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Evaluating ICT Integration in Turkish K-12 Schools through Teachers' Views

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The current study aims to explore ICT integration in Turkish K-12 schools purposively selected as a representation of F@tih and non-F@tih public schools together with a private school. A convergent mixed methods design was employed with a multiple case strategy as such it will enable to make casewise comparisons. The quantitative data was collected through e-capacity measurement scales. Concurrently, the qualitative data was gathered through three open-ended questions. The evaluation results illustrate that a private school outperformed all public schools, including F@tih and non-F@tih schools. However there are some promising results indicating that F@tih project has made some significant inroads into improvement of ICT related school conditions, specifically ICT infrastructure of public schools. Yet, the findings also illustrate that ICT coordination and support, ICT vision, policy and teachers' ICT training, and their ICT use are policy domains that should be addressed and improved in both F@tih and non-F@tih schools.

Keywords: e-capacity framework, F@tih project, ICT integration, multiple case study, program evaluation

INTRODUCTION

The rapid growth in knowledge and technology has spawned a growing disparity between education and other sectors. In order to bridge this gap and provide an experience of equity pedagogy for all students, many countries have had to employ Information and Communication Technologies (ICTs) as a mediator for teaching the skills and knowledge that students need for the information society (Buabeng-Andoh, 2012). As a result of this imperative, for the last two decades, ICT integration in education has been of increasing concern in both developed and, particularly, developing countries (Jamieson-Proctor, Watson, Finger, Grimbeek & Burnett, 2007). Since ICT is regarded as "a learning tool and the mediator of a nation's educational goals" (Baser-Gulsoy, 2011, p. 1), national educational organizations and policy makers need to overhaul their curricula and integrate ICT into the teaching and learning process in order to achieve strategic educational outcomes. In addition, more recently, with the announcement of large-scale ICT integration programs, not only educational goals of a country, but also many interrelated political, social and

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economic outcomes have gained currency. To achieve these interrelated strategic outcomes has become closely associated with effective use of ICT in education.

In view of this, many countries like the UK, Turkey, Uruguay, Peru, Korea, Mexico, China, India, and Malaysia have initiated large-scale ICT integration programs like OLPC (One Laptop Per Child) in Peru and F@tih (Movement of Enhancing Opportunities and Improving Technology) project in Turkey. Since this sort of initiatives generally aims to provide every student with a laptop or tablet, they are usually called as one-to-one (1:1) programs. Implementation process of these national large-scale initiatives has been the subject of discussion and debate not only in international research community but also in countries considering of initiating their own ICT integration programs. Proponents of allocating huge national budgets for this kind of large-scale ICT integration projects claim that the common technology use in schools improves the quality and the quantity of teaching and learning process (Buabeng-Andoh, 2012, Hew & Brush, 2007; Yildirim, 2007). By contrast, some opponents go on to discuss that there isn't a satisfying amount of proof empirically showing the significance of relations between the use of ICT in classroom and the school improvement. For example, Gulbahar (2007), argued that "despite the huge educational investment on ICT in schools, there is a little success achieved so far" (p. 943). However; a more recent research study displayed that there is a link between the academic performance of students and their use of tablet PCs in the classroom (Ferrer, Belvís & Pàmies, 2011). Although these contracting results in the literature are not strong enough to make a generalization; they may put some valuable evidence to illustrate the complex nature and multi-dimensionality of ICT integration into education, as well as implicitly illustrating the need for more research studies.

State of the literature

- With the rapid growth in knowledge and technology, many countries, including Turkey, have had to overhaul their curricula and initiated large scale ICT integration programs.
- The literature acknowledges that ICT integration is a complex and multi-faceted phenomena consisting of system, school and teacher level conditions. However, previous studies mostly focus on ICT related teacher conditions.
- Previous studies herald that little is known about the current ICT integration process in Turkish K-12 schools, especially F@tih schools. In order to fill this gap and extend the existing sparse literature, we employed a convergent mixed-methods design with a multiple case strategy.

Contribution of this paper to the literature

- This paper adds originality to the existing sparse ICT integration literature by presenting formative evaluation results of F@tih, non-F@tih schools, and a private school.
- On theoretical side, the current study utilized a multiple case strategy to elaborately explore the current implementation of ICT integration focusing on both ICT related teacher and school level conditions, together with teachers' actual use of ICT.
- On practical side, our findings provide invaluable insights and shed light to ICT policy makers, school principals, and international research community by clearly depicting the strength and weaknesses of current implementation of ICT integration in Turkish context.

Since the previous research studies are mostly based on qualitative methods and mainly focus on teacher level conditions, there is a need for a more holistic approach to evaluate ICT integration. In this vein, in order to examine components of ICT integration in Turkish context, as a theoretical foundation we utilized e-capacity framework developed and empirically tested by Vanderlinde and van Braak (2010) . Framed by the e-capacity theoretical construct, the current study adds originality to the sparse literature of ICT integration in Turkish context since it employs a mixed methods design with a multiple case strategy in order to elaborately explore the current implementation of ICT integration in Turkish K-12 schools in their natural context.

LITERATURE REVIEW

In the search for factors that have a significant effect on the use of ICT in educational context, several researchers have conducted significant number of research studies (Akbaba-Altun, 2006; Akbulut, 2010; Almadhour, 2010; Almekhlafi, & Almeqdadi; Baser-Gulsoy, 2011; Buabeng-Andoh, 2012; Cakiroglu, 2015; Demiraslan, & Usluel, 2008; Flanagan, & Jacobsen, 2003; Hismanoglu, 2012; Karaca, Can, & Yildirim, 2013; Lim, 2006; Mumtaz, 2000; Pamuk, Cakir, Ergun, Yilmaz, & Ayas, 2013; Sahin, Akturk, & Celik, 2013; Tezci, 2011; Vanderlinde, & van Braak, 2010; Yuen, Law, & Wong, 2003). By reviewing the literature, it can be concluded that research investigating the factors effecting the integration of ICT into the curriculum mainly focuses on teacher characteristics including gender (Almekhlafi, & Almeqdadi, 2010; Tezci, 2011), teachers' attitudes towards ICT (Cakiroglu, 2015; Pamuk et al., 2013; Sahin et al., 2013) or other conditions at teacher level (Almadhour, 2010; Yücel, Acun, Tarman, & Mete, 2010) along with teachers' pedagogical beliefs (Baser-Gulsoy, 2011, Mumtaz, 2000) and ICT training (Hismanoglu, 2012; Tondeur, van Keer, van Braak, & Valcke, 2008). However, other research studies, with a broader perspective, have demonstrated that there are some other factors at school level that influence ICT integration; such as, school principals' attitudes towards ICT (Flanagan & Jacobsen, 2003; Yuen et al., 2003), school culture (Tezci, 2011), ICT policy or ICT planning (Goktas, Yildirim, & Yildirim, 2009; Gulbahar, 2007; Hooker, Mwiyeria, & Verma, 2011; Lim, 2006; Tondeur et al., 2008; Vanderlinde, van Braak, & Dexter, 2012), ICT infrastructure (Akbaba-Altun, 2006, Tondeur et al., 2008), other institutional and technological factors (Akbulut, 2010; Buabeng-Andoh, 2012; Demiraslan, & Usluel, 2008; Karaca et al., 2013; Yildirim, 2007).

Although the research studies in the past decade have dominantly focused on ICT related teacher conditions and have put a pivotal role on teachers use of ICT as a means of effective educational change, Afshari, Bakar, Luan, Samah, & Fooi (2009) argued that "most teachers neither use technology as an instructional delivery system nor integrate technology into their curriculum" (p. 77). Likewise, Yildirim (2007) conducted a research study investigating teacher's ICT use and the results of which showed "most teachers did not use ICT to promote pupils attainment in areas across the curriculum, but they use computers frequently for preparing handouts and tests" (p. 171). Thus, a significant number of research studies illustrate that teachers do not use ICT in teaching and learning process as a mediator of achieving educational outcomes. Consequently, this gives rise to questioning and concerns of teachers' ICT skills and their ICT training.

Valuing ICT skills of teachers, Almadhour (2010) stated that teachers' role is central to effective integration of ICT into curriculum, and further suggested that teachers' ICT skills should be improved for an effective ICT integration. This suggestion is evidently supported by a recent empirical study conducted by Hismanoglu (2012), revealing that "the prospective teachers having five ICT-related courses displayed better attitudes in comparison to those not completing this training period" (p. 183). Theoretically, Yucel, Acun, Tarman and Mete (2010) grouped teachers into three stages in regard to their ICT integration process. The first group displays feelings of inadequacy in using ICT, and ICT knowledge is the most important variable for those who are at the highest (third) stage. As a result, the literature indicates that there is a link between teachers' use of ICT in their classes and their ICT training and ICT competencies.

In view of this link, in order to find what factors influence teachers' decisions to use ICT in classroom, Mumtaz (2000) conducted a research study and described some factors, such as; "access to resources, quality of software and hardware, ease

of use, incentives to change, support and collegiality in their school, school and national policies, commitment to professional learning and background in formal computer training" (p. 319). Similarly, Akbulut (2010) found that there are eleven indicators of ICT integration, namely, teaching-learning methods, e-learning, e-interaction, learning communities, infrastructure, access, ease of use, technical assistance, policy, special education and health. Appreciating the central role of teachers' beliefs towards ICT, Mumtaz (2000) put an emphasis on the role of pedagogy, and also highlighted three key elements of a successful ICT integration; the teachers, the school and policy makers. Consequently, by reviewing the literature, it can be evidently concluded that ICT integration is a complex and multidimensional phenomena including system, school and teacher level conditions.

After reviewing the sparse but sometimes conflicting ICT literature, it is inferred that there is a need for a more holistic ICT integration framework. In line with this need, Vanderlinde and van Braak (2010) argued that most of the conflicting research results in the ICT literature are mostly based on context specific qualitative findings. Although they are promising for future studies; these theoretical underpinnings are not useful for quantitative research since they present few scales. As a result, there are few research studies empirically testing the ICT integration in schools. More specifically, in one-to-one program running countries like Turkey, little is known out of the borders of country and even inside its borders because of insufficient official documentation and sparse research reports (ERI, 2013).

Given the need for a more inclusive ICT integration model based on a school improvement approach, Vanderlinde and van Braak (2010) presented the e-capacity framework consisting of two layers that investigate ICT integration at school level and teacher level. The first layer includes five conditions such as (1) ICT school support, (2) ICT coordination, (3) schools' ICT vision, (4) ICT policy and (5) ICT infrastructure. The second layer includes two conditions, (1) ICT teachers' professional development, and (2) teachers' ICT competencies. Along with these mediating factors, Vanderlinde and van Braak (2010) also put Teachers' actual use of ICT in teaching and learning process a mediating role and place teachers' actual ICT use into another mediating layer in the model (see Figure 1).

As illustrated in Figure 1, e-capacity framework explicitly depicts the interrelated conditions in complex nature of ICT integration. Based on the interrelated context of macro-systems, such as economic, social, national and international context, inspired by a school improvement approach, the inclusive e-capacity model embraces school related and teacher related conditions together with teachers' actual use of ICT. In the central part, it places ICT curriculum implementation and ICT as leverage for instructional transformation. The e-capacity framework served as a theoretical foundation in the current study that aims to elaborately explore ICT integration in Turkish K-12 schools by employing a mixed methods design with a multiple case strategy.

SIGNIFICANCE AND PURPOSE OF THE STUDY

Integrating ICT into a centralized educational system such as Turkey's depends on its successful design and application (Akbaba-Altun, 2006). In planning for ICT integration in education, "policymakers need to begin by clarifying overall national education policy, objectives and approaches, as this should serve as the rationale and road map for technology integration in their education systems" (Hooker, et al., 2011, p.16). By contrast, with an overemphasis on ICT infrastructure of the schools, the Turkish government initiated this sort of a large-scale project without sufficient planning and guidelines. Although the pilot phase of the project has ended, there is a lack of official documents and research/evaluation reports that will provide insights for international research community and lessons or experiences that can be drawn

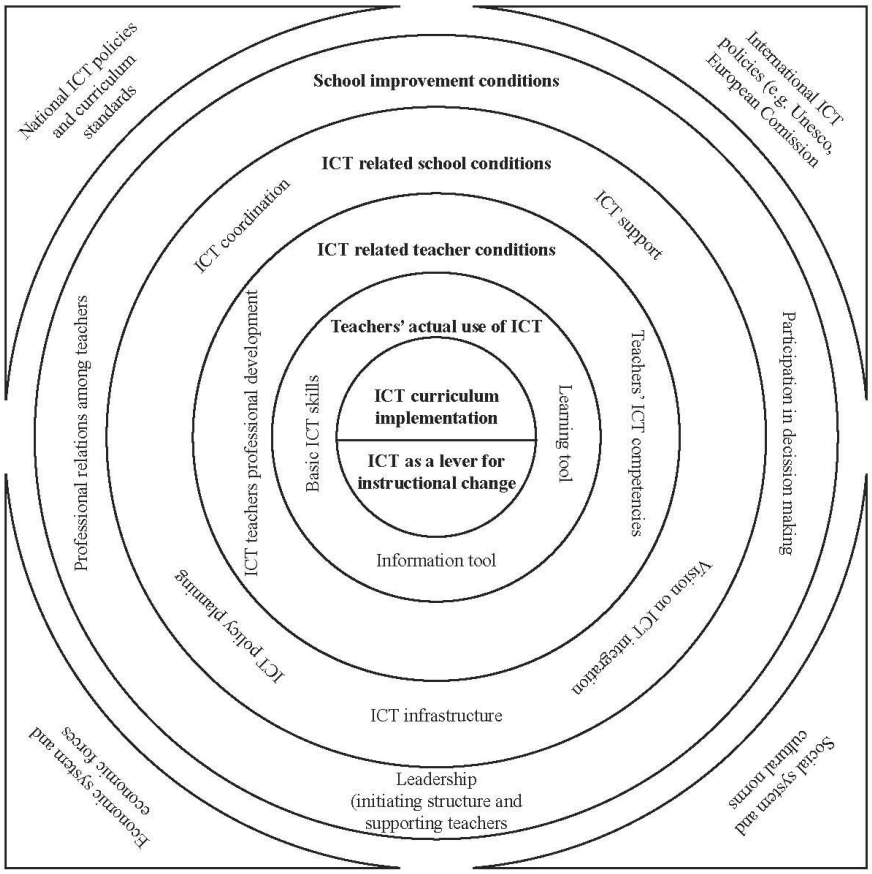

Figure 1. E-Capacity Model (Vanderlinde & van Braak, 2010, p. 544)

from the natural context of F@tih schools (ERI, 2013). In this vein, the current study adds to the limited body of research exploring ICT integration in Turkish context. It also differentiates from the previous studies as follows:

- Though most of the previous studies in the literature mainly focus on ICT related teacher conditions by utilizing either quantitative or qualitative methods, the present study tests both ICT related teacher and school level conditions by employing a mixed methods design.
- There are a limited number of studies in the literature conducted to evaluate ICT integration in F@tih context. However, these studies mainly focus on teachers', students and/or parents' views about IWBs and/or Tablet PCs (Cakiroglu, 2015; Sahin et al., 2013; Pamuk et al., 2013) ignoring some important school level conditions such as schools' ICT vision and infrastructure. Yet, the current study utilizes a more comprehensive theoretical construct - e-capacity framework - in order to elaborately evaluate ICT integration in F@tih context.
- The most significant difference between our study and the previous studies, we employed a mixed-methods design with a multiple case strategy with different type of schools in the same socio-cultural context as such to make it possible to decide if there is a significant difference between F@tih and non-F@tih schools regarding ICT integration.
- Unlike the previous studies in the literature, we calculated the effect size of the measures of the strengths of significant differences so that future researchers can compare our results with similar studies.

Consequently, since little is known about the current process of ICT integration in Turkish K-12 schools, previous studies acknowledge that there is a need for more case studies (Cakiroglu, 2015; ERI, 2013; Pamuk et al., 2013; Sahin et al., 2013). Given this, the overarching aim of the present study is to explore ICT integration in Turkish K-12 schools including F@tih, non-F@tih and a private school by utilizing a convergent mixed-methods design.

In this context, the current study adds some original contributions to the theory and praxis in the realm of ICT integration. First of all, on the theoretical side, the current study adds value to the literature in extending the sparse literature of ICT integration. Secondly, it also presents invaluable insights to how e-capacity theoretical construct works in evaluation of a cross-cultural context of F@tih. Thirdly, on the practical side, the current study provides evaluation results of F@tih project schools and purports comparative results of non-F@tih schools together with a private school. Finally, in addition to explicitly defining policy domains that need to be improved for an effective ICT integration, the current study also provides some significant insights as such to serve as a guideline for both F@tih project decision-makers and ICT policy makers along with international research community by clearly illustrating the strengths and weaknesses of the current implementation of ICT integration in Turkish K-12 schools. Moreover, findings of the current study are also robust, since quantitative and qualitative findings mostly concurred. Thus, they may shed valuable insight into future research and researchers planning similar cases.

In order to explore ICT integration in case schools, the following evaluation questions were sought an answer:

1. What are the teachers' perceptions about ICT related school conditions?
    i. Is there a significant difference between the mean scores within the case schools?
    ii. What do the teachers think about (a) ICT support and coordination, (b) ICT vision and policy, (c) ICT infrastructure in their schools?"
2. What are the teachers' perceptions about ICT related teacher conditions?
    i. Is there a significant difference between the mean scores within the case schools?
    ii. What do the teachers think about (a) Teachers' Professional Development and (b) Teachers' ICT Competencies?
3. How often do the teachers use ICT in the classroom (ICT as an information tool, ICT as a learning tool, Basic ICT skills)?
    i. Is there a significant difference between the mean scores within the case schools?
    ii. What do the teachers think about their actual use of ICT in class?
4. What do the teachers think about the ICT integration in education?

METHOD

In order to explore ICT integration in Turkish K12-schools, a convergent mixed-methods design ('QUAN + qual' as in the typology of Creswell, 2012, p. 538) was employed utilizing a multiple case study strategy (Cassell, & Symon, 2004; Yin, 2003) with five K-12 schools in Istanbul Bagcilar district, in Turkey. The rationale for employing a mixed-method design was to blend the strengths of one type of method and neutralize the weaknesses of the other and enhance the data triangulation (Creswell, 2012, p. 542). The quantitative and qualitative data collected from the five participating schools were analyzed and interpreted to explore ICT integration. More concretely, by gathering quantitative and qualitative data concurrently, a convergent mixed methods design was utilized in order to help explain or elaborate on the quantitative results (Creswell, 2012).

Research setting

The multiple case study was conducted with five K-12 schools in Bagcilar district of İstanbul by employing a purposive sampling technique (Cozby, 2001; Creswell, 2012). The rationale for conducting the study in İstanbul is that it is the biggest province in Turkey with more private schools and F@tih pilot schools than any other province in Turkey. Moreover, Bagcilar is the most crowded city in İstanbul and it hosts a very multicultural population migrated from different regions of Turkey. In order to examine ICT integration in different type of schools in a cross-cultural context, all case schools were selected from Bagcilar.

The rationale for conducting this study with different type of schools including F@tih, non-F@tih, private, general and vocational secondary schools is to explore current implementation process of ICT integration in Turkish K-12 schools. We aimed to draw crosscase comparison results that may help to evaluate whether F@tih schools have really made any significant inroads into ICT integration compared with non-F@tih or private schools. In this regard, the case study also explores the school related conditions, teacher related conditions and teachers' actual use of ICT, in order to present a broader understanding of ICT integration process in case schools that may help to draw lessons for similar cases.

The rationale of including a private school in this study is that private schools are attracting more and more students every year; consequently, there is a remarkable increase in their number (Aydin, Guclu, & Pisapia, 2015). In 2013 private primary schools formed 3.4%, private lower-secondary schools 5.3%, and private secondary schools 9.9% of all schools in Turkey. However, in Istanbul 17.9% of primary schools, 17.8% of lower-secondary schools, and 35.6% of secondary schools were formed by private schools (IDNE, 2014). This palpably illustrates the growing privatization of the education sector in Turkey, especially in big cities like Istanbul. One of the underlying reasons of such a remarkable growth in their number may be associated with their effective ICT integration and ICT use opportunities offered by these private schools. In view of this, a private school is also under scrutiny in the current study in order to draw comparison results with F@tih and non-F@tih state schools.

The criteria for choosing the participating case schools was that School 1 is a state school and the only school in Bagcilar district that participated in the pilot phase of the F@tih project since its first announcement; School 2 is also a state school but it has more recently been included in F@tih project; School 3 is a non-F@tih state school and the biggest school in Bagcilar with about three thousand students; School 4 is also a non-F@tih vocational state school and it has an ICT technician training program; and finally School 5 is a private school running its own ICT integration program independent from Ministry of National Education (MoNE). All five case schools were selected purposefully as such that they can offer excellent research opportunities and provide experiences and lessons that can be drawn from their natural context. The researchers intended to explore ICT integration of these schools and understand whether ICT integration process significantly differ across the F@tih schools, non-F@tih schools and a private school. In this regard, our units of analysis are these five case schools. Detailed information about the case schools was presented in Table 1.

As presented in Table 1, the total number of participating teachers was 102 teachers (N=102) from five case schools in İstanbul Bagcilar district. The participants were 44% female, 75% above the age of 30, 41% with less than 10 years of teaching experience, nearly 60% attended at least five ICT in-service training. Since our units of analysis were case schools, they each provided unique research context of ICT integration experience. School 1 and School 2 have provided to explore F@tih experience. School 3 and School 4 are non-F@tih schools and they

Table 1. Contextual details of the case schools

	School 1	School 2	School 3	School 4	School 5
School Network	Public *(General Secondary)*	Public *(General Secondary)*	Public *(General Secondary)*	Public *(Vocational Secondary)*	Private *(General Secondary)*
ICT Background	F@tih Project pilot school	F@tih Project newly entered school	Locally ICT supported school	Having an ICT technician training program	Running own ICT integration program
District type	Urban	Urban	Urban	Urban	Urban
Number of IWBs	35	41	-	-	8
Number of computers in IT classroom	24	15	48	120	24
Tablet/Pupil ratio	1:1	0,25:1	-	-	1:1
Number of students	870	871	3054	865	130
Number of teachers	51	38	186	48	18
Participating teachers	16 (*9 male +7 female*)	20 (*11 male +9 female*)	18 (*6 male +12 female*)	30 (*25 male +5 female*)	18 (*6 male +12 female*)
Teachers average age	37 years	33 years	35 years	36 years	30 years
Average teaching experience	13 years	9 years	11 years	13 years	7 years
ICT in-service training	1-5 training	1-5 training	1-5 training	1-5 training	1-5 training

both provided a benchmark for comparing F@tih and non-F@tih schools. Finally School 5, a private school, also served as a benchmark to better understand how effective F@tih is to bridge the existing technology gap between public and private schools.

Data collection instruments and analysis

The quantitative data were collected through *E-capacity Measurement Scales* (Vanderlinde & van Braak, 2010) consisting of eight subscales: *ICT support and coordination* (self-reporting, Likert type, 7-item perception scale), *ICT vision and policy* (self-reporting, Likert type, 7-item perception scale), *ICT infrastructure* (self-reporting, Likert type, 4-item perception scale), *ICT teachers' professional development* (self-reporting, Likert type, 4-item perception scale), *Teachers' ICT competencies* (self-reporting, Likert type, 5-item perception scale), *ICT as an information tool* (self-reporting, Likert type, 7-item frequency scale), *ICT as a learning tool* (self-reporting, Likert type, 5-item frequency scale), *Basic ICT skills* (self-reporting, Likert type, 5-item frequency scale). Administering these measurement scales, school-related conditions, teacher-related conditions and teachers' actual use of ICT were formatively assessed in the five participating case schools.

Prior to data collection process, all items in the scales were translated into Turkish and then were reviewed by a board of four experts from foreign languages and educational sciences departments of Yildiz Technical University in order to ensure Turkish language equivalence of each item and content validity. After some

Table 2. Cronbach alpha (α) coefficient for e-capacity measurement scales

Scales	Turkish Version		Original Version (Vanderlinde & van Braak, 2010)	
	Number of Items	α	Number of Items	α
ICT support and coordination	7	.84	7	.91
Schools' ICT vision and policy	7	.94	7	.93
ICT infrastructure	4	.90	4	.83
ICT teachers' professional development	4	.86	4	.82
Teachers' ICT competencies	5	.87	5	.85
ICT as an information tool	7	.85	7	.87
ICT as a learning tool	5	.90	5	.88
Basic ICT skills	4	.82	4	.88

minor revisions suggested by the experts the Turkish version of the scales were generated (See Annexes). Table 2 illustrates the Cronbach's Alpha internal consistency coefficients measured for each e-capacity measurement scale.

As presented in Table 2, internal consistency coefficients tested in Turkish version of all measurement scales in the e-capacity model mostly concurred with the original version tested by Vanderlinde and van Braak in 2010. Thus, the translated Turkish version indicated a high level of reliability standard in Turkish context.

The quantitative data were statistically analyzed via SPSS 17.0 with a cut-off point of .05. The mean score and standard deviation of each item in the scales were calculated to determine the perception and frequency levels of the teachers in the participating schools. Prior to employing analyses of variance, Kolmogorov-Smirnov test and Levene's test were administered to the sample to understand whether the assumption of normality and equality of variance were violated or not. Seeing that the test distribution is normal, parametric analyses such as MANOVA were administered in order to explore whether there is a statistically significant difference in means across the case schools. As a post-hoc test Scheffe was administered in order to compare mean scores that significantly differed for each case school.

Concurrently, the participating teachers from the five case schools were asked whether they could accept to answer three open-ended questions. A total of 72 voluntary teachers answered open-ended questions. The first question was "What do you think about a) ICT support and coordination, b) ICT vision and policy, c) ICT infrastructure in your school?" The second question was "In your school, do you think a) teachers' professional development, b) teachers' ICT competencies and c) teachers' actual use of ICT sufficient? Explain why." The last question was "What do you think about ICT integration in education?" The text data of answers to the open-ended questions on the questionnaires were transcribed verbatim, coded and analyzed through categorizing and identifying overlapping themes in NVIVO10. Then the qualitative data were synthesized with the results of the quantitative study in order to refine the results elaborately.

RESULTS

Findings on ICT related school conditions across cases

In order to explore whether there is a statistically significant difference among the teachers' mean scores across the case schools, MANOVA was employed. Prior to MANOVA, the normality homogeneity of the variance within the cases were tested by employing Kolmogorov-Smirnow test and Levene's test. According to the K-S test

Table 3. Comparative analysis of ICT related school conditions across the cases

Scales	School 1 (n=16)		School 2 (n= 20)		School 3 (n=18)		School 4 n=(30)		School 5 (n=18)		MS	$F_{(4-97)}$	p	η^2	Scheffe
	M	SD	M	SD	M	SD	M	SD	M	SD					
1 ISSC	3.58	0.81	2.92	0.93	3.07	0.90	3.36	0.57	4.09	0.50	3.92	6.99	.00	.22	2<5, 3<5, 4<5
2 SIVP	3.34	1.18	2.92	0.83	2.55	0.98	3.29	0.93	4.26	0.60	7.40	8.71	.00	.26	2<5, 3<5, 4<5
3 IIS	4.22	0.69	3.43	1.06	2.62	1.29	3.43	1.02	3.97	0.82	6.57	6.39	.00	.20	3<1, 3<5

1 ISSC = ICT School Support and Coordination *MS= Mean Squares, SD= Standard Deviation,*
2 SIVP = Schools' ICT Vision and Policy *η^2= Eta squared effect size, $^*p < .05$, $^{**}p < .01$*
3 IIS = ICT Infrastructure

results (F= .78; p > .05) and Levene's test results (F = .77; p > .05), the test distribution is parametric and the equality of the variance is provided. The test results indicated that the assumption of normality is not violated. Then MANOVA analysis was administered to understand whether there is a statistical significance within the cases' mean scores. The MANOVA results illustrated that there is a significant difference between mean scores within case schools (Wilks Lambda (Λ) = 0.443, $F_{(32, 333)}$ = 2,573, p < .05).

The comparative analysis results illustrating the teachers' perceptions of ICT related school conditions in five case schools were presented in Table 3.

Displayed in Table 3, mean scores and multivariate analysis of variance (MANOVA) results illustrated that there were statistically significant differences in all 'ICT related school conditions [*ISSC* ($F_{(4-97)}$ = 6.99; p < .01) , *SIVP* ($F_{(4-97)}$ = 8.71; p < .01), *IIS* ($F_{(4-97)}$ = 6.39; p < .01)] scores across the case schools. For a deeper exploration of the significance of mean scores across the case schools, as a post-hoc test Scheffe was conducted and it was found that teachers from School 5 [*ISSC* (M = 4.09, SD = .50) , *SIVP* (M = 4.26, SD = .60)] had significantly higher perception scores than teachers from School 2 [*ISSC* (M = 2.92, SD = .93) , *SIVP* (M = 2.92, SD = .83)], teachers from School 3 [*ISSC* (M = 3.07, SD = .90) , *SIVP* (M = 2.55, SD = .98)] and teachers from School 4 [*ISSC* (M = 3.36, SD = .57) , *SIVP* (M = 3.29, SD = .93)]. In addition, regarding the ICT infrastructure condition, the teachers from School 1 (M = 4.22, SD = .69) and School 5 (M = 3.97, SD = .82) had significantly higher scores than teachers in School 3 (M = 2.62, SD = 1.29). Table 3 also demonstrates the Eta squared effect sizes of ICT related school conditions [*ISSC,* η^2 = .22; *SIVP,* η^2 =.26 and IIS, η^2 =.20], which were found above .20, indicated that the differences among teachers' perceptions had a modest effect (Muijs, 2004, p. 195).

The most salient conclusion that can be drawn from the crosswise comparison of cases is that School 1 (a F@tih pilot school) had the highest mean score in ICT infrastructure condition (M = 4.22). This can be an indicator of that F@tih project implementation process has made significant inroads into improving F@tih pilot schools' ICT infrastructure. However, School 5, (a private school) had the highest mean score in ICT school support and coordination (M = 4.09) and schools' ICT vision and policy (M = 4.26). Moreover, non-F@tih schools (School 2, School 3 and School 4) performed the lowest scores. This can be an indicator of that both F@tih and non- F@tih schools should pay heed to improving ICT school support, ICT coordination and schools' ICT vision and policy.

In order to explore teachers' views on ICT related school conditions and elaborately refine the quantitative findings, as a first open-ended question, the teachers in each case school were asked whether they think ICT related school conditions (*ICT support and coordination, ICT vision and policy, ICT infrastructure*) are sufficient in their schools and why.

In the analysis of the first open-ended question, two themes emerged: 'ICT infrastructure' and 'no or unknown ICT policy and vision'. In order to better

illustrate the teachers' views about ICT related school conditions, some of the samples of their comments were given below.

> The school administrators are not willing to provide sufficient resources. They probably think that providing with computers in IT labs is enough for ICT integration. (Teacher/School 2)
>
> We use smart boards and our students use tablet PCs actively in our classes. (Teacher/School 5)
>
> I don't know anything about the school's ICT policy, of course if there is one! (Teacher/School 3)
>
> Thanks to F@tih project, our school has sufficient ICT infrastructure. (Teacher/School 1)
>
> Although our school is a vocational ICT school, the ICT infrastructure is not sufficient especially in classrooms excluding the IT labs. The ICT infrastructure should urgently be improved. (Teacher/School 4)

As illustrated above, the teachers assert that 'ICT infrastructure' and 'no or unknown ICT policy and vision' are policy areas that need to be addressed under ICT related school conditions and should be improved for a successful ICT integration.

The qualitative analysis of first open-ended question showed strong parallelism with the comparative analysis of quantitative results on ICT related school conditions. For example, in School 5, most of the teachers' answers (86%) were positive about ICT related school conditions in their school. On the contrary, in School 2, most of the teachers (75%) think that ICT related school conditions are not sufficient in their school. These findings palpably supported the quantitative findings, as well as providing data triangulation. Moreover, this can be an indicator of the reliability and validity of the findings of the current study.

Findings on ICT related teacher conditions and their actual use of ICT

The comparative analysis results examining the teachers' perceptions of ICT related teacher conditions and their actual use of ICT in five case schools were presented in Table 4 and Table 5.

As given in Table 4, mean scores and MANOVA results purported that there were statistically significant differences in all 'ICT related teacher conditions, [*ITPD* ($F_{(4\text{-}97)}$ = 6.28; p < .01) , *TIC* ($F_{(4\text{-}97)}$ = 4.66; p < .01)] scores across the case schools. For an additional examination of the significance of mean scores across the case schools, as a post-hoc test Scheffe was administered. In ICT teachers' professional development condition, it was found that teachers from School 5 (*M* = 3.56, *SD* = .87) had significantly higher perception scores than teachers from School 2 (*M* = 2.50, *SD* = .86) and teachers from School 3 (*M* = 2.43, *SD* = .81). In addition, concerning the teachers' ICT competencies, it was observed that the teachers from School 5 (*M* = 3.88, *SD* = .78) had significantly higher scores than teachers in School 3 (*M* = 2.82, *SD* = .90). Table 4 also illustrates the Eta squared effect sizes of ICT related teacher conditions [*ITPD,* η^2 = .20; *TIC,* η^2 =.16], which were found around .20, indicated that the differences among teachers' perceptions had a modest effect (Muijs, 2004, p. 195).

Table 4. Comparative analysis of ICT related teacher conditions across the cases

Scales	School 1 (n =16)		School 2 (n =20)		School 3 (n =18)		School 4 (n =30)		School 5 (n =18)		MS	$F_{(4\text{-}97)}$	p	η^2	Scheffe
	M	SD	M	SD	M	SD	M	SD	M	SD					
1 ITPD	3.28	0.98	2.50	0.86	2.43	0.81	3.10	0.76	3.56	0.87	4.54	6.28	.00	.20	2<5, 3<5
2 TIC	3.60	0.83	3.19	0.79	2.82	0.90	3.51	0.75	3.88	0.78	3.05	4.66	.00	.16	3<5

1 ITPD = ICT Teachers' Professional Development *MS= Mean Squares, SD= Standard Deviation,*
2 TIC = Teachers' ICT competencies η^2*= Eta squared effect size,* $^{*}p < .05$, $^{**}p < .01$

Table 5. Comparative analysis of teachers' actual use of ICT across the cases

Scales	School 1 (n =16)		School 2 (n =20)		School 3 (n =18)		School 4 (n =30)		School 5 (n =18)		MS	$F_{(4-97)}$	p	η^2	Scheffe
	M	SD	M	SD	M	SD	M	SD	M	SD					
1 IIT	3.02	0.81	2.76	0.54	2.83	0.77	3.36	0.72	3.76	0.77	3.26	6.16	.00	.20	2<5, 3<5
2 ILT	3.00	0.97	2.89	0.80	2.67	0.67	3.53	0.99	3.96	0.71	5.28	7.15	.00	.22	1<5, 2<5, 3<5
3 BIS	3.35	0.93	3.10	0.74	2.80	0.82	3.50	0.95	4.04	0.77	3.95	5.32	.00	.18	2<5, 3<5

1 IIT = ICT as an information tool
2 ILT = ICT as a learning tool
3 BIS = Basic ICT skills
MS= Mean Squares, SD= Standard Deviation,
η^2= Eta squared effect size, $^*p < .05$, $^{**}p < .01$

Not surprisingly, regarding ICT related teacher conditions, School 5, a private school, outperformed non-F@tih state schools (School 2 and School 3); however, there were no statistically significant differences between the School 5 and School 1. Yet, this can serve as a weak proof of that F@tih project piloting process has made some contribution to teachers' professional development and their ICT competencies, but not at a satisfying level.

Table 5 illustrates the calculated mean scores and the results of variance analysis of teachers' actual use of ICT. Accordingly, it was observed that there were statistically significant differences in teachers' actual use of ICT conditions [*IIT* ($F_{(4-97)}$ = 6.16; p < .01) , *ILT* ($F_{(4-97)}$ = 7.15; p < .01), *BIS* ($F_{(4-97)}$ = 5.32; p < .01)] frequency scores across the case schools. With a closer look to explore the significance of mean scores across the case schools, Scheffe was employed as a post-hoc test and it was revealed that teachers from School 5 [*IIT* (*M* = 3.76, *SD* = .77), *ILT* (*M* = 3.96, *SD* = .71), *BIS* (*M* = 4.04, *SD* = .77)] had significantly highest frequency scores than teachers from School 2 [*IIT* (*M* = 2.76, *SD* = .54), *ILT* (*M* = 2.89, *SD* = .80), *BIS* (*M* = 3.10, *SD* = .74)], teachers from School 3 [*IIT* (*M* = 2.83, *SD* = .77), *ILT* (*M* = 2.67, *SD* = .67), *BIS* (*M* = 2.80, *SD* = .82)]. In addition, regarding the basic ICT skills condition, the teachers from School 5 (*M* = 4.04, *SD* = .77) had significantly higher scores than teachers in School 1 (*M* = 3.35, *SD* = .93). Table 5 also presents the Eta squared effect sizes of teachers' actual use of ICT conditions [*IIT,* η^2 = .20; *ILT,* η^2 =.22 and *BIS*, η^2 =.18], which were found around .20 and indicated that the differences among teachers' perceptions had a modest effect (Muijs, 2004, p. 195).

Another salient conclusion that can be drawn from the crosswise comparison of cases is that teachers from School 5, (a private school) had significantly higher frequency scores than other case schools, except for School 4, a non-F@tih vocational with an ICT technician training program. Although this result can be surprising but somewhat it is expected since the School 4 is a vocational school with an ICT technician training program. This result also illustrates the robustness of our findings. On the other hand, this finding can be an indicator of that the teachers in F@tih schools do not use ICT in their class as frequently as they are expected to, even though the teachers in School 1 had higher frequency scores than the ones in School 2 and School 3. In addition, this relatively lower frequency scores observed in School 1 may be caused by the ongoing e-content development process and also F@tih teachers may still need more ICT training. In addition, the lowest frequency scores within the cases were found in School 3 as expected.

As a second open-ended question, the teachers were asked whether they think ICT related teacher conditions and their actual use of ICT are sufficient in their schools and why. The teachers' answers were descriptively analyzed and the percentages of their answers were calculated. In the analysis of second open-ended question, two themes emerged: *'the need for more ICT training'* and *'insufficient opportunities'*. Some of the teachers' comments about ICT related teacher conditions in their schools were presented below.

> We as the teachers do have minimum requirements in terms of ICT competency, but technology is developing continually and this means we do need more training in order to update ourselves accordingly with the changing technology. (Teacher/School 1)
>
> We need more in-service training because it is hard to give up old habits. (Teacher/School 4)
>
> Teachers are already familiar with new technologies in their daily lives… however; they do not have enough opportunities to use ICT in their classes. (Teacher/School 3)
>
> We use technology in class, yet we need more in-service training in order to keep up with the developments in new technologies. (Teacher/School 5)

As it is implicitly pointed out in the teachers' comments, teachers think that the existing ICT training opportunities are not sufficient so they mentioned they 'need more ICT training' for a successful ICT integration even in School 1 and School 5, with relatively significant higher perception scores. This finding supported the quantitative findings. In addition, the teachers herald that they have 'insufficient opportunities' to use ICT in the classroom and they are also lack of enough ICT peripherals, software or hardware etc. These are some of the impediments to teachers' integrating ICT in teaching and learning processes.

According to the teachers' views, in School 5 (80%), a private school, in School 4 (75%), a vocational ICT trainer school, and in School 1 (70%), a F@tih project pilot school, most of the teachers think ICT teacher related conditions and their actual use of ICT are sufficient in their schools, which mostly concurred with the quantitative results.

Results on teachers' overall views toward ICT integration in education

As a last open-ended question, the teachers were asked what they think about ICT integration in education. The teachers' answers were descriptively analyzed and the percentages of their answers were calculated.

According to the teachers' views, in School 5 (100%), a private school, and in School 1 (100%), a F@tih project pilot school, all of the teachers think positively about ICT integration in education although they mention that some policy issues need improving especially the training opportunities. Another remarkable result is that, although it is a vocational ICT school, 27% of teachers in School 4 think negatively about ICT integration. This contradicting result may be explained by teachers over exposure to the old-fashioned technologies in their school, since it is a very old school and not included in F@tih project.

In the analysis of third open-ended question, three themes emerged: '*fast and effective learning*', '*practical and useful'* and '*pedagogical purpose'*. In order to better illustrate the teachers' views toward ICT integration, some of the teachers' comments were given below.

> [ICT] is very useful and practical for both teachers and students. I believe it boosts students' learning and promotes effective learning. (Teacher/School 5)
>
> ICT should be integrated into education as it is a must in our era; however, it shouldn't be put into the centre of education… (Teacher/School 2)
>
> I believe that ICT makes learning more permanent and efficient as it enriches the learning environment. (Teacher/School 1)
>
> Thanks to ICT, I believe our educational system will improve faster. (Teacher/School 3)

> If ICT is used at moderate extents and according to the purpose, I believe it will be very useful. However, I don't think a completely ICT-based educational system will guarantee the quality of education. (Teacher/School 4)

As it can be inferred from the teachers' comments above, most of the teachers think positively toward ICT integration in education and they state that ICT integration promotes fast and effective learning and also it is practical and useful for both teachers and students; however, they noted that ICT should be used appropriately to its set purpose, that is, as a mediator of teaching and learning, not as an end.

DISCUSSION AND CONCLUSION

In 2011 the Turkish government initiated a highly ambitious project entitled "F@tih", with a piloting 52 schools from 17 provinces across Turkey. The project aims to improve ICT integration in education and bridge the existing gap in technology. In order to explore what outcomes have been reached so far and shed light to ICT policy makers, and international research community, as well as drawing some lessons for other countries planning to roll out their own one-to-one program, a convergent mixed method design was employed with a multiple case strategy in five case schools as a representation of F@tih, non-F@tih and private K-12 schools. The e-capacity framework served as a theoretical foundation in evaluating ICT integration in case schools. We extracted three major findings from the data and illustrated these results in Table 6.

First, quantitative results purported that ICT related school conditions, teacher conditions and teachers' actual use of ICT as perceived by teachers in School 5

Table 6. Summary of results

	School 1	School 2	School 3	School 4	School 5
School Network	Public (General Secondary)	Public (General Secondary)	Public (General Secondary)	Public (Vocational Secondary)	Private (General Secondary)
ICT Background	F@tih Project pilot school	F@tih Project newly entered school	Locally ICT supported school	Having an ICT technician training program	Running own ICT integration program
ICT support and coordination	High	Medium	Medium	Medium	High*
Schools' ICT vision and policy	Medium	Medium	Modest	Medium	Very High*
ICT infrastructure	Very High*	High	Medium	High	High*
Teachers' professional development	Medium	Modest	Modest	Medium	High*
Teachers' ICT competencies	High	Medium	Medium	High	High*
ICT as an information tool	Medium	Medium	Medium	Nearly High	High*
ICT as a learning tool	Medium	Medium	Medium	High	High*
Basic ICT skills	High	Medium	Medium	High	High*

** illustrates a significant difference*
The interpretation criteria for evaluation results is determined based on 5-1/5 = 0.80 formula. Accordingly, 1.00-1.80 = weak 1.81-2.60 = modest, 2.61-3.40 = medium, 3.41-4.20 = high, 4.21-5.00 = very high

significantly outperformed all other case schools except for School 1. In addition, compared with all other public schools, School 1 had significantly higher mean scores on ICT infrastructure. These findings can be an indicator of F@tih project has made some significant inroads into improvement of ICT related school conditions, particularly ICT infrastructure of public schools. On the other hand, these results also implicitly indicated that ICT infrastructure is an important but not the only enabling factor of a successful ICT integration. These findings mostly concurred with the findings of the previous studies (Akbaba-Altun, 2006; Tondeur et al., 2008).

Second, the findings also demonstrated that ICT related teacher conditions (*ICT Teachers' Professional Development and Teachers' ICT skills and competencies*) in School 2 and School 3 were not at a satisfying level; consequently, these schools lagged behind the School 5, School 1 and School 4. More specifically, both quantitative and qualitative results heralded that especially in state schools teachers' ICT skills and competencies should be improved and more effective ICT training should be provided for teachers in order for a successful ICT integration. These results partly supported the findings of previous research (Almadhour, 2010, Hismanoglu, 2012, Vanderlinde, et al. 2012).

Third, as seen in the summary results on Table 6, the findings on the teachers' actual use of ICT in their classes displayed that teachers in School 5 use ICT the most frequently amongst all case schools. Moreover, the teachers in School 4, since it is a vocational school with an ICT technician training program, use ICT in their classes more frequently than all other public schools including F@tih schools. This result can be seen as a denotation for the validity of present research. Another remarkable result that can be drawn, the teachers in School 1, although it is a F@tih project pilot school, do not use ICT in their classes as frequently as in School 5 and School 4. Compared with a private school, all state schools except for School 4, underperformed in terms of teachers' ICT use in their classes. This can be a signal of that the teachers especially in state schools do not use ICT as frequently as they are expected to do. These findings also partly supported the findings of previous studies (Afshari et al., 2009; Yildirim, 2007).

On the other hand, the qualitative results mostly supported the quantitative results, which is another indicator of the validity and robustness of our findings. As result of qualitative analysis, some overlapping themes emerged. These themes are 'ICT infrastructure', 'no or unknown ICT policy and vision', 'the need for more ICT training', 'insufficient opportunities', 'fast and effective learning', 'practicality and usefulness of ICTs' and 'pedagogical purposes'. These themes mostly overlapped with the factors identified by the previous research (Demiraslan-Usluel, 2008; Goktas et al., 2009; Hismanoglu, 2012; Tondeur et al., Yildirim, 2007). In the first place, the teachers in School 5, School 1 and School 2 think that ICT infrastructure in their schools is sufficient; however, teachers in School 3 and School 4 heralded that ICT infrastructure in their schools needs urgently improving. Teachers in School 2, School 3 and School 4 asserted that there is no ICT policy in their schools or they do not know about it if there is one.

Secondly, teachers in all five schools stated that they need more ICT training for a successful ICT integration. Teachers from School 2, School 3 and School 4 suffered that they have insufficient opportunities to integrate ICT in their classes and they are lack of ICT peripherals, software and hardware. Finally, almost all of the teachers who answered the last open-ended question mentioned that they think positively about the ICT integration in education and most of them heralded that using ICT in class is very practical and useful for teachers and students. This finding mostly supported the findings of a recent study carried out with F@tih teachers and students (Cakiroglu, 2015). However, some of the teachers noted that although they think positively about the use IWBs in class, they are skeptical about the use of

Tablet PCs for instructional purposes rather than as a tool of entertainment. In addition, they underline that ICT should only be used for instructional purposes; not as a tool of entertainment, just as a mediator of teaching and learning. This finding also showed strong parallelism with the results of previous studies carried out in F@tih (Pamuk et al., 2013; Sahin et al., 2013).

SUGGESTIONS AND LIMITATIONS

Although multiple case strategy with a purposive sampling technique enabled excellent research opportunities and provided insights for future research; yet, it presented some limitations such as limiting the generalization of the results. Another limitation of the study is that the reliability of the research results depends on the participating teachers' answers to both quantitative and qualitative instruments. In addition, the current study is limited with five case schools in İstanbul Bagcilar district; however, its results are promising and robust, since the quantitative and qualitative findings showed strong parallelism and also provided data enhancement and triangulation. On the other hand, the current study has made some invaluable contribution both to the theoretical literature and praxis of ICT integration realm. On the theoretical side, the e-capacity framework proved feasibility and usefulness in evaluation of ICT integration in Turkish context on the grounds that our findings mostly concurred with the results of previous studies. On the practical side, formative evaluation of the implementation of F@tih provided some promising and enlightening guidelines and policy domains as a concrete illustration of strength and weaknesses of the current implementation of ICT integration in Turkish context. Based on our findings, the following suggestions were drawn and listed below.

- Regarding ICT related school conditions, although there is some proof that F@tih project has made some significant inroads into improving F@tih pilot schools ICT infrastructure, it is imperative that F@tih policy makers should pay heed to improving schools' ICT vision and policy, along with ICT support and ICT coordination conditions.
- As to ICT related teacher conditions, though there is some weak proof of that F@tih project piloting process has made some contribution to teachers' professional development and their ICT competencies; the teachers still report that they need more effective and up-to-date ICT training. Thus, teachers should be provided with more comprehensive online or face-to-face in-service training accordingly their training needs.
- With respect to the teachers' use of ICT in class, the findings revealed that the teachers, albeit in F@tih schools, do not use ICT in their classes as frequently as they are expected to. In view of this, the e-content development process should be prioritized and the e-content database provided in www.eba.gov.tr should be diversified and enriched. In addition, online e-content development tools may be offered for teachers to design their instruction.
- Almost all teachers think positively about ICT integration in education; however, some of them, particularly working in non-F@tih schools, suffer from unequal opportunities and they demand to have the same opportunities with their colleagues in F@tih schools. In this vein, F@tih project should be expanded as such to include all type of schools if F@tih really intends to conquer digital divide within schools and regions.
- In line with the findings of previous studies, although most of the teachers are in favor of IWBs, they are skeptical about tablet PCs. Thus, there is a need

for further studies to elaborately inquire the use and effectiveness of Tablet PCs in F@tih schools and their effects on student achievement.

Future research may include in depth or focus group interviews and observation techniques by employing a grounded theory methodology in order to generate a more comprehensive theoretical model, grounded in F@tih context, that explains what concepts and relations have an influence on teachers' ICT use in teaching and learning process. Furthermore, future research should also employ a longitudinal survey design, or a quasi-experimental design in order to investigate the effects of ICT integration on students' outcomes in a context of F@tih.

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Appendix A - ICT related school conditions

Scale 'ICT school support and coordination'

1. In our school, we can receive technical support while working with ICT
2. In our school, we can receive pedagogical support when working with ICT
3. In our school, colleagues help each other when facing problems with the ICT-equipment
4. In my school there is a clear contact person for everything that has to do with ICT integration
5. The schools' ICT coordinator has a clear overview of the ICT-activities performed at school
6. It is clear which tasks the ICT coordinator has at my school
7. The ICT coordinator controls and monitors the schools' ICT policy

Scale 'Schools' ICT vision and policy'

8. My school has a clear vision on the role and place of ICT in education
9. My school has a well developed ICT policy plan
10. The schools' vision on the place of ICT in education is well-known by all colleagues
11. Teachers at my school know the content of the schools' ICT policy plan
12. The schools' vision on the place of ICT in education is acknowledged by the colleagues
13. The ICT policy plan of my school starts from a shared vision on 'good' education
14. The schools' ICT policy plan gives me concrete assistance for working with ICT

Scale 'ICT infrastructure'

15. The schools' hardware infrastructure (computers, laptops, computer class, etc.) is sufficient to integrate ICT in classroom practices
16. I am satisfied about the schools' software (CD-ROMS, computer programmes, etc.) I can use with my pupils
17. The ICT infrastructure in my class is appropriate for the ICT-activities I do with my pupils
18. I am satisfied about the schools' ICT peripheral equipment (digital projector, digital camera, etc.) I can use

Appendix B - ICT related teacher conditions

Scale 'ICT teachers' professional development'

19. I attend frequently in-service teacher trainings about the educational use of ICT
20. I attend frequently technical ICT in-service teacher training courses
21. I try to keep informed about everything that has to do with ICT in education
22. I take initiatives to learn about everything that has to do with ICT in education

Scale Teachers'ICT competencies'

23. I have sufficient technical knowledge and skills to use ICT in classroom
24. I can easily fix technical problems when being confronted with it
25. I have sufficient organisational skills to integrate ICT in my classroom
26. I have sufficient background to use ICT in my classroom for instructional purposes
27. I have shortcomings to use ICT in a pedagogical and didactical way (reversed item)

Appendix C - Revised scales of Tondeur et al. (2007)

Scale 'ICT as an information tool'

28. My pupils use ICT to store information
29. My pupils use ICT to write texts and/or to control for spelling errors
30. My pupils learn about ICT because I use ICT during classical instruction
31. In my class pupils use ICT to look up and select information (e.g. Google, Yahoo, etc.)
32. My pupils use ICT to present information to each other, for instance by a powerpoint presentation
33. In my class pupils learn to use ICT to send an email in an efficient way
34. My pupils use ICT to save and to share files with each other

Scale 'ICT as a learning tool

35. My pupils use educational software and instructional computer programmes to learn
36. My pupils use educational software and instructional computer programmes to make exercises
37. Pupils in my class use ICT for remedial assignments
38. In my class pupils use ICT for tasks and assignments
39. In my class, pupils with learning problems use appropriate educational software and instructional computer programmes

Scale 'Basic ICT skills'

40. My pupils use ICT to learn to type
41. My pupils learn to use ICT in a safe manner
42. Pupils in my class learn to use the computer machine and other ICT peripheral equipment
43. Pupils in my class learn the basic skills to use ICT

EK-1 – BİT ile ilgili okul düzeyi koşullar

Okulda BİT desteği ve koordinasyonu

1. Okulumuzda, BİT kullanırken teknik destek alırız.
2. Okulumuzda, BİT kullanırken pedagojik destek alırız.
3. Okulumuzda, çalışanlar BİT kullanımında sorun yaşadıklarında bir birlerine yardımcı olurlar.
4. Okulumuzda, BİT kullanımıyla ilgili her konuda bize yardımcı olan bir personel vardır.
5. Okulun BİT koordinatörünün okuldaki BİT faaliyetleri konusunda kapsamlı bilgiye sahiptir.
6. Okulumuzda BİT koordinatörünün görevleri bellidir.
7. BİT koordinatörü okulun BİT politikasını kontrol eder ve izler.

Okulun BİT vizyonu ve politikası

8. Okulumuz BİT'in eğitimdeki yeri ve rolü konusunda açık(anlaşılır) bir vizyona sahiptir.
9. Okulumuz gelişmiş bir BİT planına sahiptir.
10. Okulumuzun BİT'in eğitimdeki yeri konusundaki vizyonu bütün çalışanlar tarafından bilinmektedir.
11. Okulumuzdaki öğretmenler BİT planının içeriğini bilmektedirler.
12. Okulumuzun BİT'in eğitimdeki yeri konusundaki vizyonu bütün çalışanlar tarafından kabul edilmektedir.
13. Okulumuzdaki BİT planı kaliteli eğitim vizyonuna bağlı olarak şekillenmiştir.
14. Okulumuzun BİT planı bana BİT kullanırken somut yardım sağlar.

BİT altyapısı

15. Okulumuzun donanım altyapısı (bilgisayar, laptop, BT sınıfları, vb.) sınıflarda BİT kullanımı için yeterlidir.
16. Okulumuzun derslerimde kullanmam için sağladığı yazılımlardan (CD/DVD, bilgisayar yazılımları, vb.) memnunum.
17. Okulumuzun BİT altyapısı derste kullandığım/kullanacağım BİT aktiviteleri için uygundur.
18. Okulumuzun BİT yardımcı ekipmanlarından (projektör, tepegöz, dijital fotoğraf makinesi vb.) memnunum.

EK 2 – BİT ile ilgili öğretmen düzeyi koşullar

Öğretmenlerin mesleki gelişimi

19. BİT'in eğitim amaçlı kullanımı konusunda sık sık hizmetiçi eğitimlere katılırım.
20. Sık sık BİT ile ilgili teknik konularda hizmetiçi eğitim seminerlerine katılırım.
21. Eğitimde BİT kullanımıyla ilgili her çeşit bilgiye ulaşarak bilgilerimi güncel tutmaya çalışıyorum.
22. Eğitimde BİT ile ilgili her türlü bilgiyi öğrenme konusunda inisiyatif kullanırım.

Öğretmenlerin BİT yeterlilikleri

23. Sınıf içinde BİT kullanımıyla ilgili yeterli bilgi ve beceriye sahibim.
24. Teknik sorunlarla karşılaştığımda onları kolaylıkla çözebilirim.
25. BİT'i dersimde kullanmak için yeterli organizasyon becerisine sahibim.
26. BİT'i eğitim amaçlı kullanmak için yeterli deneyime sahibim.
27. BİT'i eğitim öğretim amaçlı kullanmam konusunda bazı engeller var.(ters kodlanmış)

EK 3 – BİT kullanımı (Tondeur et al., 2007'nin revize edilen ölçekleri)

Bilgi aracı olarak BİT

28. Öğrencilerim BİT'i bilgi depolamak için kullanırlar.
29. Öğrencilerim BİT'i bilgisayarda metin yazmak ve yazım yanlışlarını kontrol etmek için kullanırlar.
30. Öğrencilerim BİT'i ben derste BİT kullandığım için öğrenirler.
31. Benim dersimde öğrenciler BİT'i bilgiye aramak ve ulaşmak için kullanırlar (Google, Yahoo, vb.)
32. Öğrencilerim BİT'i bir birlerine bilgi sunmak için (örneğin Powerpoint sunusu) kullanırlar.
33. Benim dersimde öğrenciler BİT'i etkili bir şekilde mail gönderebilmek için öğrenirler.
34. Öğrencilerim BİT'i bir birlerinden dosya kaydetmek ve birbirleriyle dosya paylaşmak için kullanırlar.

Öğrenme aracı olarak BİT

35. Öğrencilerim eğitim yazılımları ve öğretim programlarını öğrenme amaçlı kullanırlar.
36. Öğrencilerim eğitim yazılımları ve öğretim programlarını alıştırma yapmak (soru çözmek, vb.) için kullanırlar.
37. Öğrencilerim öğrenmelerini geliştirici ödevler (proje hazırlama, vb. için BİT kullanırlar.
38. Öğrencilerim ödev hazırlamak için BİT kullanırlar.
39. Benim dersimde öğrenme problemleri yaşayan öğrenciler seviyelerine uygun eğitim yazılımları ve öğretim programları kullanırlar.

Temel BİT becerileri

40. Öğrencilerim bilgisayarda yazı yazmayı öğrenmek için BİT kullanırlar.
41. Öğrencilerim güvenli bir ortamda BİT kullanırlar.
42. Sınıfımdaki öğrenciler bilgisayar ve yardımcı BİT ekipmanlarının nasıl kullanılacağını öğrenirler.
43. Sınıfımdaki öğrenciler BİT kullanmak için gerekli temel becerileri öğrenirler.