

## Evaluating ICT use in Saudi Arabian secondary schools

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**Abstract—** In the recent past, ICT has been incorporated in several educational institutions globally as an effective tool used in facilitating high quality teaching. It is unfortunate that developing countries such as Saudi Arabia have not yet been able to enjoy the various advantages of the usage of ICT in teaching. The limitation of this technology in Saudi Arabian schools is majorly the complexity that is involved with the integration of ICT into the system of education. Another reason is the absence of a specific strategic direction. This study evaluates IT usage in Saudi secondary schools and also suggests various strategies that would be convenient in improving the integration ICT in the education system. Some of the major findings of this study include private schools have better ICT infrastructure; students at private schools are well informed about computer technologies; private schools make higher IT investments; students in private schools are taught using ICT aids; teachers at private schools are given training on latest IT updates; students in private schools are encouraged to use IT tools in projects and assignments.

**Keywords-**Information Communication Technology, ICT, secondary education

### I. INTRODUCTION

ICT has been a vital part of education in many countries including some developing countries [1]. Some general forms ICT use includes lesson preparation; researching information on various topics; printing documents; gathering ideas from colleagues, counselors and trainers; word processing; preparing multimedia presentations [1]. For the last decade, the Internet has opened a vista of opportunities to source important information and to keep teachers up to date about the latest advancement in knowledge; also teachers can open online learning forums and use blogs as part of their teaching practices [2, 3].

Various opportunities may open up due to the knowledge of computers. Students can benefit by using computers and the Internet in different ways like, word processing; drawing charts; preparing presentations; solving complex mathematical problems; accessing educational websites; gathering information about any subject [4]. With time, both the teachers and the students attain dynamic capabilities such as, updating software packages and the use of advanced features.

The aim of this study is to find out the current integration of ICT in in Saudi Arabian secondary schools. The evaluation may be based on the type of school. The various

barriers impeding the incorporation of ICT in the educational system will also be analysed. Several strategies of promoting the ICT usage will be developed. It is expected that with the information provided, the Saudi educators may be to acknowledge the benefits of integrating ICT in their teaching, provide the Ministry of Education (MoE) and Ministry of Communication (MoC) of this area with new information relating to issues which need to be considered in addressing future educational policies; as described in [5] and possibly open up the way for future research on education in the Saudi context.

### II. BACKGROUND

ICT has revolutionized the modern world. This rapid development has been incorporated in the classroom with the use of videos, teleconferencing, blogs in learning, thus teachers need to use ICT routinely in teaching [6]. The usage of ICT in schools largely depends on the perception of the students using the technology. The use of ICT has greatly increased in as indicated the many computers used in various schools across the globe. However, the usage of ICT in education has not been integrated fully in Saudi Arabia. Although computer lessons were contained within the curriculum in the 1980s, learning and teaching using computers has not been fully utilized. The government stepped in to provide the hardware and software that would fast tract the usage of ICT in education. To facilitate these new trend teachers would need to have an open mind which is not the case, since the program has encountered resistance. The solution to this resistance would be to reassure teachers of the merits of ICT usage.

The government of Saudi Arabia controls and regulates the education policies. The curriculum is unified across the kingdom and the textbooks used in each school are similar. The final examinations are tested from these textbooks. The Saudi government has made education compulsory for all children. The introduction of ICT was done in the year 1985 through three computer related subjects. Following the successful implementation of the programme in the secondary school stage, the ministry made it part of the curriculum for secondary schools. This was followed by the integration electronic devices in the learning process. The outcome of the government initiatives was the introduction of mandatory ICT subjects for girls and the launch of national wide computer networking project. The projected was aimed at integrating all school in the kingdom so that

they all share a large pool of resources. In addition, there has been a huge growth in school ICT clubs which create awareness on the advantages of computers (ICT). The ICT sector in the kingdom is set to grow because the integration of ICT in education forms part of the national policy.

Hend [7] suggests that the successful integration of information technology requires institutions to appreciate the issues that affect ICT use and provide mechanisms to accelerate the usage of technology in teaching. There are several barriers that hinder ICT implementation such as cultural values held by teachers, incompetence, resistance to change and low confidence levels among teachers [8]. Other barriers caused by the school administration include limited time allocated to computer studies, lack of adequately trained personnel and limited access to ICT software and hardware.

Afnan [9] noted that all instructors should have a computer for use in the classroom, and their offices and classrooms must have telecommunication capabilities so that they and their students can have easy access to e-mail and the internet. He recommends that institutions should consider technology use as a central component in promotion and tenure decisions, and that teachers should be encouraged to attend technology related conferences in order to learn from other's experiences [10].

Like many fields, it is noticed in the field of education that the reactions of teachers to the ICT innovations are influenced by their cultural views [11]. Another factor that influences the teachers' reaction is the school regulations along with the national norms and values [12]. Many studies agree on this point that cultural perceptions for different ICT related tools are the key factors that influence the acceptance/rejection of these tools and as well as teachers' behaviour towards new technologies.

In Khalid's survey [8], many of the teacher respondents who identified their lack of confidence as a barrier reported being particularly afraid of entering the classroom with limited knowledge in the area of ICT with their students knowing that this was the case. It was argued that lack of confidence and experience with technology influence teachers' motivation to use ICT in the classroom.

On the other side of the picture, it is found that those teachers who frequently employ the ICT tools in their classrooms and teaching overall have a better understanding of the importance of ICT in teaching. Ibrahim [13] deduced that once teachers become confident in using ICT teaching tools, they agree that these tools are helpful in their classes and teaching related work overall. Moreover, they also want to extend ICT usage in future.

A study conducted by Ihmeideh [14], based in Jordan, have elicited that a majority of teachers intentionally do not use ICT and latest teaching-aid tools due to their ICT inability instead of pedagogical/didactics reasons. Hence, lack of teacher competence may be one of the strong barriers to the integration of technologies into education. It may also be one of the factors involved in resistance to change.

Watson [15] concluded that an 'accept change' attitude of teachers is necessary for the successful integration of new technologies. Watson also noted that different teachers react to ICT differently and it is important to consider the attitude

of teachers towards technology because this is what influences them to use or not to use ICT in the classrooms.

In contrary to the teacher level barriers, the school level barriers are related to the school administration. These barriers are not limited to a single entity (i.e. teacher) rather they represent the whole school that mainly include administration and management issues.

An important result of recent studies is that many teachers have the competency and the confidence of using the ICT and new technology tools in their teaching, but they still use ICT rarely due to having limited time. This finding is observed by a large number of researchers that difficulty to find reasonable computer time as one of the major barriers of ICT use in teaching. It is interesting because overall people are spending more time on computers but spending time on a computer to prepare for teaching is still difficult.

The future of education is based on the general principle of futures studies which states that although the future is unknown its development can be influenced [16]. The aim of futures studies of education is to facilitate individuals' formulation, implementation, and envisioning of their preferred futures. Alkhaldeh [17] views future education as education that has a more holistic view of the world and its problems and promotes the development of students who are politically, socially, and environmentally aware and capable of independent decision-making. However, it is common to read in the futures related literature an association between the future of education and technological developments. Harmelen [6] underlined this by explaining that education will not be changed simply as a result of introducing new technology, "but by the ways in which these developments are incorporated into social life (changing our values and goals for education) or into educational practice (changing the methods and tools we have available to education). It is only by developing a complex picture of the potential relationships between technological, scientific and socio-cultural development, that we will develop a picture of possible educational futures that is robust and which avoids the realms of science fiction".

The futuristic vision of education is referred to in the Arabic literature in general and in the Saudi literature specifically as the "Futures School", since the school is the centre of all educational activities.

The future vision of information and communication technology in the Kingdom includes references to the educational system as the plan is to teach ICT as a subject in all school years, employ ICT for distance learning, and in all schools provide ICT centres connected to the Internet. The overall future vision views Saudi Arabia as an information society that produces information and knowledge and is capable of benefiting from and making use of this flow of information to improve proficiency, increase productivity, and improve the quality of products and services.

### III. METHODOLOGY

This study has evaluated the usage of ICT in secondary education in the Saudi Arabian education system by reviewing the current literature and conducting a questionnaire survey. A quantitative methodology has been

employed. A cross-sectional study design has been used during the research as it is advantageous in terms of costs, convenience and practicality. However, this design fails to provide a conclusive inference [18]. This method enables the researcher to analyze information quickly, and take a snapshot of the population under study; although there are some limitations of a cross-sectional study, such as it only provides a picture of the population characteristics in a particular point in time, and is unable present any dynamic picture [18].

50 secondary school students belonging to two different schools, located in the city of Jeddah, Saudi Arabia participated in this exercise. One school is a public school and the other one is a private school. 20 teachers from the public school also participated. The schools have been sampled through convenience sampling method, as it can save time as well as cost [18]. However, convenience sampling method has some disadvantages; for example, the research results may be biased as it is unable to examine important characteristics of a large sample [18].

Two self-administered questionnaires were administered to the students and the teachers. The questionnaires had 13 questions. Four questions involved personal information, five questions were multiple choice questions concerning the use of electronic devices and four questions involved the use of Internet. The participants were required to spend ten minutes while answering the questionnaire.

The use of questionnaires to collect data is convenient as information can be collected from various types of respondents in a standardized way within short period of time [18]. However, some likely limitations include the misinterpretation of questions by participants; and some participants may not complete the questionnaire upon reading the questions carefully [18].

The participants were provided with sufficient information that would help them decide on whether to take part in the education study. The participants would be anonymous. The participants also had the freedom to withdraw from the study. They were given information pertaining to how could give feedback concerning the study.

#### IV. RESULTS

In recent decades, meeting ethical standards by academic researchers has been given much emphasis to encourage participants to take part in studies without much concern [18]. This research has been conducted upon following ethical procedures as set by Flinders University. The participants have been provided with enough information to help them decide to take part in the study. Flinders University has been providing to the participants to provide information on this research as well as about the confidentiality of personal information. The participants will not be identified under any circumstances. An information sheet was provided to help in making decision about the participation in the research. The participants were informed that they could withdraw from the study at any time. Besides, they were provided with information about how they can inform the university about their concern related to the study in the future.

19 students were from Khaled Ben Sultan School which is a public school and 31 students were from Dar Alzekr School which is a private school. Descriptive analysis and the comparison between observed frequencies and expected frequencies of sample members (students). From the results, it was established that 62% of the sample members own a laptop computer and 56% of the students that participated own a desktop computer. It was evident that 54% of the students possess a smart mobile and none of them own a tablet computer. According to the results, only 4 people of the sample, which is at 8%, do not own a computer. It was revealed that 86% of the participants use computers at home and 60% use computers outside home. Only 10% of the participants don't use computers and 4% of the participants use computers in school.

In addition, the results indicated low usage of internet, in particular search engine usage. About 66% of the participants used search engines while 12% had no clue about search engines. The number of students who used computers at for over 6 hours was at 56% and the about 36% participants don't use computers at school. The method used to connect to the internet was predominantly DSL at 62% of the participants. 12% of the students used dial-up connection and 30% used wireless internet. The main purpose of connecting to the internet was not pleasure due to cultural barriers and restriction for the parents [19, 20, 21]. The teachers have good access to internet connection with about 80% owning a personal computer which highlights the great importance of internet usage in teaching.

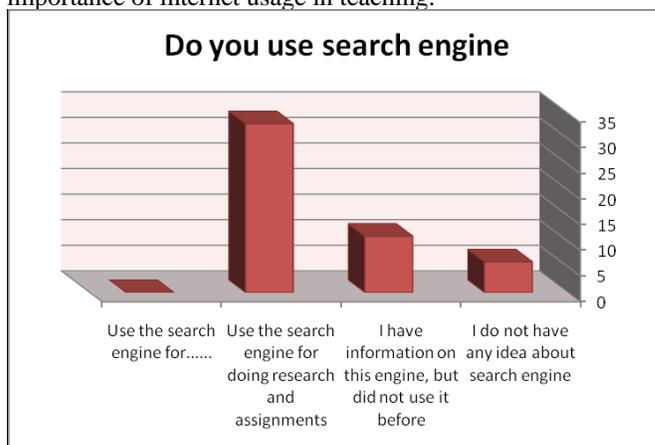


Figure 1. The use of search engine

Figure 1 illustrates that 6 members of the sample confirmed that they do not have any information about search engine, while 11 members of the sample confirmed having information about search engine but they did not use it. While 33 members of the sample revealed that they use search engine in doing their homework and research. No student of the sample stated using the search engine for any other purposes.

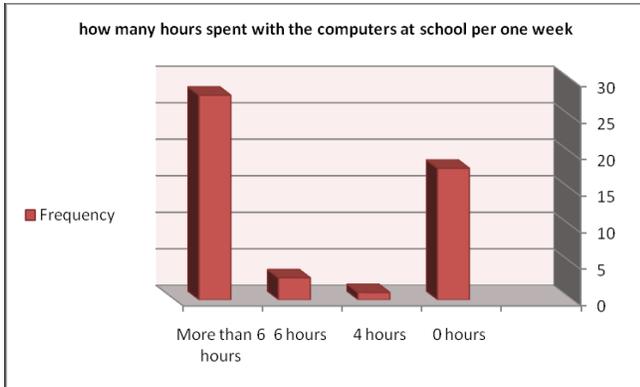


Figure 2. Number of hours spent using computers at school

Figure 2 states that 18 members of the sample do not use computer at school during the week and do not spend any hours during the school day using the computer, while the results pointed that 1 member of the sample uses computers in school for 4 hours per one week and that 3 members of the sample uses computers in school for 6 hours per one week, also 28 members of the sample use computers for more than 6 hours per week which is a result of increased emphasis by the school on technology implementation, especially through encouraging students to use computers in the campus setting [22, 23].

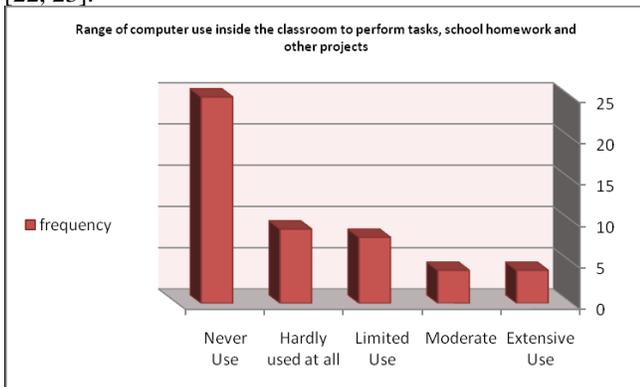


Figure 3. Computer use inside the classroom

Figure 3 states that 4 members of the sample use computer at school on constant basis, while the results pointed that 4 members of the sample use computer in school at moderate basis and that 8 members of the sample have limited use of computers at school and there are 9 members of the sample that hardly use computers at school. Also the results revealed that 25 members of the sample do not use computer in school at all which may be a result of lack of IT resources in the school and also absence of supportive policy and incentive mechanism to motivate students to use computers [22].

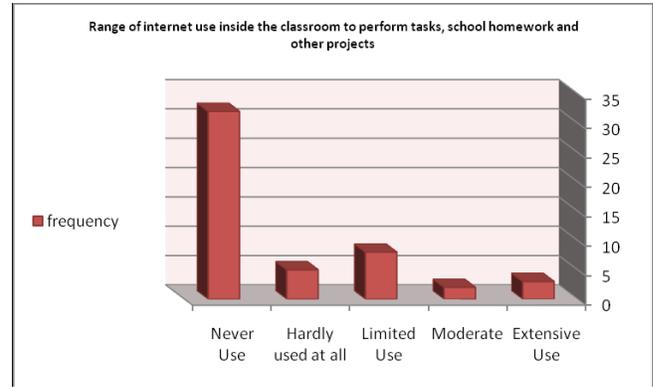


Figure 4. Internet use inside the classroom

Figure 4 states that 3 members of the sample use internet at school extensively, while the results pointed that 2 members of the sample use the internet in school at a moderate basis. Results showed that 8 members of the sample have limited use of the internet at school and there are 5 members of the sample hardly use computer at school also the results revealed that 32 members of the sample do not use internet in school at all which is a result of lack of IT resources in the school and also the absence of supportive policy and incentive mechanism to motivate students to use computers [22].

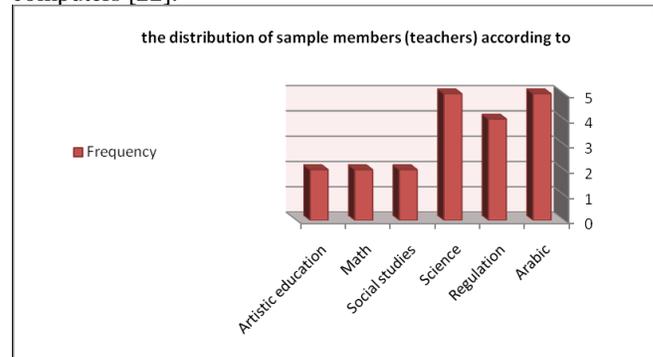


Figure 5. Subjects taught by the sample

Figure 5 clarifies the distribution of sample members (teachers) according to the subject they teach as the total of sample number is (20) persons of which 5 persons teach the subject Arabic. The number of teachers who teaches the regulation subject 4, while the teacher who teaches the unification subject are 5, and there are 2 science teacher, also there are 2 social studies teachers and finally there are 2 artistic education teachers.

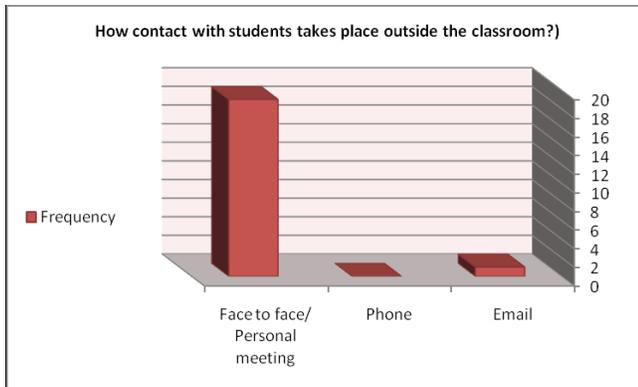


Figure 6. Contact mechanisms between student and teacher

Figure 6 shows that 19 members of the sample confirmed that contact with students outside the classroom is done through confrontation (face to face basis or personal meetings), while there was no indication for contact with students outside the classroom through email except for one member also the results revealed that no contact through phone.

## V. DISCUSSION

The results in study has revealed that the educational system in Saudi Arabia has not adequately incorporated IT in its teaching. Several projects can be launched so as to upgrade the educational system. However, there exist immediate remedies that would strengthen and open up new avenues for a sufficient IT infrastructure in the Saudi education system.

Saudi Arabia has a lot of resources. These resources are not utilised properly due to improper guidance and lack of convenient tools and systems that have been implemented in the schools. We suggest that all schools should implement the Learning Management Systems (LMS). This implementation would ensure that the current resources are effectively utilized, significantly reduce the use of paper, offer online teaching, offer a communication channel between the students and the teachers, offer easy accessibility of resources, ease submission of assignments and ease the grading system.

There is a need of immediate actions to be taken following the results of this study. These actions should be undertaken by the stakeholders, the Saudi government and the education ministries. The recommendations for the upgrading of the educational system are as follows.

The Stakeholders that include the teachers, policy makers, administrators and the ministry of education should be made aware of the global trends for using IT in the day to day life. The hardware that exists in computer labs should be upgraded so as to be able to handle complex situations. Multimedia equipment should be used to deliver lectures especially in the public schools. A web based software should be designed with logins for teachers, administrators and students. This system should enable the uploading and downloading of assignments. Not only will it save time but will also allow students to access their teachers. The Saudi Arabia government should be able to supply free laptops and

personal computers to the teachers and students. This action would effectively address the state of the educational system. The trainers should be equipped with the necessary knowledge so as to be able to deliver education via IT. Feedback from the stake holders should be encouraged so as to keep track of the rising problems and looking for ways of improving the system. A paperless environment should be promoted as it reduces pollution as well as saving costs. The accessibility of sites should be monitored closely so as to ensure that there is no misuse of the resources provided.

## VI. CONCLUSION

It is certain that without the knowledge of IT, a country lacks what it takes to be competitive in the global market. The Saudi government should undertake the strategies recommended in incorporating IT in its education system. A positive attitude should be attained in laying a strong IT foundation. This would enable the country to cater for the future need adequately and have the capability of absorbing changes and growth. It does not matter how behind the country is as success is never achieved over night. As long as there is a vision and determination, this development is achievable.

The flow of following the steps may not necessarily be sequential but their significance is mutually exclusive. A plan and a realistic target are required. Resources, human hours and funds should be allocated effectively. Industry experts should be consulted and the software applications should be upgraded. There should be a network of computer labs within the school and a paperless environment should be promoted. This aggressive approach is very vital as delaying further in incorporating IT in the education system would require a longer time to recoup. The discussed recommendations would ensure that the new generation works systematically with other students across the globe. Hence, the future generations will gladly reap the benefits of today's infrastructure and foundations laid by existing stakeholder.

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