

ICT TRAINING COURSES FOR TEACHER PROFESSIONAL DEVELOPMENT IN JORDAN

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ABSTRACT

Information and Communication Technology (ICT) is increasingly having pervasive role and presence in the educational milieu as it continues to shape all aspects of our lives. Numerous reform projects have been in place aiming to infuse ICT across education systems. Teachers are widely believed to be the key agents of any educational change. Accordingly, the Jordanian Ministry of Education adopted several ICT training courses aiming to prepare teachers to integrate ICT effectively across the curriculum. The current study focuses on the conduct and effectiveness of ICT training courses within the Jordanian education system. Interviews, questionnaires, direct classroom observations, and field-notes of classroom practices were used for data collection. The findings suggest that ICT professional development courses for teacher were helping them to improve their ICT skills and knowledge. However, other finding highlighted problems regarding the conduct and the nature of these courses including timing and modes of training, follow-up, teacher's belief, school culture, workload, and motivation, appeared to impact the effectiveness of training courses.

INTRODUCTION

Schools, as all other social institutions, are rapidly embracing information and communication technologies (ICT). Globalization and the knowledge-based economy are leaving no choices for education systems worldwide but to adopt ICT and weave it into their educational milieus, and the Jordanian education system is no exception. The system has adopted several ICT-related education initiatives aiming to reform the system towards the knowledge-based economy.

In recent years, ICT-related Initiatives are adopted and implemented by education systems with greater appreciation of their complexity. A major aspect of the complexity involved with ICT integration into education systems is based on the many factors involved with it including factors associated with the human side of the integration (e.g. teachers, on-going support, trainers, and headmasters) and the technological side of it (e.g. access to computers, technical support, and the e-materials). During the early attempts of integrating computers into education systems the technology itself was overemphasised at the cost of the human side. These attempts were based on the assumption that technology can revolutionise education and therefore, resources and efforts were diverted to providing schools with computers and other technologies. During that stage, technology was conceived as an end in itself, which resulted in computers being distributed to schools with little thought given to their best use (Richardson, 2005; Veen, 1993). However, the early attempts were doomed to failure as it became clear that technology could not improve educational practices and outcomes by itself. Therefore, a shift in the focus occurred towards other supporting factors to the successful integration of ICT across education systems.

The failure of the early attempts to revolutionise education through the infusion of computers shifted the attention considerably to teachers. Accordingly, teacher-related issues are discussed as integral components to any successful educational intervention and therefore have gained extensive research and debate (Cochran-Smith, 2004; Doyle & Ponder, 1977; Fullan, 1993; Gillingham & Topper, 1999; Sarbib, 2002; Townsend & Bates, 2007). For instance, Veen (1993) asserts that teachers' beliefs about content and the pedagogy, along with their overall competence, far overweigh any other factors in respect of their adoption of ICT, including technical support provided by schools, and principals' support of ICT integration. Other studies have confirmed that teacher factors such as competence, attitude and time, are of a greater significance than factors associated with hardware (Farenga & Joyce, 2001; Means, 1994; Veen, 1993). Hence, preparing teachers to utilize ICT across the curriculum is paramount to any successful ICT-related initiative.

Teacher training courses, both pre and in-service, can help teachers who are tentative to move faster and adopt technology while they show the more enthusiastic teachers new ways in implementing ICT into their profession. Thus, the Jordanian education system has adopted several ICT training courses aiming to improve their use of ICT in the classroom, including: International Computer Driving License (ICDL), Intel Teach to the Future, World Links, iEARN and CADER. The courses aimed to improve teachers' ICT proficiency at three levels: ICT skills, pedagogical skills, and curriculum training (Alutaibi, 2003). The ICDL course focused on improving teachers' ICT skills, including word-processing, spreadsheets, and surfing the Internet. On the other hand the

Intel Teach to the Future program aimed to train teachers and students to use technology effectively in the classroom (Intel Corporation, 2005; Ministry of Education, 2002) and World Links focused on preparing students, teachers and the educational system to enter the information age through providing schools and teachers with skills and educational resources to harness ICT (World Links, 2002). In addition, CADER was offering a Higher Education Diploma in ICT, which specializes in training teachers to use modern pedagogies and integrate them with ICT. While iEARN course had been adopted early in 2004, it was then discarded during the early stage of its implementation, as it appeared to focus only on the student side of the education system.

However, improving teachers' integration of ICT in teaching has proved to be not a straightforward task to be carried by the education system. The literature has identified several factors which can impact the effectiveness of ICT training courses when assigned for teachers including: individual differences among teachers, school culture and teacher interaction, and follow-up and ongoing support provided to teachers when they try to implement their newly developed skills.

Individual differences among teachers: ICT professional development courses should consider the fact that teachers are widely divergent regarding their knowledge about ICT (Bradshaw, 2002; Galanouli, Murphy, & Gardner, 2004; Gilmore, 1995; Rosen & Weil, 1994). Such consideration can prevent programs from being frustrating for teachers with little or no experience in using ICT, and at the same time they avoid being disappointing for other teachers with better ICT knowledge and skills.

School culture and teacher interaction: Apparently, the self-contained culture of schools is not aligned with the emerging aspects and skills of the knowledge-based economy such as collaboration, teamwork and communication. Increasingly, the world is more dynamic and in such an environment neither teachers nor schools can perform effectively in their traditional isolation. According to Fiszer (2004) "isolation is the enemy of improvement when the practitioner must be ready to meet constantly changing student needs" (p.16). Moreover, the literature stresses the need for teachers to share experiences with each other in order to best learn how to integrate ICT in pedagogy. As Lewis (1998) puts it, schools have the potential to be learning places for teachers too, providing that the culture of schools is reshaped to facilitate this.

Follow-up and ongoing support: Pre-service education is not sufficient for teachers to be able to handle their job for the rest of their lives; rather, they require ongoing professional development and support. In the information age, where innovations are constantly introduced and change is happening rapidly, the demand for ongoing professional development is in high priority (World Bank, 2002). Furthermore, it might be relatively straightforward to present professional development programs, but a greater challenge arises when teachers try to implement what they learn in real classrooms. Anderson (1997) suggests that teachers might abandon new practices while they are in the early stages of implementation because of lack of assistance. This is, according to Fiszer (2004), because teachers might see their newly developed skills and knowledge as "incompatible" with the everyday teaching/learning situations that they face. Therefore, Bradshaw (2002) found that in order to maximize the return of the investment in staff development, significant resources need to be redirected to follow-up activities. In addition, she warns that without follow-up and coaching, any staff development would not impact on more than 5-10 percent of participants' practice.

These issues, among others, need to be taken into account in order to ensure the positive impact of ICT training courses on classroom practices. As part of the appreciation of the importance of issues identified in the literature while staying attentive to issues might arise from the current investigation within the Jordanian context.

BACKGROUND TO THE RESEARCH

The sound value of this study stems from shedding light on an issue that is of great interest to countries that adopt ICT training courses to improve their teachers' performance for the information age. As a developing country in the Middle East and North Africa region, Jordan is striving to improve its education system for the knowledge era. ICT professional development courses are integral to improve educational practices as they empower teachers with knowledge and skills required for integrating ICT in the classroom. Such moves and actions need to be guided with research. The Jordanian education practices need sound and grounded research to guide decisions and strategies. Thus, the current study can provide a clear picture for decision makers, and other research, of issues associated with ICT training courses in Jordan.

The primary purpose of this study was to explore Jordanian teachers' experiences with ICT training courses adopted by the Ministry of Education. Large expenditure and great efforts were dedicated by the Jordanian education system to updating itself in order to become more 'compatible' with the knowledge-based economy. Furthermore, the heavy reliance on external aid in order to initiate and implement education reform projects

requires extra and careful planning for such projects. The efforts need to be aligned with clear vision into what is aimed for and how it is achieved. It is well documented that ICT-related initiatives in Jordan lack scholarly investigations to guide them (Alomari, 2009); rather, they rely on official reports which usually portray patches of success within educational initiatives. The main focus of the study was to answer the question “what influences the effectiveness of ICT training courses adopted by the Jordanian education system?”

More specifically, the present study tries to answer the following research questions:

1. What kind of ICT professional development is available for Jordanian teachers?
2. What issues influence the effectiveness of ICT training courses for teachers?

Research Design: The current study utilized a mixed methods approach in order to investigate Jordanian teacher preparation to use ICT to support teaching and learning. The combination of both questionnaires and case studies were found to be adequate for the investigation. The purpose of gathering different types of data is to understand “more fully, to generate deeper and broader insight, to develop important knowledge claims that respect a wider range of interests and perspectives” (Greene & Caracelli, 1997, p.7). In this way, a phenomenon can be studied from different perspectives and a variety of information can be collected which strengthen the investigation (Creswell, 2003; Greene & Caracelli, 1997; Mark, Feller, & Button, 1997; Sandelowski, 2000; Tashakkori & Teddlie, 1998). Sandelowski (2000) states that this aspect of mixed-method inquiry is a significant advantage for researchers because it can “expand the scope of, and deepen their insight from, their studies” (p.246) which can reflect upon better understanding and more warranted defensible claims (Brewer & Hunter, 1989; Mark, et al., 1997).

This study employed an Explanatory Sequential Design (Creswell, 2003; Creswell & Clark, 2007) to collect, analyze, interpret and report data (Greene & Caracelli, 1997). This approach starts with quantitative data collection and analysis and is followed by qualitative inquiry. However, the overall enquiry remains predominantly qualitative (Figure 1). Therefore, the present study is seen to be interpretive, that is, although initial design included both quantitative and qualitative approaches, the quantitative part has developed into the qualitative one.

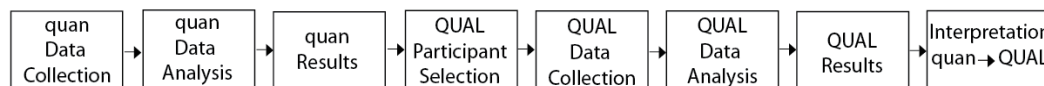


Figure 1: The Explanatory Design (Creswell & Clark, 2007, p.73)

The study was carried out over an extended period of time between August 2004 and October 2008. Twelve schools were selected through stratification from the three regions of Jordan: Northern, Central, and Southern regions. The stratification enabled the study to target particular schools and clusters of schools where ICT integration and training were active. Participating schools were carefully selected from both rural and urban areas as well as boys and girls schools from each region. Nevertheless, the study was predominantly qualitative. The qualitative approach has been deemed appropriate for the in-depth investigations requested in the present study because by its nature, it allows the researcher to develop understanding of the meaning or nature of others' experiences (Strauss & Corbin, 1998; Windschitl, 1998). It facilitates substantive exploration into a novel learning environment about which little is known, which was the case of teachers' experiences and utilization of ICT training courses adopted by the Jordanian Ministry of Education. In addition, it enables the experiences of participants to be portrayed, and a detailed account of the context to be taken into account. The qualitative approach enabled this study to uncover intricate details by allowing an account to emerge which was descriptive and comprehensive (Best & Kahn, 1986; Merriam, 1998), and which was “grounded” (Patton, 1980, p.41) in the real experiences of the two participating schools during their integration of ICT.

Population and sample of the study: A total of 120 teachers, 10 teachers from each of the 12 schools, were handed teachers' questionnaire. One hundred and fifteen teachers completed the questionnaire as well as the 12 principals of the participating schools. The main criterion for selecting teachers from each school was their participation in ICT professional development courses provided by the Ministry of Education.

Early contacts and investigations through mentors, principals, teachers and documents obtained from the Ministry revealed that thirteen schools from the Central Region had received equipment and ICT professional development courses as part of the Discovery Schools initiative. A hundred Discovery Schools were selected in Amman by the Ministry of Education in order to pilot and steer ICT integration across the Jordanian educational system. Thus, the Discovery Schools were at the forefront of ICT integration as they were meant to showcase best practices in ICT, and therefore, they were receiving extra attention from the education system through

infrastructure and professional support. Four Discovery Schools from the Central Region participated in Phase (1) of the study. Two of these four schools were selected for in-depth investigation. The following criteria were employed for selecting the two schools:

- Participation in ICT training courses provided by the Ministry of Education;
- ICT resources and infrastructure;
- School administration's support for ICT implementation;
- Teachers' utilization of ICT in teaching;
- Positive attitudes towards ICT on the part of teachers and principals; and
- School's willingness to participate in the study.

The two schools, Fajr and Noor, were selected as they reported having optimal conditions for ICT integration in Jordan compared with other schools, which allowed them to serve as 'critical cases' within the educational system. Two teachers were selected from each of the two schools: a mathematics teacher and another science teacher because these subjects had been digitized and had supporting electronic materials. Mathematics curricula had been digitized for all grades (1-12) and science curricula had been the second to follow.

Research instruments: A variety of data gathering instruments were utilized in order to investigate the research questions. Questionnaires, interviews, and observations were used to collect data. The study comprised two phases: Phase (1), in which the researcher administered two questionnaires: Questionnaire (1) was directed to teachers in the twelve selected schools and consisted of (31) items and Questionnaire (2) was directed to the principals in the twelve schools. In addition, nine face-to-face interviews were conducted in the two schools in the participants' native language (Arabic language). According to Stake (1995), "the interview is the main road to multiple realities" (p.64), therefore, interviews are used in qualitative research to obtain data from different sources to provide different perspective at the issue of concern. Thus, teachers were interviewed for approximately 45 minutes in order to explore their experiences with, understanding of, and expectations from ICT training courses. Moreover, considering the crucial role of principals in ICT integration at the school level, the principals of the two schools were interviewed for approximately half an hour to 45 minutes. The interviews were semi-structured in nature in order to guide the discussion without being limiting. In addition, lesson observations were carried out. This technique is highly valuable for data collection in qualitative inquiry, which requires researchers to 'be there' in the real context of the research offering "dynamic 'slices' of classrooms" (Forman, 2005, p.109).

A pilot study was carried out in order to check the clarity, instruction and layout of the questionnaires. Twelve participants who had undertaken at least one ICT training course were involved in piloting the study and their responses helped in reshaping the questionnaires. It became clear that the open-ended items were generally left unanswered, which led to re-formatting the open ended items to become clearly structured, easier, and faster to complete. In addition, one item required re-wording in order to eliminate ambiguity. Furthermore, for the interviews and observations, the researcher did member checks by sharing findings with some participants who were willing to participate in this process and asking for their comments on that.

Triangulation of data: In the current study, triangulation was achieved in three ways: type of data, data sources, and data analysis. Firstly, triangulation was sought through the kind of data collected. That is, data collected in each phase of the study, Phase (1) and Phase (2), triangulated each other. In Phase (1), data were collected through two questionnaires distributed to teachers and principals. Phase (2) provided chances to ask participants to expand and clarify some answers had been provided to the questionnaires in Phase (1), especially in respect of questions that revealed misinterpretation by participants. Secondly, triangulation was sought through a diversity of data sources including data collected from teachers and principals in schools, as well as other stakeholders and officials from the regional directorates of education and the Ministry.

Thirdly, triangulation was sought during the analysis and discussion of the data. On one hand, findings were compared and interrogated within the research itself, the finding from the two phases, and on the other hand with other findings from previous studies. In addition, some of the findings were shared with some participants in order to benefit from their perspectives on the data.

Data analysis: For the two questionnaires, there were two stages of analysis. The first was a preliminary analysis of the two questionnaires during the data collection in Phase (1) in order to guide the selection of two schools and teachers for Phase (2). The second stage of analyzing the questionnaires included comparisons of results between schools and the three regions of Jordan. However, simple descriptive frequency tabulation was the main means for analyzing the two questionnaires.

For the qualitative phase, it was crucial to identify the unit of analysis. Brewer and Hunter (1989) define units of analysis as “those entities *about* which we collect data and about which we want to generalize or make inferences” (p. 109, italic in source) and therefore, they define what the case is. In present study, the unit of analysis was the school, which implied examining the uptake of ICT by the school and how teachers in the selected schools experiences and integrated ICT across the curriculum. In addition, the analysis examined the school as a unit within the larger context of the educational system and how this influences a school’s adoption of ICT.

Thematization and categorisation were used to make sense of the data collected during interviews, observations, and school visits during Phase (2). Themes and patterns were matched and compared between the two case studies. However, for the final discussion of findings, both quantitative results and qualitative findings were integrated in order to confirm/disconfirm, cross-validate, and gain in-depth understanding (Creswell, 2003; Tashakkori *et al.*, 1998) of teachers’ experiences with ICT. The findings then were compared with other studies.

FINDINGS AND DISCUSSION

This section presents findings related to factors associated with teachers’ adoption and implementation of ICT regarding the main two research questions.

ICT training courses

As indicated above, ICT training courses adopted by the Jordanian Ministry of Education aimed to improve teachers’ ICT proficiency at three levels: ICT skills, pedagogical skills, and curriculum training (Alutaibi, 2003). This section presents findings related to the first research question: “What kind of ICT professional development is available for Jordanian teachers?”

Participation in ICT training courses: Participation in the four ICT courses was greatly varied among teachers from the three regions of Jordan. The ICDL course was the most widespread of all, with least variation across regions compared with all other courses. One hundred and thirteen (98.2%) teachers reported undertaking the course, of whom 38 (97.4%) in each of the Central and the North regions, and 39 (100%) in the Southern Region. On the other hand, the iEARN course had a substantially lower profile, with only 2 (1.7%) teachers among all participants reporting undertaking the course. Furthermore, the World Links course showed high presence in the Central region, as 12 (30.7%) teachers reported having undertaken this course, while none of the teachers from the South region reported undertaking it, only 4 (10.2%) teachers from the North region (Table 1).

Table 1: Number of teachers participated in ICT training courses by November 2006

	Central Region/schools				No. (39)
	Fajr	Noor	Salam	Urdon	
ICDL	11	7	12	8	38 (97.4%)
World Links	0	4	5	3	12 (30.7%)
Intel	7	3	3	1	14 (35.8%)
iEARN	0	1	0	0	1 (2%)
	Northern Region/schools				No. (39)
	Wefaq	Fatima	Karama	Sabeel	
ICDL	6	7	12	11	36 (92.3%)
World Links	2	1	1	0	4 (10.2%)
Intel	3	7	6	2	18 (46.1%)
iEARN	0	1	0	0	1 (2%)
	Southern Region/schools				No. (39)
	Qalam	Sail	Alam	Rayah	
ICDL	10	10	10	9	39 (100%)
World Links	0	0	0	0	0 (0.0%)
Intel	7	4	2	1	14 (35.8%)
iEARN	0	0	0	0	0 (0.0%)

Table 1 shows that Al Fajr, Noor and Salam schools from the Central region with high participation in Intel, World Links, and ICDL programs. Seven teachers from Fajr School had participated in the Intel course. However, none of the teachers from that school reported undertaking either World Links or iEARN. On the other hand, 4 teachers reported undertaking World Links course from Noor School and 5 from Salam School, and these were the largest proportions of teachers among all schools.

It may thus become apparent that the ICDL course was most consistently taken up by participating schools across all three regions, while World Links and Intel were better represented in the Central and North regions. However, this can be understood in light of the mechanism of disseminating ICT across the Jordanian education system, which it starts from the Central Region where the centre of the education system is located, before it spreads to other regions.

Skills developed by training courses: ICT skills and pedagogical skills: As discussed earlier, ICT training courses usually target two levels of teacher' ICT skills: ICT skills, and pedagogical use of these skills. Predictably, as the vast majority of teachers from all the three regions reported undertaking the ICDL course, 88 (76.5%) teachers reported developing computer skills (e.g. Word processing, presentation and accessing to information). However, only 58 (50.4%) reported developing pedagogical skills from ICT training.

Furthermore, teachers from the Southern Region were more likely to develop computer skills (e.g. Word processing, presentation and access to information) than both the other two regions, as 33 (84.6%) of them reported developing such skills. However, 20 (51.2%) teachers from the Central and 23 (58.9%) from the Northern regions reported developing pedagogical skills compared with 15 (38.4%) from the Southern. This tendency might be due to World Links and Intel courses which were concentrated in the Central region before expanding to the Northern and Southern regions, as was already demonstrated in Table 1 above.

As a result of ICT training, Jordanian teachers are expected to practise their newly developed skills in teaching. Teachers from all three regions reported the greatest use of ICT use was searching for additional teaching resources. In addition, 52 (45.2%) teachers reported searching for additional sources on the Internet and 37 (32.1%) reported using ICT to prepare for lessons. Nevertheless, ICT-based interaction in the school culture appeared to have minimal presence among teachers, as only 5 (4.3%) teachers reported using ICT for communication and 13 (11.3%) of them reported uploading files (e.g. lessons) to the Internet. This might be linked to the availability and quality of Internet connection in.

Overall, teachers from the Central Region reported the highest use of ICT among teachers from all regions. Twenty-two (56.4%) teachers from this region reported searching for additional sources on the Internet compared with 15 (38.4%) from both the North and South regions. Nevertheless, the use of Internet and the World Wide Web for communication remained low in the Central region, as only 3 (7.6%) teachers reported using ICT for communication. Teachers from Fajr and Noor schools reported greater use of these two functions of ICT than did teachers from all other schools in the study.

According to Navarro and Verdisco (2000), dealing with teacher issues has all the characteristics of the most difficult problem that faces educational policies. Thus, it has been recommended that 30% of a school development budget should be allocated to staff development (Harvey & Purnell, 1995). Nevertheless, teacher training in Jordan received approximately \$US 300,000 (1.36%) out of \$US 22M the total spending on the JEL, which is a significantly small amount (McKinsey & Company, 2005). While this might be justified as the reform was in its early stages and there was a need to provide schools with infrastructure, it remains an indication of the existing balance in investing the educational dollar. However, dealing with teacher issues is a complex task. That is, these issues are "politically and ideologically charged; their financial implications [...] are huge" (Navarro & Verdisco, 2000, p.3). In addition, the ambiguity of skills required for teachers to become competent in ICT adds to the complexity of the task (European SchoolNet, 2005; Navarro & Verdisco, 2000; Rudd, 2001).

The system's approach of providing teachers with ICT professional development showed clear fragmentation. Participants reported the absence of national standards for ICT training courses (e.g. ICDL, World Links, Intel) which had been internationally developed. Each of these courses was responsible for developing its own standards, which added to the fragmentation. Benefiting from the experiences of other countries such as Denmark, France, Hungary and Switzerland (European SchoolNet, 2005), the Jordanian educational system can develop its own national ICT certificate. The development of national standards for international courses operating within the educational system could make ICT training less fragmented through compelling the international ICT training courses to meet the national agendas and standards.

Issues impact the effectiveness of ICT training courses

This section presents findings regarding the second research question: “What kinds of issues are related to the effectiveness of ICT training courses for teachers?” both teachers and principals portrayed several issues associated with the effectiveness of ICT training courses conducted by the Ministry of Education including: time and timing, modes, follow-up, teacher belief, school culture, teacher workload, and motives and incentives attached to attending courses.

Timing and time of ICT training: Timing and time of ICT training have been identified in the literature as crucial factor for the success of ICT professional development. On one hand, enough time should be allocated for teachers to participate in training, and on the other, enough time should be allowed for teachers to practise their newly developed ICT skills in classes (Downes *et al.*, 2001). Furthermore, the timing of training courses should be suitable for teachers, and should not exploit teachers’ non-work time (Galanouli *et al.*, 2004; Gilmore, 1995; Mathew *et al.*, 2002).

Teachers in this study complained about the limited time available for them to develop and practice ICT related knowledge and skills which impede their desire to utilise ICT properly. For example, a teacher noted: “*it is unrealistic for the teacher to search for other materials than the textbook if his/her workload is more than nine lessons a week.*” (Q1:85) Another wrote, “*Using the computer needs time for preparing the digitised materials, and we, the teachers, suffer from the lack of time and work pressure.*” (Q1:110)

Moreover, in regard to time allocated for training courses, only 49 (42.6%) teachers from the three regions of Jordan believed that it was enough to develop new ICT skills. Seventeen (43.5%) teachers from the Central Region, and 16 (41%) from each of the Northern and the Central regions, believed that the time was enough for them to develop new ICT skills.

Sixteen teachers commented on issues regarding time and timing of ICT training courses. The timing issue appeared to be of significance especially to female teachers. Understandably, making training after school hours or during holidays can be at the cost of teachers’ own time. The timing of training was problematic as it was usually conducted after school hours or during holidays. Usually, teachers from the three regions of Jordan travel between half and one hour to central locations in major cities of each of the 36 directorates where ICT training is conducted. Therefore, female teachers may find it difficult to maintain a balance between their family commitments and their professional live. Thus, the majority of comments were provided by female teachers and there was a request from teachers to make training courses during the school day and to consider training as part of teacher’s workload. One female teacher commented:

“The place where training takes place and its distance from where one lives should be considered. Training should also be considered as part of the teacher’s working hours.” (Q1:36)

There were frequent complaints, especially among female teachers, about the timing and location of training:

“The place where training takes place and its distance from where one lives should be suitable. Training should be considered as part of the teacher’s working hours.” (Q1:75)

This remark was prompted by teacher training courses which were conducted mainly after school hours or during holidays. Additionally, teachers also complained about having to make their own way to training sessions. The location of courses certainly meant that teachers from other regions were required to travel independently to these locations, sometimes spending over two hours traveling to the central location without financial assistance from the education system (Nawal, a computer lab coordinator, February 28, 2007) making training courses a burden on teachers.

Furthermore, 28 (24.3%) teachers in Phase (1) who had received training asked for more training on ICT. In addition, the principal of Noor School reported that teacher training was not enough for teachers to be able to use ICT in their teaching as some teachers simply did not know how to utilize ICT.

Teachers in this study reported an extensive reliance on one-session courses and workshops for their ICT professional development. For instance, during an English language lesson given by Reem, an English language teacher from Fajr School with 13 years of experience, she tried to practice what she had learnt in one-session workshop on using the new English Interactive Online (EIO), however, her frustration was clear, especially that

she tried her best but without any assistance or follow-up. Indeed, this approach without follow-up has been labeled as the least effective one, as well as the least cost-effective in terms of what teachers develop and implement from such short courses (Sun, Heath, Byrom, Phlegar, & Dimock, 2000). Teachers need time to master and practise new skills in order to be able to pass them on to students.

Modes of ICT training courses: Several issues are identified in the literature regarding the mode of training including: the location of training, starting points of courses, and skills taught (Downes, et al., 2001; Fiszler, 2004; Guskey, 2000; Mathew, Callaway, Letendre, Kimbell-Lopez, & Stephens, 2002; Strudler, Mckinney, & W. Paul Jones 1999). In addition, as teachers are expected to implement skills that they develop from ICT training in classrooms, training should ensure a direct link between these skills and their implementation in real teaching environments. Browne and Ritchie (1991) as well as Granger *et al.* (2002) stressed that learning isolated skills can have little impact on classroom practices if training courses do little to help teachers to transfer these skills to classrooms.

Participant teachers in this study commented on several issues regarding their ICT training. Teachers expressed their frustration about both the physical environment and the quantity of machines. Some teachers were asking for more space as the rooms were very crowded (Q1:116). In addition, teachers asked for more machines to be able to practise what they learn during their courses (Q1:121) as *the number of computers was not enough which causes teacher's frustration* (Q1:116). In one teacher's words,

"The role of training [courses] would become greater if they are implemented in classrooms during practicing teaching, because the purpose of this training is implementing the computer in teaching." (Q1:3)

The literature recommends that ICT training should consider individual differences between teachers in terms of their previous knowledge of ICT (Galanouli, et al., 2004; Gilmore, 1995; Rosen & Weil, 1994). In the present study, 71 (61.7%) teachers from the three regions of Jordan indicated that ICT training courses took into account their previous knowledge, and 25 (64%) teachers from each of the Central and North regions indicated that their previous knowledge was considered by ICT training courses. Nevertheless, this indicates that a large proportion (38.3%) of teachers believed that their previous knowledge was not considered by training courses. According to one teacher, *"training courses do not consider the individual differences. Some teachers do not know how to turn on the computer."* (Q1:80)

Training courses should have clear aims and strategies to achieve these aims. Contents, time, location, as well as the way of distributing a professional development course within the system have to be addressed. When teachers undertake new ICT courses they are expected not only to develop knowledge but also to accomplish a level of autonomy and confidence in using this technology in classrooms (Granger *et al.*, 2002). The aims of the course have to be clear; in the first instance, whether the goal is to provide teachers with ICT skills or skills for the pedagogical use of ICT (Downes, et al., 2001; Tawalbeh, 2001). Moreover, the location of the course has to be considered - whether it is a computer room, a classroom or even a lecture room - as this can reflect upon the transferability of newly acquired skills by teachers to classrooms (Granger *et al.*, 2002). Furthermore, in order for teachers to be able to make sense of what they learn during ICT training courses, they should be given the opportunity to have hands-on practice during training courses (Downes, *et al.*, 2001; Gilmore, 1995; TeleLearning, 1999), and to have enough time afterwards to practise on their own (Strudler *et al.*, 1999).

Follow-up to training: Follow-up has been identified as a major ingredient of any successful use of ICT by teachers across the curriculum as it helps teachers to make sense of their newly developed skills in light of their own practices in classrooms (Bradshaw, 2002; Fiszler, 2004; Lewis, 1998). As Fiszler (2004) notes, teachers might abandon their newly developed skills if they find them "incompatible" with real teaching/learning settings.

Teachers commented on the lack of follow-up for ICT training in Jordan and frequently requested more efforts to follow-up training courses. For instance, a teacher wrote: *"teachers must receive follow-up in the field when they implement technology."* (Q1:1) However, Table 2 shows that only 16 (41%) teachers from the South Region received follow-up to their training, compared with 10 (25.6%) and 9 (23%) from Central and North regions, respectively. However, this finding might be linked to the distance of the South Region from the centre of the education system where mentors, especially from the Central and the North regions were, often removed from their duty to reinforce other field such as authoring and training, as will be discussed later.

Table 2: Number of teachers reporting receiving follow-up after ICT training in the three regions

	Central Region/schools					No. (39)
	Fajr	Noor	Salam	Urdon		
Did you receive any follow- up?	3	4	2	1		10 (25.6%)
Was the follow-up adequate to transfer skills to classrooms?	6	4	1	0		11 (28.2%)
	Northern Region/schools					No. (39)
	Wefaq	Fatima	Karama	Sabeel		
Did you receive any follow- up?	1	1	2	5		9 (23%)
Was the follow-up adequate to transfer skills to classrooms?	1	1	4	2		8 (20.5%)
	Southern Region/schools					No (39)
	Qalam	Sail	Alam	Rayah		
Did you receive any follow- up?	5	3	5	3		16 (41%)
Was the follow-up adequate to transfer skills to classrooms?	2	2	3	3		10 (25.6%)

Twenty-nine (74.3%) teachers from the Central Region reported receiving follow-up to their training and only 10 (25.6%) believed that the follow-up was adequate to transfer ICT skills to classrooms (Table 2). Fajr and Noor schools reported receiving more follow-up than any of the other Central Region, and teachers in these two schools showed more satisfaction with their follow-up. However, during the course of the current study, it became clear that these positive responses were due to teachers' misinterpretations of the term "follow-up" used in the questionnaire. That is, investigation in Phase2 showed that teachers reported visits to schools by officials and stakeholders as being "follow-up".

A major feature of successful ICT professional development is the quality of follow-up which teachers receive after the training courses (Lewis, 1998). Anderson (1997) cited "lack of good assistance" as one of the reasons that can cause teachers to abandon new practices they learn during their training courses as soon as they return to the classroom. Fiszer (2004) also warns that without follow-up teachers might abandon the new skills they develop during professional development courses because of "incompatibility" with the real teaching/learning setting they face. In addition, Bradshaw (2002) concludes that in order to maximize the return of investment in staff development, significant resources need to be redirected to the follow-up activities. Similarly, according to Huberman and Miles (1984), it is the assistance and support that teachers receive, once change is underway, which decide the life or death of innovations in schools.

Mentors are the main source of support and assistance for in-service Jordanian teachers. Although principals are also considered to be permanent mentors in schools, more than half (57%) of the principals in this study indicated that they were *unable to assist teachers in integrating ICT in their teaching*. Therefore, follow-up was exclusively the responsibility of subject mentors from the regional directorates of education. Nevertheless, it became clear that these mentors' role was limited due to first their workload, and second due to their lack of competence to guide teachers in the implementation of ICT.

Noor and Fajr schools were expected to receive intensive follow-up, due to their location within the vicinity of the Ministry and the directorate of education, and to their extensive participation in ICT integration. During Phase (1) of this study, approximately 57% of Noor's teachers reported that they received follow-up for their ICT training, and approximately half of that percentage (28%) were from Fajr School. However, as indicated earlier, during Phase2 of the study it became clear that even participants in the two schools who reported receiving follow-up had misinterpreted this item in the questionnaire as referring to ordinary visits by stakeholders and officials. As the two schools were extensively involved with reform, they were often visited, but the purpose of visits was not follow-up for teachers in order to ensure their proper ICT implementation. While teachers who were undertaking Cader course were indeed visited by their trainers once a week, this course was available only for a meagre number of teachers.

It became clear that follow-up in the two schools was not consistent. As the two schools were among the first in the country to participate in reform during the pre-piloting and piloting stages of implementing the new curricula, both schools received intensive follow-up during the initial stage of the implementation during the school year 2003/2004. However, the principal of Noor School highlighted to this inconsistency as he noted that *"The digitisation started there was intense follow-up and mentors used to visit the school very often but this was only during the first year of the program. The follow-up*

was only in the beginning of the program and now it is superficial.” (Ali, December 15, 2005)

Furthermore, participants from all levels of the education system pointed to the underperformance of follow-up. Participants commented on mentors’ competence in providing assistance to teachers regarding ICT integration. Leila, a biology teacher with 22 years of teaching experience from Fajr School, had undertaken the Intel course, during which she was required to develop a portfolio of her activities (e.g. presentations and work sheets). However, after the end of the training course, it is up to teachers to use the newly developed skills or not. Although Leila acknowledged that her mentor was cooperative, she did not have ICT knowledge and skills to help her. In addition, Yousif, a mathematics teacher with 13 years of experience from Noor School stressed that mentors “are neither prepared nor qualified to supervise teachers to use technology” (Yousif, December 30, 2005).

Furthermore, participants commented on the mentors’ availability to provide follow-up for teachers. Mentors were overloaded as each mentor was responsible for 120-130 schools, each of which is expected to be visited, supported, and evaluated during the schooling year. Furthermore, they were often assigned to the authoring team of new curricula as well as training teachers. The overload of mentors prevented them from providing proper assistance and follow-up to teachers. Rajab, a mentor from Directorate2, mentioned that he used to visit the Discovery Schools very often, four to five times a week, sometimes daily during the piloting of the e-math during the 2004/2005 schooling year (Rajab, December 8, 2005). However, after that the number of visits dropped dramatically from twice a week to once or twice a year (Hassan, January 19, 2006) as mentors were taken from their mentoring responsibilities to other duties leaving teachers without guidance.

Belief in the potential of ICT: The literature has demonstrated that teachers are more likely to adopt ICT when they are convinced of its benefit for their teaching and students’ achievement (Downes *et al.*, 2001; Grunberg *et al.*, 1992; Lai, 1993; Means, 1994; Subhi, 1999). Therefore, educational interventions should dedicate time and effort to convince teachers of the benefits of ICT for teaching and learning.

Teachers reported major changes as a result of undertaking training courses. Table 3 shows that 110 (95.6%) teachers from the three regions reported becoming more aware of the benefits of ICT after undertaking ICT training. Furthermore, teachers reported major changes in their instructional strategies as a result of ICT training, with 94 (81.7%) teachers indicating that their instruction had improved as a result of ICT training. In addition, 95 (82.6%) participant teachers believed that their teaching became more student-centred as a result of their ICT training. These findings were also confirmed by principals’ accounts. Thirteen (92.8%) principals believed that teachers who had undertaken ICT training became more effective in their teaching as a result of their training. In addition, 10 (71.4%) principals believed that ICT teacher training was reflected positively in students’ achievement.

Table 3: Number of teachers reporting belief and instructional changes as a result of participating in ICT training

	Central Region/schools				No. (39)
	Fajr	Noor	Salam	Urdon	
More aware of the benefits of ICT	11	6	11	9	37 (94.8%)
My teaching has improved	8	5	8	9	30 (76.9%)
My teaching is more student-centred	10	5	10	9	34 (87.1%)
	Northern Region/schools				No. (39)
	Wefaq	Fatima	Karama	Sabeel	
More aware of the benefits of ICT	6	8	11	11	36 (92.3%)
My teaching has improved	5	6	12	7	31 (79.4%)
My teaching is more student-centred	5	7	11	6	29 (74.3%)
	Southern Region/schools				No (39)
	Qalam	Sail	Alam	Rayah	
More aware of the benefits of ICT	10	10	9	8	37 (94.8%)
My teaching has improved	9	9	9	7	34 (87.1%)
My teaching is more student-centred	8	9	9	6	32 (82%)

Overall, teachers from all three regions reported highly positive impacts of ICT training on their attitudes towards ICT and upon their instructional methods. Sami, from Noor School, summarized the transformation of his attitude towards ICT in one of his early postings to the electronic discussion board on World Links website as follows:

“For me, learning how to use the computer was stressfull [sic], because I thought it will be very hard, and I thought that it will need a computer engineer to turn on the computer. However, when I started my course I found out that it's really easy and it suit every body, and I learned most of what I know now just by playing on the computer and practicing over and over. And the most intersting [sic] thing happened when one of my friends interduced [sic] me to the Internet, and it was a new era for me. It did really change my point of view in many aspects.” (Sami, May 27, 2004. Posted online in English)

On the other hand, Yousif was against the integration of ICT in education. Unlike Sami, he was a mathematics teacher who had received a laptop from the Jordan Education Initiative as part of the e-math; however, this did not change his belief, especially after his struggle with maintenance. However, he proceeded to explain why he opposed the integration of ICT in his teaching:

“I could not rely on the wage I receive for being a teacher, so I have another job after school hours to be able to support my family.” (Yousif, December 30, 2005)

Due to the low income, teachers are pushed by their family responsibilities to find a second job, which is usually private tutoring after school hours. Additionally, Jameel, a mathematics teacher from Noor School with 15 years of experience, mentioned the pecuniary motive behind his decision in recent years to work after school hours:

“After three months of chasing for the laptop to be fixed, they wanted to fine me... we are hidden soldiers [teachers] and we need support, well, now I finish school and go straight to my other job. It is private tutoring because, I swear, we are not able to cope. Before three years I never though of private tutoring, but now it is getting hard and you could not cope without a second job.” (Jameel, 15 November 2006)

Leila, from Fajr School, was an example of the enthusiasm and positive attitude amongst teachers towards ICT. She said that she used computer labs at least once a week. In addition, she cited an example of commitment to using ICT:

“I bought a laptop on my own and used it in classrooms even before ERfKE [Education Reform for the Knowledge Economy] started in 2003, even before computers were made available for the school. That time laptops were large and heavy and because I used to carry my laptop with me most of the time, I started to have shoulder and back pain. I think technology is very useful for education and the decision by the ministry of education to integrate technology into education was a wise decision but the important thing is how we go about implementing the decision. Any reform is nothing if it is not implemented properly.” (Leila, December 7, 2005)

In addition, although Samar, a mathematics teacher with 20 years of experience from Fajr School, had participated in ICDL program only, she was enthusiastic to try new ICT-related ideas. She was engaging her students with activities by asking them to digitize lessons and chapters from textbooks of all grades. The teacher could not hide her smile of pride when she brought a large portfolio which contained her work with her students. The portfolio comprised color-printed presentations and floppy disks. In this case, we see how a teacher was able to adopt ICT in her instruction even without having received formal training in the pedagogical use of ICT.

School culture: Teachers' interaction and collaboration in schools can improve their adoption and implementation of ICT (Fischer, 2004; Sandholtz, Ringstaff, & Dwyer, 1997; Wenger, 1998). Through these activities, teachers may learn new skills from one another and verify their competence by reflecting on their own practices. Furthermore, teachers may overcome daily problems regarding implementation of ICT by working with more experienced colleagues who might be able to offer scaffolding of ICT skills both during and after training.

All principals (100%) indicated that they facilitate collaboration amongst teachers. In addition, 99 (86%) teachers from the three regions reported increased collaboration with other teachers as a result of their ICT training courses. Teachers from the South Region reported greater collaboration (36 teachers [92.3%]) compared with 34 (87.1%) and 29 (74.3%) from Central and the North regions, respectively. In addition, teachers from the South Region reported having more opportunities to observe other teachers when implementing ICT, with 11 (28.2%) reporting doing so compared with only 6 (15.3%) and 7 (17.9%) from the North and the South. Nevertheless, only 24 (20.8%) teachers from the three regions reported having observed other teachers during implementing ICT.

However, this factor was generally missing in schools and most teachers were seen to have only minimal interaction. Only enthusiastic teachers with self-motivation sought collaboration and interaction with other more knowledgeable teachers while they implemented ICT in their curriculum. For instance, Sami was a physics teacher of with 15 years of experience He was a regular user of the Internet, and maintained a high profile on the electronic discussion board “Collaboration Centre” which was available for teachers who participate in the World Links course. He frequently posted to this website while discussing issues with others. In addition, the pattern in which he responded to my emails indicated that he was a regular and a frequent user of ICT. Sami was a Master Trainer with World Links. In addition, he maintained his own website. Thus, other teachers in his schools used to visit him during his classes in the computer lab. Each time the researcher attended his classes in the computer labs there were other teachers attending his class to learn from his utilisation of ICT, even though they were teaching different subjects. The observations were self-motivated by these teachers in order to see how he used technology in his teaching and to learn from that. (OBNS.1, an English language teacher who was attending the class) Sami himself pointed out that through such occasions teachers try to learn from each other in a collaborative way. Sami mentioned that he had helped other teachers to overcome some downfalls of the technology via the Internet by instructing them through emails. Unfortunately, he constituted an exception as collaboration among teacher was not a norm in the school culture.

For teachers who undertook the World Links course, there was an electronic discussion board, to which they were requested to contribute. However, browsing through the discussion board showed that most of the postings were made only to fulfill the course’s requirement. Some postings included only the teacher’s name and e-mail address. In addition, the majority of participants in the discussion board posted only once and then disappeared. However, there were a few active participants, who were mainly coordinators or trainers in the program. Furthermore, there were a small number of postings where teachers participated by asking questions or sharing their own experiences. For example, some teachers shared plans for lessons that integrate ICT in teaching, which can be used by other teachers as models, while other teachers posted links of useful websites.

Teacher workload: Teachers’ workloads and the time constraints can severely hinder technology acceptance by teachers (Hu, Clark, & Ma, 2003). Clearly, in order to achieve the goals of the educational system and to enable teachers to implement new initiatives, it is essential to reduce teachers’ workload (Fullan, 1982, 2003; Grunberg & Summers, 1992).

Ali, the principal of Noor School, noted that *teachers are already overloaded; they could not cope with this pressure and the pressure from training*. In addition, Yousif pointed to the pressure on teachers to meet certain deadlines, as they were required to finish the textbook by the end of the year. Therefore, for Yousif:

“including extra activities or spending more time on additional sources will distract me from the main goal for which is completing the textbook before the end of the school year.” (Yousif, December 30, 2005)

Sami also mentioned that teachers being overloaded as one main obstacle facing ICT integration. In addition, mentors were aware of this aspect as Rajab stated that: *teachers are overloaded to learn, prepare, and practice what they learn*. (Rajab, December 8, 2005) Therefore, One teacher proposed

“giving teachers enough time to be able to show techniques and skills he/she learns by using computers to teach students in an innovative and interesting way apart from the traditional way.” (Q1:49)

It is unreasonable to expect teachers to attempt and try new teaching strategies and methods without giving them time to do so. Trying new teaching strategies while overloaded with other teaching responsibilities can be a daunting task for teachers and might involve mere recycling of old practices in order to accommodate both pressure to change practices and overload creating the illusion of improved performance. Accordingly, teachers’

load needs to be taken into account when planning for ICT training courses in order to ensure the actual implementation of skills developed during the courses by giving teachers enough time and support to try new teaching strategies.

Motives and incentives: Motives and incentives for teachers who undertake ICT professional development programs are identified in the literature as a supporting factor for ICT professional development (Downes, et al., 2001; Dusick, 1998; Shuldham, 2004). In the Jordanian context, as noted earlier, the Jordanian education system considered ICT training courses as prerequisite for teacher promotion and rewards. The vast majority of teachers (81%) reported receiving incentives for their participation in ICT training courses. According to one teacher *“money incentives have big role in teacher’s acceptance of learning new technologies.”* (Q1:26) Nevertheless, Sami criticised this link between the incentives and the ranking system, which according to him made teachers compete to participate in these courses and *forget what they learn during training course as soon as they receive the certificate.* This was also confirmed by Ali, as he noted that:

“Training courses do not qualify them [teachers] to use technology in their teaching; teachers may undertake training courses only for the certificate or the rewards and forget what they learn after that.” (Ali, December 15, 2005)

Basil also referred to this point as he said that

“until now, teachers undertake ICT professional development programs only for the certificate, teachers’ ranks, or money rewards.” (Basil, December 13, 2005)

While motivation, through certification and promotions, is essential for joining ICT training courses by teachers, the system needs to ensure that motivation is not an end by itself. Like any other educational interventions, ICT training courses are expected to improve students’ learning through improving classroom practices. Thus, there should be special efforts through follow-up and mentoring to ensure the transfer of skills into classrooms.

LIMITATIONS OF THE STUDY

The small number of interviewed teachers and principals can be seen as a limitation of the study, therefore, and we acknowledge that our findings are context specific. Therefore, the reader has the full choice over identifying how findings in the current study may transfer into similar contexts (Lincoln & Guba, 1985). In addition, further studies can be conducted in order to compare what has been found in the Jordanian context with other similar contexts.

CONCLUSIONS

The Jordanian Ministry of Education adopted several ICT training courses aiming to prepare them to integrate ICT effectively across the curriculum. The adopted training courses helped teachers to improve their ICT-related skills and knowledge which improved their perceptions of ICT in their profession. Nevertheless, it became clear that the conduct and nature of these courses subvert their potential benefits to teachers. Several factors, including timing and modes of training, follow-up, teacher’s belief, school culture, workload, and motivation, appeared to impact the effectiveness of training courses. Accordingly, the planning and design of courses should take into account such factors in order to insure the positive impact of these courses on teaching practices and eventually on students’ achievements.

The discussion above highlighted several issues appeared to influence the positive impact of ICT training courses on teacher utilisation of ICT in their profession. Issues such as teachers and mentors overload, one-session courses and workshops, lack of follow-up for teachers after they return to schools can undermine the accomplishment from ICT training courses. In addition, careful attention should be given to both levels of skills sought by teachers, both ICT-related skills and the pedagogical use of ICT. While motivation is important to motivate teachers to undertake training courses, it is more importantly to ensure that the promotion is not its ultimate goal.

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