

Instructing ICT Lessons in Primary Schools: Teachers' Opinions and Applications

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Abstract

Regarding the use of information and communication technologies, acquiring basic knowledge and skills has become a necessity. Schools offer ICT lessons to young generations in order to enable them to use of ICTs effectively. But there are uncertainties about this relatively new lesson concerning effectiveness of the lesson and about how instruction of this lesson has been made. The aim of this study was to investigate how ICT lessons in primary schools are taught. In order to reach this goal, opinions of 51 computer teachers were collected through a survey questionnaire and analyzed by using both qualitative and quantitative techniques. According to the results the most frequently used methods by computer teachers were demonstration and practice, Q & A and lecturing methods. In terms of teaching materials, teachers reported that they were most frequently using textbook. There are two basic approaches used for software instruction in ICT lessons: demonstration & practice and use of written instructions. Some of the participant teachers reported that they preferred to use both approaches eclectically. According to the findings, the time duration allocated for this lesson is the most significant basic problem stated by the teachers in terms of implementing the curriculum prepared by the Ministry of National Education.

Key Words

ICT Lesson, ICT Teacher, ICT Instruction, Instructional Method.

In the current age where sources of information have been diversified, the concept of literacy has expanded to cover basic ICT skills (Yenice, Sümer, Oktaylar, & Erbil, 2003). Educational institutions are now expected to raise individuals who are able to use ICT effectively (Akkoyunlu & Kurbanoglu, 2003). According to the standards developed by the International Society for Technology in Education (ISTE, 2007), all students should be able to use ICT effectively to support learning and decision making.

From the perspective given above, it may be suggested that instruction of ICT is one important topic that educators should focus. In Turkey, ICT is offered as an elective lesson in primary schools. In previous years adjustments had been made regarding weekly hours of the lesson. Finally the ministry decided weekly hour of the lesson to be 1 hour for 6th, 7th, and 8th grades (Talim ve Terbiye Kurulu Başkanlığı, 2007, 2010).

Unfortunately, there are inadequate number of scientific studies conducted regarding the instruction of ICT (Phelps, Hase, & Ellis, 2005; Erdoğan et al., 2010). This situation is valid also for Turkey. Between the years 1989 and 2009, articles on ICT instruction were just 5.2% of all the articles, published in SSCI journals, on educational technology (Sert, 2010). Throughout this study, a limited number of manuscripts on ICT instruction could be accessed. Out of these studies, some were conducted with primary school

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and secondary school students (Asan & Haliloğlu, 2005; Dagdilelis, Satratzemi, & Evangelidis, 2004; Erdoğan et al., 2010; Ersoy, 2005; Ge, Thomas, & Greene, 2006; Gedizgil & Deryakulu, 2008; Kural Er & Güven, 2008; Özdener & Öztok, 2005; Park, Sim, & Roh, 2008), some were conducted with undergraduates and adults (Akdemir & Memiş, 2008; Aşkar & Davenport, 2009; Barg et al., 2000; Birol, Bekiroğulları, Etçi, & Dağlı, 2009; Göktaş, Yıldırım, & Yıldırım, 2008; Gülseçen & Kubat, 2006; Köseoğlu, Yılmaz, Gerçek & Soran, 2007; Phelps et al., 2006; Dunsworth, 2004; Ross, Drydale & Schulz, 2001; Scheepers & Villers, 2000; Varank, 2006). Some of these studies were conducted with various age groups (Özdener, 2008; Yan & Fischer, 2004). On the other side, the literature contains studies which are related to but not directly on ICT instruction (Akbaba-Altun, 2005; Altun & Ateş, 2008; Dirisağlık & Kabakçı, 2009; Karal, Reisoğlu & Günaydın, 2010; Orhan, 2005; Seferoğlu, 2007; Seferoğlu & Akbıyık, 2009; Tanrıoğen & Özel, 2011). In addition to quantitative inadequacy of the studies on ICT instruction, scope of these studies vary (method, material, achievement, problem solving skills, attitude etc.), preventing us to see number of these conducted studies are sufficient. It is difficult to mention that instructional methods (cooperative, demonstration & practice, etc.) or approaches (behaviorist, cognitive, constructivist) used for ICT instruction have been studied enough.

One of the most important aspects of teaching-learning process is how to teach subjects. Arrangement of learning experiences as well as selection and practice of instructional methods are of significance (Açıkgöz, 2003; Çelikkaya & Kuş, 2009). Efficiency of a curriculum may be obtained by arranging learning environments and selecting appropriate approaches, methods, and materials (Aykaç, 2011). One of the easiest ways of achieving curricular objectives is selecting and practicing appropriate instructional methods (Demirel, 2006). In other words, instructional methods employed are important to ensure effectiveness of a lesson. Although a number of studies were conducted on ICT instruction, yet instruction of ICT has not been studied enough. Scientific studies on ICT instruction may contribute to curriculum development efforts as well as other researches. They may also help to and guide ICT teachers. Eventually, this study was planned and carried out to clarify implementations and practices in ICT instruction given in primary schools.

Method

Model and Aim

This research is a case study. Case studies are useful in describing details of, bringing possible explanations to, and making an evaluation of a case (Gall, Borg, & Gall, 1996 cited in Büyükoztürk, Kılıç-Çakmak, Akgün, Karadeniz, & Demirel, 2009). The basic aim of this study is to determine how ICT lessons in primary schools are taught. In order to reach this goal, ICT teachers' opinions were collected. The case was limited with methods and materials used in the lesson, instruction of software, and weekly hours of the lesson.

Data Collection Tools

Two instruments were used in data collection. The first instrument, personal information form, was used to collect personal information such as gender, work experience, type and facilities of the workplace. The second instrument was a survey titled "Instruction of ICT Lesson". Participants were asked about tools, materials, and methods they use during the teaching-learning process. The survey was developed by the researchers after a literature search. The survey used by McCarthy (1998) in his doctoral dissertation was benefitted during formulation of the survey items. Opinions of 3 experts were obtained to maintain content validity of the survey. Afterwards, a pilot implementation was realized with the participation of 4 ICT teachers. Based on the feedbacks, minor corrections were made and the final version of the survey was introduced. The final version of the survey consisted 64 multiple choice and rating type and 2 open ended items.

Study Group

The study group was determined with convenience sampling and consisted of 51 computer teachers. E-mail addresses of 66 ICT teachers whom the researchers have had acquaintance were accessed and data collection tools were sent to them. The surveys returned from 51 ICT teachers were included in the study. The teachers' workplaces were in 28 different cities of Turkey. Nearly half of the participants (47%) were female, while 53% of them were male. The work experience of the teachers was between 1 and 5 years. All teachers were working at schools equipped with IT rooms.

Analysis of Data

The data were analyzed using both quantitative (frequency, percentage, and arithmetic mean) and qualitative (content analysis) techniques. The data, collected with multiple choice and rating type items, were analyzed using frequencies, percentages, and arithmetic means. The data, obtained with open-ended questions, were analyzed using content analysis. In addition, open-ended responses were used in interpretation of research findings.

Content analysis enables reaching concepts and relations to explain the collected data (Yıldırım & Şimşek, 2008). This analysis (identifying themes and coding) was performed upon agreement of the two researchers. To maintain internal and external validity of the coding task, themes were reviewed several times. They were ensured to be consistent with each other and also to explain the data meaningfully. After identification of the themes, a part of the data set was test coded and themes were reviewed again.

Role of the Researchers

ICT lesson and ICT instruction are among research interests of the researchers. Besides, the researchers teach undergraduate and graduate students such topics as use of ICT in education and ICT instruction. All activities like accessing the participants, developing data collection tools, collecting, and analyzing data were performed by the researchers.

Limitations

The main limitation of the study is the sampling technique. A maximum variation sampling might have been more advantageous to study a broad range of subjects. However, another sampling technique was not used because, during data analysis, the data collected were seen adequate to depict the case. Other limitations of the study are a) not applying to experts' opinions during identification of the themes and b) coding of the data only by the researchers. With the precautions explained in analysis of data these limitations were eliminated in a degree.

Results

According to the findings, the most frequently used methods by ICT teachers are demonstration & practice, Q&A, and lecturing methods. Problem solving, group discussion, and team work are other frequently used methods. ICT teachers do not prefer

project method so often. Inadequate duration of the lesson is the main reason shown to that. The teachers, in varying percentages, indicated that they draw students' attention, stimulate recall of prior learning, summarize the topic and provide feedback in order to maintain learning. Also some teachers indicated that they helped students one to one.

In terms of teaching materials, ICT teachers most frequently use course book. They also prefer written instructions prepared by themselves or by other teachers. Other sources such as web sites, animations, or videos are preferred less often.

The content analysis showed that there are two basic approaches used for instruction of software. These are demonstration & practice and use of written instructions. In the first approach teacher explains the topic generally with the help of a projector, afterwards students are asked to practice the topic. In the second approach students are expected to follow and apply the instructions written on a worksheet or on the course book. Some of the teachers prefer to use both approaches eclectically.

Findings indicate that ICT teachers do not use measurement and evaluation activities and do not give homework much often. Teachers face some difficulties in implementing the curriculum prepared by the Ministry of National Education. Amount of time duration allocated for the lesson is the basic source of the problem.

Discussion

Primary school ICT lesson was designed to include 3 basic learning areas which are basic operations and concepts, use of ICT, and advanced ICT applications (Talism ve Terbiye Kurulu Başkanlığı, 2006). It can be stated that primary school ICT lesson has a main focus on the use of such software types as word processor, spreadsheet, presentation software, and web page editor. Instruction of these software types may be counted as instruction of basic ICT skills (computer literacy). Researchers such as Dirisağlık & Kabakçı (2009) and Tanrıoğen & Özel (2011) report that IT rooms in primary schools are used mainly for the instruction of basic computer skills. From that point of view, we can expect methods used by ICT teachers would provide us clues regarding the instruction of software types stated above.

In a study conducted by Karal et al., (2010) it was found that ICT curriculum contains examples and situations from real life and it channels students to comprehend information. On the other hand,

Seferoğlu (2007) found that ICT teachers face some difficulties implementing project based activities given in the curriculum. Findings of the current study revealed that ICT teachers prefer methods more which are aiming at knowledge, comprehension and application levels. But this finding does not mean that they do not use methods which aim at high order thinking skills at all. Such methods are used in a moderate frequency. It is likely that facing some difficulties regarding especially time duration of the lesson; computer teachers prefer the most efficient methods to reach the curricular aims. Although the nature of the ICT lesson is appropriate for project studies, computer teachers rarely use this method. As the insufficiency of the duration allocated for ICT lesson has been reported by a number of previous studies (Altun & Ateş, 2008; Seferoğlu, 2007), this situation may be a result of limited duration of the course. It is also possible that teachers do not have enough time for these types of activities. ICT teachers are viewed as technical support persons and they were also expected to help others in some personal computer related problems they face (Seferoğlu & Akbıyık, 2007).

According to the research of Dunsworth, 2004, written instructions and project based activities are seen as the most efficient ways in computer literacy instruction. This study revealed that course book and written instructions are the most frequently used source by ICT teachers. Teachers prefer paper based materials more than electronic ones. One reason to that may be the quality of the course books. Other possible reasons may be problems of connection and inadequacy of the Internet sources in terms of appropriateness, design, and language.

Although a number of studies were conducted (Akdemir & Memiş, 2008; Asan & Haliloğlu, 2005; Barg et al., 2000; Gülseçen & Kubat, 2006; Scheepers & Villers, 2000) it is still unclear which methods or approaches are effective for ICT instruction. In addition to their quantitative inadequacy, the studies conducted on ICT instruction were designed to answer different research questions. These studies address different variables, preventing us to see a clear picture. Perhaps the most significant of the research is the one on the way ICT teachers prefer in instruction of software. Demonstration & practice and use of written instructions (tutorials) are the two basic approaches used for instruction of software. In the demonstration & practice approach teacher explains the topic generally using a projector, afterwards students are asked to practice the topic. In the second approach students are ex-

pected to follow and apply the instructions written on a worksheet or on the course book. Some of the teachers prefer to use both approaches eclectically. From the findings it is also understood that ICT teachers incorporate various methods in these two approaches. Future studies may investigate effects of the two approaches on learning outcomes. In a related study with this finding, Merchant, Kreie, & Cronan (2001) made comparisons among multimedia based learning, expository teaching and use of written instructions. The researchers found that, regarding computer literacy skills, the students who learnt in a computer based multimedia environment achieved worse and felt less content than the ones who learnt with written instructions or expository learning.

Yan and Fischer (2004) draw attention to scaffolding for novice computer users. Learners need less as they gain experience in using computers. On the other hand Dunsworth's 2004 study emphasizes importance of feedback given during ICT instruction. In his study Varank (2006) found that learning computer literacy skills in a classroom or laboratory environment motivates students more than learning these skills in a computer based environment. The common point of these studies is the instructor support. According to the findings, ICT teachers try supporting their students by employing such strategies as drawing attention, stimulating recall of prior learning, summarizing the topic, providing feedback, and helping them one to one. On the other hand, peer support is another important issue for ICT instruction. Park et al. (2007) reports positive effect of peer support on learning of ICT skills. Some of the participants of the current study stated they use peer support in their lessons. We can infer from these findings, a group of ICT teachers are aware of importance of human factor (instructor and peer support) in ICT instruction.

We know that measurement and evaluation affect student performance (Bayrak, 2007). ICT lessons in primary school do not affect students' academic achievement points. Although giving grades is not the main purpose of measurement and evaluation (Doğan, 1997), a number of studies (Altun & Ateş, 2008; Seferoğlu, 2007) draws attention to negative consequences of this situation. The findings of our study indicate that ICT teachers do very little measurement and evaluation probably as a result of such limitation.

From the unpleasant results such as not being computer literate of 69.42% of undergraduate students (Korkmaz & Mahiroğlu, 2009), we understand

more studies should be conducted on ICT instruction. These technologies evolve rapidly and knowledge about them may outdate so quickly (Phelps et al., 2005). A teacher-Centered approach for the instruction of these technologies may not be enough. In this era where teachers are expected to employ student-Centered constructivist methods (Çelikkaya & Kuş, 2009), ICT instruction should cover not only ICT skills but also effective variables as self-efficacy, dispositions, and values.

As the last words, we consider findings of this study would concern academicians, educators, and experts who are interested in ICT instruction. We also think the findings are not valid just for primary school ICT lesson given in a computer room. In a degree, they may be generalized to basic computer literacy instruction as well as instruction of such software as photo editing or video editing. Also, with the evolving technology, ICT instruction can be given in various places. Outcomes of this research can be helpful for ICT instructions given in different places.

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Ek 1.

İlköğretim Bilişim Teknolojileri Dersinde Yazılımların Öğretimiyle İlgili Verilerin Kodlaması

Öğretmen No	Kodlama Sonucu
2	Önceki dersi özetleme, soru sorma, işlenecek konuyu açıklama, uygulama yaptırma
3	Ders kitabındaki etkinlikleri yaptırma
6	Önceki dersle ilgili sorular sorma, yeni konuyu geçmiş öğrenmelerle ilişkilendirme, konuyu sunduktan sonra uygulama yaptırma, öğrencilerle bire bir ilgilenme, dersin sonunda konuyu özetleme
7	Konuyu açıklama, öğrencilerden anlatılanları yapmalarını isteme. Bazen konuyla ilgili ön bilgi verip çalışma kâğıtları dağıtma ve uygulama yaptırma, çalışmalarını ağ üzerinden kontrol etme
8	Konuyu açıkladıktan sonra uygulama yaptırma, öğrencilerin birbirlerine yaptıklarını anlatmalarını sağlama
9	Projeksiyon ve tahtayı kullanarak konuyu açıklama, esri yapma, dersin sonunda tekrar yaptırma
10	Soru sorarak dikkati çekme, konuyu bilgisayar ekranından gösterme, ders kitabındaki etkinlikleri yaptırma
11	Dikkati çekme, geçmiş öğrenmeleri hatırlatma, işlenecek konuyla ilgili ipuçları verme, uygulamaya yönelik bir konu ise gösterip yaptırma, dersin sonunda sorular sorma
12	Konuyu güncel olaylarla ilişkilendirme, ipuçları verme, beyin fırtınası yapma, soru sorma, ders kitabındaki etkinlikleri yaptırma, ders sonunda soru sorma, özetleme, ödev verme
14	Projeksiyon ile konuyu açıklama, soru sorma, uygulama yaptırma, öğrencilerle birebir ilgilenme, çalışmalarını değerlendirme
16	Dersi kitaptaki basamaklara göre işleme
17	Projeksiyon kullanarak konuyu açıklama, proje yaptırma
18	Küçük gruplara bilgisayar başında konuyu açıklama, uygulama yaptırma, değerlendirme
20	Kitaptaki etkinliklere göre ders işleme, uygulama yaptırma
22	Geçmiş öğrenmeleri hatırlatma, dikkati çekme, uygulama varsa yaptırma, özetleme
23	Projeksiyon kullanarak konuyu açıklama, proje çalışması yaptırma
24	Geçmiş öğrenmeleri hatırlatma, dikkati çekme, konuyu açıklama, bazen kitaptaki etkinlikleri yaptırma, uygulama yaptırma, öğrencilerle birebir ilgilenme, özetleme
26	Tahtaya kullanarak konuyu açıklama, kitaptaki etkinlik ve uygulamaları yaptırma
27	Geçmiş öğrenmeleri hatırlatma, konuyu açıklama, uygulama yaptırma, öğrencilerle birebir ilgilenme
28	Ders kitabındaki etkinlikleri yaptırma
31	Projeksiyon kullanarak konuyu açıklama, ders kitabını ve kendinin hazırladığı etkinlikleri uygulama, öğrencilerin keşfetmesi sağlama
32	Geçmiş öğrenmeleri hatırlatma, ders kitabındaki etkinlik ve uygulamaları yaptırma, uygulama yoksa başka derlerle ilgili çalışma yaptırma, oyun oynatma
33	Dikkati çekme, ipucu verme, soru sorma
35	Geçmiş öğrenmeleri hatırlatma, tartışma, soru sorma, bazen konuyu açıklamadan önce uygulamayı öğrencilerden yapmalarını isteme, projeksiyon kullanarak uygulamayı açıklama, uygulama yaptırma, öğrencilerle birebir ilgilenme, tekrar yapma
36	Geçmiş öğrenmeleri hatırlatma, dikkati çekme, ağ yazılımı kullanarak gösterip yaptırma, problem biçiminde uygulama yaptırma
37	Dikkati çekme, soru sorma, uygulama yaptırma
38	Projeksiyon ile gösterme, uygulama yaptırma
39	İpuçları verme, buluş yoluyla öğretimi kullanma, gösterip yaptırma
41	Hedeften haberdar etme, konuyu açıklama, uygulama yaptırma, öğrencilerle birebir ilgilenme
42	Geçmiş öğrenmeleri hatırlatma, dikkati çekme, projeksiyon kullanarak konuyu açıklama, uygulama yaptırma, öğrencilere birebir yardım etme, akran yardımını sağlama
43	Ders kitabındaki adımları izlemelerini isteme, uygulama yaptırma, ders kitabındaki eksiklikleri farklı materyallerle tamamlamaya çalışma
45	Hedeften haberdar etme, soru sorma, beyin fırtınası yaptırma, projeksiyon kullanarak konuyu açıklama, uygulama yaptırma, öğrencilere birebir yardım etme
46	Hedeften haberdar etme, konuyu açıklama, uygulama yaptırma, birebir ilgilenme
47	Geçmiş öğrenmeleri hatırlatma, dikkati çekme, soru sorma, ders kitabına göre konuyu işleme, soru sorarak ya da uygulama ile öğrenilenleri kontrol etme
48	Disiplinler arası bağlantı kurmaya çalışma, dikkati çekme, araştırma yaptırma, gösterip yaptırma, akran yardımını teşvik etme, birebir yardım etme, kontrol listesi ile kontrol etme
49	Geçmiş öğrenmeleri hatırlatma, tahtayı kullanarak etkinliği açıklama, uygulama yaptırma, bazen çalışma kâğıdı verme, öğrencilere yardım etme
51	Ders kitabını izleyerek uygulama yaptırma, ürünleri kaydederek ürün dosyası oluşturma
53	Ders kitabından konuyu açıklama, sonra bilgisayar ekranından konuyu açıklama, uygulama yaptırma, kontrol etme
54	Geçmiş öğrenmeleri hatırlatma, gösterip yaptırma, buluş yoluyla öğrenmeyi kullanma
56	Projeksiyon kullanarak konuyu açıklama, uygulama yaptırma, öğrencilere birebir yardımcı olma
58	Dikkati çekme, tartışma, tartışma, projeksiyon kullanarak konuyu açıklama, uygulama yaptırma, özetleme
60	Projeksiyon kullanarak konuyu açıklama, gösterip yaptırma
61	Dikkati çekme, uygulamaları gösterip yaptırma, birebir yardım etme, proje verme
62	Dikkati çekme, projeksiyon ve akıllı tahta kullanarak konuyu açıklama, uygulama yaptırma, öğrenci dosyalarıyla ilgili tartışma yaptırma
63	Geçmiş öğrenmeleri hatırlatma, kılavuz kitaptaki etkinlikleri açıklama, uygulama yaptırma, yardım etme
64	Kılavuz kitaptaki etkinlikleri açıklama ve uygulama yaptırma
65	Projeksiyon kullanarak konuyu açıklama, uygulama yaptırma, öğrenci çalışmalarını kontrol etme
66	Projeksiyon kullanarak konuyu açıklama, öyküleştirme, anlatılanları uygulama, çalışma kâğıtlarında verilen örneği yapmalarını isteme

Ek 2.

Öğretmenlerin İlköğretim Bilişim Teknolojileri Dersinde Yazılımların Öğretiminde İzlenen Yollarla İlgili Temalara Değınme Durumları

Öğretmen No	Yazılımların Öğretiminde İzlenen Yollar	Öğretmen No	Yazılımların Öğretiminde İzlenen Yollar
2	1, 3	36	1, 3, 4
3	2	37	1, 3
6	1, 3, 6	38	3
7	3, 1, 2, 7	39	3
8	3, 5	41	1, 3, 6
9	3, 1	42	1, 3, 6, 5
10	1, 2, 3	43	2
11	1, 3	45	1, 3, 6
12	1, 2	46	1, 3, 6
14	3, 6, 7	47	1, 2, 9
16	2	48	1, 3, 5, 6, 7
17	3	49	1, 3, 2, 6
18	3, 7	51	2, 7
20	2	53	2, 3, 7
22	1, 3	54	1, 3
23	3, 4	56	3, 6
24	1, 2, 3, 6	58	1, 3
26	3, 2	60	3
27	1, 3, 6	61	1, 3, 4, 6
28	2	62	1, 3, 7
31	3, 2	63	1, 2, 6
32	1, 2	64	2, 3
33	1	65	3, 7
35	1, 3, 6	66	3, 2, 4