ICT and Education

A Case Study In

King Hamad's School's of Future

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Contents

King Hamad's School's of Future

Introduction:

This paper talks about "King Hamad's School's Future" Project. The main purposes of the project are, to use ICT in education in order to establish a Virtual Learning Environment (VLE), to build and guide the Bahraini society towards an economy that is based on knowledge (K-economy) and to build the foundation for electronic government (e-government). By 2008 this project will cover all Bahraini local schools including all sectors primary, intermediate and secondary.

This assignment is divided into five areas including: First, the introduction, where I am writing about the importance of the changes and a full description of the project from the Kingdom of Bahrain's Ministry of Education prospective. The second part is talking about the context, which focuses on the historical background, the importance and aims of the project. The third part focuses on the strategy the Ministry of Education has followed in implementing the innovation. Evaluation is the fourth part and it is the most important one where my evaluation and reflection of the project of the theoretical literature and other related studies will be stated to explore which areas of the project have been successful or unsuccessful so far and why. The final part is the conclusion where I will sum up and state my point of view.

1- The Importance of Change to the Virtual Learning Environment (VLE):

It has been defined that we live in a society of knowledge (Tatkovic *et al.*, 2005); and it is obvious that lots of changes have occurred in education in order to provide the local market with skilled workers. This makes the wage gap between skilled workers and unskilled ones bigger especially in industrialized countries (Yan, 2006). This is proven by a study in Canada which shows that ICT has a significant impact on the use of more skilled workers in 84 Canadian manufacturing industries (Yan, 2006). As a result, the educational curricula are also changing to accommodate the fast progress toward using the state of the art technology in every day's life. Moreover, due to the fact that many of universities are currently offering distance learning and some others who are only offering distance learning courses, encouraged the educational sector to use ICT. Finally, the fast investments growth that some technological companies like Oracle and Saab who are investing in electronic education stated that this field has high demands on the future purposes (Theab, 2003).

2- Description of the Project:

The project consists of a comprehensive integral educational system in order to shift learning from traditional learning environment to a Virtual Learning Environment (VLE) which will enhance students' global collaborative learning (Theab, 2003). A research in a Malaysian university indicated that ICT gives students the confidence through the collaborative learning process between the learners themselves and the learners and tutors (Zin *et al.*, 2006). This specific change will gradually call for curriculum development and train teachers to use ICT in teaching (Theab, 2003). As education becomes

multimedial and teachers use virtual resources more often (Tatkovic,Sehanovic and Ruzic, 2005), the impact of ICT on curricular learning would be a function of the use of it outside of school (Harrison *et al.*, 2004). Moreover, the project will increase the collaboration among students, teachers, schools' departments and parents; where they can collaborate at any time and place. It helps to work collaboratively as it enhanced the efficient process of learning and as collaboration is one of the important topics in learning and teaching with ICT (Gunderson, 2006). It will also eliminate the class and school physical barriers. Furthermore, it will allow students to study according to their pace and for teachers to follow up individuals more effectively (Theab, 2003). In addition, students can share ideas from different social, economic and experiential backgrounds (Gunderson, 2006).

The system offers life transmission of lectures to any schools connected to the system. In addition, it helps to change from textbooks to flexible electronic ones with all the multimedia, sound and video features. (Theab, 2003).

Context:

1- Historical Background:

Information technology implemented in Bahrain in 1985 as an elective computer subject in secondary schools then it became a compulsory one. Ministry of Education built computer labs and facilitated them with all tools needed. Moreover, it facilitated each school learning resources centre with at least 3 computers with internet connection and it is working now to supply those centres with at least 12 computers. It also supplied

teachers' staff rooms with computers and connected them to the internet and also supplied schools with educational software. Finally, it is updating the computer annually, and supports schools technically (Theab, 2003), through enrolling a technician in every school and having a technician centre where help is given to schools in need; as the high level of technical and personal support is needed to present the resources (Hagston, 2001).

In 2001 Ministry of Education decided to put a clear vision and a strategic plan to implement Information and Communication Technology (ICT) in all stages, from a computer subject to a Virtual Learning Environment (VLE). The reason for that was to face the national development needs and to favor from the opportunities that the technology gives in this field supported by the wide spread of internet usage (Theab, 2003). In addition, ICT offers activities in the context of whole-life learning, social integration and personal development (Tatkovic,Sehanovic and Ruzic, 2005).

Therefore, Ministry of Education sought the cooperation of UNESCO to establish an international seminar in Science, Technology and Innovation (STI) and assured that ICT was one of the main topics of the agenda. Therefore, UNESCO sent two ICT experts from Finland, to collect data. They produced a comprehensive report "ICT in Education and Learning".

That report was rich with successful experiences which was considered as the outline for implementing ICT in education in Bahrain (Theab, 2003).

That report was published in the international seminar that was held in Bahrain from (20 – 22 April 2002). They fostered the report as a fundamental document to implement ICT in education in Bahrain. It was suggested that ICT should cover all the subjects taught in schools and its development, the development of curricula, teacher training and usage of home resources (Theab, 2003). In addition, teacher training was also covered and suggested in that report as it is widely recognized that it is part of any ICT development process and it is vital to increase knowledge (Dillon and Tearle, 1999). Moreover, it was suggested that Ministry of Education should establish a team managed by the Minister of Education to lay a plan in how to implement ICT in Education in Bahrain (Theab, 2003).

2- The Importance of the Project:

The need to use ICT persistently will remain the key to full participation in an information society (Williams *et al.*, 1999). The project appears to be very important for developing the education system in Bahrain to harmonize it with the future market and the society increased needs for technology. In addition, transforming learning from traditional teaching and learning to E-learning that is based on technology. This will guide the society towards the e-government which is the second step in the government policy (Theab, 2003). Moreover, informational education is understood as a new quality of higher education and a good investment in the future of children (Tatkovic,Sehanovic and Ruzic, 2005).

3- Aims of the Project:

The project aims at the effective contribution in developing economy through:

1 – Changing the society into an information technology society in order to fully achieve the global development requirements.

2 – Achieving the needs of the markets for information technology.

3 – Preparing citizens to live in an information technology society towards changing to the economy, which is based on Knowledge (K-economy).

4 – Investing the information technology in favour of education.

5- Providing students with values and skills such as, individual learning, learning experience, collaborative learning, the effective learning; and skills such as; personal motivation, creative skills, problem solving, and lifelong learning (Theab, 2003).

Implementation:

The strategy for carrying out the project was very clear and direct. It was based on the seminar which was held in Bahrain in April 2002 and the report the UNESCO presented. In applying this project Ministry of Education followed the progressive experimental application to begin with a number of secondary schools, and then followed it by evaluating the strategy they used in order to generalize it on the rest of schools. First ICT is implemented in 11 schools (boys and girls), which were connected to the broadband connection. The project is going to be implemented gradually for the rest of the public schools in the three stages in parallel, primary, intermediate and secondary (Theab, 2003). While in New Zealand they have a different successful model in implementing teaching and learning with ICT. Management is the heart of the project which supports

student learning, infrastructure, pedagogical, monitoring, implementation and teacher education. All the elements are interrelated and removal of any one of these would result in preventing ICT from being effective (Ramsay, 2001).

Evaluation:

According to Bahrain's Ministry of Education the project is successful due to the factors mentioned below:

1. The administrative and organisational preparation for implementing the project.
2. The creation of the necessary infrastructure such as software, technology equipments, networks, security systems etc.
3. The training that the teacher is taking in order to use the new technology.
4. The knowledge establishment of technology in schools' environments.
5. The development and integrated educational curriculum and the establishment of the projects based on ICT.
6. Using the intranet to publish all the supplementary materials and e-books.
7. Establishing collaborative environment between Ministry of Education and the local society.
8. Systematically monitor and evaluate the project. This is being done by Measurement and Evaluation Centre which is established recently in the Ministry of Education and supervised by UNESCO (Theab, 2003).

The evaluation part is going to be presented in seven headings. All factors will be discussed and reflected on from the literature reviews. However, factor number 6 (using

the internet to publish all the supplementary materials and e-books) will be excluded from the evaluation part due to the fact that e-materials can be also supplied via CDs and DVDs. In addition, I believe that factor number 6 as a means of e-materials transformation rather than a strong factor to make the innovation successful.

1- The Administrative and Organisational Preparation for Implementing the Project.

The implementation of information and communication technology to enhance learning has been more challenging than it was expected. The questions are why to implement ICT, in what context and what are the benefits and reasons for using it; are more important than how to implement ICT (Tearle, 2004). While there is a great deal of knowledge about how ICTs are being used in education, there is not much data on how ICTs are being used in schools (Trucano, March 2005). Therefore, that's why Ministry of Education ask UNESCO for practical help. It is clear from the project's aims that Ministry of Education knows what it wants, but I think it overestimated the benefits of ICT in education and goes beyond what ICT actually offers.

As innovation in education is a multi-dimensional process which needs changes in beliefs and behaviour (Moonen and Voogt, 1998), plain substitution of old means by new technologies is literally impossible. It is unavoidable that any replacement will cause secondary changes in patterns and behaviour that will be hardly predictable (Westera, 2004). Innovation of education is a complex process which needs new developments in pedagogy and technology. It implies changes at organisational level and human

functioning (Westera, 2004). However, there is nothing written or said about changing behaviour in the project aims. In addition, although the social and cultural dimensions of using ICTs are significant (Reid, 2003), the analysis of these aspects requires looking at learning not only as an individual construction developed during the interaction with the computer but also as a social construction developed within the whole learning activity (Bottino, 2004). Therefore, management should be focused more on the process of implementation and less with the design (Tolmie, 2001). However, Ministry of Education asked the UNESCO experts to help in designing the foundation for the innovation, while it does not ask for the help in the process of the implementation which is more important than the design one.

There is widespread belief that ICTs can and will empower learning environment and take it to be student-centred approach, but the studies to prove that were very limited (Trucano, 2005). Introducing ICTs alone does not change education. ICTs are tools helping teachers to transform their pedagogical practice to learners (Trucano, 2005). Even in the most advanced schools ICTs are generally not considered central to the teaching and learning process (Trucano, 2005). Furthermore, ICT is a tool and for others it is a source of information (Granger *et al.*, 2002). Therefore, the influence that the ICT does will not achieve all the aims stated by the Ministry of Education and will not reach to its expectation. However, ICT will only transfer education to another learning environment.

Finally, the decision of where and at how many schools to launch an ICT program primarily depends on the educational priorities at the national level (Hepp *et al.*, 2004). While the major reason for implementing ICT in early stages like primary was to familiarize children with ICT and to accumulate the information; and also the introduction of ICT into primary education is an urgent priority (Melpomeni and Konstantinos, 2004), Bahrain has started teaching ICT in secondary and then intermediate and primary. Now students who come from intermediate to secondary level lack the basic ICT fundamentals. Although it is better for graduated students to have some ICT knowledge before they continue their higher studies or go into markets, it is best for students to have ICT knowledge from primary and accumulate the information and practice gradually until they finish secondary school.

2- The Creation of the Necessary Infrastructure Such as Software, Technology Equipments, Networks, Security Systems Etc.

Findings of studies show that many educational innovations ultimately fail because too little effort or too few resources are assigned to preparing teachers for the innovation (Khvilon and Patru, 2002b). Availability of technology (include the quantity, type, reliability of computer, access arrangements and location of equipment) receives the most attention over the years (Tearle, 2004). However, software tools should include ideas about good pedagogical practices where collaboration and communication needs are also to be considered (Bottino, 2004). In addition, the design of new tools should include, where appropriate, all the use of multimedia features and should also offer the learners the opportunity to interact with variety of ways to enable them to access knowledge from

a different and more constructive perspective. It should support student's problem solving processes and provide them with the opportunity to carry out open-ended problems (Bottino, 2004).

Moreover, the cost of buying software and hardware is also a problem. Sometimes schools have budget to buy hardware but not software or the opposite (Cairncross and Pöysti, 2006). Another problem is that the availability of Arabic educational software. Almost all the educational software is in English which needs to be adapted into Arabic (Cairncross and Pöysti, 2006) and that costs a lot. Ministry of Education supports schools with some e-materials and software, and signed an agreement with a company to transfer the books and curricula into electronic ones featured with sound and video. There is also a multimedia team in Ministry of Education whose role is to supply schools with e-materials. However, the problem that the Ministry of Education encounters is that it can not fully judge whether the designed e-book is applicable, suitable and workable for the schools because Ministry of Education lacks the ICT experts who combine the knowledge of pedagogy and ICT.

Moreover, it is important for teachers to be technically trained and supported otherwise if a problem encounters they will spend their teaching time on repairing the hardware or software (Cairncross and Pöysti, 2006). In addition, some teachers may not know what might be suitable for the students (Cairncross and Pöysti, 2006). Although, in every school there is a technician and a technician centre in the Ministry of Education, the innovation team should put in its implantation strategy that teachers in schools who are

qualified in ICT support are more likely to use technology in their teaching, and in a wider variety of ways, than teachers with who are less qualified. Some technicians in schools are not qualified enough to sort out computers' error or how to repair a computer. Therefore, if a problem encounters they ask the technician centre for help and that takes time for the technician centre to send someone to repair that error.

3- The Training That the Teacher is Taking in Order to Use the New Technology.

It is unbeneficial to equip schools with recent technology without training the teachers in how to use them. The idea has shifted from training to the effectiveness of training (Tearle, 2004). As in using ICT to support teaching and learning teachers consume time as they attempt to shift pedagogical practices and strategies and when such strategies are used regularly (Trucano, 2005). It is important to train teachers to understand the pedagogy required to use the technology to meet teaching and learning needs (Tearle, 2004). Consequently, progressive consideration is given to the needs of the teachers who will be using the technology, the ways in which it will be used, the curriculum objectives, the social context and the way in which teaching and learning activities are organised (Bottino, 2004).

However, teachers need more than just knowledge about educational technology, they need practical examples and ideas; and they need coaching and mentoring (Zachariades at al, 1995, cited in (Moonen and Voogt, 1998). Teachers would therefore have to engage in pedagogical change through a greater awareness of the potential of the new technologies (Lawson and Comber, 2000a). In addition, ICT Training is believed to result in a more

simply providing knowledge to teachers and does little to help transfer the skills to actual classroom implementation. Accordingly, teachers do not only need to encode the information, but also to achieve a level of confidence and autonomy in using the material with students (Granger *et al.*, 2002). They don't only need training in ICT skills; they also need training in using ICT in pedagogy. They should also be supplied with examples of lesson where ICT is used.

On the other hand, many teachers use ICT for personal work and little use in the pedagogy of their classroom (Watson *et al.*, 1998). It is thought that they are not motivated and are afraid of using ICTs in teaching. Therefore, they should be motivated by variety of incentives, such as certification, professional advancement and pay increases (Trucano, 2005). In order to overcome this problem, Ministry of Education tied obtaining promotion in work with training courses. One is not promoted or even gets a step forwards unless he/she finishes the required training courses in the step that he/she is in.

4- The Knowledge Establishment of Technology in Schools' Environments.

The implementation of ICT in schools is viewed as a special case of managing change (Tearle, 2004). It is not only supplying schools with equipments and software. Schools, students, teachers, and administrative staff, should value the change to help in making it smoother and easier to adopt. It is the teachers in schools who alter their work to accommodate the change therefore it is important to share with them before implementing a new technology. It is hard to know to what extant their refusal or

acceptance to the new technology is. Therefore it may be important for those who are in change to understand the theory of controlled behaviour which helps in understanding the readiness of individuals to change their behaviour (Tearle, 2004). Moreover, one of the most vital problems in education is when teachers don't have a coherent sense of the reasons for educational change; what it is and how to proceed. They will be confused and failed to adopt with that change. Although teachers are expected to be leaders in the development in a changed learning environment they lack the necessary education management of change (Cox *et al.*, 1999). Furthermore, teachers have not taken any preparation training courses from the Ministry of Education in order to help them to adapt that change.

It is known that one of the features of an education organization is 'ready to change'. When the organization has the ability to adapt the change and ready to face the consequences of that change it become a 'learning organisation' rather than a 'controlling organisation' (Tearle, 2004). In addition, leadership and management are important in implementing the change. Not only management of the change is needed but management of people as well (Tearle, 2004). As change is part of our everyday life, managing the change is important in schools in recognition of the view that the introduction of ICT into a school setting is an example of a change (Tearle, 2004). To manage this change successfully there is a focus on an adaptive culture where the emphasis at all the time is on the process of learning and on the ability to generate and learn new ideas, rather than on knowledge acquisition as a product (Tearle, 2004). It is suggested that the whole school context is an important consideration in terms of ICT

implementation, and this will in turn be linked to how "ready" the school and community of people in it are to adopt the planned change (Tearle, 2003). Several assumptions emphasize that change is a process of highly personal experience not an event which is accomplished by individuals to develop feelings and skills (Anderson, 1997). Conversely, the innovation in Bahrain takes an event change where administrative staffs, teachers and students are not prepared for that change.

Moreover, computer is an individual device where each students need one to use and make full of using it (Cairncross and Pöysti, 2006). Schools in Bahrain do not have more than 3 or 4 computer labs in each school; therefore students can not use the labs all the time. They usually study in traditional classes. The question is how many hours they spend in using labs! Not more than 1 hour a day because other teachers and other classes need that lab to prepare as well. Accordingly, students don’t study all their subjects via ICT. Moreover, the amount of the hours in accessing the internet is important (Cairncross and Pöysti, 2006). Can students access the internet from the labs? And for how many hours they can do that, is another issue. In each school there are plenty of computers but the usage of them is very limited. They are being used for administrative and routine tasks, while the real benefit may have not been tasted until now (Cairncross and Pöysti, 2006). It should be used to support the subject teaching ICT skills. Although it is said that making the administrative daily routine tasks via computer will ease the teachers’ job burdens and teachers will have more time to spend in teaching (Cairncross and Pöysti, 2006), but this is not the purpose of supplying schools with computers.

To solve the above problem "placing computers in classrooms enables much greater use of ICTs for ‘higher order’ skills than placing computers in separate computer laboratories” (Trucano, 2005). School building would not be able to accommodate a computer for every student in every lesson especially the existing ones. On the other hand, classroom spaces were designed to accommodate the traditional instructional style with little, if any thought give to investigation-based, group learning, study area, or even ICT area (Lawson and Comber, 2000b). In almost all schools one rarely finds that classrooms have any computers because it is being afraid that students may damage them purposely. OfSTED (Office for Standards in Education) suggested that the policy for implementing ICT in education is not through large labs, but in small areas in classes. This has the advantage of needing less space but the problem is that they are more difficult to manage. This system corresponds with idea that ICT is a tool for teaching not a subject to teach and that's why it should be in classes rather than in labs (Reynolds *et al.*, 2003). As long as this process is not implemented in classrooms and only in labs I think that this will prevent teachers from going to labs and to teach there. Moreover, if labs are used to teach subjects with ICT we need to change every class to a lab. That means ordinary classes should be changed into labs and that costs a lot. In classrooms however, children typically use computers only rarely and their impact on children's learning experiences is limited (Conlon and Simpson, 2003). The creative adoption of new technology requires teachers who are willing to take risks (Conlon and Simpson, 2003). Another solution for the above mentioned problem is, in the new school computers are no longer placed in isolated rooms with locked doors to be opened only by an ICT teacher. Instead, subject-area teachers, administrators, and librarians all use them

and other ICT equipment whenever these are needed in their working places. Ideally, the same is true for students. In and out of lessons, they use computers when needed: in classrooms, auditoria and labs, in the library, in rooms available for project activities and homework preparation (Lawson and Comber, 2000b).

Furthermore, in some occasions, particularly where enthusiasm already existed, schools have tension when the Ministry of Education does not invite them to be one of the early schools to have access to ICT (Tearle, 2003). Conversely, Ministry of Education should ask schools if they would like to be invited for the access to ICT, and those who refuse the invitation, Ministry of Education investigates the reasons and helps the schools to prepare themselves for the next years.

This applies to teachers as well. While there have been some optimistic views on the ease with which teachers are willing to use computers, it is said that there are reluctant users among teachers - the technophobes as well as those who enthusiastically embrace new developments – the technophreaks" (Lawson and Comber, 2000a). In addition, the teachers' attitude to the new technologies and their readiness to use ICT therefore, it is an issue of critical importance (Melpomeni and Konstantinos, 2004). Teachers' attitudes to the new technology and their beliefs affect the way technological innovation is applied in education. So, teachers' should be familiarised with the use of new technology to build their confidence which is a key factor in the effective use of the computer at schools (Melpomeni and Konstantinos, 2004). Teachers must feel confidence to use ICT and to have every needed sources within reach (Tearle, 2004). Moreover, teachers must be

motivated to use the new technology and they should feel the difference in using it in comparison with the previous methods.

To sum up this point, the most effective way to bring the adoption of an innovation in schools is to engage the whole school in a democratic process of planning change. This means that all the teachers are involved in the decision to adopt ICT in school. Teachers should also support each other especially when one of them takes a training course he/she should go back to his/her school and train/teach the other teachers. ICT knowledge and practice should go in schools from one teacher to another. They should work like a team where the information cycles from one to another. This can't be done unless there is a strong leader who knows how to take the full benefits and invest in ICT.

5- The Development and Integrated Educational Curriculum and the Establishment of the Projects Based on ICT.

As education curricula needs time to be changed, and ICT tools do not, the balance between them is difficult. The lack of the educational content inhibits teachers and learners from using ICT (Trucano, 2005). Furthermore, even if the curricula suit the stage the students in, and even though the time students spend in using the ICTs and accessing the internet is very limited in schools (Trucano, 2005), students use ICTs in much more sophisticated ways than teachers do (Trucano, 2005) because they more often use ICTs in their daily life. This puts teachers in trouble with two things, to prepare for the lesson and to catch up with the latest technology and software. In addition, Ministry of Education should build flexible curricula which enable fast learners to learn more and help in

building their confidence in knowledge and for slow learners to reinforce their information.

On the other hand, the equity issues related to uses of ICTs in education should be tolerated. It should facilitate greater inclusion of such groups into educational environment and include special needs students. (Trucano, 2005). As one sees the goals and the strategy that the Ministry of Education is implementing has not mentioned this group. Nevertheless, government schools include the three categories of special education needs; special needs category, gifted students category and simple mental diseased students category; they did not include them in the project or design a curriculum for them.

6- Establishing Collaborative Environment between Ministry of Education and the Local Society.

The existence of formal and informal communities of practice and peer networks can be important tools to support ICT in education initiatives and activities (Trucano, 2005). It is vital to have a strong relationship with key players in industry and politics (Hepp *et al.*, 2004). It is believed that the successful policy related to using ICTs in education requires consultation with a diverse group of stakeholders (Trucano, 2005) and that Ministry of Education has done that.

7- Systematically Monitor and Evaluate the Project. This is Being Done by Measurement and Evaluation Centre Which is Established Recently in the Ministry of Education and Supervised by UNESCO.

This factor is important as assessment gives teachers indication of students' level of ICT literacy and their ability to apply what they have learned in ICT and other subjects(Khvilon and Patru, 2002b). Moreover, assessments provide the opportunity to amend the curriculum (Khvilon and Patru, 2002b). Furthermore, sharing UNESCO in the assessment process gives the assessment more reliability and validity. However, as United Nation gives the right to children to be heard, children must involve in decision making (Downes, 1999), but some educators still think that children are not mature enough to make a decision for their future and that's why they are not included in the assessment team. In addition, teachers are not fully involved in developing the process of innovation or the process of assessment. They only follow it and sometimes they suggest some views in teaching rather than in the process itself (Anderson, 1997).

Conclusion:

Undoubtedly, ICTs are potentially a useful tool both for managing education and for teaching and learning. But getting the best from ICTs depends on several variables, including the appropriate design of software and hardware; the training and attitude of instructors; and the realization that different students have different requirements. It also requires a willingness to experiment. Effective use of ICTs in education and training is likely to require quite different pedagogical techniques from traditional classroom teaching. In addition, technology is never a substitute for good teaching. Without skilled

instructors, no electronic delivery can achieve good results. But neither can traditional classroom teaching, come to that.

Training should be also supplied to pre-service teachers. Such courses should focus on applying IT skills to achieve pedagogical objectives rather than IT skills in isolation. Pre-service teachers should be provided with standards and performance indicators describing what they should know about and be able to do with technology. (Khvilon and Patru, 2002a).

Finally, "leadership is often the most important factor in the successful integration of ICTs into the school's instructional practices and curriculum". It has been shown that without effective and supportive leadership, changes are not likely to occur (Khvilon and Patru, 2002a).

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