RECOMMENDING A WAY TO CREATE THE CLIMATE

TO INTEGRATE TECHNOLOGY IN A SCHOOL SETTING

IN ALEPPO, SYRIA.

A Thesis

Submitted in partial fulfillment

of the requirements for the degree of

Master of Arts in *Education Technology*

by

Laina Bassam Rajab

Department of Psychology, Education and Physical Education

Notre Dame University – Louaize

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Dedication

I dedicate my thesis to my father Bassam Rajab and my mother Maral Vartkis, whose affection, love, encouragement, and prayers day and night made me successful in all life aspects.

To my husband Abboud, for being the source of motivation and strength during moments of despair and discouragement and for your endless love, care, and support.

To my sons Sam and Dany, for adding joy and happiness to my life.

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My profound gratitude goes to my family for their support and payers: my father for giving me the strength to reach for the stars and chase my dreams, for your prayers and care, for

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Abstract

The twenty-first century confronts its citizenship with new choices, opportunities, and challenges due to the universal presence of technology in all spheres of life, especially in education. Technology made a shift in the academic field and created new possibilities that shook the traditional teaching and learning paradigms; teachers and trainers are confronted by challenges that range from the acquisition of skill and literacy in the usage of technology to the delivery of the necessary tools that will guide students to become knowledge creators and users.

The overall objective of this study was to investigate the readiness of the Syrian teachers in private schools toward ICT integration in education and to make recommendations for the effective reach of the innovation. A descriptive survey was utilized in three purposively sampled schools to review the infrastructure on technology integration, cultural perceptions (attitude and belief), computer competence, computer access, and demographic variables (including computer training background). A qualitative method was employed to collect data on the population of teachers in the city of Aleppo. A questionnaire was developed and was distributed to teachers selected from the population. The questionnaire stage was followed by in-depth phone interviews with a purposeful sample of 3 principals. In light of the questionnaire findings, results were

analyzed and a technology integration improvement plan was recommended to empower and

encourage ICT integration into the instructional repertoires.

Keywords: ICT, integration, education, technology, school, teacher, principal

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CHAPTER ONE

Introduction

During the development of the youngest children, there are moments when ideas fall into place to new connections be made; when they begin to associate abstract concepts with an understanding of the world and their place within it. That should be a natural part of the educational process for most children. However, there are still several cultural forces, social contexts, and political situations that can inhibit this development for particular demographic groups; this is especially true for children who lived in Syria.

Syria had a rich history of learning and education, being home to the first known alphabets and one of the oldest recorded languages still used today, namely Aramaic. Regrettably, education, economic, and social collapse brought on by years of conflict have undone years of educational achievement (UNICEF MENA, 2015). Before the crisis, Syria had a rich education system and have achieved near-universal primary education enrolment and a secondary school completion rate of 74 percent (Bouchane, 2016).

The Syrian situation is not a secret or an obscure reality. For instance, Syria is overrun by a plethora of problems ranging from political instability to social unrest and poverty. Access to technology and ICT correlates with the economic health of a country (Haddad & Jurich, 2002). Unfortunately, Syria does not have the resources that other countries have. The lack of knowledge, skills, expertise, and the most important the vision or rationale for the importance of technology integration to facilitate the teaching-learning process and the need to reform the education systems to accommodate 21st century's modernity (Baylor & Ritchie, 2002, p. 398) stated that "regardless of the degree

of technological sophistication, it will not be integrated unless teachers have the skills, knowledge, and perspectives required to invest it into the curriculum". That is, teachers should become productive agents to be able to integrate technology into the classroom. Especially that today's students immersed in technology at a very early age, have spent their daily lives using computers, smartphones, and digital media (Oblinger, 2008; Prensky, 2007). Therefore, as a good entrance for them to be engaged in education, the integration of technology into teaching-learning contexts is necessary to enhance students' collaborative learning skills as well as developing transversal skills that stimulate social skills, problem-solving, self-reliance, responsibility, and the ability for reflection and initiative. All these factors are the core values that students need to achieve in an active teaching and learning environment (Ghavifekr et al., 2014) and thus allow future citizens to survive in an erudition society.

Information and Communication Technology (ICT) is an essential part of the current time and a crucial indicator and means to solve social problems and promote economic development (UNESCO, 2005). And positioned as a critical mechanism to improve access, inclusion, equity, and address quality issues in education, Papert (1996) alleged that technology will change the educational landscape unendingly and in ways that will engender a dramatic increase in the performance of learners.

Several former types of research have proven that the usage of ICT in the teaching-learning process could improve students' achievement (Jamieson-Proctor et al., 2013; Nakayima, 2011). Many researchers have taken an effort to examine the factors that affecting teachers' acceptance of ICT usage in the classrooms (Capan, 2012; Dudeney, 2010; Virkus, 2008; Zhang, 2013). It showed that the major barrier of the

implementation was the teachers' belief and attitude as the teachers are an important element of classroom practices (Fullan & Stiegelbauer, 1991). Teachers' role is getting more important especially in the usage of ICT in pedagogy which could improve the achievement of the students, their creativity, and thinking skills.

The Ministry of Education (MoE) is responsible for all pre-tertiary education meaning that it defines educational policy, and the general plans of the state, and is meant to ensure that educational plans are translated into reality (UNESCO, 2011). According to WES (2016), teacher training is MoE's priority, which provides continuing professional development for teachers on an ongoing basis. The local Directorates use classroom observations to monitor teacher performance and provide access to guidance from education specialists. The metaphor of the information age has generated a whole set of speculations about the necessity of educational reforms that will accommodate the new tools (Pelgrum, 2001). The Syrian government responded to the call by introducing computers into education.

Recognizing the importance of technology, the Syrian Ministry of Education has adopted a national plan to introduce computers and informatics into pre-college education. The schools have been equipped with the necessary tools to engage technology in the educational process (computers and the internet). Further, the Ministry created a new specialization in computer technologies to increase the number of computer experts in the society. According to the National Report (2000), the introduction of technology into the educational system aimed "to keep pace with the progress and to reach efficient levels of education." Unfortunately, this implementation faced particular challenges in achieving the education goals and improving the quality of

education. The foremost obstacles include a lack of coordinated action, formulated in non-educational realms, and missing the planning and training in this process of technology implementation.

In this contemporary age, both developed and developing nations presently recognize the involvement of ICT and ICT tools as means to understand and master core educational skills and concepts. Based on several studies, ICT highlighted the opportunities and the potential benefits in educational delivery in schools, especially at the early stages of education. ICTs spans a broad spectrum of products, beside web-based services, ICT includes email, teleconferencing, television lessons, audio conferencing, interactive voice response system, radio broadcasts, interactive radio counseling, audiocassettes and CD ROMs and others are used in education for various purposes (Bhattacharya & Sharma, 2007; Sanyal, 2001; Sharma, 2003). Also, all the technology applied for data handling and interaction, particularly in education.

Technology can foster better communication between home and school. Parents and educators are two of the most influential contributors to a student's educational success. Educational institutions urged to include ICT in their curriculum planning, especially that ICT has brought about better communication between schools and parents of students. With ICT, parents can address the problems of their children, give feedback, and increase collaboration with the school to foster physical, emotional, and intellectual well-being for students. The use of ICT will not be limited only to the delivery of everyday knowledge but also to the enhancement of family engagement and to promote education outside the schoolroom (Commission for Europe, 2011).

ICT in education can reduce barriers for students and teachers irrespective of the country their location. By ICT, learning can occur anytime and anywhere, eliminating the geographical barriers to access any information from any location in the world.

ICT equips learners with multiple online resources; knowledge can be acquired through various visual or audio tools, teaching and learning no longer depend exclusively on printed materials. According to UNESCO (2007), ICT tools can be employed as an educational instrument to improve learning outcomes by enabling the learners to learn more interactively and involving themselves more closely in the topics they are learning. It can develop their motivation for learning through the enhancement of the relevance of content and learning.

The Statement of the Problem

Syrian students may have been at a disadvantage because they lived the repercussions of the war that had a significant impact on the social and material status of most families. A crisis that left behind an increase in the distance from the education technology modernity witnessed by the world. Quality education became vital to the country because it is one of the tools that can empower learners and increase their opportunities to be more qualified and better prepared for the information age.

The advancement of technology impacted the education system and increased the demand for knowledgeable leaders and educators. The skills and attitude of the teachers are essential factors in the adoption of any technology because unless teachers develop positive attitudes toward ICT, they will not use them in their teaching practice (Watson, 1998; Woodrow, 1992). As the most pivotal role in teaching students to use technology to

enhance their learning still lies predominantly with the classroom teacher (Cox, 2013; Ertmer, 2005; Kayalar, 2016; Osler, Hollowell, Nichols, 2012).

There are constraints on creating ICT-integrated learning environments and spaces in Syria and developing countries. The integration of ICT into education needs to be more holistic and focus on the basic educational infrastructure, to support low-cost educational environments with higher quality access, and to benefit more effectively from the infrastructure and investment, specifically in developing countries (Gulati, 2010).

Syrian schools encounter a variety of barriers, including limited infrastructure and educational resources and the lack of skilled teachers (Arroyo, Woolf, Zualkernan, 2011) for the successful implementation of technology in the education sector. Good educational design is needed to ensure that what the participants including policy-makers, teachers, and students need, seek, and have achieved is aligned with the nested set of learning spaces, facilities, resources, and even arrangements (Goodyear & Retalis, 2010)

Syrian Schools' Situation

Education was hit hard by the war in Syria. Before the crisis started, in March 2011, Syria had a rich education system; 12 years of free education were provided by the state, with nearly all primary aged Syrian children in school and two-thirds of 12-17 year-olds enrolled in secondary education.

Syrian schools had been heavily affected by attacks on education, including attacks on students, teachers, buildings, targeted killings, and abductions. Since the start of the conflict, over a quarter of Syrian schools have been damaged, destroyed, or used as shelters by Internally Displaced People (IDPs). Such targeted attacks had a profound impact on children and education.

With the fears that the crisis will lead to a lost generation of children, who will lack necessities and be unable to gain access to education, many apartments have been converted into schools that accommodate a limited number of students within limited possibilities.

Although most private schools had an interactive whiteboard, a computer lab, a projector, and a computer for each class, technology integration in education was almost non-existent due to the shortage of electricity and internet interruption.

Purpose of the Study

The purpose of the study was: First, to investigate the readiness of three popular private schools in Aleppo, Syria for the integration of technology. Second, to explore teachers' attitudes and competence toward technology integration into education. Third, to suggest how to train school personnel and educators.

Research Questions

1. To what extent were private schools in Aleppo ready for the integration of technology?

   - What were the technology professional development or support systems available to educators and school leaders' in relation to technology integration?

   - How did

     a. Beliefs or attitude of educators'

     b. Computer proficiency of educators'

     c. Level of computer access of the educators'

   influence their technology integration?

2. How did the infrastructure facilitate the integration of technology?

3. What recommendations for educators and school leaders were made to promote the integration of technology?

Significance of the study

Today's students are being prepared for a future rich in technology and requiring 21st-century learning skills (Newbill & Baum, 2013; Arthur et al., 2012). Educators need to advance their technological skills and usage to align with the increasing demand of 21st-century technology advancements (Kusano et al., 2013; Newbill & Baum, 2013). This study shed the light on the importance of technological advancement school committees needed to have, and implemented a framework that could be applicable to the schools and educators in need of technology integration support to increase best-practices of technology integration, reduce institutional and personal barriers, and ensure students are being adequately 21st-century skill ready.

Scope of the study

The study of creating a climate to integrate technology into Syrian private schools was carried out in Aleppo, Syria. The availability of educational technology was the guideline for including the three schools in the study. Furthermore, the three schools were located in the same city. Accordingly, the researcher could easily have access to them.

Summary

Chapter 1 began with an overview of the Syrian situation and the Syrian education system and highlighted the advantages of technology integration into school communities. Some of the barriers to technology integration in developing countries

mentioned have indicated a lack of readiness and training. Teachers were the role models of effective integration. In the statement of the problem,

In the statement of the problem section poor infrastructure, lack of training, and limited educational resources were emphasized as some of the barriers that affected the technology integration process. The last section of the chapter included the purpose of the study, research questions, the significance of the study, and the scope of the study.

CHAPTER TWO

Literature Review

In this part of the study, the researcher reviewed the work done by researches on ICT integration. In short, it will relate to literature from other writers or researchers about the topic.

ICT in Education / Schools.

Integration of Information, Communication, and Technology (ICT) in education was positioned as a critical mechanism that can help improve access, inclusion and equity, and address quality issues in education. UNESCO Member States have acknowledged the need for ICT to "be harnessed to strengthen education systems, knowledge dissemination, information access, quality and effective learning, and more effective service provision." (UNESCO et al., 2015).

The innovation of technology integration transformed our societies and changed the way people think, work, and live (Grabe, 2007). It became the knowledge transfer highway. Educational institutions which were supposed to qualify students to live in the Knowledge Society need to consider ICT integration in their curriculum (Afshari & Salleh, Ghavifekr, 2012). For its aim to improve and enrich the quality, accessibility, and cost-efficiency of the delivery of instruction to students and to benefit from networking the learning societies to encounter the challenges of existing globalization (Albirini, 2006, p.6).

The process of adoption of ICT in educational institutions is not a single step, but it is an ongoing and continuous step that fully supports teaching and learning and information resources (Young, 2003). The integration is more than simply using a device

to perform a task (Cauley et al., 2009; Guzey & Roehrig, 2009) or limited to assigning a

website to use for research or showing a video in the classroom. Instead, it is the

application of technology to facilitate the teaching-learning process through different

mediums, provide opportunities for student-centric learning, engage learners, and allow

for differentiation and learning preferences (Ertmer, Ottenbreit-Leftwich, Sadik,

Sendurur, & Sendurur, 2012; Hsu, 2010; Ritzhaupt et al., 2012; Ottenbreit-Leftwich,

Glazewski, Newby, & Ertmer, 2010). Without this continual focus on technology as a

method for achieving desired learning outcomes, technology becomes an extraneous,

disconnected entity (Thompson, 2013). Therefore, to improve the quality of the teaching-

learning process technology integration into the schools' community is essential to

qualify students with needed skills. According to Light (2009), if technology is integrated

successfully into a learning environment, helps students construct their knowledge and

develop complex thinking skills. ICT independently cannot create this kind of teaching

and learning environment Light asserted teachers must know how to structure lessons,

select materials, guide activities, and support the learning process.

In concurrence with qualifying students for the current digital age, teachers are

seen as the fundamental users for ICT in their daily classrooms routine due to the

capability of ICT in providing a dynamic and proactive teaching-learning environment

(Arnseth & Hatlevik, 2012). Having adequate knowledge and skills while using

technology is an essential qualification that has to be accomplished by teachers. Besides,

the beliefs about technology integration in teaching are influential factors that can affect

the teachers' performances during the teaching and learning process. Hsu (2016) was

concerned with three components of belief: to find out teachers' classroom technology

use, pedagogical beliefs, self-efficacy beliefs, and the value of the technology for

students. Teachers' pedagogical belief is simply defined as teachers' acceptance of

utilizing technology to support students' performances in learning. The teachers are open

to the integration of technology in teaching. Then, self-efficacy belief refers to the

teachers' self-confidence in using the technology in their classrooms. It closely connects

to teachers' skills and knowledge about technology use and their belief about the

importance of technology for students that can also influence the effectiveness of

deploying technology in teaching. The positive value of teachers can significantly affect

the frequency of technology integration. Research has indicated that teachers' confidence,

competencies, and willingness to use technology directly impact students' engagement

and productivity in the classroom with technology (Uslu & Bumen, 2012; Yu, 2012).

Darling-Hammond (2010) and Ritzhaupt et al. (2012) advocated that the more educators

use technology in the classroom, the more productive their students become with

technology. They further suggested the more apprehensive, constraining, or reserved the

educator is with technology, the more stifled the students are.

ICT in developing countries.

Education technology has become a fundamental input into the provision and

growth of educational services over the past decades. With the recent developments of

the education systems in many developing countries and the lagging outcomes regarding

learning, retention, graduation rates, and socioeconomic equity, investments in

educational technology are regarded as a promising alternative to facilitate these

outcomes.

Information and Communication Technology (ICT) has turned out to be an effective educational technology that promotes dramatic shifts in teaching and learning processes. Therefore, it is necessary since its growing power and capabilities alter the learning environments available for education (Pajo & Wallace, 2001). Although ICT can improve the educational system to a greater extent, developing countries are distant from assembling these benefits due to barriers exits. Computer technologies had attained wide recognition in technologically developed countries by the time they entered developing countries. The widespread use of ICT has caused fundamental changes in the character of technologically developed societies (Johnson & Willis, Maddux, 1997). The new changes were illustrated by speed, convenience, and efficiency. With these attributes, "computerization has risen to ideological prominence, an expression of grand hopes and ideals" (Winner, 2003, p. 595). ICT could be used to create new varieties of interactive learning media for improved quality, equity, and access in education (Rosswall, 1999). Shortly, the ICT term applied to education, are those technologies include computers, the Internet, and broadcasting technologies can facilitate the delivery of instruction and the learning processes. These technologies were identified as essential tools that better support learners' needs through differentiated and personalized instruction (Watson & Watson, 2011).

In developing countries, many stakeholders, educators, government, and business leaders assume that ICT acquisition enhances the instructional use of computers and enhances teaching and learning. Kozma (2011) insisted that ICT has made significant impacts on the global economy by transforming economic systems and social paradigms in alignment with ICT. Yet, providing computer tools for the classroom (Candiotti &

Clark 1998) or providing technology will make the desired transformation in education (Kent & McNergney, 1999) because developing countries have limited vision on the need to reform the educational systems.

Given the global demand for the technologically skilled labor force, together with the challenges of an increasingly competitive global market, developing countries have suddenly found themselves under economic, social, vocational, and pedagogic pressures to use technology in education (Kiangi, 1998). ICT integration in schools was crucial to develop economic and social shifts worldwide (Kozma, 2011; Leach, 2008).

Students growing up in this Information Age need to develop a set of skills different from students of the past. These students need to function in a global marketplace where technology skills, critical thinking capabilities, and the ability to effectively access and utilize information are prerequisite skills for success (Culp, et. al., 2005; Baker, 2007). Consequently, Information technologies are deemed necessary for economic survival, social change, and international-business competition; international governments' adoption of these tools reflects an awareness of that unavoidable fact (Ojo & Awuah, 1998).

Given the various avenues in which Education technology integration solutions can be implemented, it is impossible to establish an absolute threshold for the needs that households, schools, or educational systems must have met before adopting an Education Technology product. However, the educational environments in developing countries do not afford opportunities to integrate ICT into education due to limited infrastructure, network and electricity problems, a lack of trained human resources, etc. (Kozma, 2011).

Indeed, technical aspects and infrastructure are the fundamental issues for ICT integration in education

Challenges to integrating technology in schools

The economic growth and the rapid global advancement of technology established a substantial investment in education. With the expansion of knowledge and the improvement of technology, the domain 'teaching' became challenging for its demands for technological adaptation to cope with cultural and social dynamism. Teachers are the implementers and thus need to develop and apply new technologies into their classroom practices. Teachers are at the center of curricular changes and control the teaching-learning process (Plomp, 1996).

Traditionally, educators have been an indispensable input into the education production function. Their aptitude, teaching capacity, effort, and content knowledge play an important role in student achievement (Chetty et al., 2014). In terms of technology, unfortunately, most of these characteristics are generally lacking among teachers within the educational systems of developing countries (Global Partnership for Education, 2019).

One of the major problems associated with technology integration into the educational systems of developing countries has been the lack of trained teachers and trainers (Gumbo, 1998). Generally, the skills and technical background necessary for effectively utilizing the new technology are absent or in short supply (Soolnanan, 2002). As Ruohonen & Adelakun (1998) noted, insufficient and inadequate human-resource development for IT implementations works against the effective IT adoption and integration in most developing countries.

Effective application of ICT into the classroom profoundly relies on the availability of technological resources, qualified and confident teachers; as teachers' confidence, competencies, and willingness to use technology directly affect students' engagement and productivity in the classroom (Uslu & Bumen, 2012; Yu, 2012) beside the other internal and external factors that directly or indirectly influence teachers' performance and morale.

Furthermore, ICT can change the way teachers teach, particularly in student-centered approaches for developing collaboration and the highest skills (Haddad, 2003). Yet, School leaders should be aware that the challenge is not getting technology and computers into schools but integrating ICT into the teaching and learning process to improve the learning outcomes. Therefore, there is a clear-cut difference between teachers who use ICT to facilitate learning for understanding a particular topic and those who use resources only for presenting the topic without direct application (Cox, Webb, Abbott, Blakely, Beauchamp, and Rhodes, 2004).

Teacher preparation is insufficient (Rodrigo, M. M. T., 2001). The economic strength and financial capability of developing countries and even the rest of the world are considered another major challenge regarding technology integration. Lack of appropriation for ICT due to the lack of electricity, inadequate financial support, infrastructure, human capital, management support, as well as behavioral and environmental aspects might be some barriers to be believed as reasons.

Richardson, (2011) has recounted that the most significant challenges to adopting the use of the latest technologies in Cambodia were hardware incompatibility, complexity, language barriers, the dearth of electricity, computers, Internet access, and of

practice for trainees, and the inability to understand the advantages of these technologies. This situation reflects on the current situation of Syria, as Syria started freshly to recover from a war that had a great influence on the Economic and financial stability.

Additional constraints consist of the conventional mindset of the school principals, inadequacy of ICT facilities, the shortage of adequate maintenance of the available/existing ICT resources, dependence for financial investment on the central government, and dependence on ICT service providers for software/courseware (Andrada & Abcede, 2001). Researcher Berrett et al. (2012) explained that for the advantage of their teachers and students, school leaders need to define clearly and articulate what technology integration is, as well as what function it plays in the school community. ICT vision is important to effective ICT integration (Bangkok, 2004). Without a clear vision and a well-articulated set of goals, technology integration initiatives can become lost and confusing among educators (Davies, 2011; Margolis & Huggins, 2012; Norton, 2013; Levin &Schrum,2013). A clear vision provides the school community with direction and focus (Levin & Schrum, 2013; Margolis & Huggins, 2012; Norton, 2013). Accordingly, if a vision on the use of ICT is successfully created, then the next step will be to articulate the integration of ICT to teachers (Dexter, S., Anderson, R., 2000). Conclusively, empowering them to make their instructions more realistic, observable, and achievable.

Attitudes and Believes toward ICT in education

Effective technology integration for education demands developing and understanding the transactional relationship between the components of knowledge and the unique dynamics of the school's framework and goals. Today, there is a rapid growth

of technology-based learning, and it is the most promising in the educational industry

(Hall, B., 2001).

Research revealed that the successful integration of technology in education

depends mainly on educators' attitudes towards technology use (Albirini, 2006, Kluever,

Lam, Hoffman, Green & Swearinges, 1994), and an essential element in indicating the

technologies application in educational settings (Albirini, 2006).

Mumtaz (2000) affirmed that teachers' beliefs about ICT are central to integration.

To successfully integrate technology, teachers need to change their beliefs about the

nature of learning, the role of the student, and their role as a teacher (Niederhauser et al.

1999, p. 157).

Despite the advancement of technology, educators are not integrating technology

as effectively or efficiently as expected or needed (Gumbo et al., 2012; Arthur et al.,

2012). The reason continued to the barriers of different proportions. Elman (2016) stated

that teachers possibly have numerous barriers that they encounter in deploying the ICT.

These barriers to technology integration are divided into two distinct categories: personal

barriers and institutional barriers (Ertmer, et al., 2012; Kopcha, 2010). Personal barriers

are internal obstacles and directly connected to the educator (Kim, Kim, Lee, Spector,

and DeMeester, 2013), and institutional barriers are those created by educational

institutions: districts, individual schools, or administrators (An & Reigeluth, 2011).

Findings supported the idea and that two distinct categories were identified to

describe the barriers impacting teachers' technology implementation in the classroom.

These categories are defined as first- and second-order barriers. The first-order barriers

are external and the second-order are internal to the teachers (Brickner, 1995; Ertmer,

Ottenbreit-Leftwich, Sadik, Sendurur, and Sendurur, 2012). External barriers include

hardware, software, infrastructure, time, training, and support; whereas internal barriers

involve teachers' beliefs, values, vision, perceptions, and experience with technology

(Ertmer, 1999; Ertmer et al., 2012; Kerr, 1996; Kopcha, 201 2; Tunca, 2002).

Tsai and Chai (2012) indicated the existence of a third-order barrier to teachers'

technology integration in classrooms, i.e., design thinking (p. 1059). That is the ability to

create learning materials and activities, adapting to the instructional needs for different

contexts or varying groups of learners (Tsai & Chai, 2012, p. 1058).

Adequate knowledge and skill for technology integration is an essential

qualification that has to be fulfilled by educators. Studies have identified resistance to

change, negative attitudes toward computers, constraints on training and support, cost,

and a lack of access to the apt types of technology in appropriate locations as

fundamental barriers to the integration of technology in the classroom (Ertmer 2005;

Harris & Sullivan 2000; Zhao et al. 2002). Teachers who are committed to the integration

of technology in the classroom instruction may find the process challenging due to the

barriers that exist, decisions on whether and how to use technology depend on them,

themselves, and the beliefs they hold about technology (Bitner 2002; Ertmer 2005).

Factors Related to Teachers' Attitudes toward ICT

Among the various factors that influence achieving considerable use of technology in

education, educators' attitude is an essential factor; the further challenge is to specify

these factors that may have produced these attitudes. Rogers (1995) and Thomas (1987)

highlighted the effect of the cultural conditions of a given country on the adoption of

technology amongst its people. Inherent adopters may resist a technological tool because

it may not fit within their cultures. Other studies have identified additional factors, such as computer competence (Francis-Pelton & Pelton, 1996; Harrison & Rainer, 1992), computer access (Marshall & Ruohonen, 1998; Na, 1993), and computer training (Gressard & Loyd, 1985; Knezek, Christensen & Rice, 1997).

a. **Cultural Perceptions**

Using technology to promote innovation and cultural change in schools proves difficult; it is crucial to consider the cultural backgrounds of the teachers and learners when designing computer-based learning because culture shapes learners' values, perceptions, and goals and determines how they respond to computer-based learning (Collis, 1999).

Researchers have warned of the current lack of attention to cultural beliefs and their impact on ICT adoption in developing countries (Loch, et. al., 2003; Hill et. al., 1998). On the same ground, Harper (1987) argued that cultural factors play an important role in creating negative attitudes toward computers: "One direct cultural cause is people's apprehension that life is becoming too mechanized, so they resist contributing to a "computer culture". Another cause is the concern that there are other social problems that need to be solved before computer-education is addressed." (p. 47).

The changes that the developing countries are opting for cannot be attained by simply placing computers in their schools. Martinez (1999), among the others, suggested that one of the challenges facing developing countries is to make technology a vital aspect of people's culture. McLoughlin and Oliver (2000) also echoed this when they stated that "the acceptance, use, and impact of WWW sites are affected by the cultural backgrounds, values, needs, and preferences of learners"(58).

Numerous technology specialists have indicated that ICT integration in education should arise in the light of the cultural conditions of the country and the prevailing school culture (Albirini, 2006b; Harper, 1987; Thomas, 1987; Watson, 1998). Unless principals recognize the importance of ICT for their school and national cultures, they will not use it in their classes. To place a new technology into an organization's culture, the organizational and technological values must match (Hodas, 1993). Within the school organization, if the technology is not received well by teachers, there must be a mismatch of values between the culture of schools and the technology.

Chen, et. al. (1999) considered cultural perceptions among five main factors that may determine ICT adoption by educators. Unfortunately, however, very few studies have tried to study the impact of culture on the reception/rejection of the new tools.

b. Computer Competence

While the infusion of technology into schools requires new competencies on the part of the teachers, teachers' preparation does not perpetually afford these competencies (Francis-Pelton & Pelton, 1996). The research argued that teachers frequently struggle with technology integration in the school curriculum on daily basis (Spiegel, 2001). Heeding this problem Bulkeley (1993) stated "The problem is not getting computers and software, though; it is also knowing how to use them" (p.9). In reality, computer competence does not, narrowly, include the knowledge of the devices but also the skills and experience necessary for putting them into practice. Prior research suggestd that the success of educational innovations depends to a great extent on providing teachers with the competencies required to make them function (Pelgrum, 2001). On the same ground,

Knezek and Christensen (2002) ascertained that teachers' competence with computer technology is the principal determinant of effective classroom use by students.

Subsequently, positive attitudes and perceptions towards computers are also important since it leads to increased computer competency (Carey; Wang; Chisholm & Irwin, 2002). Several studies showed that computer competence is a significant predictor of teachers' attitudes toward computers (Albirini, 2006; Berner, 2003; Na, 1993; Summers, 1990). And teachers' computer competence team up with attitudes in determining both the initial acceptance of computer technology as well as future behavior regarding computer usage (Francis-Pelton & Pelton, 1996; Harrison & Rainer, 1992). In their study of the correlation between teacher attitude and the acceptance of technology, Francis-Pelton and Pelton (1996) affirmed, "Although many teachers believe computers are an important component of a student's education, their lack of knowledge and experience leads to a lack of confidence to attempt to introduce them into their instruction. This lack of confidence then leads to anxiety and reluctance to use technology" (p. 1).

Summers (1990) asserted that a major reason for teachers' negative attitudes toward computers is their lack of knowledge and experience in using these tools. Likewise, Al-Oteawi (2002) found that most teachers who showed negative or neutral attitudes toward the use of ICT in education lacked knowledge and skill about computers that would enable them to make ''informed decision '' (p. 253). He, consequently, suggested that teachers should have adequate training programs to advance their knowledge and skill.

Jaeglin (1998, cited in Christensen, 1998) examined students' and teachers' views toward computer-assisted class discussion and found that students were positive about computer

use as an effective learning tool, and teachers were uncomfortable using computers in-class activities. The main reason for teachers' relative discomfort about computer use is their technical discomfort with using these tools besides the unfamiliarity with the functionality of the software they were using and about the optimal way to integrate it into class activities.

c. Computer Access

One of the most significant barriers to technology integration in developed and developing countries is access to computer resources (Albirini, 2006; Marshall & Ruohonen, 1998). Norris, Sullivan, Poirot, and Soloway (2003) concluded from the analysis of data from the snapshot survey of more than 4,000 K-12 schools in the USA that there was a significant relationship between the level of access to computers and the level of computer integration. Examination in developing countries has revealed that while computers were supplied for students' use, almost none were available specifically for teachers' use (Abas, 1995).

Individuals' attitudes toward ICT have been recognized as an essential factor for the success of technology integration in education (Akbulut, 2008; Bebetsos & Antoniou, 2009; Hashim, Ahmad, & Abdullah, 2020). Studies investigating computer attitudes have reported a significant correlation between computer access and attitudes toward computers (Marsshall & Ruohonen, 1998; Pelgrum, 2001; Na, 1993).

Knezek and Christensen (2002) noticed that teachers' access to technology tools has a major impact on the quality of computer use from the teachers. Fewer studies, however, suggest that access to computers did not correlate with teachers' attitudes toward ICT,

Watson (1998) reported of teachers resisting the very existence of computers in the educational milieu.

d. Awareness of school leaders and educators

One of the fundamental factors to implementing differences in schools is effective leadership (Calabrese, 2002). Sheninger (2014) documented that school principals influenced technology integration in the classroom. Anderson and Dexter (2005) collected data from more than 800 schools in the USA to identify technology leadership characteristics. Findings revealed that for education technology to become an essential part of a school, technology leadership is necessary, even more than technology infrastructure (p74). In fact, to imagine a leader who does not use technology trying to convince teachers that it is important is difficult (Cafolla & Knee, 1995, P 3).

ICT's educational potential will not be realized without the support of school leaders, especially the principal (Schiller, 2003). Principals firstly should accept and acknowledge the role that technology has on the teaching-learning process if they want to integrate technology effectively in their school. The examination of Kincaid and Feldner (2002) showed that effective principals understand how technology can support best practices in instruction and assessment; and provide teachers with the necessary guidance.

Furthermore, Leong et al. (2016) affirmed that technology leadership practices correlated with teacher ICT competence and were supported by many leadership theories (Bass & Bass, 2008; Bush, 2011; Leithwood & Jantzi, 2006; Northouse, 2013; Robbin & Judge, 2013; Yukl, 2013). This conclusion is in line with Papa's (2011) hypothesis that only school technology leaders have the power to make instructional decisions related to technology and the implementation of technology programs.

Technology leadership is perhaps the key to the success of technology integration in education (Byrom & Bingham, 2001). However, researchers have reported research gaps in the topic of technology leadership (Albion, 2006; Davies, 2010; J. Richardson, 2012; Kowch, 2005; McLeod & Richardson, 2011; O'Dwyer et al., 2004), the ICT research literature has largely ignored the role of principals as technology leaders (Michael, 1998; Schiller, 2003).

Furthermore, Davies (2010), Kowch (2009), and O'Dwyer et al. (2004) urged that further research on guidelines and development programs for technology leadership should be carried out.In addition, researchers conducted by Seezink and Poell (2010), J. W. Richardson and McLeod (2011), Wang (2010), Badri et al. (2016), and Evers et al. (2016) recommended that professional development for technology leaders should be studied in depth.

e. ICT Training

Training of technology skills, new and old, has remained a strategic factor for the success of technology integration (Boud & Hager, 2011; Loveland, 2012; Potter & Rockinson-Szapkiw, 2012). An and Reigeluth (2011) underlined the importance of supporting educators' technology integration needs with professional growth, training opportunities, and continuous support from technology specialists.

The recent report from Training Industry Trends found that learners' needs are changing, technology is evolving, skills are different, automation is altering processes, and globalization is expanding our reach (Harward & Taylor, 2014). However, Schrum et al. (2011) stated that as many as 92% of leader preparation courses do not involve technology use. Therefore, school leadership preparatory training should include

technology to produce future-ready school principals who can lead teachers and students as learning experiences become virtual and ubiquitous (Aldowah et al., 2017; Esplin, 2017).

While the need is present, the reality is that the skill set of the majority of leaders falls short. The integration of technology by leaders and teachers was affected by inadequate training, incompetency in ICT, and limited access to ICT (Abdullah et al., 2015).

Dawson and Rakes (2003) stated that "Many principals still have little firsthand experience with technology" (p. 32). This lack can be rectified through training and personal use and not through adjunct training for the basic activities or information searches otherwise technology will not be integrated pedagogically and will, therefore, not serve as a source of experiences that can be articulated with the teachers' professional activities (Russell et al. 2003; Lim. 2007).

Several schools have developed training programs for their staff. Unfortunately, there are no studies carried on the literature to measure the efficiency of these programs and the acquired knowledge, skills, and attitude of principals and teachers during these courses. National programs in developing countries are not based on research. Consequently, the success of these programs is limited (Albirini, 2006a).

Summary

The integration of technology in education bear great significance towards students' learning experiences and achievements. Therefore, educators are called to be skillful in deploying technology tools in their classrooms. Following the foregoing findings practice, time, and support were fundamental influences in the successful acquisition of new skills as Uslu and Bumen (2012) have consistently contended

integration does not occur overnight and it was through on-going technology mentoring or coaching educators were able to acquire the needed skills and the ability for best practice (Hayes & Noonan, 2008; Sawchuk, 2010). Enormous investigations demonstrated that factors restraining efficient and effective technology integration and relate directly to personal and institutional barriers, teacher-reported barriers as common and reoccurring issues around the world (Hsu, 2013; Kim et al., 2013; Pan & Franklin, 2011; Ritzhaupt et al., 2012).

School's mission is to provide its students with quality education and prepare them for the future that includes the 21st century's technological readiness. To meet these objectives, educators of the school must be technologically proficient and trained to overcome encountered barriers.

CHAPTER THREE

Methodology

The purpose of the chapter was to explain the methodology that was used to investigate the readiness and attitudes of Syrian private schools toward ICT integration and the factors that influence those attitudes. The chapter also included a description of the research design, research participants, location, instruments used, and the procedure. According to Creswell (2012), researchers can help establish the overall validity of a study by clearly identifying the research methods employed to conduct the study. For this purpose, the research methods used to conduct this study have been discussed in detail in this section.

Design

The research design was a qualitative case study using a survey research design. Creswell (2007) defined a case study as the detailed examination of a "case" a setting, subject, event, or a bounded system involving details, in-depth data collection involving multiple sources of information. This approach is used widely within educational research (Hitchcock and Hughes, 1995; Bassey, 1999).

The researcher used a descriptive research study; according to Gay & Airasian (2000), "descriptive data are usually collected by questionnaire, interview, telephone, or observation". According to Jhonson and Cristensen (2014) in Elemam (2016), the Questionnaire is an instrument to collect personal data of research participants by completing any information needed.

Descriptive research, likewise referred to as survey research (Gay & Airasian, 2000), was mainly concerned with "attitudes, opinions, preferences, demographics,

practices, and procedures" (p. 275). "The various approaches to survey research have the same purpose: gathering opinions, beliefs, or perceptions about a current issue from a large group of people" (Lodico, Spaulding, et al., 2006).

The results of the analysis were supplemented by phone interviews to gather more in-depth information and to ensure the trustworthiness of the results. As Gelsne (1998) noted, "The multiple data-collection methods contributes to the trustworthiness of the data" (p. 31). The use of qualitative contributes in response to current calls by many researchers to include qualitative measures for probing the process of diffusion of innovations (Rogers, 1995). Interviews became essential to explain the unanswered issues that the survey data analysis generated.

Participants

Best and Khan (1993) defined a population as "any group of individuals that have one or more characteristics in common that are of interest to the researcher" (p. 13). Gay and Airasian (2000) defined a target population as "The population that the researcher would ideally like to generalize to" (p.122). The target population in this study was three Syrian private school teachers in Aleppo during the 2020 -2021 school years, using the purposive sampling technique. The participants were educators currently teaching at the three schools. The sample size was 60 participants, which consisted of 3 school principals and 57 teacher participants. These categories of participants were also purposively sampled. Babbie (2002) argued that in research, it was "appropriate to select a sample based on knowledge of a population, its elements, and the purpose of the study" (p. 178). This sampling method was appropriate for this study because a particular population was needed to address the research questions.

Research Instrument

According the research objectives, a questionnaire and interview questions were developed by the researcher to obtain needed information. Permission to use these instruments was secured before using them for data collection in this study via an email sent to the school principals.

Questionnaire Instrument:

The researcher developed the questionnaire based on the following criteria: a literature review of studies related to the adoption of computers and computer-related technologies in education (Al-Oteawi, 2002; Isleem, 2003), literature on new technologies in developing countries (Al-Oteawi, 2002; Na, 1993; Sooknanan, 2002; Rogers, 1995), and the experience of the researcher. As mentioned above, the questionnaire instrument was a means of collecting self-reported data from the participants. All statements of the questionnaire were either created by the researcher or selected from previous research based on their relevance to the current study and their cultural and contextual appropriateness.

In the present study, the questionnaire was designed to collect data about technology integration for all the subjects in the school community. Next, the questionnaire requested information about the age of the respondents. The reason was to check whether age was a factor concerning mastering digital literacies. The qualification was necessary because it was important to check whether teachers had the requisite teacher training for technology integration.

The questionnaire was made up of 8 parts, used to ascertain the readiness of the private school communities regarding digital literacy skills, attitude towards technology,

preservice training, and awareness of digital skills of Principals and Teachers participants. It was equally used to assemble information about the challenges faced by Principals and Teachers participants as well their recommendations for effective technology integration.

The latter section of the questionnaire (open-ended responses) on challenges and recommendations to technology integration was added by the researcher for the purpose of the study. The chief intent was to provoke Principals and Teachers participants to reflect and recommend solutions for effective technology integration in schools. Interview Instrument:

The interview instrument for the principal participants was developed by the researcher to collect additional details related to the questionnaire. And to further investigate issues that were unanswered by the questionnaire data.

Each interview involved seventeen structured questions and allowed for open-ended comments.

In particular, the interviews were anticipated to provide some explanations. The first part requested demographic information, while the remaining two parts had questions linked to personal opinions about the ICT integration in the teaching-learning instruction; and available infrastructure.

Procedure

The researcher had sent a formal application explaining the objectives and advantages of the study. The three Principals granted permission for this research to be completed in the three schools. Respondents also were assured of the confidentiality of their responses and identification.

The research was conducted as follows:

At the beginning, Principals and Teachers participants from the schools under study answered the Questionnaire within three weeks days. The Principals participants then collected the filled questionnaires and submitted them to the researcher. Later, during semi-structured interviews of 25-30 minutes, Principals participants provided information on the availability of technology, the integration of technology into the teaching-learning process, and their opinions on the challenges and recommendations for effective technology integration. After collecting data from teachers (by WhatsApp, e-mail, and phone calls), a general revision and interpretation made for answers for the purpose of putting them in an order to get a deep understanding of the results.

Summary

Chapter three described the methodology used to conduct the study on the integration of technology into private Syrian schools.

The analysis and discussion of the research findings were presented in Chapter Four.

CHAPTER FOUR

Results and Discussion

Reporting the findings of the data analysis, this chapter had the results of the data collected and the interpretations of the findings.

The findings obtained in this research were explained according to the research questions. All the former processes were guided by the two purposes of the study: (1) to determine the readiness of private schools in Syria for technology integration in the education system, and (2) to make recommendations to overcome the insufficiencies.

It should be noted that all the 57 questionnaire that were sent to the Teachers participants were returned, accounting for 100% response rate, 15 questionnaire were discarded because they were not completely filled

Research Question 1:

To what extent were private schools in Aleppo are ready for the integration of technology?

The main objective of the first research question was to answer whether Syrian private schools were ready for the integration of technology. It was found that there was a complete lack of readiness in the three schools under study. To further investigate the reasons, the researcher added another question:

What is the technology professional development or support systems available to educators and school leaders in relation to technology integration?

The purpose of adding this question was to reveal if the professional development of Principals and Teachers participants influenced the integration of technology in the school communities under study.

It was found that the professional development of Principals and Teachers participants had an influence on the integration of technology in the school communities under study.

To further analyze the degree of the influence, the following four points were examined profoundly:

How do

  a. Beliefs or attitudes of educators'

  b. Computer proficiency of educators'

  c. Level of computer access of the educators'

influence their technology integration?

To answer this research question findings from the interview questions with the Principal participants and questionnaire with the educators were used.

The findings of the interviews with the three principal participants indicated that they all had received training on the primary skills for technology integration. As to whether technology integration professional development training is available for the school principals:

Principal A indicated that: "The lack of training on modern technology integration in the classroom is a key reason for their lack of knowledge about this technology."

Principal B answered that: "They have never received any technology-related knowledge or training in their university education."

Principal C acknowledged that: "Most available training was limited to the basic software application usage, like how to prepare a PowerPoint presentation or how to use the projector effectively."

Principal A and B corresponded with Principal C: "Available training concerning technology integration is limited to the PowerPoint application, assigning video preparations assignments, and using the projector effectively."

Principal A and Principal B stated that they have an interactive whiteboard in the school setting and that they have received training on how the use the whiteboard as a technology device but not as an interactive means. Almost all participants indicated that they did not attend any professional development training on how to use specific software applications or educational platforms. Unfortunately, the use of interactive technology devices and educational platforms was limited. Technology integration in the schools was limited to computers, projectors, and numeral gaming programs.

Participation in technology-related professional development available for educators was measured using different scales, the figure 1 presented some of the answers to this question
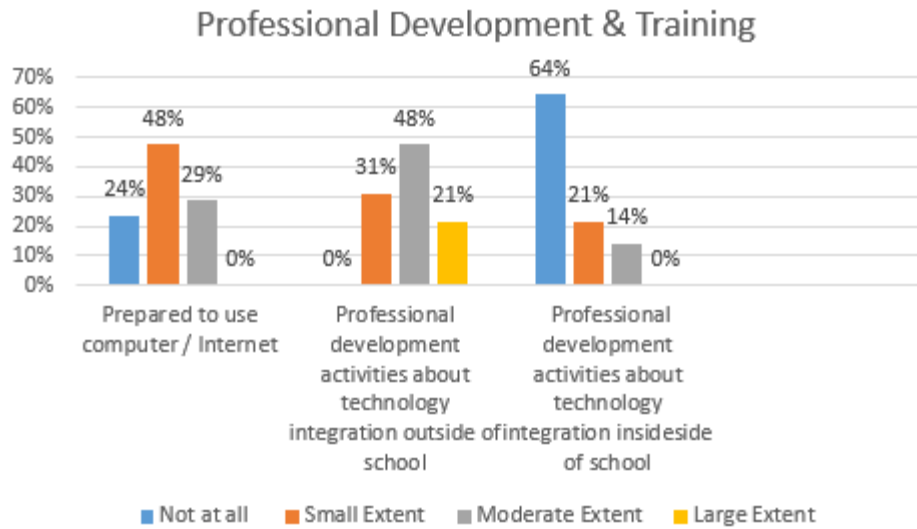
Figure 1. Professional development and training of the educators

The purpose of this research question was to find out if the professional development of educators guided the integration of technology into the school community. It was found that the professional development of the Teachers' participants defined the degree to which technology was integrated into the school community. The schools had neither technology training nor a program for professional development. Thus this negatively influenced technology integration in the schools' communities.

Findings from the interviews and the questionnaire analysis indicated that respondents did not know of any professional development offered as shown in Figure 2.
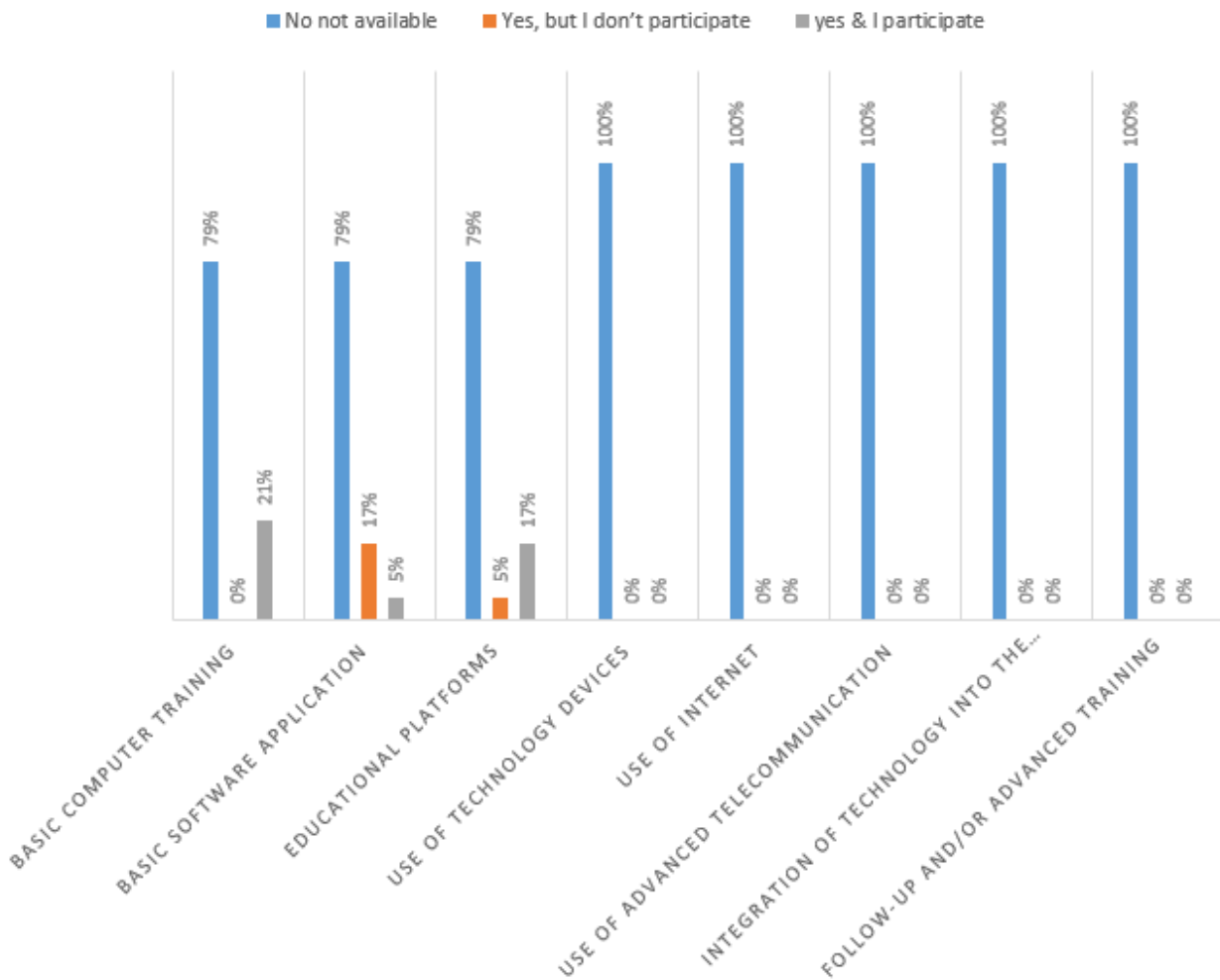
Figure 2. Technology Integration Topics and Trainings

When asked in the interview whether the professional development of teachers

was available for educators in the school, the three principals revealed that there were no

professional trainers for effective educational technology integration in the country. Yet,

although the three schools' understudy didn't provide professional development for

educators, some of the Teachers' participants made personal efforts both at professional

development and technology integration, as showed in the previous figures.

Koehler and Mishra (2009) affirmed that for teachers to acquire a new knowledge

base is challenging, especially if it is a time-intensive activity that must fit into their busy

class schedules. Teachers are often not provided with adequate training and their

professional development often is a one-size-fits-all approach to technology integration

when they need more context-specific training related to the classes they teach. Bakia,

Means, Gallagher, Chen, and Jones (2009) expressed that professional development

should engage teachers with topics that could change their instructional practice, such as

learning to use technology to support new teaching methods or teaching concepts in

specific subjects. Teachers also need to be equipped with the knowledge and skills to

integrate technology meaningfully into their curriculum (Linton & Geddes, 2013);

however, the design of the professional development needs to minimize the teachers'

investment of additional time and energy while maximizing the benefits to their

instructional practices (Winslow et al., 2014). Based on established research, it remains

imperative for 21st-century teachers to be provided more than simply access to

technology tools and devices (Richardson, 2013). Educators need the necessary training

and technology skills to create effective technology-integrated learning opportunities for

their students.

Summary

The findings indicated that the lack of technology integration professional

development programs for teachers contributed to the poor integration of technology into

the schools' under study. Thus, schools need to have and share with teachers' clear

directions and understanding of technology plans and afford opportunities for

professional growth and development. Researchers have found successful technology

coaching programs to provide both specialized professional development and the

continuous technology integration support system necessary for effective and sustainable

technology learning environments (An & Reigeluth, 2011; Chapman, 2012; Gann, 2012; Knight, 2011; Smith, 2012; Sugar & van Tryon, 2014).

To further analyze the degree of the influence, the following four points were examined profoundly:

How do

a.   Beliefs or attitudes of educators'

The main objective of studying the beliefs and attitudes of Principals and Teachers participants was to measure if their beliefs and attitudes influenced the integration of technology into the school community. It was found that the beliefs and attitudes of the Principals and Teachers participants influenced the degree to which technology was integrated into the school community.

The results of the interviews with the three Principals participants indicated that they all had a positive attitude towards technology integration and confirmed that technology use in the classroom has a positive impact on students learning and motivation. The three Principals Participants were aware that technology supports learning experiences across curricular domains and develops students' intellectuality.

To examine the attitudes closely participants were asked four open-ended questions to investigate the effective integration of technology, furthermore the barriers that prevent effective integration.

The Principals participants advanced the following reasons:

According to principal A: "teachers were not integrating technology effectively blaming the reason on the lack of knowledge, the lack of support, lack of training, or lack of time to prepare technology-rich lessons."

Principal B declared that: "teachers and students in the school use projector constantly but not able to use the interactive board effectively because of the inadequate training opportunities and adequate trainers."

Participant C stated that the barrier for not integrating technology in the school is the setting and location of the school (due to conflict circumstances, houses turned into schools), and not having enough computers (shared a laptop between classes).

All three principals agreed that: "the irregular, unstable, not dependable Internet connectivity, and electricity shortage as a main barrier for the effective integration."

Educators' Participants' beliefs and attitudes were measured using the Questionnaire and presented using the following Tables:

Table 1. Teachers' Believe about Computer

#	items	A	S A	D	S D	TOTAL
1	Computers make me feel uncomfortable	14%	0%	24%	62%	100%
2	Computers save time and effort.	31%	43%	26%	0%	100%
3	Students must use computers in all subject matters.	36%	21%	26%	17%	100%
4	Computers would motivate and enhance students' learning.	29%	40%	14%	17%	100%
5	Teaching with computers offers real advantages over traditional methods of instruction.	21%	36%	26%	17%	100%
6	Class time is too limited for computer use.	21%	57%	12%	10%	100%
7	It would be hard for me to learn to use the computer in teaching.	40%	24%	12%	24%	100%
8	Computers should be a priority in education.	29%	45%	24%	2%	100%
9	Computers dehumanize society	52%	0%	38%	10%	100%
10	Computers will not make any difference in our classrooms, schools, or lives	14%	0%	31%	55%	100%
11	Students need to know how to use computers for their future jobs.	17%	26%	38%	19%	100%

Note: A = Agree   SA= Strongly Agree   D= Disagree   SD= Strongly Disagree

Teachers were asked a range of questions to identify their beliefs about ICT (Table 1) and their attitude toward ICT (Table 2).

Table 1. Illustrated teachers' responses about their beliefs, indicating positive affect toward ICT. The majority of the respondents agreed or strongly agreed that computers save time and effort (74%), Computers would motivate and enhance students' learning (69**%**). Teaching with computers offers real advantages over traditional methods of instruction (57%). Computers should be a priority in education (74%). Also, most of the teachers disagreed or strongly disagreed with the negatively stated items. Computers make me feel uncomfortable (86%). Computers will not make any difference in our classrooms, schools, or lives (81%).

Findings revealed that Teachers participants felt comfortable about computers, which is essential for the successful integration because the implementation of ICT cannot be successfully run unless teachers have the belief, capability, and experiences to use it in daily teaching and learning activities (Elemam, 2016).

Having adequate knowledge and skills while using technology is an essential qualification that has to be accomplished by teachers. Besides, Teachers' belief about technology integration in teaching is one of the influential factors that can affect the teachers' performances during the teaching and learning process. Hsu (2016) concerned on three components of belief to find out teachers' classroom technology use; pedagogical beliefs, self-efficacy beliefs, and the value of the technology for students. Teachers' pedagogical belief is simply defined as teachers' acceptance in utilizing technology to support the students' performances in learning. The teachers are open with

the integration of the technology in teaching. Then, self-efficacy belief refers to the

teachers' self confidence in using the technology in the classrooms. It closely connects to

the teachers' skills and knowledge about the technology uses. Moreover, the teachers

believe about the importance of the technology for students can also influence the

effectiveness of deploying technology in teaching.

Although, participants' attitudes toward ICT were positive, yet teachers and

principals were not ready for technology integration. After all, their attitude was not

informed by practice because the barriers presented in table 2.

Table 2. Technology Barriers and Concerns

#	Items	NB	SB	MB	GB	Total
1	Not enough computers	14%	0%	24%	62%	100%
2	Outdated or unreliable computers	14%	29%	17%	40%	100%
3	Internet access	0%	0%	0%	100%	100%
4	lack of electricity	0%	0%	38%	62%	100%
5	Inadequate training opportunities	0%	0%	0%	100%	100%
6	lack of support or advice regarding ways to integrate technology into the curriculum	0%	0%	29%	71%	100%

Note:	NB= Not a Barrier	SB= Small Barrier	MB= Moderate Barrier	GB= Great Barrier

Elman (2016) stated that the teachers might have numerous barriers encountered

in deploying the ICT. These barriers to technology integration were defined as two

distinct categories: first- and second-order barriers. First-order barriers are external, and

second-order are internal to the teachers (Brickner, 1995; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). External barriers include hardware, software, infrastructure, time, training, and support. Findings in Tables 1 and 2 supported this claim when Principal participants and Teachers participants associated the irregular, unstable, undependable Internet connectivity and electricity shortage to the poor technology integration. Besides the lack of support or advice regarding technology, inadequate training opportunities and adequate trainers, and finally not having enough computers as essential barriers for effective technology integration.

The internal barriers involve teachers' beliefs, values, vision, perceptions, and experience with technology (Ertmer, 1999; Ertmer et al., 2012; Kerr, 1996; Kopcha, 2012; Tunca, 2002). Also, findings supported the idea when 64% of teachers' participants (in table 1) agreed or strongly agreed that it is hard to learn to use the computer in teaching.

The barrier most often rated as a great barrier was lack of time (78% of teachers participants agreed and strongly agreed). This result was supported in the literature. Researchers have listed the highest barrier among teachers as feeling overloaded with curriculum, planning, and a need to prioritize standardized testing(Aldunate & Nussbaum, 2013; Morgan, 2011; Uslu & Bumen, 2012).

Consequently, practice, time, and support were fundamental influences in the successful acquisition of new skills. Moreover, the lack of technological equipment, not enough computer labs, and Internet connection problems are some factors that affect technology integration in the classroom negatively(Hur, Shannon, and Wolf, 2016)

Summary

The findings indicated that Principals and Teachers participants had a positive attitude towards technology integration in the school communities under study. However, limited time, access to the internet, electricity shortage, lack of digital skills, and lack of training and support influenced their attitude towards technology integration.

b. Computer proficiency of educators'

The main objective of studying the computer proficiency of educators was to measure if their skills influenced the integration of technology into the school community. It was found that the computer proficiency of the Principals and Teachers participants determined the degree to which technology was integrated into the school community.

This part was analyzed and reviewed based on the interviews with the Principals participants and the questionnaires of the Teachers' participants.

The interview findings indicated that, as discussed earlier, the lack of professional development and training programs for educators and school staff negatively influenced technology integration in the school communities. Subsequently, the lack of training and trainees influenced the computer proficiency of educators.

The respondents from the three schools under study reported having "Little Competence" in using computers. When principals were asked to clarify the reasons behind the low level of computer competence, the three main reasons that were given for this were the lack of financial resources, time, and training opportunities.

Principal participants also indicated that they support teachers by providing basic skills training opportunities, which explains the limited integration to computer, projector, and numeral gaming programs. Furthermore, they all confirmed that the concept of using specific technological platforms for student management, grading,

communication, and teacher preparation practices is new and needs a lot of training and preparation.

Principal A related not integrating technology in the teaching and learning process for the lack of time and the overloading tasks carried

Principal B and C expressed their willingness to attend training sessions to increase their computer competence. Interestingly, Principal C stated that she would improve her competencies in using the whiteboard as an interactive means than increase her overall computer literacy.

Principal A related this indifference to the insufficient number of computers available.

Teachers' participants collected data were analyzed as the following

Table 3. Technology Skill of Educators

#	Item	None	Basic	Proficient	Advanced	Totle
1	Able to connect multiple devices using correct cables	36%	40%	17%	7%	100%
2	Take digital pictures /videos and download them to my computer	0%	24%	38%	38%	100%
3	Create slide presentations using PowerPoint	0%	5%	33%	62%	100%
4	configure settings such as headers, footers, margins, columns, tabs on a word processing document	0%	7%	67%	26%	100%
5	Analyze data and create graphs in Microsoft Excel	57%	29%	14%	0%	100%
6	Embed video into your presentations	0%	12%	40%	48%	100%
7	Gather information for planning lessons	0%	48%	40%	12%	100%
8	Access model lesson plans	14%	26%	36%	24%	100%
9	Administrative record keeping (i.e., grades, attendance, etc.)	48%	38%	14%	0%	100%
10	Communicate with colleagues/other professionals or parents or students	33%	50%	17%	0%	100%
11	Post homework or other class requirements or project information	45%	38%	17%	0%	100%
12	send an email to a colleague, student, or parent	14%	31%	31%	24%	100%
13	send a document as an attachment to an email message	10%	45%	33%	12%	100%
14	use a web based subscription or program (Raz-Kids, Spelling City, BrainPOP) in my classroom with my students.	57%	26%	17%	0%	100%

Figure 3. Techology Skills Percentage

TECHNOLOGY SKILLS PERCENTAGE

Advanced 18%
None 22%
Basic 30%
Proficient 30%
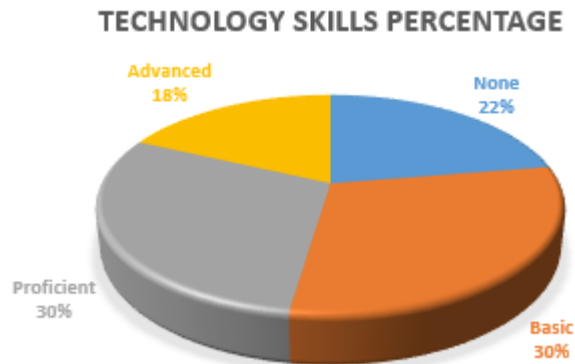
To begin to analyze the influence of Teachers' skills on technology integration in the three schools' understudy, the researcher first focused on the type of technology skills that each teacher felt they possessed. Overall, the personal technology skills of the teachers' participants were moderate.

Moderate for this part of the study means (figure 3.)

18% of respondents reported having advanced technological skills, meaning that they felt they knew enough to train other staff. 30% of respondents stated that they were proficient with technology, which acknowledges that they could perform most skills without assistance. 30% of respondents reported having basic personal technological skills where basic skills were measured based upon the educator having done the skill before but still needed some assistance. And finally, 22% of the educators were found as being completely new learners.

In questions related to the type of technology teachers' used in the classroom, most of the respondents reported low use of the educational platform in the classroom(57% None and 26% Basic), posting assignments (45% None and 38% Basic), sending e-mails (10%None and 45% Basic), communicating with colleagues, or parents, or students (33%None and 50% Basic), administrative record keeping (48%None, 38% Basic) and analyzing data and creating graphs in Microsoft Excel (57% None, and 29% Basic).

The most frequently used tools were the projector (33% Proficient and 62% Advanced), the Microsoft word (67% Proficient and 26% Advanced), the video presentations (40% Proficient and 48% Advanced), access model lesson plans (36%

Proficient and 24% Advanced) and gathering information for planning a lesson (40% Proficient and 12% Advanced).

It was found that Teachers participants needed professional development and advanced technology skills training to provide effective learning experiences for the learnersThe literature revealed that many teachers want to integrate technology into their classroom instruction (Aslan & Zhu, 2015; Kimmons & Hall, 2016), but they lack the knowledge for effective integration (Mishra & Koehler, 2006; Vatanartiran & Karadeniz, 2015) and the self-efficacy (MooreHayes, 2011). When teachers have the experiences, their technology use increases (Kim et al., 2013) as practice makes teachers feel more confident and proficient in integrating technology.

Summary

Providing teachers with adequate professional development opportunities related to technology integration is essential to increase the level of technology integration in classrooms. Yet, these opportunities will not translate into higher levels of integration unless they provide the knowledge, skills, resources, and support to maximize its effects on teaching and learning (Papanastasiou, Zemblyas, & Vrasidas, 2003).

c. **Computer Access**

The main objective of studying the computer access of Principals and Teachers participants was to measure if their access influenced technology integration into the school community. It was found that the computer access of the Principals and Teachers participants determined the degree to which technology was integrated into the school community.

This part was analyzed and examined based on the interviews with the Principals participants and the questionnaires of the Teachers' participants.

The interview findings indicated that the three schools understudy had insufficient access to computers and technology devices.

The three Principals participants affirmed that access to computers is necessary for 21st-century teachers and students. Therefore they will try to increase their access if training programs become available for educators.

Principal A linked the low access to the school setting (due to conflict circumstances, houses turned into schools).

Like Principal A, Principal B associated the poor access for school settings, insufficient computers (no laboratories available), and lack of funding to purchase desired technology.

The three Principals participants related the low access to the lack of time for teachers to learn, practice, and plan ways to use computers or the interactive board. Principal C asserted that the poor access is related to inadequate training opportunities and trainers (regarding educational platforms and effective interactive board integration).

Finally, as discussed earlier, the three Principals re-confirmed that the irregular, unstable, and undependable Internet connectivity and electricity influenced to a great extent the technology integration.

Questionnaire data collected were analyzed as the following;

To analyze Teachers participants' computer access, two questions were asked in the questionnaire.

The first part was about technology access. When Teachers' participants were asked about the number of school-provided computers/laptops were located in their classroom, all participants (100%) paired with Principals participants and declared that they had a shared laptop in each department.

Similarly, when they were asked about the school-provided computers/laptops placed in their classroom, all participants (100%) affirmed that laptops had internet access and were used for instruction and presentations. While the part related to the students' usage, (71%) of the participants reported that students used the laptop device for research tasks or assignment presentation, whereas (29%) reported that students did not use the laptop device.

Moreover, four scales were used to measure Teachers' participants' use of computers or the Internet for instruction during class time as shown in table 4.

Table 4. Technology Usage During Classtime

	Regularly	Often	Sometimes	Seldom
On average, you use computers or the Internet for instruction during class time?	0%	29%	71%	0%

Findings in Table 4 corresponded with earlier responses, the degree to which the computers were used were measured by regularly(75%), often (50%), sometimes (25%) and seldom(less than 15%). Results reveled that teachers used the computer (29%) often and (71%) sometimes.

Furthermore, when Teachers' participants were asked whether they assigned projects that required their students to use a computer, (100%) of the responses were

projects outside the classroom which is understandable because they had a shared device in each department.

Lastly, Teachers' participants were asked about the approximate percentage of students who had access to a computer at home respondents confirmed that approximately most (80%) of students had computers or at least Smart devices at home.

To further investigate computer access in the schools uderstudy, part 4 was added in the questionnaire (appendix x, part 4)

Table 5. Available Technology In The School

#	Item	N A	S E	M E	L E
1	Computers/laptops	0%	75%	25%	0%
2	Tablets or iPads	0%	0%	0%	0%
3	Internet in your classroom	59%	41%	0%	0%
4	E-mail at school	80%	20%	0%	0%
5	Interactive Technology	49%	35%	16%	0%
6	Classroom Technology (e.g., document cameras, scanner, projector,etc.)	0%	63%	29%	8%
7	Virtual Learning Networks (e.g., Canvas, Moodle, Ed Modo, Eschool, etc.).	0%	0%	0%	0%

Note: NA= Not at all   SE= Small Extent   ME= Moderate Extent   LE= Large extend

Teachers' participants asserted that schools under study had inadequate technology equipment and devices, which justifies the poor technology integration in the three schools.

Teachers' participants stated that computers were available to a Small Extent (75%) or Moderate Extent (25%), Interactive Technology varied between Small Extent (35%) and Moderate Extent (16%), and Classroom Technology ranged between (63%) Small Extent, (29%) Moderate Extent, and (8%) Large Extent.

Internet in the classroom was not available (59%), if available for a Small Extent (41%), Email system was (80%) not available, and lastly, virtual learning networks, besides the tablets or iPad were not available (100%).

Questionnaire respondents reported low access to computers which gives clear evidence of the insufficiency of computers in schools, particularly for teacher's use. The results also showed that teachers continue to struggle with implementing technology into their daily practice mostly due to the lack of accessibility of technology besides lack of professional development training.

The lack of available technology devices for teachers had been widely reported in the literature as a barrier to technology integration in education (e.g., Abas, 1995; Na, 1993). Hur, Shannon, and Wolf (2016) reported that the lack of technological equipment, insufficient computer labs, and Internet connection deficiency are some of the negative aspects that affect technology integration in the classroom.

Summary

The findings indicated that Principals and Teachers participants had limited access to technology equipment and devices, and this deficiency influenced the technology integration in the three schools under study.

Based on the previous discussion, teachers' attitudes and beliefs, computer proficiency, and computer access of Teachers' participants had influenced the technology integration in the three schools under study.

Although Teachers' participants had positive attitudes toward technology integration; yet they needed to partner with a computer to provide renovated learning experiences for learners.

Lack of knowledge, ability, and accessibility were the foremost constraint for the technology integration. These outcomes supported the studies conducted heretofore (Alkhawaldeh & Menchaca, 2014; Mishra & Koehler, 2006; Prasojo et al., 2019; Vatanartiran & Karadeniz, 2015). Adequate professional development programs and training supported by practice, knowledge, skills, and experience benefit may be gained.

Research Question 2:

How did the infrastructure facilitate the integration of technology?

The purpose of the research question was to investigate if adequate infrastructure facilitated technology integration into the school community.

The available infrastructure in the three schools under study did not facilitate technology integration. Questionnaire and interview findings were already discussed in detail in the previous research question (computer access). To further illustrate the influence, some of the findings were re-reviewed.

Based on what was discussed previously in the computer access part, limited computers and technology devices were available in the three schools' under study. The

findings in the computer access part were discussed in-depth during the interviews with the three Principals.

To begin with, when Principal participants were asked about the number of computers or tablets available for teachers and students to use, the three principal participants reconfirmed the insufficient (one computer shared in each department) number of computers and technology devices and the unavailability of tablets in the schools' campus. One principal participant reported that due to the conflict circumstances, apartments were used as schools, a limited number of classes were available for students, and limited numbers of students were able to attend school, so their priority was to educate according to the possible conditions.

Also, When Principal participants were asked about the kind of digital devices did the teachers use for the teaching-learning process, principals stated that computers and projectors were the foremost technology devices used in the classrooms.

Principal A stated that the computer-related activities in which teachers most often engaged their students included expressing an opinion in writing, doing research tasks using the Internet, and preparing a presentation for a taught topic. All these activities were assigned as homework for students, so the insufficient computers were not a constrain.

Principal B reported that interactive boards were used as a projector and a computer because of the lack of skill, training, and trainees for the effective integration of the whiteboard.

The lack of readiness for technology integration into the three schools under study was not only due to inadequate technology devices but also because of the repercussions

of the long-drawn crisis that left behind an increase in the cultural backwardness and the distance from the educational technological modernity witnessed by the world.

To further investigate the available infrastructure, the researcher addressed the issues surrounding poor equipment or connectivity.

Principals participants in the interview were asked whether the internet was available for teachers in the school settings. The three Principal participants reported that the internet in the country was irregular, unstable, and undependable.

Furthermore, the three Principals participants declared that available computers and Smart devices in the three schools were connected to the internet, although the internet connectivity was very slow.

When Principal participants were asked about the electricity, the three principals affirmed that the country had a power shortage; and due to lack of power, schools resort to using generators to provide electricity to the schools. Hence, even fewer teachers are able to utilize the technology, leading to a low frequency of ICT.

The findings on the influence of the internet and electricity on technology integration showed that the three schools under study had a weak internet facility and definite power shortage. Consequently, if teachers do not possess adequate computers, a fast internet connection, and electricity, the implementation of educational technology remains not attainable. Kilinc, Tarman, and Aydin (2018) found that lack of technology, deficiency of access and absence of administrative and technical support are the prominent barriers to technology integration. A common theme across the literature has been the barrier of existing infrastructure in preventing the successful integration of technology (Bando, 2016; Gulati, 2008; Paterson, 2007; Goyal et al., 2010; Vadachalam,

2017; Zualkernen and Conje, 2008; Dahya, 2016 Carlson, 2016; Qablan, 2009; Chigona et al., 2014; Hennessey et al., 2010; Hosman, 2010; Islam and Grönlund, 2016; Berrera-Osorio, 2009). And infrastructure means resources as essential as electricity and school buildings to more advanced resources, such as internet and data availability.

Summary

The study of the influence of the available infrastructure found that technology integration was negatively impacted by poor technology infrastructure and inadequate technology support for teachers. Technology infrastructure is an obligation to effective integration in the learning-learning process. High-speed internet connectivity, sufficient technology devices for students and teachers, ongoing professional development and training programs for educators and principals are examples of the technology infrastructure.

Research Question 3:

What recommendations for educators and school leaders should be made to promote the integration of technology?

The purpose of this research question was to prompt teachers to reflect and provide guidance for technology integration into their school communities.

In the questionnaire, Teachers' participants were asked to reflect on the challenges that prevented them from integrating technology, provided data were presented in figure 4.

What were the major challenges to technology integration into the school community?

Figure 4. Challenges Faced by Teacher Participants in Technology Integration.
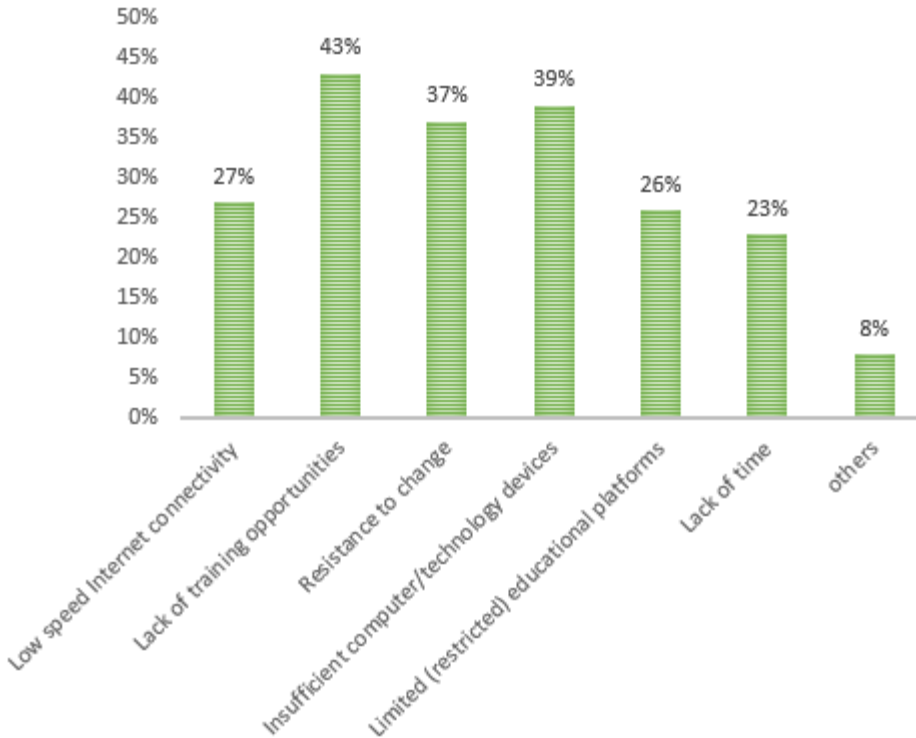
Findings from Teachers participants revealed that the major challenges for technology integration were (43%) Lack of training opportunities, (39%)Insufficient computer/technology devices, (37%)Resistance to change, (27%) Low-speed Internet connectivity, (26%)Limited (restricted) educational platforms, (23%) lack of time, and (8%)others.

While challenges reported by Principal participants were as the following two principals found the expensive equipment, lack of training programs, and time as major challenges, the third Principal agreed with expensive equipment and lack of training but found the lack of vision and acceptance to change as the primary challenge for the successful integration of technology.

Ertmer P.A, (1999.p. 50) reinforced previous challenges and identified first-order barriers to engagement as consisting of irrelevant obstacles to teachers, examples of

which include equipment, time, training support, and general infrastructure to support technology use.

Principal and Teacher participants were also asked to reflect on their recommendations that encourage them to integrate technology. Limited resources were available from the Teachers' participants in relation to the recommendation. Few available resources focused on training programs and providing schools with tools and equipment.

Principal participants' recommendations were similar to Teachers participants in regard to training and equipment. Principal A added suggestions about providing teachers with awareness sessions about the importance and effectiveness of technology on students learning. Principal B suggested providing training about the effective integration of interactive boards and using the internet effectively.

Summary

Findings indicated that Syrian schools under study were not ready for technology integration. Collected data from the interviews and questionnaire showed that Syrian schools understudy had technology resources limited to one computer in each department, projector, videos, PowerPoint presentations, and one of the three schools had an interactive board. Teachers have never been encouraged to integrate new technologies in their teaching. Available resources were not sufficient (due to the circumstances the city was going through); schools needed to have and share with teachers clear directions and understanding of technology and afford opportunities for professional growth and development.

While the participants in this study were enthusiastic about the role technology can play in improving learning and students' ability to learn and held positive attitudes to learn to use technology, many did not have the opportunity or were still unprepared to use modern technological tools in their classroom. The lack of technology and pedagogical knowledge in integrating technology was the major barrier to technology integration in the schools under study. The researcher, therefore, made some recommendations to be shared with the party concerned.

Recommendations from the Researcher.

The current study results indicated a low technology integration among most of the teachers who were part of this study. Based on the findings, the following recommendations were made:

Recommendation 1: Technology Integration Vision and Plan

Decision-makers need to have a clear vision of the kind of teaching and learning method they want to develop, besides the knowledge and skills learners will demonstrate and define a clear and articulate type of technology that enhances that approach. Because without a clear vision (direction and priority) and a well-articulated set of goals (structure and guidelines), technology integration initiatives can become lost and confusing among educators (Davies, 2011; Margolis & Huggins, 2012; Norton, 2013; Levin & Schrum, 2013). Henceforth teachers need to be provided with:

First, a well-developed content and sequence for technology integration by grade level provide teachers with clear expectations and help them determine the appropriate application for their classroom.

Second, a strategic technology plan shared with the school's community delivers a perspective of the kind of technology integration that should be occurring.

Third, establishing a pedagogical framework provides a pathway to understanding the influence of technology on teaching and learning.

Finally, providing teachers with clear direction, goals, and specific expectations facilitates effective technology integration.

Recommendation 2: Develop a Technology Policy Environment

Results indicated that teachers had positive attitudes toward technology integration despite the various limitations regarding its implementation in Syrian schools. For a successful technology integration, schools need a robust and integrated policy environment that involves the following:

Shared vision: Schools need to have an agreed-upon vision for what teaching and learning with technology look like in practice.

Metrics: SMART (Specific, Measurable, Achievable, Relevant, and Time-bound) goals, strategies to evaluate student learning outcomes, teacher performance and advancement, applicable guidelines, and timelines for implementation and use.

Support: Maintenance, restoration, replacing outdated equipment, training, security.

Capacity building for essential educational actors: supervisors, subject specialists, head-teachers, or principals

Internet connectivity: Wi-Fi facilities in classrooms

Educational support: Arab-fit digital content, digital books, online assessments.

Curriculum: blend technology across all content areas, based on grade level.

Recommendation 3: Focus on human resource development.

The majority of teachers in Syrian schools have not been prepared for integrating technology in their teaching. Therefore, there is a strong need for developing effective ongoing professional development programs and trainings. Prasojo, Habibi, Yaakob, Mukminin, Haswindy, and Sofwan (2019) studied the perceptions of school principals, the results revealed that the major external barriers to technology integration were lack of funding and lack of professional development. Yet, purchasing computers and software for schools and connecting them to the Internet does not mean practical uses of technology. Teachers' attitudes and confidence play an essential role in effective technology implementation; Hur, Shannon, and Wolf (2016) found that professional development does not significantly affect technology integration and teachers' self-efficacy. Instead, it affects teachers' perceptions regarding the advantage of technology integration and their self-confidence especially. Therefore, self-confidence in technology use positively affects technology integration (Koh & Frick, 2009).

The responsibility of technology integration in the school should not be on the teachers only whereas should be shared with the school leaders (principals) and other educational actors present in the school community. Teachers need continuous professional development and support in how to integrate technology to fulfill their professional tasks, and principals need to understand how to support and evaluate teachers as they integrate technology to promote more learner-centered atmospheres, and teachers themselves must know how to incorporate technology into lesson design, instruction, and assessment.

Furthermore, training should not simply focus on computer literacy skills but also should including reflection, the ability to explore technology at own level, practical uses and support (Clark-Jeavens, 2004; Baek et al., 2008). Likewise, it is necessary to consider the social and cultural influences and contexts of ICT use, as ICT has personal, professional, social, cultural, political and economic significance, meaning and values (Clark-Jeavens, 2004; Baek et al., 2008).

Recommendation 4: Provide ongoing support and coaching for teachers.

Effective professional development provides the opportunity for teachers to acquire new skills, resources, experiences, and knowledge to implement in their field of teaching. Yet, training may not always meet the needs of the teachers, specifically if the training focuses on the use of types of equipment.

Schools need to have school-level computer coordinators collaborate with the classroom teacher to integrate technology tools according to their curriculum and fulfill the vision of the new technologies with planning and leadership.

The computer coordinator encourages teachers to comprehend the curriculum, link the technology to the curriculum, and provide new ways of incorporating technology into the classroom.

Teachers have the unwieldy task of keeping up with new types of learning, recent program changes, and new technology. They need to qualify themselves and their students according to those changes. In this regard, school leaders need to support teachers by providing a school-based coordinator who has practical experience in integrating technology into curriculum and lesson plans.

Summary

Chapter 4 presented the analysis and interpretation of the findings. It was found that schools suffered from a complete lack of readiness for technology integration, although teachers had a positive attitude toward integrating technology in the classroom. Recommendations made above are suggested to develop the technology integration and enhance teacher pedagogy specifically in terms of technology use and improve student learning.

CHAPTER FIVE

Conclusion

Brief overview of the study

The purpose of the study was to determine the readiness of three popular private schools in Aleppo, Syria, for technology integration, to explore teachers' attitudes and competence toward technology integration into education, and to suggest recommendations for the effective integration in the three private schools under study. The findings collected from the questionnaire and interviews indicated poor technology integration among most of the participants of this study. Although participants had positive attitudes toward technology integration, many did not have the opportunity or were even unprepared to use modern technological tools in their classroom.

Teachers' computer competence in the three schools under study was notably low in almost all the major computer applications and functions. According to researchers, teachers' barriers with integrating technology are related to low confidence, lack of competency, lack of support, and limited experience with technology devices or programs (Anthony, 2012; Gumbo et al., 2012; Ritzhaupt et al., 2012). Teacher confidence and ICT competence are positively related to how teachers use ICT in the classroom (Wastiau et al., 2013). Where needed competencies for technology integration are not only linked to technology but also pedagogical attitudes and content planning (Sang, Valcke, Van Braak & Tondeur, 2010; Tondeur, Scherer, Siddiq & Baran, 2017)

As predicted, participants had limited access to computers and technology devices. The three schools under study had a shared computer (laptop) in each department. The most productive technology in the three schools under study that

teachers reported they used the most were computers and projectors. These tools

represent a low level of technology integration because they are not fully engaging

students (Ertmer, 2005).

The literature revealed that access to technology and professional development

were key barriers to technology integration (Lowther et al., 2008). And common barriers

to integration were the lack of accessibility to different technological tools, lack of

knowledge and time to learn how to use technology, and lack of equipment and money to

support technology initiatives.

Next, the study indicated that the majority of Teachers and Principal participants

had little or no computer training. Based on the findings, the three schools understudy

need to invest in their teachers' professional development and growth so that their

technology-based initiatives evolve successfully.

Concerning the infrastructure, besides the limited computer and technology

devices for schools staff, the three schools under study had a weak internet facility and a

definite power shortage which had an even more negative influence on the technology

integration.

The second objective was to propose recommendations for effective technology

integration into school communities. Limited resources were available regarding

Principal and Teacher participants' recommendations for effective technology integration.

The common point was training programs and technology tools and equipment.

The researcher suggested recommendations to support effective technology

integration. At first, to have a clear vision and plan for technology integration. Next, to

develop a technology policy environment. Later, to focus on human resource development. And finally, to provide ongoing support and coaching for teachers.

Implications

       The findings of this study have the opportunity to contribute to the positive transformation of the traditional education system of Syrian schools and to initiate a shift in the schools' approach to technology integration practices by increasing the levels of confidence, competency, and technology integration of the schools' principals and teachers. It also provides a framework for proven technology integration models and directions and equips teachers with the clear expectation to apply technology at their respective grade levels.

       Knowledge gained through this study and the recommendations made may deliver applications for other schools likewise experiencing low levels of technology integration by using this study as a platform for launching their investigation of their school's technology culture and teachers' practices of technology integration.

Limitations

       Because the researcher was far from the three researched schools, some limitations were unavoidable:

       First, the research was conducted in three private schools and on a small size of teachers. To generalize the results for large groups the study should have involved more than three schools.

       Second, teachers found it challenging to fill the questionnaire, which required the researcher to be present in the surveyed schools to explain it to the participants.

Third, the questionnaire was lengthy and included many questions. All the questionnaires that were discarded had cells partly filled. Similarly, most open-ended questions were not answered probably because the sections required additional information. Therefore, I suppose reducing the questions would have changed the attitude of the respondents regarding filling the questionnaire.

Recommendations for Future Studies

Based on the analysis of the data and the findings, the following recommendations presented for consideration:

1- Since the current study is the first of its kind in Syria, Aleppo, similar (or repeated) studies are needed on a larger population to produce more knowledge in this area.

2- The impact of multi-leveled professional development programs and training on technology integration methods of teachers.

3- The impact of multi-leveled professional development programs and training on teachers' confidence and competency related to technology integration to explore the relations between the amount of training needed to effectively increase the level of technology integrated into the classroom and its impact on increasing student engagement.

4- Technology integration in pre-service teacher professional development and training, and its role in improving their technology integration skills, confidence, and strategies.

Conclusion

The current study revealed that (three) schools in Aleppo, Syria drought awareness, and readiness for educational technology integration. Because technology is continuously evolving and advancing and affecting our lives and education, schools are tasked with the responsibility of equipping students with the 21st-century's requirements and skills by creating a shift in the school's technology culture and improving teachers' technological abilities.

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APPENDICES

The appendices presented the two instruments that were used for data collection

(Questionnaire for Teachers participants and interview for Principals participants). The

explanation of each instrument was described in previous sections.

Appendix A

Questionnaire for Teachers Participants

Technology Integration Questionnaire

Thank you for taking the time to help me complete this survey. I have created this as a requirement for a master course I am taking at Notre Dame University – Louize (NDU). The survey should take about 20 minutes to complete.

Please note that this survey is anonymous – answer freely and honestly.

Please add a tick [√] on the Choice that best describes you.

 Part 1:   Personal Information

1 Which school do you work in?

------------------------- school

2 What is your gender?
-------- male   -------- Female

3 How old are you?
-------- Under 25   -------- 26 - 30   -------- 31 - 45   -------- 46 +

4 What is the highest level of formal education that you have completed?
-------- Under   -------- University   -------- Masters   -------- Ph.D
university degree   degree

5 What subject do you teach?
-------- Math   -------- Science   -------- Language   -------- others
                                 Arts

6 How long have you been teaching?
-------- 1 – 5 years   -------- 6 – 10 years   --------10 + years

7   What is your position in the school?

-------- principal   -------- teacher

Please rate your own technology skills according to the scale. Please select one for each question.

Part 2:   **8 Technology skills**

Skill	**None:** Never done this task before	**Basic:** done this before, but need help.	**Proficient:** I can perform this task without any assistance.	**Advanced:** I could train staff to do this.
Able to connect multiple devices using correct cables	--------	--------	--------	--------
Take digital pictures /videos and download them to my computer	--------	--------	--------	--------
Create slide presentations using PowerPoint	--------	--------	--------	--------
configure settings such as headers, footers, margins, columns, tabs on a word processing document	--------	--------	--------	--------
Analyze data and create graphs in Microsoft Excel	--------	--------	--------	--------
Embed video into your presentations	--------	--------	--------	--------
Gather information for planning lessons	--------	--------	--------	--------
Access model lesson plans	--------	--------	--------	--------
Administrative record keeping (i.e., grades, attendance, etc.)	--------	--------	--------	--------
Communicate with colleagues/other professionals or parents or students	--------	--------	--------	--------

Post homework or other class requirements or project information	--------	--------	--------	--------
send an email to a colleague, student, or parent	--------	--------	--------	--------
send a document as an attachment to an email message	--------	--------	--------	--------
use a web based subscription or program (Raz-Kids, Spelling City, BrainPOP) in my classroom with my students.	--------	--------	--------	--------

List any other technology skills that have and not been mentioned

---

Please complete the following questions by adding tick [√] for the appropriate choice.

Part 3:   Technology Access

9   How many school-provided computers/laptops are located in your classroom?

----

10   How many of these school-provided computers computers/laptops located in your classroom

a. -------- have internet access
b. -------- used for instruction?
c. -------- used by students?

11   On average, you use computers or the Internet for instruction during class time?

a. -------- Regularly – more than 75% of the time
b. -------- Often – about 50% of the time.
c. -------- Sometimes – about 25% of the time.
d. -------- Seldom – less than 15% of the time.

12   Do you assign projects that require your students to use a computer:

a. Inside the classroom?   -------- Yes   -------- No

b. Outside the classroom?   -------- Yes   -------- No

13 Approximately, what percentage of your students have access to a computer at home?

-------- %

Please complete the following questions and add tick [√] for the appropriate choice.

Part 4:   Technology Usage

14 Are the following <u>available</u> to you, if yes, to what extend do you use them?

a. Computers/laptops in your classroom   -------- Yes   -------- No
     If yes

-------- Not at All | -------- Small Extent | -------- Moderate Extent | -------- Large Extent

b. Tablets or iPads in your classroom   -------- Yes   -------- No
     If yes

-------- Not at All | -------- Small Extent | -------- Moderate Extent | -------- Large Extent

c. Internet in your classroom   -------- Yes   -------- No
     If yes

-------- Not at All | -------- Small Extent | -------- Moderate Extent | -------- Large Extent

d. E-mail at school   -------- Yes   -------- No
     If yes

-------- Not at All | -------- Small Extent | -------- Moderate Extent | -------- Large Extent

e. Interactive Technology
(e.g., whiteBoards)   -------- Yes   -------- No
     If yes

-------- Not at All | -------- Small Extent | -------- Moderate Extent | -------- Large Extent

f. Classroom Technology (e.g., document
cameras, scanner, projector, etc.)   -------- Yes   -------- No
     If yes

-------- Not at All | -------- Small Extent | -------- Moderate Extent | -------- Large Extent

J. Virtual Learning Networks (e.g.,
Canvas, Moodle, Ed Modo, Eschool,
etc.).   -------- Yes   -------- No

If yes

-------- Not at All   -------- Small Extent   -------- Moderate Extent   -------- Large Extent

Please complete the following questions by adding tick [√] for the appropriate choice.

Part:5   Technology barriers and concerns

15   Please indicate to what extent, if any, each of the following are barriers to your use of school computers, technology, or the Internet for instruction.

a. Not enough computers   -------- Yes   -------- No

If yes
-------- Not a barrier   -------- Small barrier   -------- Moderate barrier   -------- great barrier

b. Outdated or unreliable computers   -------- Yes   -------- No

If yes
-------- Not a barrier   -------- Small barrier   -------- Moderate barrier   -------- great barrier

c. Internet access   -------- Yes   -------- No

If yes
-------- Not a barrier   -------- Small barrier   -------- Moderate barrier   -------- great barrier

d. lack of electricity   -------- Yes   -------- No

If yes
-------- Not a barrier   -------- Small barrier   -------- Moderate barrier   -------- great barrier

e. Inadequate training opportunities   -------- Yes   -------- No

If yes
-------- Not a barrier   -------- Small barrier   -------- Moderate barrier   -------- great barrier

f. lack of support or advice regarding ways to integrate technology into the curriculum   -------- Yes   -------- No

If yes
-------- Not a barrier   -------- Small barrier   -------- Moderate barrier   -------- great barrier

Please complete the following questions by adding tick [√] for the appropriate choice.

Part 6   Technology Training and Professional Development

16   a. In your opinion, how well prepared are you to use computers and the Internet for classroom instruction?

-------- Not at all prepared   -------- Somewhat prepared   -------- Well prepared   -------- Very well prepared

b. To what extent have each of the following prepared you to use computers and the Internet?

-------- Not At All   -------- Small Extent   -------- Moderate   -------- Large extent
                                                                                           extent

c. Professional development activities about technology integration (outside of school)

-------- Not At All   -------- Small Extent   -------- Moderate   -------- Large extent
                                                                                            extent

c. Professional development activities about technology integration (at your school)

-------- Not At All   -------- Small Extent   -------- Moderate   -------- Large extent
                                                                                             extent

17   Does your school make the following types of training available to you and, if yes, have you ever participated in these programs?

a. Use of computers in general or basic computer training

-------- No not available   -------- Yes, but I do not   -------- Yes & I participate
                                                   participate

b. Software applications (Word, Excel, PowerPoint, etc.)

-------- No not available   -------- Yes, but I do not   -------- Yes & I participate
                                                   participate

c. Educational platforms (Canvas, RenWeb, Google Docs, etc.)

-------- No not available   -------- Yes, but I do not   -------- Yes & I participate
                                                   participate

d. Use of technology devices (ie: SmartBoards, iPads, Doc Cameras)

-------- No not available   -------- Yes, but I do not   -------- Yes & I participate
                                                   participate

e. Use of Internet

-------- No not available   -------- Yes, but I do not   -------- Yes & I participate
                                                   participate

f. Use of advanced telecommunication

-------- No not available   -------- Yes, but I do not   -------- Yes & I participate
                                                   participate

g. Integration of technology into the curriculum/classroom instruction

-------- No not available -------- Yes, but I do not participate -------- Yes & I participate

h. Follow-up and/or advanced training

-------- No not available -------- Yes, but I do not participate -------- Yes & I participate

Please complete the following questions by adding tick [√] for the appropriate choice.

Part 7 Believes

18 Please choose the best statement

a. Computers make me feel uncomfortable.

-------- agree -------- strongly agree -------- disagree -------- strongly disagree

b. Computers save time and effort.

-------- agree -------- strongly agree -------- disagree -------- strongly disagree

c. Students must use computers in all subject matters.

-------- agree -------- strongly agree -------- disagree -------- strongly disagree

d. Computers would motivate and enhance students' learning.

-------- agree -------- strongly agree -------- disagree -------- strongly disagree

e. Teaching with computers offers real advantages over traditional methods of instruction.

-------- agree -------- strongly agree -------- disagree -------- strongly disagree

f. Class time is too limited for computer use.

-------- agree -------- strongly agree -------- disagree -------- strongly disagree

g. It would be hard for me to learn to use the computer in teaching.

-------- agree -------- strongly agree -------- disagree -------- strongly disagree

h. Computers should be a priority in education.

-------- agree   -------- strongly   -------- disagree   -------- strongly
                        agree   disagree

i. Computers dehumanize society.

-------- agree   -------- strongly   -------- disagree   -------- strongly
                        agree   disagree

j. Computers will not make any difference in our classrooms, schools, or lives

-------- agree   -------- strongly   -------- disagree   -------- strongly
                        agree   disagree

k. Students need to know how to use computers for their future jobs.

-------- agree   -------- strongly   -------- disagree   -------- strongly
                        agree   disagree

Participant's Expanded Responses

Part 8   (open ended responses)

19   Supposed your school administration annually made resources available (e.g. release time for improving computer-based instruction, technology specialist training, technology support coaching, etc.) In your opinion:

a. what kind of resources (programs or people) should they provide?

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

b. how can the resources improve your instructional use of computers?

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

20   Describe the ideal instructional technology support system, if any, you would like to have

available to you as an educator and how would impact your use of technology in the classroom?

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

21   What are the major challenges to the technology integration into your school community?

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

22   What do you think can be done to overcome these challenges?

…………………………………………………………………………………

…………………………………………………………………………………

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Thank you very much for your response.

Appendix B

Interview for Principal Participants

Interview Questions

Part 1:

Personal Information:

1. Age:

2. Position:

3. Years of experience:

4. Education level:

Part 2:

Understanding teaching-learning pedagogy and the use of technology:

5. How would you describe your own teaching pedagogy? know of subject matter and approach to use / find technology?
6. How do you prepare your lesson using technology?
7. Describe a lesson where you used technology (for principals, a lesson you observed)
8. (For the Principals) Do you think it is important for teachers to integrate technology into their teaching – learning process? Why?
9. How would you describe your technology knowledge?
10. Is there a Profession Development for technology integration available for educators and school leaders?
11. (for Principals) How does available technology enhance the work of the school community?
12. What do you think are the major challenges to the integration of technology in your school community?
13. How do you think can you overcome these challenges?

Part 3:

Infrastructure:

14. How many computers / tablets are available for teachers, students, and / or the school community?
15. What digital devices do teachers use for teaching – learning?
16. Is the internet available in the school community?
17. Does the school experience a power outage? if yes, what are the alternative sources available?