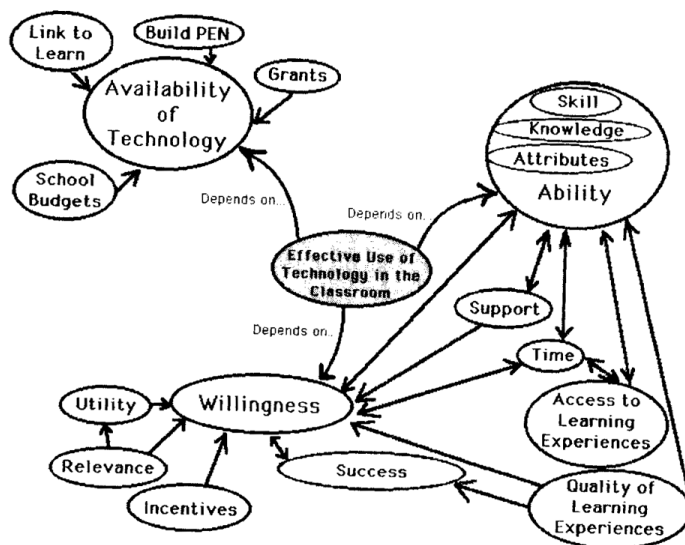

Figure 1. A Systems Approach to Improving Technology Use in Education (Toci & Peck, 1998, p.22)[1].

In summary, looking from a systems perspective, Toci and Peck (1998) implemented some strategies by considering all the factors that are likely to promote or impede the change process. On the other hand, it is a common problem all over the world that most technology integration efforts were conducted in piecemeal and incremental ways, which generally involves simply provides ICT infrastructure and in-service training opportunities (Aksit, 2007; Menchaca et al., 2003). Peck and Carr (1997) pointed out that using piecemeal "quick fix" change efforts, cannot overcome the gap between educators, their communities and school administration. Nelson and Reigeluth (1995) emphasized that systemic educational change can be successful to address many of these problems that our schools face. For this reason, this study utilized a systems approach by Toci and Peck (1998) to offer some technology related professional development facilities for improving teachers' technology use in the schools.

Purpose of the Study
The purpose of this study is two folds. First, it is aimed to identify the current state of technology use in this elementary school. Second, using a systems approach by Toci and Peck (1998), this study is designed to offer some professional development strategies to enhance teachers' technology use in an elementary school in Ankara.

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[1] Note. From "A systems approach to improving technology use in education," by M. Toci and K. L. Peck, 1998, Canadian Journal of Learning and Technology, 27(1), 19-30. Copyright 1998 by Copyright Holder. Reprinted with permission.

Method

A case study research design has been employed to gather detail information about a contemporary phenomenon of "technology integration" in an elementary school setting (Yin, 2002). As case studies allow the use of multiple methods (Marshall & Rossman, 1999), both qualitative and quantitative methods were used in this study.

Participants and Sampling

This study was conducted in a public elementary school in Ankara, Turkey. The participants involved all the teachers and administrators from this elementary school, including 41 teachers (39 women, 2 men) and 3 administrators. The number of participants is presented in Table 1.

Table 1. Information about participants

	N
School principal	1
Assistant principals	2
Classroom teachers	17
Turkish/literature	3
Social Sciences	2
Mathematics	2
Science and Technology	2
English	3
Computer	1
Religious	1
Art	2
Music	1
Physical Education	2
Technology and Design	2
Early Childhood	2
Guidance	1
Total	44

Data Collection and Data Analysis Methods

Both qualitative and quantitative data collection methods were used in this study. At beginning, a teacher survey developed by Karaca (2011) was used to describe and estimate the current state of technology use in this school. While developing this survey, Karaca (2011) benefited from the questionnaires in the literature. Content and face validity of the survey was checked by 4 different experts in the field. This survey included demographics and several questions related to teachers' perceptions about technology use in their school. Teacher surveys were distributed to the participant teachers by the researcher and the data was analyzed by using descriptive statistics.

Qualitative data collection methods were also used to collect data. Informal observations has been made in this school from the beginning to the end of the study. In addition, interviews were conducted with the school administrators, to have an idea about the implementation of the professional development strategies. Then, all these qualitative data was analyzed using qualitative data analysis methods recommended by Marshall and Rossman (1999).

Procedure

This study was completed in 2 phases: (1) Identifying current state of technology use, (2) Designing and Implementing Strategies.

Phase 1: Identifying Current state of Technology Use

In this phase, some informal observations and teacher surveys were used to reveal the current state of technology use in the school. Surveys were given to all the teachers in the school and 37 teachers filled the surveys with a response rate of %90. The participants involved 17 classroom teachers, 2 social sciences teacher, 2 science and technology teachers, 2 mathematic teachers, 3 English language teachers, 3 Turkish language teachers, 2 art teachers, 2 early childhood teachers, 2 technology and design teachers, 1 physical

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sciences and 1 guidance teacher. There were 35 women and 2 men teachers. 11 teachers were over 46 years old, 17 teachers were between 36 and 45 years old, and 9 teachers were between 26 and 35 years old.

Phase 2: Designing and Implementing Strategies

After defining the current state of technology use in the previous phase, it was time to design, develop and utilize some strategies to enhance teachers' technology use in their lessons. In the current vision statement of the school, all the teachers are expected to use new technologies to support teaching and learning activities in their lessons. Under this vision statement, the researchers determined three major goals by using the factors given by Toci and Peck (1998) as a framework (see Table 2).

Then, a school meeting was organized with teachers and school administrators. In this meeting, the researcher talked about the results of teacher surveys and the schools' future expectations and projected goals about technology use. Then, the researchers took the opinion of the teachers and administrators to find out the most appropriate strategies for reaching these goals. After this meeting, the emerging strategies have been noted (see Table 2). Finally, these strategies were implemented with the help of the school administrators.

Table 2: *The Major Goals and Strategies*

Goals	Strategies
Goal 1: Increase the availability of technologies in the school.	- Getting financial support from school-family association
Goal 2: Improve teachers' technology related abilities	- Stakeholder Involvement
	- Regular parent meetings
Goal 3: Increase teachers' willingness to use technologies	- Regular School Meetings
	- Instructional Material support
	- In-service technology trainings
	- Rewards and Incentives
	- Sharing educational resources through an e-mail group
	- Sending the school announcements by e-mails
	- Improving the school web site

Findings

Current state of Technology Use

To have a first look at the availability of technologies in this school, the researcher made some informal observations. There was a television and video player in almost each classroom. Most of the new technologies (e.g. computers, projectors) were located in two IT classes of the school. Only 4 classes were occupied with computers and projectors and there was a computer and printer in both teachers' room and administrators' rooms.

The teacher survey results were helpful to understand teachers' perceptions about the presence of technologies in the school. The findings confirmed the preceding observations that teachers reported the presence of some former technologies, involving television (70%), overhead projector (%54), and video player (62%). On the other hand, the presence of computers (38%) and projectors (31%) in the school were comparably low.

The survey results also indicated that many teachers use computers (51%) and the Internet (46%). Teachers mostly used technologies for entering student grades (70%) and for searching information (57%). Also, some teachers use technologies for preparing lesson plans (46%) and exam questions (40%). Finally, few teachers use computers for presenting lessons (22%), and drill and practice purposes (19%).

Then, the teachers were asked about their computer competencies. None of the participant teachers stated to be "very good" in using computers. Only 5 of them stated to be "good" in using computers. On the other hand, many teachers found themselves as "average" (n=14) and "poor" (n=13) in using computers. The survey results further indicated that most teachers (63%) expressed their need for

technology related in-service trainings. They required some trainings about basic computer use (n=12), Microsoft Office (n=23) and the Internet applications (n=10).

The teachers were also asked about the barriers that influence their technology use in the lessons. Most teachers (65%) stated that they do not have necessary knowledge and skills to use technologies and the provided in-service technology trainings were not enough to meet their needs. Furthermore, 51% of teachers expressed that there were not sufficient technologies and instructional materials in the school. Some teachers also complained about their lack of time to prepare instructional materials (27%), and to use technologies in the lessons (35%).

Implementation of Strategies

Depending on the results of previous phase, some professional development strategies developed and implemented to enhance teachers' technology use in their lessons. Since most teachers complained about their lack of knowledge and skills to use technologies, some technology related trainings were offered by the researchers. As teachers mentioned their training needs about basic computer use, Microsoft Office and the Internet applications, related trainings has been provided. The content of these training sessions was designed according to teachers' needs. After presenting tutorials about each topic, the teachers had a chance to practice what they have learned by developing some sample applications. According to Toci and Peck (1998), providing these kinds of quality learning experiences is very helpful for increasing both teachers' abilities and willingness to use technologies.

As the findings of teacher surveys indicated an inadequacy of the instructional materials, some on-the-shelf educational CDs, materials and software were provided. Further, in the scope of this study, some educational CD's has been developed for teachers from different subject fields by 3th grade undergraduate students from Computer Education and Instructional Technologies Department of a university in Ankara, Turkey. The content of these CDs' were prepared by the teachers and their opinions have been gathered about the design of these instructional software. Finally, 10 educational CD's for different subject areas were developed and distributed to the teachers.

In addition to all these material support and training opportunities, teachers and parents have been asked to join school decision making process. The school administrators organized some regular parent and school meetings, in which these stakeholders shared their experiences, ideas and needs related to technology use. The researcher observed that the school principal was very successful in creating a democratic and friendly school environment. Supporting this idea, the school principal explained that:

> *"Sometimes, you may go to a school where administrators don't want to speak to you, even worse, they upbraid when you say something... It is very difficult to work in such an environment...Therefore; I try to conduct good relationships with my school personal, my parents and also the students. That is why I don't have much difficulty in having their support in the works done..."*

Accordingly, the school principal emphasized that having good relationships with the main stakeholders was very important as he thought that it is the only way to gain their appreciation and respect. To develop such relationships, some picnics, kermises (fund-raising), dinners and small trips were organized.

The school principal expressed that establishing respectful and trustful relationships was also very helpful in having parents' contribution to school needs. In the parent meetings, the parents were informed about the activities and facilities taking place in the school and they were involved in school decision making process by having their voice in important school issues. Technological needs of the school were also explained to the parents. As a result, the school-family association provided considerable financial support for buying necessary media and materials in this school. With this support, 12 classes were equipped with computers and projectors.

Further, the school principal used an interesting strategy to motivate the teachers utilizing these technologies:

> *"I use an inverse motivation strategy for increasing the use of technologies in the lessons. First, I say the parents that as you gave the financial support to provide these technologies, you have to force the teachers to use these technologies. Then, I say the teachers that as we get financial support from the parents, you have to use these technologies effectively in your lessons."*

With the financial support from the parents, the entrance hall of the school was also equipped with some technologies, including a computer, a projector and a LCD television. These technologies were used to present teachers' and students' social and cultural activities. To encourage teachers to present these activities digitally, the principal forbade to hang the picture and photographs to the walls in this school.

Instead, these pictures, photographs and exhibitions were presented on this projector and LCD television located in the entrance hall of the school. Further, the principal encouraged teachers' use of IT classes, by making the use of these classes mandatory for teachers.

On the other hand, there was no information technologies teacher to help the other teachers about using technologies and IT classes. However, the school principal expressed that it might be an opportunity for the teachers:

> *"Sometimes, having an information technologies teacher might have inverse impacts on technology integration since every teacher wants to have their works done by this teacher. Instead, in our school, the teachers have to solve their technology related problems by themselves. Though it seems an unfavorable condition, I think that it is actually an opportunity for the teachers to learn about technologies."*

The principal also used several incentives to increase teachers' willingness to use technologies. He gave appreciation letters to the teachers who use technologies effectively in their lessons. Furthermore, he always praised and valued teachers' effort, which made a sense of recognition and appreciation of their work. The school principal explained that appreciating model teachers motivates also other teachers to use technologies:

> *"The model teachers have an important role to make their colleagues to use technologies. One or two model teachers in each educational level might be very helpful to encourage colleagues for using technologies. Sometimes, I also become a model teacher by presenting some technology supported lessons in the school meetings. I showed several educational CDs, videos, simulations and electronic encyclopedias to the teachers to make them aware of how they can benefit from these resources in their lessons."*

Accordingly, presenting such sample applications, the school principal emphasized the value of technologies in enriching the traditional classroom activities. Further, he required the teachers to prepare a sample presentation and present it to the colleagues in the seminar term. Then, the teachers made a 15 minute presentation on a topic about their subject field. Though the presentations were very simple, these kinds of experiences were beneficial for overcoming their fear of using technologies.

Furthermore, the researcher helped the teachers to get e-mail accounts. Then, an e-mail group was formed for this school. The school administrators started to send some educational resources and electronic materials to this group. Also, the school announcements were sent via e-mail as the school administrators thought that it might be a good way to make the school personnel familiar with the technologies. The school principal explained that:

> *"In our school, the school announcements were sent by e-mail, so e-mail is accepted as a formal communication tool. At the beginning, the teachers were checking their e-mail with the help of their colleagues or their children. I think that it is a starting point for teachers to overcome their fear of technology. After a while, they gained the basic skills, such as opening the computers, downloading files from internet, saving files, sending and receiving e-mails and chatting. As their use of e-mail was appreciated by the other teachers and also by their families, they were encouraged to use other technologies as well."*

Finally, the school web site has been improved to make it more interactive. In this web site, discussion forums were built, where teachers and students would have a chance to share their experiences and opinions. Several discussion groups for the social clubs in the school were also formed, in which students and teachers discussed about the upcoming social events.

Discussion

After defining the current status of technology use in the school, some professional development strategies has been offered using a systems approach proposed by Toci and Peck (1998) in the present study. The literature emphasizes that in any systemic change effort, it is important to develop a comprehensive design involving all the main stakeholders (Eteokleous-Grigoriou, 2009; Nelson & Reigeluth, 1995; Reigeluth et al., 1992). Since having the voices of the stakeholders with different backgrounds, experiences and opinions empowers the change process (Joseph and Reigeluth, 2010), ongoing conversations should exist between the main stakeholders for discussing about how to increase technology use in lessons (Ertmer, 2005). For this reason, the present study involved the main stakeholders in school decision making process. To do this, a school meeting was organized with teachers and school administrators to have their opinions about the appropriate professional development strategies. Using the factors given by Toci and

Peck (1998) as a framework, some professional development strategies were planned and implemented with the help of the school administrators.

One of the superior characteristics of this school was that it had an innovative and supportive principal, which is one of the conditions to be met in any systemic change effort (Reigeluth, 1993). He used several incentives and rewards to empower teachers' willingness to use emerging technologies. Toci and Peck (1998) explained that with the presence of such incentives, teachers are more likely to allocate extra time for learning about technology.

The importance of establishing good relationships with the main stakeholders in achieving the goals of the school is highly emphasized in the present study. Gaining the stakeholders' appreciation and respect, it became easier for the principal to get any kinds of support from them in technology integration process. For instance, having good relationships with parents, the principal was successful in getting considerable financial support for buying necessary technologies. According to Sahin (2011), it is a general application in Turkey that the school administrators generally need to ask parents for financial support since very limited budget has been provided for the schools in Turkey. Though having good relationships with the parents might help to get support from parents, it might be still difficult for most schools with parents coming from low socioeconomic status. For this reason, necessary financial support should be provided by Ministry of National Education for all the schools.

Though this study is a good example of improved relationships among the stakeholders, the parents still do not have much opportunity to participate in the decision making processes in most schools. As parent involvement is critical for any kinds of innovation process, some facilities should be provided for developing an effective school–home communication (Baker, 1977).

Conclusion

To answer the requirements of information age, there is a need for systems thinking by considering the interrelationships and interconnections. However, it is a common problem all over the world that technology integration efforts were generally conducted in piecemeal and incremental ways, which may not be successful in improving technology use in the schools (Adiguzel, 2010; Aksit, 2007; Ertmer, 2005; Menchaca et al., 2003). This study is designed to overcome these deficiencies by offering some technology related professional development facilities using a systems approach by Toci and Peck (1998). Looking from a systemic perspective, this study proposed some strategies to enhance technology use in elementary schools. The strategies used in this study might be helpful for the school principals and teachers in their struggle during the technology integration process. Also, it will give suggestions to the policy makers about how to integrate technologies into curriculum and how to support the schools in technology integration process. Some future studies should also be conducted to further examine the strategies to effectively integrate technologies to educational settings.

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Genişletilmiş Özet

Bilgi çağının gereksinimlerine cevap verebilmek için yeni teknolojilerin eğitim ortamlarında etkili bir şekilde kullanılması gerekmektedir. Reigeluth ve diğerlerine (1992) göre yeni teknolojiler, okul yöneticileri ve öğretmenlerin yönetimsel, araştırma, iletişim ve öğretme yeteneklerini güçlendirerek, onların daha etkin roller kazanmalarına olanak sağlamaktadır. Ayrıca, yeni teknolojilerin öğrenme ve öğretim süreci üzerinde de önemli etkileri bulunmaktadır (Chen, Y. L., 2008). Tüm bu nedenlerden dolayı, teknolojinin eğitim ortamlarında etkili bir şekilde kullanılması için neler yapılması gerektiği konusu önemle araştırılmalıdır.

Öğretmenlerin hem ev, hem de okul ortamında teknolojiye erişiminin eskiye nazaran çok daha rahat olmasına karşın, halen teknolojiyi öğretim amacıyla çok fazla kullanmamaktadırlar (Ertmer, 2005; Adıgüzel, 2010). Literatürde, öğretmenlerin teknolojiyi kullanmamalarına sebep olarak bir çok faktör öne sürülmektedir. Yakın zamanda Karaca ve diğerleri (2012) tarafından düzenlenen bir çalışmanın sonuçları incelendiğinde Türkiye'deki ilköğretim öğretmenlerinin teknoloji kullanımını etkileyen en önemli faktörlerin bilgisayar deneyimi, öğretmenlik deneyimi, zaman eksikliği, okul müdürü desteği, meslektaş desteği, öğretmenlerin teknolojik yeterlilikleri ve öğretmenlerin teknoloji ile ilgili tavır ve düşünceleri olduğu görülmüştür. Yazarlar, teknoloji entegrasyonunu etkileyen bu faktörler arasında önemli ilişkiler bulunduğunu ve bu nedenle tüm bu ilişkiler göz önünde bulundurularak, her bir faktör için eşzamanlı stratejiler uygulanması gerektiğini belirtmişlerdir.

Türkiye'de eğitim ortamlarına teknolojinin entegre edilmesini sağlamak amacı ile çeşitli projeler yapılmış olmasına karşın, bu projelerin çoğu küçük çaplı değişim çabaları olup, sadece okullardaki teknoloji altyapısının iyileştirilmesi ve öğretmenlere hizmet içi eğitim sağlanması gibi bileşenlere sahiptir (Aksit, 2007). Literatüre bakıldığında öğretmenlerin gereksinimleri incelemenmeden uygulamaya konulan bu tarz yüzeysel değişim çabalarının öğretmenlerin teknoloji kullanımını arttırmakta yetersiz kaldığı görülmektedir (Adiguzel, 2010; Aksit, 2007; Ertmer, 2005). Nelson ve Reigeluth'a göre, bahsedilen problemlerin giderilebilmesi için sistemik değişim prensiplerinden faydalanılması gerekmektedir.

Durum çalışması yönteminin kullanıldığı bu çalışmada, Toci ve Peck (1998) tarafından öne sürülen sitemik yaklaşım prensipleri kullanılarak öğretmenlerin teknoloji kullanımını arttırmak amacı ile

çeşitli profesyonel gelişim stratejileri önerilmektedir. Çalışmanın katılımcıları Ankara'da bir ilköğretim okulunda görev yapmakta olan 1 okul müdürü ve 2 müdür yardımcısı ve 41 öğretmenden oluşmaktadır. Çalışma verileri öğretmenlere uygulanan anketler ve okul yöneticileri ile yapılan görüşmeler aracılığı ile toplanmıştır. Ayrıca, yapılandırılmamış gözlem yöntemleri kullanılarak, çalışmanın tüm süreçleri araştırmacı tarafından gözlemlenmiştir. Çalışmanın başında, okuldaki mevcut teknoloji kullanım durumunun belirlenmesi amacı ile öğretmenlere anket uygulanmıştır. Anket sonuçları incelendiğinde öğretmenlerin okulda bulunan bilgisayar ve projeksiyon aleti gibi yeni teknolojileri yeterli bulmadıkları görülmüştür. Ayrıca, öğretmenlerin teknoloji ile alakalı gerekli bilgi ve becerilere sahip olmadıkları ve bunun öğretmenlerin derslerde teknoloji kullanımını engelleyen en önemli faktör olduğu görülmüştür. Çalışmanın sonraki aşamasında okul yöneticileri ve öğretmenlerle bir toplantı yapılarak, anket sonuçları paylaşılmış ve okuldaki teknoloji kullanımını iyileştirmek amacı ile ne tür profesyonel gelişim stratejileri uygulanması gerektiği konusunda okul yöneticileri ve öğretmenlerin fikirleri alınmıştır. Nitekim, Regiluth ve diğerlerine (1992) göre herhangi bir sistemik değişim sürecinde başarıya ulaşabilmek için tüm paydaşların görüşlerinin alınması gerekmektedir. Bu nedenle, bu çalışmada okul yöneticileri ve öğretmenlerin görüşleri alınarak çeşitli profesyonel gelişim stratejileri tasarlanmış ve bu stratejiler okul yöneticilerinin yardımı ile uygulanmıştır.

Öncelikle, anket sonuçlarına dayalı olarak, araştırmacı tarafından öğretmenlere gereksinim duydukları konularda hizmet içi eğitim seminerleri verilmiştir. Buna ek olarak, öğretmenlere derslerinde kullanabilecekleri hazır öğretim materyalleri ve yazılımlar sağlanmıştır. Ayrıca, öğretmenlerin istek ve ihitiyaçlarına uygun eğitim CD'leri geliştirilmiştir.

Sistemik değişim sürecinde iletişim ve diyaloğun önemini vurgulayan Joseph ve Reigeluth (2010), tüm paydaşların değişim sürecinde söz sahibi olması gerektiğini belirtmiştir. Bu amaçla, katılımcı okulda düzenli olarak veli toplantıları düzenlenmiş ve aileler okuldaki teknoloji entegrasyonu süreci hakkında bilgilendirilerek, onların da sürece katkıda bulunmaları sağlanmıştır. Ayrıca, okuldaki teknolojik araç gereç sayısını arttırmak amacı ile okul-aile birliğinden finansal destek sağlanmıştır. Joseph ve Reigeluth (2010)'a göre bu tür aktiviteler sadece değişim sürecini güçlendirmekle kalmayıp, aynı zamanda paydaşların teknoloji entegrasyonu sürecini sahiplenmelerine de olanak sağlamaktadır.

Tüm bunlara ek olarak, okul müdürü, öğretmenleri teknoloji kullanımı konusunda istekli hale getirmek amacı ile çeşitli teşvik yöntemleri kullanmıştır. Teknolojiyi etkin kullanan öğretmenleri sözlü ve yazılı olarak ödüllendiren okul müdürü, kendisi de teknolojiyi etkin bir şekilde kullanarak öğretmenlere örnek teşkil etmiştir. Okul toplantılarında teknoloji kullanarak çeşitli sunumlar yapan okul müdürü, seminer döneminde de öğretmenlerden teknoloji kullanarak diğer öğretmenlere bir ders sunumu yapmalarını istemiştir. Toci ve Peck (1998)'e göre, okul müdürleri tarafından sağlanan bu tür destek ve ödüllendirmeler sayesinde öğretmenler derslerinde teknolojiyi daha hevesli bir şekilde kullanmakta ve teknoloji kullanımı için ekstardan zaman ayırmaktadırlar. Bu sebepten dolayı tüm okul müdürleri bu tarz ödül ve teşvikler kullanarak öğretmenlerin teknoloji kullanımı desteklemelidir.

Bu çalışmada uygulanan stratejiler teknoloji entegrasyonu sürecinde yaşanan sıkıntıların üstesinden gelebilmek için neler yapılması gerektiği konusunda okul yöneticileri ve öğretmenlere yol gösterici olacaktır. Ayrıca,bu çalışma, okulların teknoloji entegrasyonu konusunda ne şekilde desteklenmesi gerektiği konusunda politika yapıcılara da önerilerde bulunmaktadır.