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Success factors for ICT implementation in Saudi secondary schools: From the perspective of ICT directors, head teachers, teachers and students

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ABSTRACT

The role of Information Communication and Technology (ICT) in education is undisputed globally. Therefore, many developed and developing countries have invested heavily in the ICT sector in education. Saudi Arabia is one of these countries. However, although it has invested massively in the ICT sector in education, the progression has often been disappointing – resulting in a number of serious questions being raised for decision-makers and educators alike. One of the most important of these questions is ***'what factors affect the successful implementation of ICT in schools'.*** Hence, the importance of this paper is to find an answer to this question and related questions from the participants' perspective. Consequently, the study is primarily concerned with qualitative data, collected in semi-structured interviews with two ICT directors, four headmasters, four teachers and four students, in Saudi secondary schools. Generally, the results showed that ICT was perceived as an important tool in improving performance, collaboration, learning experience and learning outcomes. However, some challenges that affect the application of ICT in Saudi schools are, for example, the lack of space, resources, maintenance, a lack of ICT skills among school along with a lack in ICT training and a lack of clear ICT policies. However, the overcoming of these obstacles could turn these barriers into positive factors to aid in the success of ICT implementation.

Keywords: *ICT Directors, Headmasters, Teachers and Students' Perceptions; Saudi Arabia schools; ICT in Education; successes factors; barriers.*

INTRODUCTION

In a global context, ICT is increasingly accessible and influential. Therefore, most countries see ICT as a gateway for the raising of educational standards (Noor-Ul-Amin, 2013). Today, both developed and developing countries recognize the value of ICT tools for their economic development. Developed countries, The US, for instance, spends more than $10 billion annually in educational technology in public schools (Brunk, 2008), while Australia spends approximately AUD$8 billion (Lane, 2012).

Developing countries, for example India, which has adopted a program aimed at reconstructing the existing system of tertiary and vocational education through the integration of ICT tools to reinforce the acquisition of human capital (Halewood & Kenny, 2008). Likewise, Uganda's developmental policy relies strictly on ICT and the use of considerable ICT tools to act as a sufficient driver and enabler to boost the country's economy and education (Ssewanyana & Busler, 2007).

Saudi Arabia has not been left behind in the development of ICT. The Saudi government has made huge investments with a view to developing public education. For example, in 2007 the Saudi government invested almost £2bn in reforming and improving education using modern technologies. Furthermore, public education was improved by revising the curriculum and

introducing electronic devices to facilitate teaching. This project also introduced training and developmental programs for educators to ensure sufficient use of ICT in education (Tatweer, 2015). Furthermore, about 25% of the overall Saudi government budget for 2015 is dedicated to the educational sector(more than £36 billion), which adds to the already massive funding being pumped into the educational field towards the implementation of technology in the school curriculum and improving ICT facilities (Ministry of Finance, 2015).

However, in spite of this massive spending and governmental support, Saudi Arabia still lags behind the countries that lead the world in the educational sector, especially in ICT (Ageel, 2011; Almadhour, 2010). There is still a real gap between the availability of ICT technology in Saudi schools and methods of implementation. For example, some recent studies related to ICT in Saudi schools (Oyaid, 2009; Almadhour, 2010; Almalki & Williams, 2012; Al-Harbi, 2014), revealed that the Saudi government needs to develop an effective strategy for ICT in education and to implement it in practice. Almadhour (2010) concluded in his study, 'Unfortunately although the Saudi Arabian government has lots of funding, there is no clear strategic framework towards equipping ICT in schools'. From a more global context, studies conducted in North America have actually shown that greater investments or the availability of technological resources in the classroom do not necessarily translate to improved academic achievement, mainly as a result of poor implementation (Wozney et al, 2006; Ungerleider & Burns, 2002; Balanskat et al., 2006).

Consequently, this paper aims to explore the success factors for the effective incorporation of ICT into instructional practices by answering the research question, ***'what factors affect the successful implementation of ICT in Saudi schools'*** by examining relevant ICT strategies**,** models and frameworks used in education, In addition to the barriers that hinder ICT in education. The words model and framework are used interchangeably in this paper. Varied components of the framework are referred to as elements.

SUCCESS FACTORS AND HINDERING FACTORS FOR ICT IN EDUCATION

There are a number of strategies and frameworks, which have been applied in developed countries to allow the effective use of ICT in education. For instance, the research published by The Ministry of Education in New Zealand (2006), *'ICT Strategic Framework for Education',* offered ICT tools to direct and manage ICT input with the goal of enhancing educational objectives for the government. The study commenced with the question: 'why an ICT strategic structure for learning?' The cooperation of educational centres and government institutions was assumed to be essential in the efficient application of ICT in the learning sector. The framework takes into consideration the issues of those working and studying in educational environments. On top of this, it is in line with the country's E-government and National Digital Strategies offering the basis for dynamic E-education to be integrated into New Zealand learning practice. Therefore, there is a need to establish and maintain partnership between all parties engaged in the educational process in order to handle all ICT issues effectively (Bingimlas, 2009).

Using a similar concept, the Department of Education in Australia established a national framework for ICT aimed at providing maintainable and significant change to educating and learning within Australian institutions to train pupils for additional teaching and learning and for existing in a digital age. In addition, this aimed to reduce barriers by addressing leadership factors by facilitating leadership; responding to student needs by individualising and expanding pupils' education; linking learning further than the institution; enhancing pupil appraisal and reporting; advancing, quantifying and observing pupil ICT proficiencies and obtaining and employing pupil information. The framework also addresses the technical and expert protocols in place to ensure they are offering, obtaining and controlling education procedures; maintaining expert instruction; mechanising commercial procedures; and offering dependable infrastructure (Alhawiti, 2013).

Though the Australian framework had crucial elements that address student factors and technical barriers, it has limited focus on headmaster and teacher's factors. There are, also, elements of this framework that may pose limitations on implementation in the Saudi educational system. For example, the current systems and policies 'enabling the environment and curriculum' are not developed enough in Saudi Arabia (Hakami *et al*., 2013). The framework has however structured, and recognised ten essential elements for effective ICT application, these key components can enhance the implementation and development of ICT in the Saudi Arabian context especially for rigid and structured education systems. A good example of this is enabling leadership, which is vital in ensuring the implementation of ICT at ministerial and educational establishments. This is currently not streamlined well in Saudi Arabia and there is a clear gap in policy and practise, along with failing to link the school head teachers and the Saudi Ministry. (Al-Miman, 2003; Oyaid, 2009; Robertson & Al-Zahrani, 2012). It has been seen that some head teachers lack leadership due to the various barriers experienced in ICT use and implementation, as a result, the adoption of this can enhance the current research (Bingimlas, 2009).

The need to provide frameworks, processes and systems that can evaluate the learning process, as well as manage and support professional learning as identified by Almadhour (2010), makes the Australian national framework very relevant to Saudi Arabia in the context of the learning processes. This study therefore investigates some of these elements such as the current infrastructures, leadership roles and ICT capabilities, not only of students as in this framework, but those of teachers and head-teachers as well.

(Lee et al., 2009) a study in South Korea explored how the e-learning practices established altered the learning concept from teacher to pupil-focussed (see Figure1).

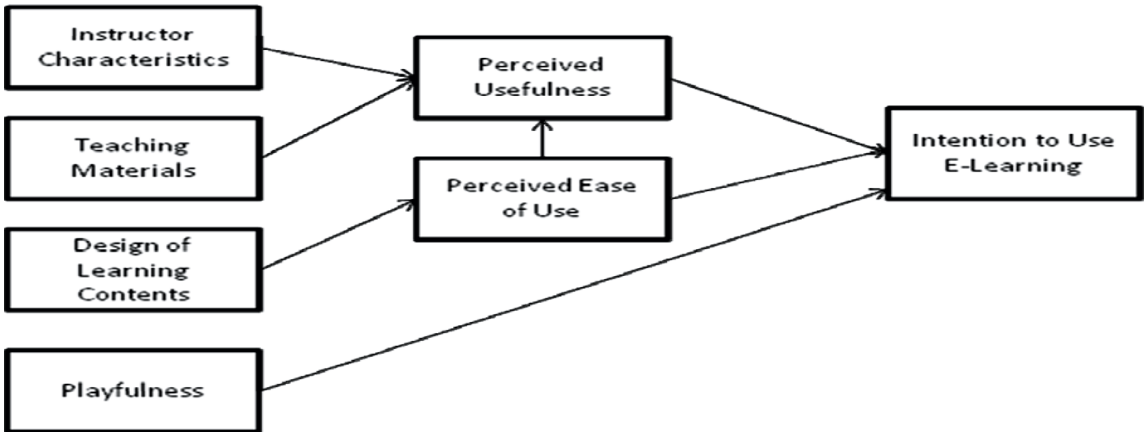

Figure 1: *The relationship between E-learning and satisfaction (Lee et al, 2009).*

In contrast, the current system in Saudi is largely teacher focussed, although in actuality, this South Korean model facilitated the efficient reaction of teachers to critical matters like the dense pupil population in Korea and elevated learning standards. Lee and company see ICT through e-learning as cost effective, efficient and an alternative to traditional learning as it bridges the space and time barriers to learning. The success of the model is however alluded to addressing the learners and educational objectives in the design, which requires an approach that is multidisciplinary, and task driven

As in South Korea, Saudi Arabia has had a rapid growth in ICT however; the adaptation of e-learning and its acceptance has not been fully explored as an implementation strategy and there are limited empirical studies that show learner acceptance (Al-Harbi et al, 2013). Aspects of this model can help address access, lack of space and environmental barriers faced by Saudi schools. The key variables that are vital in this model are centred on teacher characteristics, learning material and design. There is need to ensure the resources developed fit the needs of the student (Eyitayo, 2013). However, for the acceptance of the technology the perceived usefulness of the material by the learner is crucial (Kaur, 2011). In addition, one element of this model is to measure participants' perceptions of ICT, in order to be compatible with one of the study's objectives. Therefore, this model could be useful. In this matter, for instance, Oyaide (2009) emphasizes the importance of investigating teachers' characteristics (Views, beliefs and attitudes) and the extent to which they are helpful, cooperative, and accommodating to students. In addition, the availability of ICT tools is crucial; to understand which learning contents are designed for consistent and accurate delivery (Bingimlas, 2009). The extent to which students enjoy learning and believe that e-learning will enhance learning outcomes is an additional factor (OECD, 2000). Finally, to what extent students intend to participate in e-learning is also important. However, a proper strategy, planning and an implementation framework needs to be in place. The ability of learners and instructors are also critical for the success of this model (Lee *et al,* 2009).

Lim and Khine, (2006) examined the strategies employed by four Singapore schools, two primary and two junior colleges in order to manage barriers in and out of the classroom to ICT implementation. They found six operating strategic elements, based on the observations of ICT lessons and face-to-face interviews with teachers, directors of ICT and school headmasters. These included: technical support staff; training of student ICT helpers; time for teachers to prepare for ICT; collaboration among teachers; support provided by headmasters in addressing teachers' ICT concerns; and training for teachers on how to use ICT in the classroom. This framework is central to the questions and gaps in knowledge addressed by the current study. The current study will evaluate these factors in terms of ICT application by teachers and students, and assess the availability and roles of technical support, the training and skill of teachers in ICT and support provided by the headmaster in addressing teachers' ICT concerns in Saudi schools. For the effectiveness of ICT, the challenges are not only limited to technical issues.

Other aspects have been critical and according to Newhouse (2002), the most important factor is ICT resources. Newhouse framework argues that resource availability or lack thereof has a strong relation to the curriculum. That, in turn, supports influences and provides logistics of how to deliver in terms of content, learning outcomes and pedagogy. However, Newhouse framework also emphasizes the thinking of Lim and Khine (2006), which pointed out that the availability of resources without technical support, makes ICT tools hard to integrate at school level. Newhouse adopts a systematic approach with a view that all relationships have an impact on each other. For instance, the availability of resources, with technical support but no skills or knowledge to implement ICT in classrooms implies there will be no positive outcome (Newhouse, 2002).

Interestingly, Newhouse's framework identifies key issues that are relevant to this study. Newhouse's systematic framework approach has not addressed issues regarding policies and strategy, integration of ICT in the school curriculum and the head teacher's role as a key implementer. It does however look at the role of the wider community in relation to the schools, and emphasises the teacher and student elements in ICT implementation. This framework presents a number of interacting factors that are similar to current study objectives. (See Figure 2). Therefore, the framework assumes an already established system in terms of curriculum, learning environment and availability of resources and supporting environment (Newhouse, 2002). In the Saudi context, the framework presents core elements, which the study shall review, but it has not taken a systematic or linear approach, as ICT is still in the development stage in Saudi schools (Almalki and Williams, 2012).

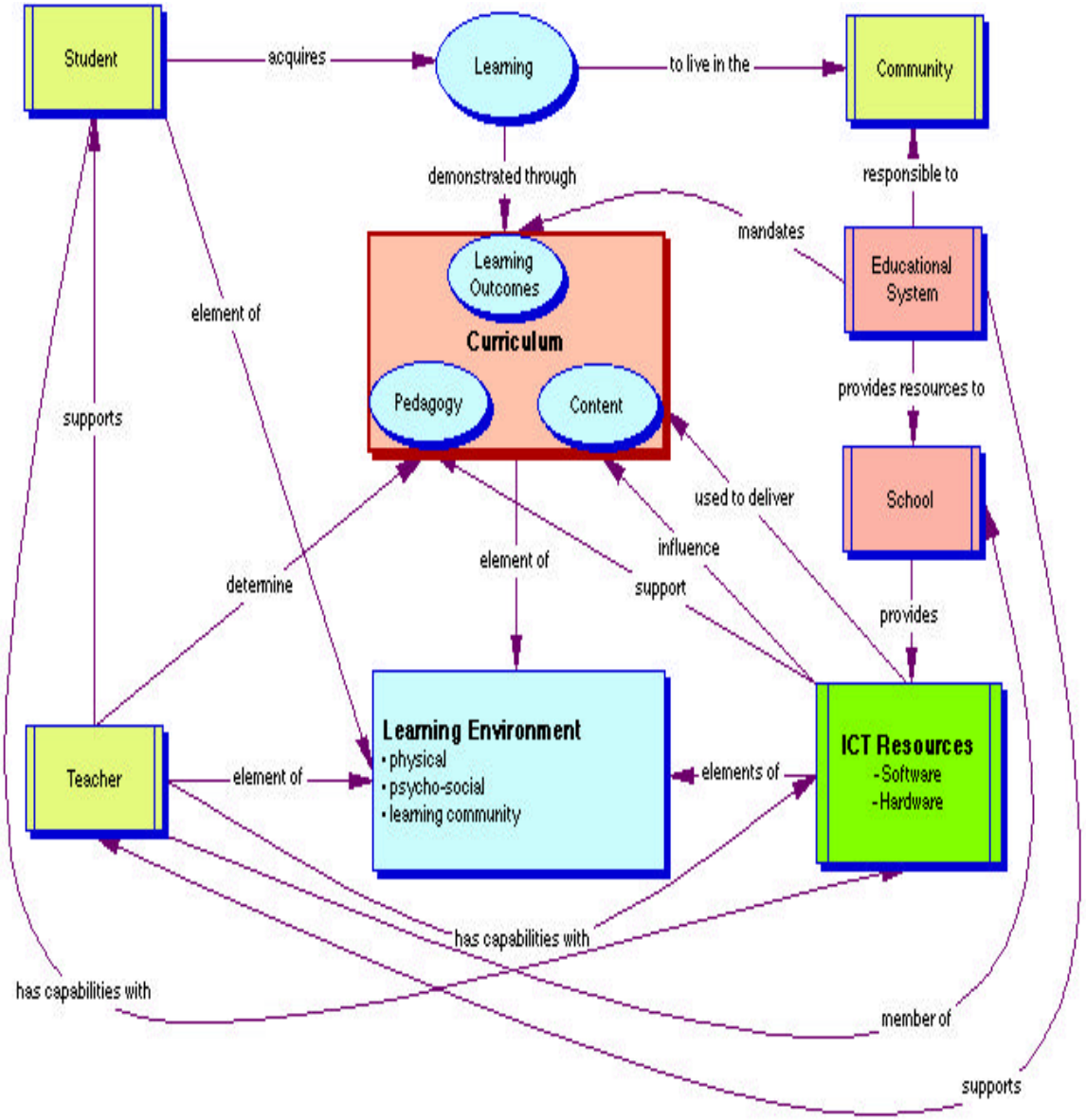

Figure 2: *Concept map indicating relationships between learning environment entities and external entities (Newhouse, 2002:p15)*

However, on the other hand, the shortage in these factors could turn them from positive factors to negative factors (barriers). Ertmer (1999) categorised factors that hinder ICT application in schools, into two main categories - internal and external obstructions. In this concept, Al- Al-Alwani (2005) described internal obstructions as barriers associated with people, in an organisation, such as headmasters and various teacher roles, views and attitudes. On the other hand, external obstructions are those associated with factors outside of the organisation, like lack

of ICT resources, lack of technical support, and lack of policy, which are all related to the Ministry of education. How these barriers could negatively affect the implementation of ICT in education is discussed below.

A study conducted by Oyaid (2009, p154) showed that 39.8% of teachers saw a lack of explanation of ICT in Saudi educational policy. In addition, studies conducted by (Almadhour, 2010; Almalki & Williams, 2012; Al-harbi, 2014), highlighted the need to develop an effective strategy for ICT in education and to put it into practice in Saudi schools. Furthermore, Almadhour (2010) concluded in his study:

> *"Unfortunately although the Saudi Arabian government has lots of funding, there is no clear strategic framework towards equipping ICT in schools"* (p62).

AL-Harbi (2014) and Ghamrawi (2013) found that the headmaster plays a major role in ICT implementation. For example, if the headmaster does not provide adequate support and encouragement to teachers, a good working environment cannot be created to motivate teachers to experiment with ICT in their classrooms. In addition, Levin and Wadmany (2005) confirm if headmasters and teachers attitudes and beliefs are not constructive with regard to ICT implementation, it is likely that ICT will not be accepted or applied in schools.

In relation to the role of the teacher, several researches were carried out to examine the relation between ICT and teacher roles (Erdemir et al., 2009; Oyaid, 2009; Alhawiti, 2013). The outcomes of these researches showed that teachers play a vital role in making the ICT implementation more successful. It is apparent that the integration of ICT in education is a highly comprehensive process requiring changes at all system levels. Teachers as the providers of information and knowledge should adjust to new strategies to make their contribution to the learning process relevant. If this is not the case, teacher resistance to change can be another barrier to their utilization of technological advances in education. Individual teacher beliefs and attitudes towards ICT can have a significant influence on their performance in the classroom (Bingimlas, 2009). However, teacher reluctance or resistance to change are other barriers to using ICT and can be due to a number of factors such as teacher competence, school digital infrastructure, technophobia, and access to ICT tools. Hence, such teacher reluctance can mean they are unenthusiastic about using computers in their teaching practices and integrating supplementary learning, thus hindering full-scale ICT integration in education (Bingimlas, 2009).

In addition, Saudi teachers as started by Al Asmari (2011) suffer from a lack of time to prepare ICT materials for lessons. In other words, the additional time required must be given to use ICT tools appropriately in order to successfully integrate technologies into the classroom. Therefore, the implementation of ICT tools can be successful if there is constant collaboration between all participants – teachers, schools, as well as the educational system. (Al Asmari, 2011).

Bingimlas (2009) highlighted in his research several obstructions that may limit ICT incorporation in learning institutions. For example, the growing number of students in classrooms, insufficient amounts of ICT recourses along with technical support and maintenance, and the absence of incentives for the teachers regarding the employment of ICT in their classrooms.

The previous relevant literature, showed some barriers that may hinder the utilization of ICT in education. In addition, the literature revealed that the successful implementation of ICT in education requires paying attention to certain factors. Figure 3 illustrates some of these factors.

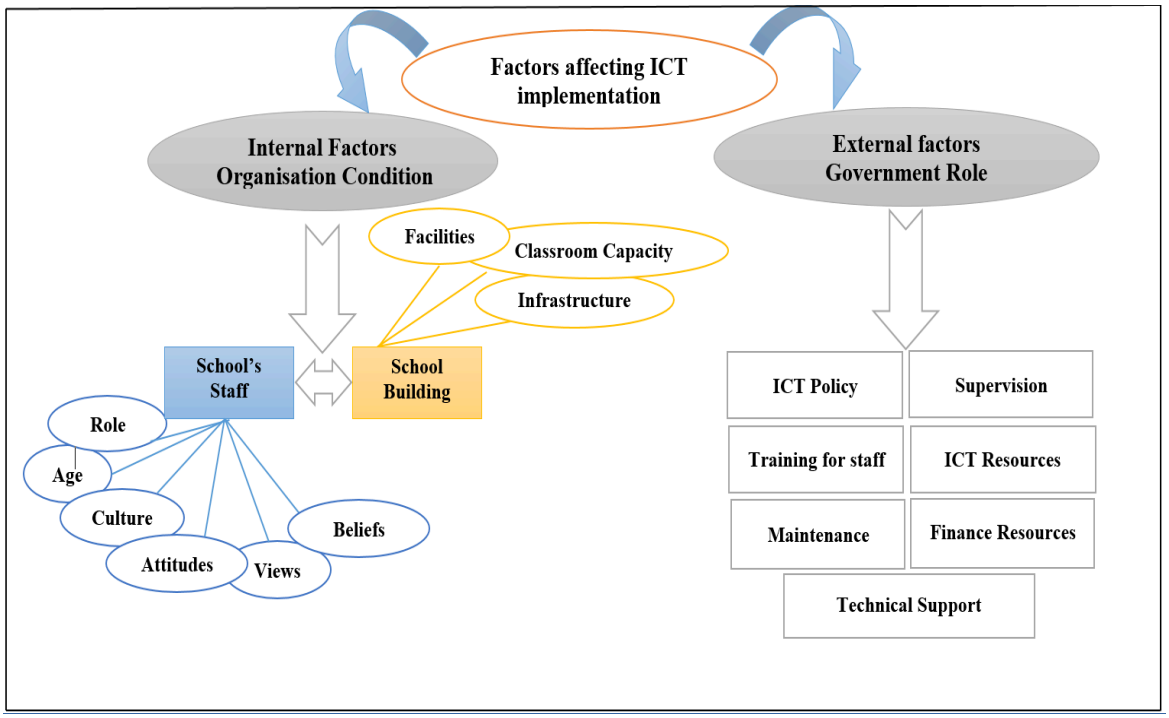

Figure 3: *Internal and external Factors affecting ICT integration in Education (Adapted from the previous literature review)*

METHODOLOGY

The study followed the 'Onion Design', which was developed by Saunders et al (2012, p160). This design is divided into six parts

Research philosophy

Since this study seeks to understand participants' perception towards the research phenomena under investigation and to answer the research question, the study complies with the interpretivism philosophy, which puts more emphasis on the development of knowledge that is socially constructed (Sexton, 2003).

Research approach

Based on the research phenomenon, this study, primarily, is exploratory research and somewhat tends to be explanatory and descriptive. The combination of these three approaches help researchers not only to explore the phenomenon but also to explain and describe why it is occurring. For example, this study tends to explore the success factors of ICT implementation in Saudi schools; it focuses on describing the problems (barriers) towards ICT, as well as explaining all the dimensions of the problem and its causes (Saunders, et al, 2012).

Methodological choice

According to Saunders et al (2012, p164), in choosing research methods the researcher will either select 'Mono method' (single method), or 'Multiple methods', (more than one data collection technique and analysis procedure). Accordingly, this study has selected single method (qualitative analysis choice). See figure 4

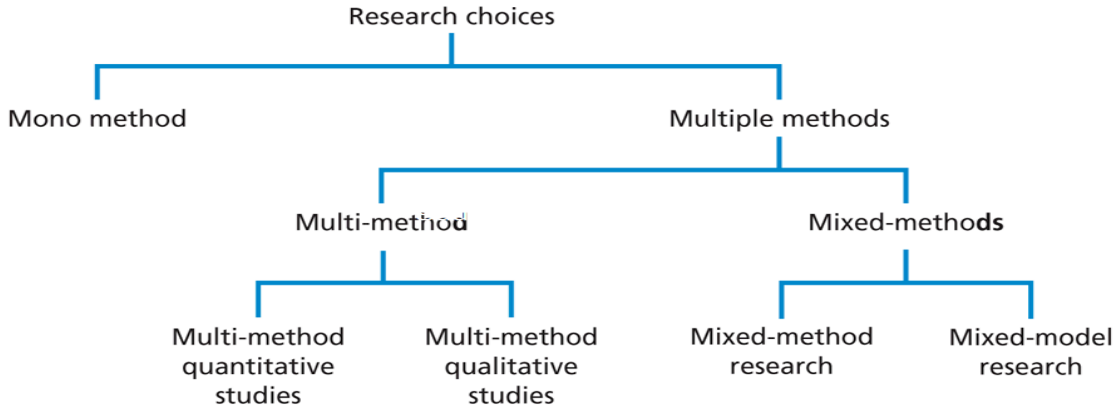

Figure 4: *Methodological Choice (Adapted from Saunders et. al, 2012.pp 165)*

Research strategies

The research strategy is based on three conditions, one of them is the types of research questions being used such as "what", and "how" used through a number of research strategies such as experiments, surveys, case studies and archival analysis (Yin, 2003:p5) . Thus, case studies have been used in this research. For example, what factors make ICT implementation more successful in education, what are the obstacles that prevent the application of ICT and how these obstacles can be overcome.

Time horizons

According to time horizons, research projects may be cross-sectional or longitudinal. Cross-sectional research is described as research investigating a phenomenon at a particular time, whereas a research investigating a change and development over a time is called Longitudinal (Saunders et. al, 2012). In this study, the time horizon is cross sectional. It was also not possible to access all Saudi schools for a longitudinal study. Furthermore, there were time limitations and a schedule for the completion of the study.

Data collection tools, sampling, techniques and procedures

Interviews

There are many ways of collecting responses from participants. For example, the common data collection methods in qualitative research are interviews, observations and focus groups (Mason,

2004). According to Harris & Brown (2010), the study selected semi-structured interview, which is often used in qualitative research to generate positive results.

Sample

The 'purposive sampling technique' also referred to as 'judgment sampling', was adopted; key informants were targeted for sampling (case studies). The participants were strategically taken from various institutions, qualifications and encounters to mirror the present ICT circumstances in Saudi secondary schools. The interview questions and choice of facets were chosen and arranged carefully in order to deal with different aspects under investigation (Gillham, 2000)

The testing of questions was done before the actual interviews to review the length of the questions and also to test their applicability and the recording tools. Trialling of questions reduces interview bias and improves quality through moderation before the final interview (Gillham, 2000). In the current study, theoretical methods, data collection and analysis were triangulated at various levels of design, sampling, data collection and data analysis. Data from different cases from policy level with two ICT directors were triangulated with four head-teachers, four teachers and four students at ICT end-user level. Semi-structured interviews and funding from the literature review were triangulated aiming to strengthen reliability and validity (Todd, 1997).

Table 3: *sample information in qualitative phase.*

Coding	Participants Position	Gender	Age	Experience In education	Training In ICT	Qualification	ICT Skills Level
H[1]	Headmaster	Male	43	19 years	Formal Training	Bachelor	Intermediate
H[2]	Headmaster	Male	38	13 years	Formal Training	Bachelor	Expert
H[3]	Headmaster	Male	39	14 years	Self-Training	Bachelor	Intermediate
H[4]	Headmaster	Male	58	33 years	No Training	Bachelor	Poor
T[1]	Teacher 1	Male	25	2 years	Self-Training	Bachelor	Poor
T[2]	Teacher 2	Male	33	8 years	Self-Training	Bachelor	Intermediate
T[3]	Teacher 3	Male	46	21 years	Formal Training	Bachelor	Intermediate
T[4]	Teacher 4	Male	28	4 years	Self-Training	Bachelor	Expert
S[1]	Student 1	Male	17	----------	No Training	High School	Intermediate
S[2]	Student 2	Male	17	----------	No Training	High School	Intermediate
S[3]	Student 3	Male	18	----------	No Training	High School	Expert
S[4]	Student 4	Male	17	----------	No Training	High School	Expert
D[1]	The Director of IT tools	Male	56	23 years	Formal Training	Bachelor	Expert
D[2]	The Director of IC	Male	43	18 years	Formal Training	Bachelor	Expert

Data techniques and procedures

The study used the constant comparative method. In this method, the data break down into discrete 'units' (Lincoln and Guba, 1985) or 'incidents' (Glaser and Strauss, 1967) then coding them to 'themes' and 'sub-themes' (Braun and Clarke, 2006). Taylor and Bogdan (1984) summarised this method:

> *"in the constant comparative method the researcher simultaneously codes and analyses data in order to develop concepts; by continually comparing specific incidents in the data, the researcher refines these concepts, identifies their properties, explores their relationships to one another, and integrates them into a coherent explanatory model"* (p126).

The study followed the Braun and Clarke (2006) strategy, which suggests six stages (each based on the previous one) that should be followed by the researcher to reach the aim of qualitative data analysis. In the first stage the researcher should be familiar with the data, after which the initial codes are created and then the themes are searched for. Data themes are reviewed in the fourth step followed by the explanation of the themes and finally the writing of the report.

Therefore, the interview texts were transcribed and then read several times with the aim of becoming deeply immersed in the data. After reviewing category indicators in the interviews' text, the next step was to identify those indicators by coding them to create 'initial codes'. This coding categorisation continued until it achieved either 'informational redundancy' or 'theoretical saturation' (Glaser, 1978). The data was organised and managed by using manual methods within Microsoft Word 2010 programs. Figure (5), gives a summary of the study design.

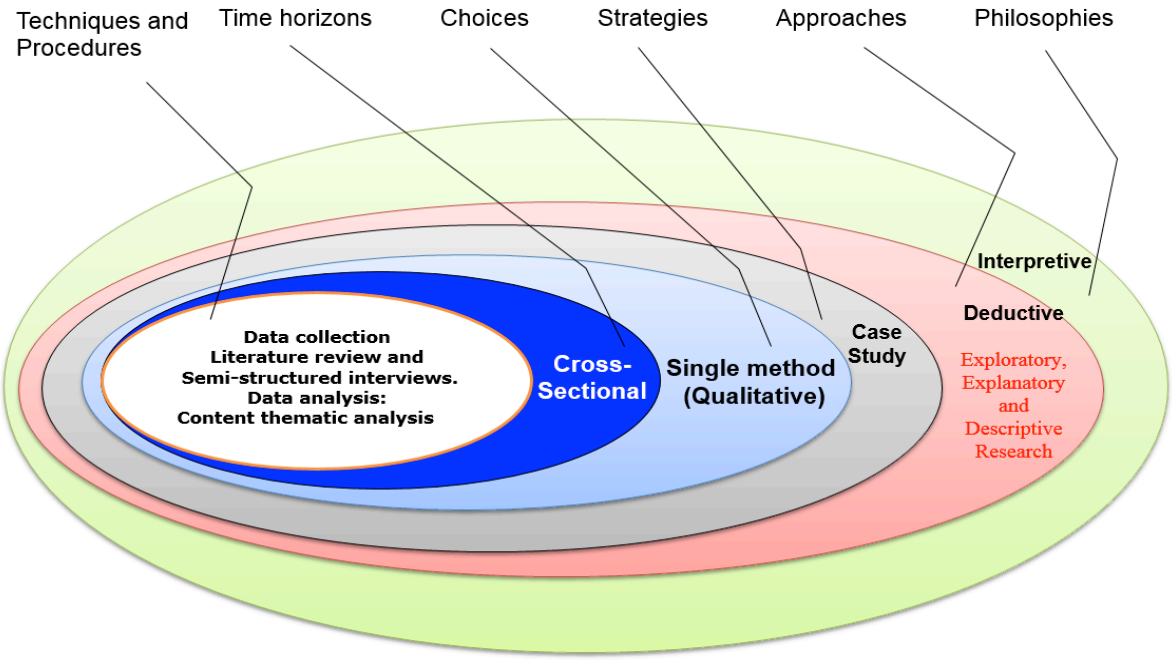

***Figure 5**: Summary of the Research Design. Adapted from Saunders et al (2012 pp. 160)*

FINDINGS AND DISCUSSION

In this section, the results of qualitative data will be presented and discussed in parallel with the literature review outcomes. Internal and external factors will be also discussed in this section (Randolph, 2009).

School's culture (views, attitudes and beliefs) towards ICT

The results showed there were positive views and attitudes from all participants towards integrating ICT tools in education. The research established that these aspects encompass most matters and could assist ICT application in institutions. For instance, (Seyal, 2012; Yuen, Law, & Wong 2003; Schiller 2003) indicated that the key element in successful ICT implementation in lessons is the perspective of the headmaster and their staff. It could be argued that their beliefs and attitudes are critical in ensuring the success of the implementation of ICT. Furthermore, the results showed negative views towards using internet at schools. In general, the need to improve student attitudes towards ICT as a learning tool and using internet for educational purposes as identified by ICT directors, headmasters and teachers is crucial.

In relation to the use of the internet in schools, the results highlighted that most headmasters and teachers tend to restrict the use of the internet at school due to moral and religious perspectives. However, The limitation of Internet access in Saudi schools may be attributed to religious or cultural beliefs (Barzilai-Nahon and Barzilai, 2005). For example, over 2,000 sites containing pornography or information on faiths other than Islam have been restricted by the Saudi Arabian authorities (Burkhart and Older, 2003). Instead of restricting the use of the internet, some solutions have been suggested, for example, The Virginia Department of Education (2007), published guidelines relating to internet safety instruction in schools. For example, the importance of learning via the internet should be convinced to both educators and students. Furthermore, the use of the latest internet security must be installed on school computers to monitor and filter student internet use (The Virginia Department of Education, 2007).

However, in Saudi Arabia there is hope as attested to by Albugami (2008) who has expressed that despite the initial resistance of religious organisations, they still do use ICT in educational practises to cope with contemporary times. Therefore, headmasters who still have conventional beliefs about ICT and its adverse effect on religion may be made aware of the fact that technologies like the internet can be modified based on the culture that uses them, and can become localized by the systems, control, and rules employed by their users.

School's staffs roles

The majority of participants mentioned the importance of the headmaster's role. They emphasized that the headmaster should be a facilitator for using ICT tools. In addition, they pointed to the importance of encouragement and support to instil change. These results are compatible with some other studies. For example, Schiller (2003), in his study of *'The Elementary School Principal as a Change Facilitator in ICT Integration'* referred to headmaster's functions of developing supportive environments, arranging training, providing consultation and promotion, monitoring and evaluating. Thus, headmasters should be regarded as the facilitators of ICT implementation at the school level.

Regarding the role of teachers, headmasters and ICT directors as well as students, the first responsibility in the implementation of ICT tools in classrooms belongs to the teachers. However,

the issue of teachers' competence in computer use is crucial; proper competence is likely to provoke confidence and positive attitudes towards the change. Today's teachers frequently explain their reluctance to use ICT tools in classrooms by referring to their belief that their skills are poorer than their students' skills. Teachers' anxiety about their potential failure evokes their denial of the usefulness and effectiveness of ICT in education. In contrast, teachers' confidence in using technologies supports their beliefs in technologies' contribution to teaching and individual development and the need to expand the application of ICT in the future (Bingimlas, 2009).

The subject of resistance to change arosed during the interview with the headmaster:

> *"Some teachers are not welcoming to this change (using ICT); they do not have any idea on how to run devices. So they prefer traditional methods".*

Teachers' resistance to undergoing changes is another barrier to their utilization of technological advances in education. Teacher's beliefs regarding ICT-based learning are important, since their perceptions affect their performance in classrooms (Bingimlas, 2009). Teachers' reluctance to use computers in classroom activities is explained by a variety of other obstacles, including their competence, school digital infrastructure, as well as access to ICT tools. Hence, teachers lacking ICT skills are unenthusiastic about using computers in their teaching practices and integrating supplementary learning, which creates a vicious cycle precluding full-scale ICT integration in education (Bingimlas, 2009).

ICT policy

Regarding external factors, the study found that the Saudi educational policy was not clear and there is a contradiction in the instructions and responsibilities. For, example, the support from the Ministry of Education is not sufficient. With regard to this concept, the director of ICT said:

> *''I admit that there is a shortage within our department to support and supervise ICT use in schools, the reason, as what I said, the lack of sufficient supervisors"*

Furthermore, the headmasters pointed out that the Ministry of Education has not committed to providing sufficient ICT tools, proper infrastructure and training for all staffs, even though it emphasizes the use of technology at schools. Accordingly, in light of the lack of clarity in ICT policy, identifying the tasks and the application of policies on the ground by the ministry is crucial.

In Saudi Arabia, further studies have also established that although there is a Saudi ICT educational policy, it is not well communicated, implemented and re-enforced. Its application is also weak at classroom level. This agrees with the studies of (Almaghlouth, 2008, Oyaide, 2009, Mulkeen, 2003). These results are interesting, because if the headmasters or teachers do not understand the ICT policy they will not apply it on ground level. In line with this concept, Al-Habeeb (2013), stressed that the Saudi government should review its policy regarding ICT in education.

Lack in ICT Training

Another factor that relates to the role of government is training. The results showed that training plays a significant role in ICT implementation. In this regard, one headmaster said;

> *"About 90% of the school's teachers are not qualified for using ICT, they need training"*

While the results showed there is an interest in training among teachers, the training times are sometimes inconvenient. Most participants agreed that planning training outside of working hours without any incentive, results in no attendance. Similarly In Western studies, training time was identified as a barrier (Jones, 2004, Tearle, 2003) that negatively affects ICT integration in classrooms (Bingimlas, 2009; Mumtaz, 2000).

To seek a solution to surmount the implementation obstacles, it is important that training should concentrate on all facets of the case, fundamental proficiency training and the methods of application of ICT in the teaching and learning procedure (British Educational Communications and Technology Agency, 2003; Scrimshaw, 2004). In this context, many have proposed solutions to help teachers' requirements and to improve their experiences in ICT employment. For instance, Snoeyink and Ertmer (2001) proposed that the primary phase of training should concentrate on fundamental ICT skills and employment of broadly utilised software and hardware applications. Once teachers have attained the necessary proficiencies, they can move on to academic instruction. In this research, teachers' demands were to have constant training in ICT to help them apply it effectively.

Lack of resources, maintenance and technical support

The lack of ICT resources was viewed as one of the main barriers that hinder ICT application in schools. There are various reported resources either available or lacking in schools that create a number of problems. This was not far off in agreement with the some teachers and headmasters who reported:

> *"Devices are not enough and most of the equipment was brought by teachers' self-efforts, some devices broke down and were abandoned in the warehouse and the school administration does not have sufficient resources to fix them, we share (four or five students) on one computer."* Also, ‘'*there is no Internet".*

All the participants regarded the absence of maintenance and technical assistance as a hindrance, which has a direct impact on teachers' confidence because of their constant fear of technical breakdowns or failures. Kozma (2008) stated that teachers will have no interest in using ICT if they feel they will face technical problems that require a long time to fix. (Jones, 2004). Ensminger (2004) stressed the significance of full time technical support to aid in the process of ICT incorporation. Furthermore, management leadership is crucial in building the ICT infrastructure through finding necessary resources, determining technological structures, and establishing partnerships with other educational institutions (Stensaker et al, 2007).

Lack of Infrastructure and financial resources

The results showed differences between schools in ***Infrastructure***. The reason for this problem is related to the types of buildings, because the government—buildings schools have a good infrastructure and more opportunity to facilitate ICT within them. Whereas, rented buildings still suffer from lack of Infrastructure because these buildings were prepared in advance for housing. The solution to this problem, as the Saudi government plans, is to dispense rented buildings in 2015 (Ministry for Education, 2013). The participants suggested another solution:

> *"The schools should be built for the future and should be ready in advance to receive this equipment".*

Finally, Moon (2002) emphasizes that the lack of financial resources is seen as a significant barrier for ICT implementation in many countries. Moreover, several studies have confirmed the shortage in ICT infrastructure is one of the main obstacles in Saudi Arabia schools (Al-Sobhi and Al-Harbi, 2008; Al-Ghaith et al., 2010; Al-Sobhi et al., 2010).

5. CONCLUSION

The results of this study show mixed feelings of both optimism and fear. Policy makers, school leaders, teachers and students face numerous problems in the attempt to integrate ICT into Saudi secondary schools. The results present some barriers regarding ICT in education. However, despite all the highlighted challenges, there is a general feeling that ICT has a future in schools in Saudi Arabia, but there is a need to improve on the present situation. Accordingly, this study presents some factors that might hinder the implementation of ICT in Saudi Arabian schools:

- Lack of ICT policy and strategy;
- Lack of proper infrastructure and access to ICT resources;
- lack of management roles
- Lack of teachers role
- lack of school staff training;
- lack of technical support and maintenance; and
- Negative attitudes, beliefs and behaviour towards ICT tools.

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