

# Influences of the Mandated Presence of ICT in Saudi Arabia Secondary Schools

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**Abstract**—In the Saudi Arabia secondary school context, ICT integration is simultaneously the product of a mandate to ICT adoption and the ultimate goal of the education reform. This study utilizes an implementation, Concerns-Based Adoption Model, evaluation, and grounded theory approach together with a thematic analysis to explore the ways of making ICT integration in Saudi schools strategic by identifying stages of concern and levels of use, determining technical, political, and cultural implementation factors, and studying the ways of balancing technology with Islamic values in three specific subject domains (mathematics, science, and Arabic). The findings indicate that mandatory uses of ICT integration impede the transition from ICT adoption to ICT implementation within the overall education reform.

**Index Terms**—ICT adoption, ICT integration, integration pedagogy, implementation factors.

## I. INTRODUCTION

The ongoing ICT-related education reform in Saudi secondary schools has mandated all teachers to be ICT adopters. This reform creates new learning opportunities for Saudi children via access to approved ICT resources and teachers' engagement in innovative training opportunities that contribute to ICT literacy. The use of curriculum digital models and equipment in classrooms with smart boards, projectors, documentary cameras, and laser printers, as well as creation of in-school digital networks, are elements of what are considered to enable integration of ICT uses in classroom settings approved by the National Report on Education Development [1]. Saudi teachers face up to the reality of a gradual shift from more traditional pedagogies to technologically advanced ones. The guideline to this change is the King Abdullah Bin Abdulaziz Project for Developing Public Education (Tatweer) project that supports ICT integration and orients Saudi teachers towards innovative practices. However, the inconsistent uptake of ICT integration, occasional uses of technology and reluctance to integrate ICT into pedagogic practices are challenges that Saudi teachers face in their educational contexts [2].

The present study explores the technical, political, and cultural implementation factors that can help change from ICT adoption to ICT implementation in Saudi secondary schools through continuous development of ICT-related integration pedagogy.

## II. THE SAUDI CONTEXT OF ICT INTEGRATION IN SECONDARY SCHOOLS

### A. Balancing Technology with Islamic Values

The Islamic, the Arab, and local elements are at the core of the Saudi collective identity, which the public school curriculum has promoted so far. Islamic culture dominates all spheres of life. The Wahhabi version of Sunni Islam consolidates the national identity of Saudi Arabia. In the Arab mind, Islam and progress are interconnected. The problem is not in adopting ICT but in balancing technology with the pillars of Islamic knowledge and thinking. Before education reform was initiated, the proportional hours of religious subjects (Qur'an, Tawhid, Tajwid, Tafsir, Hadith, and Figh) ranged from 14 to 35 percent. The role of these elements is high in teaching history [3], which may influence Saudi teachers' acceptance of ICT or resistance to its growing use. Intensive modernization has influenced secularization of the country.

The ten-year implementation plan (2004-2014) states clearly that the innovated infrastructure in Saudi school settings is grounded in computers and software. Teacher development practices cannot be positively assessed without training in this direction. At the same time, political and socio-economic advantages of using ICT in Saudi school settings are not correlated with cultural concerns about outside influences that are hazardous to the segregated system of education and Islamic beliefs. ICT integration into pedagogy in secondary schools is in conflict with the technological demands of the digital age and cultural perceptions of what knowledge management should be delegated to carefully selected software resources.

In Saudi Arabia, teaching with technology demands a long-term perspective. The process of preparing teachers for teaching with technology challenges the school settings. Teachers take Intel courses in computers in their schools. They participate in the training programs held in their school districts. For example, in 2010 forty teachers were trained in Taif. In the summer of 2011 over 1,700 male and female teachers from fifty Saudi schools took part in the training program initiated by the Tatweer project in Taif, Abha, and Jeddah. They learned how to replace conventional teaching methods by the use of Internet and computer technologies. They are being prepared for teaching in new classroom settings and accepting a teacher's role of monitoring the class and distributing students' roles. Each Saudi governorate (their total number is 26 – 2 governorates in 13 provinces) has a pilot school for implementing the Tatweer project. In order to change teaching practices with technology, the participants of the Tatweer project take a proficiency

examination and then start implementing what they have learned in their schools [4].

### *B. Current Research on the Saudi ICT-Related Reform*

ICT integration in Saudi secondary schools is guided by little research, which is mainly directed at ICT-related subjects [5]. Teachers' responses to ICT uses are poorly studied. Alwani and Soomro's study [6] throws light on the use of ICT in Saudi secondary schools but it is limited to evidence gathered in one district and one subject area. Alwani and Soomro claim that science teachers are among early adopters in secondary schools, although their subject is undermined in the Saudi curriculum [6]. Information that is available is related largely to huge investments in ICT equipment and the training of teachers. At present, ICT adoption by teachers and ICT integration in teacher practice are separated.

ICT integration in secondary schools is impeded thanks to present-day resistance to the Saudi education reform. Teachers are involved in the process without monitoring and assessing the product that will result from this integration. The reform is halted by such implementation factors:

- 1) Political implementation factors deal with Saudi's obligations of the Muslim leader. First, Saudi clerical authorities retain control over education reform, not allowing it to challenge either religious instruction or segregated schooling. Second, Saudi Wahhabism is fundamental to the public school curriculum [7]. Third, the country is in conflict with faithfulness to cultural traditions and the challenges of the digital age. Fourth, the conservative circles have failed to reduce the amount of religious instruction that characterizes the Saudi secondary school setting.
- 2) Educational borrowing from other countries without adaptation may have negative influences on the Saudi educational system. On the one hand, Saudi Arabia refers to prior experience of other countries that have established an infrastructure upgraded to new technologies. On the other hand, the country's choice of ICT integration is educational borrowing with adaptation.
- 3) Centralization instead of decentralization reduces administrative support of local authorities. Yet, local models of ICT integration are likely to be key factors to changes in teacher practices. In the collective culture, teachers will gain from decentralization because they will collegially develop their uses of ICT in their schools and districts.
- 4) Financial investments. Although financial investments are high, their equal distribution may be a main problem.
- 5) Cultural constraints. Saudi Arabia has not developed a culture of integrated uses of technology in secondary schools. The missing element is recognition of the value of teaching with technology. Henceforth, culturally relevant subject teachers need to pioneer a systemic use of ICT in the classroom, for they have an authority to do that.
- 6) No clear vision of what to do after the technology-related infrastructure is established. Taking into account implementation risks, it would be reasonable to implement the reform in stages.

### *C. Integration Pedagogy*

Integration pedagogy in the Saudi context should be based on a number of integration strategies: 1) a continuity of phased ICT integration with an emphasis on overcoming mechanical levels of use that are a feature of ICT implementation in the Saudi schools studied in this research; 2) regular monitoring and evaluation of implementation effectiveness with regard to appropriate uses of ICT to encourage both early and late adopters of ICT tools to drive from one phase to another, so that ICT integration would involve the overall education system; 3) a need for a change paradigm at both national and school levels whose standardized ICT uses in given subject domains will be integrated into ICT-related innovative teacher practices; teachers should be awarded for their creative and appropriate ICT uses and their experience should be discussed among their colleagues that teach the same subject domains; 4) Saudi schools should become integrated schools with pedagogical content knowledge that favors ICT integration due to systemic uses of ICT tools, availability of ICT tools in classroom settings, excellent training opportunities, and strategic planning of ICT integration that is reflected in the school curriculum.

## III. RESEARCH METHODOLOGY

This study utilizes implementation, Concerns-Based Adoption Model, and evaluation approaches by exploring how the strategy of ICT implementation will help Saudi teachers of mathematics, science, and Arabic respond to the needs of the Saudi education reform in terms of ICT integration in secondary schools. Grounded theory [8] is used as a method for analyzing the data and studying the effects of ICT integration in Saudi secondary schools. It complements implementation, evaluation, and adoption approaches by utilizing qualitative inquiry and comparative methods to construct the ICT integration process in a specific economic, political, and cultural context and evaluate its progress and strategies of effective post-adoption development. It is used as the overarching methodology to study ICT integration in a specific educational context.

This study adopts a method of qualitative inquiry by generating a construct of ICT integration within the education reform context to explore meanings of ICT integration in a Saudi secondary school context. This method facilitates a researcher to be immersed into a research setting by theoretically analyzing ICT integration concerns of research participants (Saudi school teachers of mathematics, science, and Arabic). A single-theme design (ICT integration within the framework of a mandate to ICT integration) is selected. The results are considered in terms of generalization by comparison with other contexts of ICT integration in secondary school settings in Saudi Arabia and beyond.

The Saudi Northern Borders province represents the education district in which the data were collected. This is the least populated part of Saudi Arabia where more than 320,000 people live. Both male and female teachers from Arar, Rafha, and Turayf are equally represented in the sampling, following the pattern that exists at the province's level. These teachers have similar problems because they are

not directly connected with religious instruction. These teachers are the main factors of the Saudi education reform. They are most sensitive to ICT integration in their school settings and in the classroom.

Stratified purposeful sampling was used to facilitate group comparison. In each selected school one teacher of mathematics, one teacher of science, and one teacher of Arabic was interviewed. The total number of teachers in a specific subject domain was 3 from each school (one teacher of mathematics, one teacher of science, and one teacher of Arabic). Each governorate was represented by 6 teachers from at least 2 schools. As the number of governorates was 3, the interviewed population of teachers of mathematics was 6, of teachers of science – 6, and of teachers of Arabic 6. The total number of interviewed teachers was 18, among them 9 teachers from schools for boys and 9 teachers from schools for girls. Structured interviews and observations were conducted by the male researcher in the Saudi schools for boys and his female assistance in the Saudi schools for girls.

The interviewed teachers were asked prepared 30 questions. The transcribed and translated interviews were scored using stages of concern, corresponding to the CBAM model: Stage 0 – awareness level; Stage 1 – level of information; Stage 2 – personal level; Stage 3 – management level; Stage 4 – level of consequence; Stage 5 – collaboration level; Stage 6 – level of refocusing.

The levels of use described the current state of each implementer. They were encoded in line with Hall [9]: VI – Renewal (the teacher is seeking more effective alternatives to ICT integration); V – Integration (the teacher is making deliberate efforts to coordinate with other teachers in ICT uses); IVB – Refinement (the user is making changes to increase outcomes of ICT uses); IVA – Routine (the teacher is making few or no changes and has an established pattern of ICT uses); III – Mechanical use (the teacher is using ICT in a poorly coordinated manner); II – Preparation (the teacher gets prepared for ICT uses); I – Orientation (the teacher is seeking out information about ICT uses); 0 – Non-use (the teacher takes no action with respect to ICT uses).

#### IV. DATA ANALYSIS

##### *A. The Combination between Stages of Concern and Levels of Use*

The teachers of mathematics from all three provinces demonstrated features associated with two stages of concern: 1- personal (only female teachers) and 3 – management (all male teachers and 1 female teacher). Female teachers even invest in their ICT training. For example, one female mathematics teacher from Turayf attended a three-month training ICT course at her own expense. Yet, the female teachers are later adopters than the male ones. The male teacher of mathematics from Arar attended a training course at his own expense as early as 2003; the male teacher of mathematics from Raffia has been using ICTs since 2007 when he assisted in organizing a Learning Resources Center; and the male teacher of mathematics from Turayf has been using ICTs since 2006, also helping arrange a Learning Resources Center. In a similar way, the female teacher of

mathematics from Rafha has been using ICTs since 2007 by helping arrange a Learning Resources Center; the female teacher of mathematics from Arar has been using ICTs since the King Abdullah project was launched in 2008; and the female teacher of mathematics from Turayf has been using ICTs as, similar to other interviewed teachers, she assisted in arranging a Learning Resources Center.

There is no wide difference between teachers of science of whom three (two males and one female) are at the management stage of concern, two (both male and female) are at the information level of concern, and one (female) is at the personal stage of concern. All teachers of science, except one male teacher of science from Turayf who attended a 6-month computer course at university, began using ICTs with the launch of the mandatory national program. Like teachers of mathematics, they also helped establish a Learner Resource Center at their school. Four teachers of science (two males and two females) received no ICT-related training, although one male teacher of science from Turayf took a computer course at university and one female teacher of science took two courses in computers and smart board usage. One male and one female teacher of science, both from Rafha, are at the information stage of concern because they are novices in comparison to other teachers. Both female and male teachers of science report that they are inclined to discuss ICT uses with their colleagues; they are all from Arar and Turayf. At the management stage of concern the teachers report that they are likely to seek support from curriculum supervisors. The male teachers report that they are more inclined than the females to seek support from the principal.

One teacher of Arabic (male) is at the management stage of concern; three teachers (two females and one male) are at the personal stage of concern, and one teacher (female) is at the information stage of concern. Two teachers (both male and female) have been using ICT since 2007, one female teacher – since 2008, one male teacher – since 2009, one male teacher – since 2010, and one female teacher – since 2009. Their uses are connected with the mandatory national program and availability of the Learning Resource Center at their schools. From these teachers only two (males) took training courses. None of them discusses ICT uses with other teachers. They express the view that Arabic is a subject that does not heavily depend on ICT uses.

Levels of use depend on regularity of ICT uses. Half of the teachers of mathematics have levels of mechanical use, whereas the other half has a refinement/routine level of use. More male teachers of mathematics have higher levels of use than female teachers of mathematics. Four teachers of science have a mechanical level of use, whereas two teachers of science have a refinement/routine level of use. All female teachers of science have a mechanical level of use. Four teachers of Arabic (equally males and females) are at a mechanical level of use, whereas two teachers (both male and female) are at a preparation level of use. They do not use ICTs regularly because there is no equipment available and they think that their subject domain requires no frequent uses of ICTs. The female teacher of Arabic from Turayf uses ICTs only 3 to 5 times per term; a male teacher of Arabic from Rafha uses ICT once or twice per month.

All participants can be divided into 5 groups in accordance

with their combinations of stages of concern and levels of use: 1) 1 – information / preparation (2 teachers); 2) 1 – information/ mechanical use (4 teachers); 3) 2 – personal level / mechanical (4 teachers); 4) 3 – management level/ mechanical (3 teachers); 5) 3 – management level/ refinement/routine (5 teachers).

Typical combinations for female teachers are 1 – information/ mechanical use (three female teachers, one male teacher) and 2 – personal / mechanical (three female teachers, one male teacher). From these data, male teachers are more trained than female teachers to use ICTs, as the combination “management/ refinement/routine” is more typical of them. The mechanical level of use is combined with 3 stages of concern (1 – information, 2 – personal, 3 – management).

The distribution of combinations in accordance with subject domains is as follows:

- 3/IV is a combination observed among teachers of mathematics and science, both male and female;
- 3/III is observed in all subject domains, but with only males teachers of mathematics;
- 2/III is a combination observed among teachers of science and Arabic, but in science only in female teachers;
- 1/III is a combination observed among teachers of science and mathematics, but only female teachers of mathematics;
- 1/II is a combination observed only among teachers of Arabic, both male and female.

#### *B. Analysis of Emerging Categories by Constant Comparative Method*

Emerging categories are based on the combined presentation of stages of concern and levels of use. They show that one and the same level of use may correspond to at least three stages of concern. At the same time, the same stage of concern may correspond to different levels of use. Similarly, stage of concern 1 may correspond to levels of use such as II and III.

The emerging categories indicate interrelatedness between stages of concern and levels of use. For example, stage of concern 1 is found with levels of use II and III, whereas stage of concern 3 is found with levels of use I to III.

- 1) The emerging category “Mandatory ICT implementation to change a classroom atmosphere” combines the information stage of concern with the preparation level of use. The characteristic features of this category are: 1) limited only to Arabic language teachers from across the sample; 2) limited to late adopters of ICT who have no training in ICT.
- 2) The emerging category “Mandatory ICT implementation to change a classroom atmosphere” combines the information stage of concern with the mechanical level of use. This category is identified among teachers of science and mathematics. They are aware of the presence of ICT in schools and are informed, as they underline in their interviews, from their personal experience that ICT saves time and effort, makes lessons more interesting, and connects students with reality. Teachers in this category are limited in their uses of ICTs (projector, educational television, projector or computer), have little training, so they use a limited number of tools. Their ICT

usage depends on availability of ICTs in their schools. They believe that ICT is additional to other methods.

- 3) The emerging category “ICT implementation at the personal stage of concern/mechanical level of use” characterizes half teachers of Arabic, both male and female, and one female teacher of science. It appears that there might be a gender bias here (three females, and one male). It is worth noting that all female respondents are from the three provinces. This emerging category is categorized as “ICT implementation is necessary in modern learning and teaching”. All respondents in this category are influenced by mandatory uses of ICT, so they expect support from the Ministry of Education in the form of products that facilitate teaching and learning.
- 4) The emerging category “ICT implementation as the start of ICT integration into the curriculum” combines the management stage of concern with the mechanical level of use. All teachers in this category have taken training courses and have experience in using ICT. They all teach different subjects: a male teacher of mathematics from Turayf, a male teacher of Arabic from Turayf, and a female teacher of science from Arar. All of them are aware of the presence of ICT in the world and the necessity for its integration into a school curriculum because students love technology, the modern world is ICT-related, and students have fun when ICTs are used in the classroom, students become more focused (girls), and students gain from ICT uses. However, objectively all these teachers are constrained by mechanical uses because they have ICTs in the classroom but the tools cannot be moved from the Learning Resources Centre. At the same time, these teachers use ICT as often as it is possible.
- 5) The emerging category “ICT implementation for teacher personal growth and student motivation” combines the management stage of concern with refinement or routine levels of use. Of the teachers of science and mathematics in this group, only one of them is a female teacher of mathematics who has taken a 3-month training course at her own expense, they speak about personal growth concerning ICT uses and their responsibility for integrating ICT into the educational environment.

#### *C. Phases of ICT Integration in the Saudi Secondary Schools*

ICT integration in Saudi secondary schools can be analyzed as a phased process. At least two phases, the obligatory presence of ICTs in a secondary school setting and the uses of new syllabuses that take into account the presence of ICT in a school setting, can be identified. The mandatory uses of ICT within the framework of the Saudi national program helped the interviewed Saudi teachers move from the awareness stage of concern to the information, personal, and management stages of concern, while most teachers are at the mechanical level of use (11 participants out of 18, 7 of them are female teachers). Thus, the mandate led to an awareness stage of concern. This provided the move from an awareness stage to several more stages of concern, which are within a range of three further stages of concern: the information, personal, and management stages of concern.

In the Saudi context, different stages of concern can be consistent with one level of use. For example, the mechanical level of use is consistent with the information and management stages of concern. This is reliable across all uses of ICT who have limited access to ICT tools. It can be assumed that the identified combinations are dependent on such objective circumstances as the absence of tools in the classroom, damaged tools, and lack of training in ICT uses.

All this influences the mechanical level of use which is identified among most interviewees. The Saudi teachers are in the context of mandatory uses but they are deprived of an adequate and sufficient presence of ICTs in their school environment. Because of that, they have to remain at a mechanical level of use. They may move to higher levels of use only if they have access to ICTs and are trained in them. Neither access nor training may be considered to be available to the extent that the Saudi teachers would want to enhance the presence of ICTs in their pedagogy.

#### *D. Analysis of Implementation Factors*

##### *1) Technical implementation factors*

The interviewed teachers of Arabic express the view that the teachers of science are given priority with regard to ICT access in a school setting. Hence, they complain that they are constrained in ICT uses in comparison with the teachers of science. From the present findings, in their uses of ICT tools, the Saudi teachers, irrespective of their subject domain, depend on the presence of a limited number of tools, very few of which can be found in the classroom. Technical service of available ICTs is the main problem. The available tools are often not in a working condition. The teachers of science complain about shortages of ICT in the classroom and insufficient technical support in schools. Some of the interviewed teachers of science have to rely on their own skills when using and even repairing ICT tools. In their view, the technical service of available ICTs is the main problem; the second problem, which is identified by the interviewed science teachers, is insufficient availability of ICT tools in the classroom and in a good condition. The Saudi teachers of mathematics value the presence of ICT for the possibility of representing geometric shapes that they used to draw by hand. They solve technical issues by looking for the information on the Internet. The teachers of mathematics think that teachers should be strong in using ICT, which may be achieved by training and refreshing courses. The shared problems may be coded as: 1) shortages of ICT tools available in the school; 2) lack of ICT tools in the classroom; 3) dependence of teachers on the technical service of ICT tools.

##### *2) Political implementation factors*

The teachers of Arabic believe that it is the responsibility of the Ministry of Education to supervise mandatory uses of ICT in the Saudi schools. The teachers are aware of the reform but they have a strong feeling that the Ministry of Education has no clear vision how to supervise this reform at the national level. The teachers are limited in their uses of ICT, for they depend on availability of ICT tools and access to them. There are no CDs recommended by the Ministry of Education for Arabic syllabuses. Like the teachers of Arabic, the teachers of science feel isolated within the ICT implementation program. The presence of ICTs leaves them

by themselves in selecting tools, preparing lessons, and deciding on appropriateness of available tools. Similar to both teachers of Arabic and science, the teachers of mathematics emphasize the fact that nobody supports and motivates teachers in their urge for using ICT. The shared problems are: 1) mandatory uses of ICT in schools as prescribed by the educational authorities; 2) teachers are left by themselves, with little administrative support and no culture of collaborating in sharing ICT experience.

##### *3) Cultural implementation factors*

The teachers of Arabic do not claim that there is a drastic change in an educational environment due to the mandatory uses of ICT tools. An ICT-competent, trained teacher is an ideal oriented to the future. Enthusiastic teachers are neither praised nor rewarded. Only some administrators support them. There is no culture of supervising ICT implementation by the Ministry of Education. From their own experience, the teachers of Arabic believe that ICT tools help them change a traditional method of explanation and revising the material, and enhance student attention, interaction, and involvement. Students become motivated in an environment that is modern due to the presence of ICT tools. Teacher performance gradually advances due to training courses and a better understanding of ICT as an effective tool of saving time and effort. The teachers of Arabic claim that ICT uses need to be adapted to conventional methods. On the whole, the teachers of Arabic think that their subject is not heavily dependent on ICT uses.

The teachers of science, unlike the teachers of Arabic, connect an ICT-competent teacher with his or her ability to use appropriate tools in order to improve teacher performance. Personal growth is linked with ICT uses in schools. The teachers of science also speak about the responsibility of teachers themselves for using ICT. They express the view that appropriateness of tools should be inherent in the individual concerns of each teacher. Whatever their limited knowledge of ICT uses might be, the teachers of science are inclined to discuss the problem. They connect ICT uses with a changing classroom atmosphere that is marked by fun, vitality, improved explanatory powers, and student concentration. The teachers of mathematics claim that the presence of ICT will change teaching methods that are based on modern tools. A strong belief in the presence of ICT in schools will direct teachers towards experimenting with new methods. The shared problems are: (1) the culture of ICT implementation needs developing; (2) the presence of ICT in schools directs teachers towards personal growth; (3) teachers need to know how appropriate ICT tools can be used in a changing learning and teaching environment; (4) an ICT-competent Saudi teacher realizes the appropriateness of ICT tools used.

## V. DISCUSSION

The mandatory uses of ICT tools in the context of the education reform favor the presence of ICT tools in the Saudi secondary school setting. Saudi teachers have information, personal, and management levels of concern. They are all informed that politically the presence of ICT tools is obligatory, since Saudi Arabia is implementing the

ICT-related education reform to create a modern school environment that is characterized by technological openness in the digital world. However, politically this process does not go beyond a mandate for the following reasons: 1) Saudi teachers do not feel they have administrative support, since this support, when it is available, is not sufficient; 2) they are rarely praised or rewarded for their ICT-related initiatives; 3) there is no well-defined conception of a teacher that is capable of integrating ICT into a subject domain; 4) there is no coordination and collaboration in a school setting concerning ICT uses. Henceforth, mandatory uses of ICT implementation may impede ICT integration and turn the transition from ICT adoption to ICT implementation into a lengthy process in which the ICT-related transition may simply die out.

The Saudi cultural implementation factors dominate over technical and political ones, since the Muslim state has a long cultural tradition of teaching methods, which allows teachers little freedom and initiative. Saudi teachers are educated to obey instructions provided by education authorities. Their decision to use ICT in a classroom setting is directed by a government mandate. Hence, many teachers in the present sample, in particular those with many years of experience, claim that they are successful without using ICT tools. It implies that Saudi teachers think that a good teacher does not need ICT tools and can be successful with implementation of traditional methods.

The absence of favorable cultural implementation factors may be attributable to the influential role of traditional methods in Saudi schools. ICT integration is impeded at the mechanical level of use because at the national level modern curriculum needs are unspecified. Also, acquisition of modern teaching methods is impeded by the strongly held and culturally inherited educational system that shows a long-lasting tendency to be protected from outside cultural influences.

ICT integration in moving from the mechanical level of use to refinement may become a reality only when a new culture of teaching and learning is rooted in Saudi Arabia. This culture needs to be more open to the outside world through a wider use of modern technologies both in a school and home environment. As soon as teachers acquire modern teaching methods that include uses of ICT, they will be able to grow professionally, which in turn will facilitate them to make decisions about appropriate uses of ICT.

The Saudi teachers are confined by mandatory ICT implementation. However, such mandatory presence, even of a limited number of ICT tools in a school setting, results in a drive for a new ICT-related culture in schools that leads to an increasing understanding of effective uses of ICT in terms of saving time and effort. This tendency is identifiable among the Saudi teachers in this sample. Widespread ICT implementation will be possible when school administrators lead teachers to coordinate teacher efforts concerning appropriate uses of ICT.

In the Saudi context, cultural implementation factors are likely to develop in the following way: 1) Saudi teachers will gradually become more interested in using ICT tools for the purpose of saving time and effort; 2) by increasing the appropriate uses of ICT tools in their subject domains, they

will be involved in the process of becoming an ICT competent, trained teacher who is capable in terms of matching appropriate tools to appropriate curriculum needs. Hence, the Saudi teachers will find ICT tools necessary in modern-day practices in learning and teaching; 3) they will develop critical attitudes to ICT uses that are appropriate to the specific cultural context that is fundamental to the cultural identity of the Arabic world. They will participate in developing a new culture of education that is not alien to technological progress but is open to transformative change under its influences; 4) supervision of ICT integration by school administration and education authorities through a variety of forms, including rewards and support of innovative teachers; 5) ICT tools need to be understood not as a borrowing from the Western civilization but the reality of the digital world in which Saudi Arabia seeks to enhance a technologically-advanced presence. The culture-specific uses of ICT in the Saudi context may be developed by coordinated efforts of teachers, not by isolated enthusiasts as it happens at present; 6) student motivation is a reflection of current technological development worldwide, in which technologies are widely integrated in educational systems. Modern students expect the system of education to respond to modern methods of teaching, so that they are prepared and well educated at home rather than seeking high quality education abroad.

## VI. CONCLUSION

This study shows that the ongoing ICT-related education reform in Saudi secondary schools has mandated all teachers to be ICT adopters. However, mandatory uses impede the transition from ICT adoption to ICT implementation within the phased process – from ICT adoption – through ICT implementation – to ICT integration. Due to its formal character, the Saudi ICT-related reform fails to motivate all teachers to participate in developing Saudi integration pedagogy. Technically, politically, and culturally, Saudi schools are poorly prepared for a change paradigm. The transition from ICT adoption to ICT implementation can be successful within the framework of Saudi integration pedagogy that is grounded in Islamic values and traditions. Saudi teachers as ICT implementers need excellent availability of ICT tools, effective training, and administrative support.

Saudi Islamic pillars of high quality, excellence, spirituality, and holism should contribute to ICT integration in harmony with Saudi willingness to implement the ICT-related reform without losing national identity. For doing this, the meaning of the mandate should be regulated as ICT adoption with personal growth in terms of ICT integration. It is strategic to Saudi teachers as ICT implementers to strengthen a continuity of the Saudi tradition of education by emphasizing pedagogical uses of ICT tools in Saudi secondary schools.

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