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Electronic brainstorming in Saudi primary education

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Abstract

This study explores the use of electronic brainstorming in classrooms in primary schools in Saudi Arabia. It involves teachers and students in primary school who used computers in their Islamic Education lessons. The main aim of my study is to explore the students' interest in Islamic Education in primary schools in Saudi Arabia, to improve their creativity skills through electronic brainstorming and to investigate the influence of the pedagogical affordances of the electronic brainstorming method on classroom activity. To this end, I compared three groups, electronic brainstorming (EBS), verbal brainstorming (VBS) and the traditional method (T), in different classrooms and with different teachers. Mixed qualitative and quantitative methods of data collection and analysis were employed. The data collection methods used in this study were classroom and online forum observations, teacher and the student interviews, and pre- and post-tests (using the Torrance test, TTCT, to measure students' creativity skills). The sample consisted of 61 primary school students aged between 11 and 12 years old and three Islamic Education teachers. The study took place in a classroom within the students' primary school in Saudi Arabia, and lasted around three months. The interview and observation findings indicated the greater student participation, motivation and creativity in the EBS method. The observation and interview findings revealed positive differences between electronic brainstorming (EBS) on side and verbal brainstorming (VBS) and traditional methods (T) on the other side in Islamic Education lessons in primary schools in Saudi Arabia. Furthermore, the analysis of the research findings demonstrated how pedagogical affordance of EBS lead to a significant improvement of creativity skills, dialogue and engagement in learning environment where EBS had been employed. Finally, this

study concluded that EBS method has considerable potential to improve the Islamic

Education curricula in primary schools in Saudi Arabia.

Dedication

To My beloved wife Mona
For her support, and prayers
Throughout the course of this thesis
Also, to my lovely children
Sereen and Eyas
May Allah bless them

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In the Name of Allah, the Most Gracious, the Most Merciful

First of All, Praise and Great Thanks be to Allah (God) for giving me support and patience to carry out this study.

Prophet Mohammed (Peace be upon him) said: *"He will not be thankful to Allah, he who would not be thankful to people".*

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GLOSSARY

BERA: British Educational Research Association
CS: Creativity Skills
EBS: Electronic brainstorming
ICT: Information and Communication Technology
KSA: Kingdom of Saudi Arabia
MoE: Ministry of Education in Saudi Arabia
MoH: Ministry of Higher Education in Saudi Arabia
VBS: Verbal brainstorming
T: Traditional method
TTCT: Torrance Tests of Creative Thinking

Chapter One: Introduction

This chapter provides an overview of the study, giving its background and a statement of the problem, as well as outlining the research questions, the research design, and the possible contributions of the research and the overall plan of the study.

1.1 Initiation

An important priority in educational research is to review the educational practices used in the curriculum, in order to aim for the creation of positive mental habits and the improvement of dialogue skills. To this end, interactive and exploratory teaching methods have been promoted which contribute to the expansion of learners' perceptions and accustom them to exercise thinking skills. There have been several theories over the years which have called for changes to traditional educational and psychological practices along these lines, such as the theories of Piaget (Piaget, 1954), Bloom (1956), Gagné (1985), Vygotsky (1978), Jerome Bruner (1996) and Wegerif (2007; 2008). These theories have attempted to develop the learning environment and some of them have attempted to integrate technology into educational practice as a means of improving teaching and learning (Lefebvre et al. 2006). However, the question of the appropriate kind of technology to use in the classroom and how to use it to enhance interactivity in the classroom and thereby improve the learning environment remains a big question (Grabe and Grabe, 2007).

The government of Saudi Arabia, through the Ministry of Education, has introduced many projects to develop education which aim to integrate ICT and thinking skills in curricula and schools (Ministry of Education, 2002). Although there is availability of ICT and awareness of thinking skills in the Saudi educational system, most teachers of Islamic Education still use traditional didactic methods and ignore ICT as a tool

and sideline thinking skills. These problems have been highlighted in studies by Almofada (2000), Alassem (2001), Al-Shafi'i (2004), Esmail (2005) and Aljlad (2007). As a result, this researcher is interested in the reform of education in the field of Islamic studies, investigating a new teaching method, that of electronic brainstorming, and wishes to explore its effectiveness in improving the educational environment.

The recent introduction of 'thinking skills' to the curriculum has left teachers facing a problem of selecting appropriate teaching methods for the development of thinking skills, especially in the Islamic Education curricula 'that rely on memorisation and lecture only; as a result students are becoming bored with these subjects' (Aljalad, 2007). Therefore the problem that this research is designed to address is the difficulties that teachers of Islamic Education face in adjusting their teaching methods to include developing the thinking skills of their pupils, in addition to transmitting course content.

There are many methods used in classrooms under the heading "brainstorming". It is an innovative technique originally used by Osborn (1963) for the purposes of activating the mind and reducing mental idleness; this is done by producing many ideas in a very short period of time. However, electronic brainstorming, which employs electronic means otherwise known as EBS, has been claimed to be a superior approach (in gained productivity) to other known brainstorming modes such as verbal (working alone) and face-to-face.

Research in Information Systems (IS) and electronic brainstorming, such as that by Stenmark (2002) and Hilliges et al. (2007), identified theoretical factors that may act both to enhance and impair productivity in electronic brainstorming groups as

contrasted with verbal brainstorming groups. Other, equally important, factors may act to encourage the generation of ideas. The factors emerging from these studies remained constant during the various brainstorming techniques, and verbal brainstorming and electronic brainstorming performed as well as each other during the experiments. In other words, their research concluded that there should be no difference in idea generation between electronic and verbal brainstorming. For these reasons, and the lack of empirical evidence supporting electronic brainstorming superiority over other modes of brainstorming, the present research proposes to question the claims made by these researchers by examining the various factors and conditions under which electronic brainstorming groups may outperform verbal brainstorming groups within the Saudi primary educational context. Conditions to be examined include those socially and culturally sensitive conditions that may inhibit or encourage electronic brainstorming.

The significance of the study is found in exploring the effectiveness of using ICT in the form of electronic brainstorming to foster students' creativity thinking skills in learning the subject of Islamic Education, and to explore the contextual factors that help or hinder this effectiveness in a way that makes a contribution to teaching in Saudi Arabia. It is also hoped to give an insight to all Islamic Education teachers on how to motivate their students. If it is successful in this, it is anticipated that Islamic Education teachers could follow the practice and be able to use ICT more effectively in delivering Islamic Education through brainstorming. Also, students could become more actively involved in their Islamic Education lessons, become more self-motivated and increase their interest in the subject. Teachers could use ICT for students with different abilities to work through at their own pace and at their own level. It is expected that all students will be better able to understand the content of

their Islamic Education courses and that students' learning differences could thereby be reduced.

1.2 Aims and Objectives

The aim of this research is to explore and examine the validity and effectiveness of electronic brainstorming in relation to verbal brainstorming and to traditional methods at the primary learning stage in the Saudi Arabian educational system. Also, the objectives of the research include validating electronic brainstorming (EBS) at the primary schooling stages in the Kingdom of Saudi Arabia and the possibilities of increasing EBS productivity through the generation of innovative and creative thinking. This should deliver the aims of the research which include making changes to students' traditional ways of learning, primary students' adaptation to new learning environments, students' character-building and overall reforms in the Saudi Educational System. Collectively, these factors should also lead to an overall social and cultural reform.

In addition, through carrying out this research, the following aspects will be investigated. First, the effect of EBS, as an application of ICT, on increasing students' interest in Islamic Education. Second, the effect of ICT and EBS pedagogy in helping students to understand Islamic Education and its features. Third, the effect of ICT and EBS pedagogy on promoting students' creative thinking skills and dialogue within their educational context. Fourth, the ways of measuring students' creative thinking ability.

1.3 Research Questions

The aims of this study were to examine the effects of the affordances of EBS, resulting from applying ICT, on increasing students' interest in Islamic Education in comparison to VBS and Traditional methods. It is worth noting that some previous works of research, such as Starmark (2002) and Hilliges et al. (2007), claimed a lack of empirical evidence supporting the superiority of electronic brainstorming over verbal brainstorming. For this reason, the researcher created research questions that focused on a comparison between EBS and VBS methods and investigated their performance from the participants' point of view, whilst observing and exploring the impact of these methods. The foregoing creates a platform on which the following five research questions are formulated:

- What are the pedagogical affordances of EBS in the context of Islamic education in Saudi Arabia from teachers' and students' perspectives in primary school?

- What are the key features of EBS that have pedagogical affordances in comparison with VBS and traditional methods?

- What are the affordances of EBS for creativity skills?

- What are the impacts of EBS on Islamic Education and its role in Saudi education?

- What are the hindrances in using EBS in Islamic Education in primary school?

1.4 Overview of the research methods

To achieve the research aims and answer the research questions, a mixed methodology was considered appropriate, as explained in Chapter 5. Both qualitative and quantitative methods in this study were employed, which strengthened the research design (Creswell, 2005; Teddlie and Tashakkori, 2003) and enriched the data (Fraser and Tobin, 1991).

A quantitative method was used in this research study through pre- and post-tests (TTCT). It provided data regarding the creativity skills of more than 60 of participants, to make comparisons with the qualitative data from a smaller of participants. The TTCT has been highly recommended for the education sector. It is the most commonly used test of creativity and is also well referenced (Kim, 2006). In addition, it has been applied and standardised for the Saudi environment by the Ministry of Education (2010) and by the research team from King Abdul Aziz City for Science and Technology (National Committee for Education) for the detection program for gifted children (Tatweer, 2006).

Participants in this study were Islamic Education primary school teachers and their students in Qassim in Saudi Arabia. The data collection of this study was done in two ways. The first method, the qualitative, consisted of interviews and observations of three Islamic Education teachers and their students. Eight interviews were carried out with teachers and they were observed with their students for around twelve lessons each. 61 students were interviewed, some of them once each and others more than once. The second, quantitative, method consisted of pre- and post-tests administered before intervention (as pre-test) and after intervention (as post-test) to all 61 students.

Data analysis included qualitative data analysis using thematic analysis and quantitative data analysis using SPSS, as explained in more detail in Chapters 6 and 7.

1.5 The research contribution

This research attempts to provide a critical evaluation of teaching methods currently being used in Islamic Education in primary schools in Saudi Arabia. The research has potential value for Islamic Education teachers, Islamic Education supervisors, administrators and developers of Islamic Education curricula in the Ministry of Education (MoE) in Saudi Arabia for integrating ICT, as EBS, and its possible application in Islamic Education. This study gives teachers an evaluation of EBS-based Islamic Education lessons regarding its conceived effectiveness, practicality and the affordances for primary school students' learning.

Another potential contribution of this study is that it may provide insights into developing Islamic Education in the Saudi Arabia but based on theoretical views coming from Western contexts. Therefore, this study extends the theoretical view to a different context, to explore what modifications might be needed in Saudi Arabia. Whereas many studies of ICT-based learning environments have been carried out in Western cultures, when they are conducted in other countries, cultural and social factors may have to be taken into account. This study, being in a non-Western context, may provide new insights into using ICT in education based on Western theoretical views of the classroom.

In Saudi Arabia, there is evidence of a need for improving Islamic Education with the use of new teaching methods (Almofada, 2000, Alassem, 2001, Al-Shafi'I, 2004, Esmail, 2005). According to another study by Almofada, (2008), Islamic Education teachers need to follow modern methods which help to transform learners from

passive to active and promote their participation and cooperation. They need to replace the old method of education with one based on the needs of the children through self-learning and encouragement of research skills and thinking skills. In addition, it is necessary to integrate technology into Islamic Education lessons, as Alshekh's study (2011) insisted. In his study, he found that the Ministry of Education in Saudi Arabia had sought to develop the process of learning and teaching; to this end they had provided technological aids though limited in quantity and quality. The computers and internet access that were introduced gave sources of learning that went beyond traditional library-based knowledge from printed books. The availability of computers and e-learning resources in resource rooms in primary schools has been accompanied by a diversity of educational software in different curricula. Consequently, Islamic Education should employ these technologies in the teaching and learning process to achieve the objectives of the curriculum. Although Alshekh recommended that this should be done by teachers of Islamic education, he observed that in practice there was a lack of such use of technology.

As previously reported in this study, it is believed that this research can contribute to helping teachers use new technologies to support effective learning environments for teaching Islamic Education in Saudi Arabia. Furthermore, it provides more insights into the pedagogical texture of teaching and learning environments and therefore gives rise to some reconsideration of the use of new technologies to develop effective learning and pedagogical affordances. Hence, this study can contribute to the field of instructional technology and pedagogies and curriculum of Islamic Education.

1.6 Structure of the thesis

This thesis comprises nine chapters, as follows:

Chapter 1: Introduction

This chapter presents an overview of the whole study, which comprises the background to the problem, the problem statement and significance of the study, as well as the purpose of the study, the research methodology to be followed and the planning of study.

Chapter 2: Overview of education in Saudi Arabia

This chapter gives an account of the Saudi educational system and illustrates primary learning in Islamic Education curricula.

Chapter 3: Electronic brainstorming (EBS) and ICT

The focus in this chapter is on a description of two areas (EBS and ICT) relating to this research and its research questions.

Chapter 4: Creativity skills (CS) in learning environments

This chapter contains a review of the literature on creativity skills in education and the theoretical framework of thinking in Islam.

Chapter 5: Research design

This shows the research design and how the investigations were conducted.

Chapter 6: Qualitative data findings

This chapter shows how the collected data were analysed, giving findings of interviews and observations.

Chapter 7: Quantitative data findings

Chapter 7 shows the data analysis of pre- and post-tests.

Chapter 8: Discussion of findings

The findings are discussed in detail in relation to the literature in this chapter.

Chapter 9: Conclusion and recommendations.

This chapter concludes the study and makes recommendations as to how the findings of the study could influence practice.

1.7 Chapter summary

This chapter has given the background and the purpose of the study, outlining the methods of data collection. In the next chapter, a background to the Saudi educational system is presented, followed by a review of the literature related to the specific area of this study.

Chapter Two: Overview of education in Saudi Arabia

2.1 Introduction

Saudi culture and education are primarily determined by the Islamic religion. Saudi Arabia is a monarchy whose constitution is based on the Qur'an, the Islamic Holy Book and Shariah Law (Islamic law). Because all aspects of social and cultural life are centred on the Muslim religious identity, it is important to take the Saudi Arabian religious and cultural context into account when reading this thesis. This study aims to contribute to the development of education in Saudi Arabia through an exploration of the development of learning and teaching in Islamic Education. Consequently, this chapter begins by describing the educational system in Saudi Arabia and goes on to explain some recent development projects to improve the quality of learning in the country. It subsequently focuses on the context of the present research which includes the primary school learning environment and the Islamic Education curriculum. It also reports the findings of some previous studies on Islamic Education in primary schools in Saudi Arabia.

2.2 Background of the educational system in Saudi Arabia

2.2.1 Introduction

This section provides an overview of education in the Kingdom of Saudi Arabia. It begins with a brief rationale for education in Saudi Arabia, followed by a description of the grades and levels in the school system. It goes on to clarify the locus of responsibility for education in the country and finally focuses on the Ministry of Education which has overall responsibility for general education. The Ministry's objectives and policies, as well as its development projects for education, are outlined.

2.2.2 Educational system in Saudi Arabia

Education in Saudi Arabia is segregated by gender and is divided into three separate systems: general education for boys, general education for girls and traditional Islamic education for boys. The aims of Saudi educational policy include raising the efficiency of education to meet the religious, economic, social and personal needs of the country, and to eradicate illiteracy among Saudi adults. As a result, the Ministry of Education was established in 1952 to preside over general education for boys, while education for girls comes under the jurisdiction of the General Presidency for Girls' Education that was merged with the Ministry of Education in 2003. Both genders follow the same curricula and take the same annual examinations (Sedgwick, 2001).

The traditional Islamic schools teach Saudi boys to become members of Islamic society as clergy and to understand the principles of Islam. The traditional Islamic secondary schools follow the same curricula as in the general secondary school to a certain extent, but with greater focus on Islamic and Arabic studies; thus they take extra Islamic Education courses. Traditional Islamic secondary schools are administered by Imam Muhammad bin Saud Islamic University and the Islamic University of Medina. Even in general schools, students study many hours of Islamic Education. For example, the memorisation of the Quran, interpretation and understanding of the Quran (Tafsir) and the application of Islamic tradition to everyday life are stressed. Islamic Education is also learnt at the university level alongside other subjects and is compulsory for all students. There are also two Islamic universities that focus primarily on religious studies (Hendrickson, 2008).

In this section, a brief look will be taken at the general Saudi education system. Firstly, in Saudi Arabia general education consists of three years of kindergarten, six

years of primary school and three years each of intermediate and secondary school. The Ministry of Education determines overall standards for the country's educational system and also oversees special education for the disabled. In 2003 the General Presidency for Girls' Education was merged with the Ministry and its functions were taken over, so the Ministry now administers the girls' schools and colleges, supervises kindergartens and nursery schools and sponsors educational programs for girls. The first government school for girls was established in 1964; by the end of the 1990s there were girls' schools in every part of the Kingdom of Saudi Arabia.

After primary school, students attend either intermediate school which is three years then students attend secondary schools which are offering programs in both the arts and sciences, or vocational schools. Subsequently, students progress to secondary school, as determined by comprehensive exams conducted twice a year and supervised by the Ministry of Education.

There was a dramatic growth of the educational system after the introduction of the First Development Plan in 1970 and this has been more than matched by an improvement in the quality of education. For example, one measure of this emphasis is that while the number of students in the educational system increased six-fold between the 1970s and the 1990s, the number of full-time teachers grew more than nine-fold. The government, however, continues to work to develop educational standards. This has been achieved by improving the quality of teacher training programs, improving standards for evaluation of students and increasing the use of educational technology; one aspect of this is the introduction of computer science at the secondary level. Finally, in 2000, an ambitious school computer project was named after Deputy Prime Minister and Commander of the National Guard Crown

Prince Abdullah (Al Shaer, 2007). The Saudi education system has levels and grades to learning, which will be described in the following section.

2.2.3 Stages of education in Saudi Arabia

The grades of education in Saudi Arabia consist of five stages of which pre-primary, primary, intermediate and secondary are under the umbrella of the Ministry of Education (MoE), and higher education which comes under the umbrella of the Ministry of Higher Education (MoH). I briefly describe these grades next:

Pre-primary education

In Saudi Arabia, children aged 3–5 years go to kindergarten. However, attendance at kindergarten is not a prerequisite for enrolment in the first grade of primary education and kindergartens are not part of the official education ladder. In addition, some private nurseries have been established with technical and financial aid from the government.

Primary education

Primary education in Saudi Arabia lasts for six years, beginning at six years old. In order to move on to intermediate education, the students have to achieve the continuous assessment from all grades of primary school which is teachers assess their students every lessons and obtain the Primary Education Certificate.

Intermediate education

Intermediate education in Saudi Arabia lasts three years. Students enter the first grade of intermediate education at 11 years of age provided they have the Primary Educational Certificate. In these grades the students study many subjects, such as Islamic Education, Arabic language and grammar, science, mathematics and English

language. In order to move on to secondary education, the students have to pass the examinations at all grades of intermediate school and obtain the Intermediate Education Certificate.

Secondary education

Secondary education in Saudi Arabia also lasts three years and this is the final stage of general education. Students have the opportunity to choose a specialised program of either Art and Literature or Science. Students should pass the examinations at all grades of secondary school to obtain the Secondary Education Certificate.

Higher education

Higher education in Saudi Arabia consists of four years in the fields of humanities and social sciences or five to six years in the fields of medicine, engineering or pharmacy. The first university, King Saud University, was established in 1957 and this constituted the starting point of the modern higher education system in Saudi Arabia. There are many government universities in Saudi Arabia. These include colleges and departments that offer diplomas, and bachelor, master and Ph.D. degrees in various scientific and humanities specialisations, and they provide community services as well. Some colleges and departments also provide distance learning. In higher education in Saudi Arabia, there are also some private colleges, community colleges affiliated to universities, and girls' colleges, in addition to government agencies and institutions that provide specialist university level education (UNESCO IBE, 2007). Most of these grades of the education system are administered by the Ministry of Education, as described in the next section.

2.2.4 Education Authorities in Saudi Arabia

In Saudi Arabia the administration of the education system is highly centralised. All educational policies are subject to government control and supervision by the Supreme Council of Education. Curricula, syllabuses and textbooks are uniform throughout Saudi Arabia. Educational administration in Saudi Arabia is conducted through eight agencies, three of which are main government agencies. The three principal authorities responsible for education in Saudi Arabia are: the Ministry of Education (MoE); the Ministry of Higher Education (MoH); and the General Organisation of Technical Education and Vocational Training. There are also other ministries, which have some educational responsibility, to provide education for their staff and/or their children. One such is the Ministry of Defence (MoD). The Ministry of Education supervises 51.4% and the General Presidency for Girls' Education 39.0% of all schools. The other governmental departments supervise 3.4% of schools. Just over 6% of schools are controlled by the private sector (Alshumaimeri, 2003).

The Ministry of Education, established in 1953 to replace the Directorate of Education. Responsibilities, has responsibilities including policy-making, planning, and budgeting to provide physical facilities and teaching materials to primary, intermediate, and male secondary schools and to support development projects. Adult and special education, teacher training programs, curricula and teaching methods, the library system, and museums and archaeological research are departments within the Ministry of Education. The Ministry of Education represents Saudi Arabia in international organisations and promotes cultural and foreign exchanges. Saudi Arabia is divided into education districts, which implement the policies adopted by the Ministry of Education; however recent school reorganisation has passed more policy authority to the local schools. The General Presidency of Girls' Education, organised

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in 1960, is the educational counterpart to the Ministry of Education but for females; this was merged with the Ministry of Education in 2003. Primary education for girls was started in 1961, and by 1963 girls' education was available at both the intermediate and secondary levels. The General Presidency of Girls' Education is divided into the Directorate General for General Education for primary, intermediate and secondary education (Al-Ghanem, 1999).

The General Organisation for Technical Education and Vocational Training (GOTEVT) was established in 1980 to accommodate Saudi Arabia's increasing needs for specialised technical training. The educational department divided into the Directorate General for Technical Education for industrial, commercial, and agricultural education and the Directorate General for Vocational Training for supervising vocational and on-the-job training programs, curricular development, program evaluation, trainee affairs, instructor training and audio-visual aids. In vocational training there are three levels: pre-vocational training centres, vocational and commercial secondary schools and higher (post-secondary) technical institutes (GOTEVT, 2001). The following section presents the Ministry of Education in Saudi Arabia (MoE).

2.2.5 Ministry of Education in Saudi Arabia (MoE)

The education system took shape in Saudi Arabia when the General Education Management Centre was established in 1926, which made the first plan for a complete educational system. In 1928, an Education Management Committee was formed which established a single system of education, with different educational levels. The first primary curricula were designed in 1935 and the Ministry of Education was formed in 1953. The first Education Minister in Saudi Arabia was prince Fahd Bin

Abdul Aziz who was king of Saudi Arabia between 1982 and 2004. The most significant achievements of the Ministry after its establishment were the creation of an administration plan for the Ministry of Education, construction of schools and continual improvement of the standards of education (Alshumaimeri, 2003).

Aims of the Ministry of Education in Saudi Arabia

The Ministry aims at engendering a new generation of young men and women who embody Islamic values in their persons, both theoretically and practically. It aims at producing a new generation who are equipped with appropriate knowledge and skills and endowed with the right orientations, are capable of responding positively to and interacting with the latest social developments and dealing with the latest technological innovations with ease and comfort. They must be able to face international competition at the scientific as well as technological levels to be able to participate meaningfully in overall growth and development.

Some aims of the Ministry are summarised below:

1. To give opportunities for education to every person of learning age, according to his abilities and inclinations, and to facilitate these opportunities by providing the appropriate infrastructure and services.

2. To plan and carry out projects that cater to the requirements of the Ministry such as construction of educational buildings, and renovation of existing educational sites, by investing capital sums in the private sector for the implementation of such projects.

3. To develop the curricula and constantly improve the general education system so that it is in accordance with contemporary social and industrial requirements (Al Shaer, 2007).

Policy of the Ministry of Education in Saudi Arabia

1. Enrolling all Saudi children of primary school age;

2. Increasing enrolment by encouraging educational programs to fulfil the needs of the Ministry and industry;

3. Achieving educational and training programs for Teachers' Colleges and others on the same level to improve their skills and enrich their experience;

4. Increasing the minimum educational requirements for primary level teachers seeking admissions to the Teachers' Colleges to bachelor's degree to ensure that all teachers have attended university;

5. Accomplishing educational and training programs for the society as a whole through the Social Service Centre in the Teachers Colleges;

6. Building schools and initiating campaigns and programs to eliminate illiteracy in all parts of Saudi Arabia;

7. Constructing night schools for primary, intermediate and secondary levels of education for adults;

8. Promoting skills, abilities and student interests through scientific, cultural, social, sporting, technical and scouting activities;

9. Executing and authorising special educational services to the handicapped including blind, deaf and those with other disabilities;

10. Discovering and working on early detection of disabilities and publishing information on ways to deal with them;

11. Working towards establishing specialised library services such as a talking library; publishing hearing books in accordance with the policies of the Ministry;

12. Construction of libraries and historical museums;

13. Working towards the achievement of self-sufficiency by enabling Saudi nationals to be capable of teaching at all educational levels;

14. Decreasing failure and dropout rates at all educational levels by raising educational standards;

15. Exchanging cultural and industrial information between Saudi Arabia and Arab, Islamic and other friendly countries in accordance with the cultural exchange agreements;

16. Evaluating the progress of curricular and educational plans in Teachers' Colleges to ensure the achievement of the Ministry's ambitions and their integration with general education curricula.

17. Participating in national and international exhibitions and conferences with a view to introducing the educational and cultural activities of Saudi Arabia to the other publics;

18. Supervising and providing technical and material help to private education and working towards improving their systems and procedures;

19. Improving national solidarity and national integration through a well balanced educational curriculum (Al Shaer, 2007).

Ministry of Education's aims for primary grades in Saudi Arabia

The aims of the primary schools in Saudi Arabia are as follows:

- To implant the true faith in the heart of the Muslim child, and to encourage him/her to behave in accordance with Islamic norms with a complete manifestation of its rules in his/her character, body, mind and language, and to identify with the Muslim nation;

- To teach students to perform their prayers and to observe the rules of conduct and good manners;

- To improve the student's basic skills, particularly those of language, arithmetic and physical fitness;

- To give the student appropriate information in various fields;

- To introduce him/her with the blessings bestowed by God on him and on his/her social and geographical environment, so that he/she may make good use of his/her gifts, allowing them be beneficial to him/her and to his/her environment;

- To foster aesthetic tastes, nurturing creative activities and building a sense of appreciation for his/her handiwork;

- To improve their talents so that they are aware of the duties and rights appropriate to their age, and the special particularities of the stage they are at, and to inculcate love for the fatherland and loyalty to superiors, who are charged with authority;

- To inculcate in the student the desire to seek useful knowledge, to learn serviceable work and to benefit from leisure time;

- To adapt the pupil for that phase of life which is to follow his/her present one. (Al Shaer, 2007).

Based on the above, it can be observed that Saudi education policy and the Ministry of Education's objectives are focused on developing student skills through the use of technology and new methods of teaching; these include the skills of thinking which are closely related to the aims that this study seeks to achieve. However, Saudi

education policy does not stop at setting goals, but also seeks to create projects for the development of education, one of which is described in the next section.

2.2.6 Educational development projects in Saudi Arabia

The Saudi government is attempting to develop education through a number of projects supervised by the Ministry of Education; the most important of these is outlined in this section.

Comprehensive Curriculum Development Project in Saudi Arabia

The Comprehensive Curriculum Development Project recruits qualified personal to produce educational materials to keep abreast of current developments which meet national and social requirements. Curriculum development has been, and still is, the top educational priority of the Ministry of Education. This project is expected to lead to significant improvements in the quality of education because it includes many aspects such as the pre-service and in-service training of teachers, enhancement of the school environment and development of educational technologies, in addition to its main objective of creating curricula and preparing related educational materials (Ministry of Education, 2002). This will be further explained in the Research Context section. The following section explains another Saudi educational development project, the King Abdullah Project for General Education Development.

King Abdullah Public Education Development Project for General Education

The King Abdullah Project Public Education Development is a 9 billion SR project and it will be implemented over the next six years to guarantee the availability of a highly skilled and motivated workforce in the future. A number of schools in Jeddah, Riyadh and Dammam have been selected for the implementation of this project.

Crown Prince Sultan will head a ministerial committee to supervise the project, which will begin with creating a high-tech classroom environment in Saudi Arabia within six years. More than 400,000 teachers will be trained to handle classes in the high-tech style. In addition, this project will emphasise extracurricular activities for the purpose of developing students' intellectual, creative and communicative skills (Tatweer, 2006). The next section describes a further project, namely the King Abdul Aziz and his Companions Foundation for the Gifted and Creativity (Mawhiba).

King Abdul-Aziz and his Companions Foundation for the Giftedness and Creativity (Mawhiba)

This centre is trying to achieve many goals through the inclusion of thinking skills in education and its aims are:

- To foster giftedness and creativity and support innovation. This includes supporting talented and creative people;

- To strengthen national capacities to generate innovative ideas;

- To find pioneering young people who are creative and talented in science and technology;

- To support and provide enriched educational activity for gifted and talented Saudi students;

- To raise awareness and educate the public (parents, teachers and employers);

- To assist educational and professional institutions across Saudi Arabia in the creation of a comprehensive program for gifted and talented people.

Mawhiba hopes to foster a critical mass of gifted and talented young leaders who can support the sustained growth and prosperity of Saudi Arabia. The rationale for this

program is that Saudi Arabia is facing a unique set of challenges owing to certain domestic and international developments. To address these challenges, several initiatives with a multi-billion SR investment are underway to transform Saudi Arabia into a knowledge-based society, thus contributing hundreds of billions of SR to GDP (Gifted Development Project) and creating millions of jobs. This transformation requires a critical mass of gifted and talented young leaders, which is not adequately supplied at the moment. (Mawhiba*,* 2000). The next section describes another project, the National Project.

The National Project (Watani)

This Project was established 2006. One of its most important aims is to advance the use of computers, the cornerstone of educational technology. This project aims to achieve internet service for all Saudi schools, which is the name of the Schools' Net Project. This project has provided a multitude of services and is a huge source of electronic reference information for every student, teacher, parent and educational supervisor. For example, it provides electronic books, interactive multimedia, web design tools for schools, e-mail, chatting and educational internet links (Tatweer, 2006).

This Project has six objectives:

1. To prepare students in an effective manner for the future by exploiting and using information technology in education and thereby developing students' skills;

2. To develop teachers' abilities through employing information technology in all educational activities;

3. To enrich students' and teachers' information in the educational environment, providing them with scientific content and educational resources;

4. To master the use of information technology for new generations of students, thereby improving the outcome of the educational process;

5. To contribute to the creation of an advanced information technology industry in the Kingdom;

6. To disseminate knowledge of information technology throughout the society and create a comprehensive awareness of the advantages of using information technology in education (Tatweer, 2006);

The foregoing has given an overview of education in Saudi Arabia. The next section turns to the research context and considers the focus of this study, namely primary education.

2.3 The research context

The context of this study is the primary school stage, which is the main stage of Saudi education, in which students spend most of their years of schooling and obtain the foundation upon which the rest of their education is based. The development projects in curricula and teaching methods focus on this stage. It is essential to take this context into account when reading it. This section describes the learning environments, Islamic Education curriculum and creativity within this curriculum. Some previous studies in this field are presented.

2.3.1 Learning environments in primary education in Saudi Arabia

A new curriculum project was briefly mentioned above; here it will be explained in more detail. The Ministry of Education in Saudi Arabia (2002) has developed a comprehensive project to improve educational curricula in Saudi Arabia, starting in 2005. This project aims to bring about a radical qualitative change in the curriculum in order to keep pace with rapid local and global developments. Thus, it aims to provide an effective means of achieving the goals of education policy in an integrated manner by creating a conscious interaction between technical developments and knowledge, and benefiting from the experiences of others. It will also identify the necessary skills to be learned by students each year. It will link whatever is learned with social life. Moreover, it will improve thinking skills, performance and the skills and values necessary for productive work (Ministry of Education, 2002).

There are four key sets of reasons behind the new project. First are the national reasons. In the past, curricula were suitable for the old days. However, the alteration in the norms of living, including the rapid development of Saudi society along cultural, economic and technical dimensions requires a change in education as well. Second are the international reasons. Experts in Saudi Universities and the Ministry of Education have described the changes that have taken place in the world during the past two decades as revolutions in communication, knowledge, globalisation, society and the world economy. Thus education needs to adapt to such changes in order to benefit from them and avoid any problems to which they may lead. Third are the scientific reasons. Specialists argue that improving and developing human resources play an essential role in the nation and its economy. Therefore, investment in education guarantees success in business since the new generation will take over the

steering wheel of the nation in the years to come. Fourth and last is the urgent need to improve the current curricula in a manner that copes with the scientific, social and economical changes that have taken place in the nation in the recent past (Ministry of Education, 2002).

The project takes into consideration the needs of the labour market and university education. It will also consider the mental, psychological and physical needs of the pupils. In addition, the project will take into consideration both national and international trends, experiments, studies and research (Ministry of Education in Saudi Arabia, 2002).

The experts in this project see that developing the labour force represents a type of investment in human capital that controls the economic capital. So, investment in education is an investment in the future because new generations will control the nation's abilities and future (Ministry of Education, 2002).

The World Bank has also affirmed the salience of educational development, especially for developing countries, to enable them to develop their human capital. UNESCO and UNICEF studies have confirmed the importance of educational development in the developing countries, especially developing appropriate curricula and teacher training. The study by UNESCO concerning education in the 21st century (Education - This Treasure, 1999) confirms the role of education and the leading role of teachers in developing societies in building human resources and self development, so that such societies may develop their own scientific abilities and remove cultural dependence. The International Conference of Parliaments that was held in Paris in 1996, in cooperation with UNESCO, encouraged countries to invest in human creativity and the production and transfer of knowledge. Additionally, the importance

of developing local expertise and concentrating on new educational programs which develop thinking, creativity and intelligence has been underlined by the Ministry of Education (2002).

The project called 'School in 2020' has been instigated by Information Management and Technology Association (IMTEC) with many Western countries. Studies and international experiments such as this represent encouragement for development (Ministry of Education, 2002).

According to the Ministry of Education (2002), none can deny the fast progress and development of Saudi society in recent years. This requires constant review and checking of the school curriculum to comply with this progress, because the current one has outlived its usefulness. But this curriculum needs to develop to comply with scientific progress and world changes, so it is necessary to focus on the following aspects:

1- Improving relations and integration among the different subjects;
2- Determining educational objectives at the different educational levels;
3- Learners' needs during their different stages of growth in the light of the new social and economic changes;
4- Coordinating among the school subjects and the present and future needs of Saudi society;
5- Complying with the new technology and its effects on the individual and society;
6- Relating science to real life by giving the learner relevant vocational experiences;
7- Concentrating on developing scientific research skills and practical activities;

8- Concentrating on developing higher mental skills like critical thinking, creative thinking and problem-solving.

The intention of this project is to develop education via intensive development of the curriculum to comply with the fast pace of local and international change. It aims to achieve the Ministry's education policy goals in an integrated way via the following points:

1- Including in the curriculum Islamic values, knowledge, skills, positive attitude to learning and work, achieving the development programs and ensuring safety, security, health and the human rights;

2- Including in the curriculum thinking skills, problem-solving skills, self learning skills and cooperative learning skills and effective interaction with knowledge sources;

3- Increasing the standard of primary and intermediate education and giving the individual what is needed in his/her social and academic life;

4- Developing performance skills by concentrating on learning by doing and by verbal practice of activities;

5- Promoting awareness of current technological developments, especially the knowledge and information revolutions;

6- Achieving integration among academic subjects at different stages;

7- Ensuring a choice of suitable activities commensurate with students' abilities and needs;

8- Integrating academic learning with practical technology by concentrating on practical examples from everyday life (Ministry of Education, 2002).

This project relies on the Saudi Arabian Education Policy Document that is considered the first reference for the intensive curriculum development project. This is based on the following:

1- The mental, psychological and physical needs of students;

2- The needs of society and the development and the employment market;

3- Integration among educational curricula, activities and educational styles;

4- Directions and international experiments and research. (Ministry of Education, 2002).

This project employs the following main elements of curriculum development:

1- Determining the principles of building of the curriculum;

2- Building the general frame of the curriculum;

3- Building the documents of the educational specialised curricula;

4- Building standard educational evidence (the specifications of the curriculum, the procedure manual of the curriculum, the teacher's competence in public education, and the standards of judging the educational materials);

5- Integrating the technology with the new concepts in education;

6- Experimenting, evaluating and development;

7- Generalising, evaluating and development. (Ministry of Education, 2002)

This project was developed over three years during which many activities were performed: training courses were offered; distinguished international experts were invited; costs of material and wages were provided; specialised workshops were

implemented; exchanges visits took place between Arab and other international experts; research and field studies were performed; comparisons were made with other countries' developments; evaluations of the current curricula were made; and coordination with all concerned sectors in the Kingdom was ensured. Thus, it has been possible to develop a common vision of what can contribute to a modern project that addresses today's needs (Ministry of Education, 2002). In the next section, the focus is on the primary school Islamic Education curriculum in Saudi Arabia.

2.3.2 The primary school Islamic Education curriculum in Saudi Arabia

This study was applied in a primary school in Saudi Arabia and focused on the Islamic Education curriculum. I chose this curriculum because my background is in Islamic Education and I had taught this curriculum in the past. In addition, this subject occupies the largest share of the primary school timetable and most Islamic Education teachers continue to use traditional methods (Aljalad, 2006). To make this curriculum clear, I present a summary of it below, after elucidating the aims of education at the primary stage in Saudi Arabia and the Ministry's policy towards primary education.

The "Policy Document on Education in Saudi Arabia 1978" (Al-Ghanem, 1999) sets out the aims of education at the primary level, the major aims being to:

1- Instil the practice of good conduct and virtues;

2- Develop life skills and skills in literacy and numeracy;

3- Provide relevant general knowledge;

4- Develop artistic and creative abilities;

5- Develop consciousness of the child's duties and rights within their level of experience;

6- Prepare students for the next stages of life.

I now give a brief overview of Islamic Education in Saudi Arabian primary schools. The Ministry of Education introduced a new strategy for Islamic Education in primary schools commencing in the year 2005. The time allocation for subjects within Islamic Education is shown in Table 1, below.

Table 1: A brief overview of primary Islamic Education curriculum in Saudi

Years / Modules	Class per week					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
The Holy Quran*	7	7	7	6	4	4
Monotheism	1	1	1	1	1	1
Islamic Jurisprudence and behaviour	1	1	1	1	2	2
Alhadeth and biography	-	-	-	2	2	2

*The holy Quran lessons include reading, memorising and Tajoid.

Table 1 shows the Islamic Education primary curriculum in Saudi Arabia. The first module is the Holy Quran, that is, the sayings of God. The Holy Quran has more lessons than any other module because it is very important for Muslims; it includes reading, memorising and Tajoid. Tajoid is how to read the Quran. This module teaches pronunciation of words. The second module is Monotheism, that is, learning Islamic theology and faith. The third module is Islamic Jurisprudence, which explains the rules and laws of Islam, and behaviour, that is, learning social skills. The fourth module is Alhadeth and biography, that is, the sayings of the Prophet Mohammed,

some history of the Islamic religion, and some events of the Prophet Mohammed's life (Ministry of Education, 2002). The next section describes the ICT and technology in primary schools in Saudi Arabia.

2.3.3 ICT and technology in primary schools in Saudi Arabia

The Ministry of Education has a long term vision of deepening integration of ICT in educational system, by providing schools, particularly primary schools, with ICT, computer laboratories and learning resource centers. To speed the process of implementation of ICT in primary schools, the MoE has begun transformation of school libraries into learning resource centers. These learning resource centers provide teachers and students with various educational materials such as books, tools, IWBs, CDs, DVDs, applications, educational software, CD-ROMs containing presentations, photos and video clips, educational games, graphics and enrichment of different materials, and with access to the Internet. Most of these resources are directly related to curriculum, which has lead to a significant enhancement of learning and teaching environment (The Ministry of Education, 2002). Moreover, learning resource centers includes rooms for self-learning and are open for all subject teachers, including Islamic education teachers. In addition, students are encouraged to use all these resources in full measure to gain valuable knowledge, skills and new experiences (MoE, 2002).

However, in some primary schools, even if there were computer laboratories and learning resource centers specifically designed for learning and teaching with the computer, they were either used for training students rather basic skills of computer use or students used these centers for playing games in their break times (Bingimlas,

2010). In this regard, this study attempted to encourage Islamic education teachers to use learning resource centers and computer laboratories in their lessons effectively.

2.3.4 Islamic Education curriculum and creativity

There have been many attempts by contemporary educators to develop the teaching of Islamic Education through the use of teaching tools or pictures. However, these trials still need real enhancement because they encompass knowledge of content rather than the objectives of Islamic teaching, its relation with life, and the nature of contemporary humankind, including thinking methods, conduct, moods, values, directions, interests, expectations, challenges and future cultural views (Aljalad, 2006).

The Islamic Education curriculum in many Islamic countries is a traditional one. Their main aim is memorising the religious texts and identifying some religious cases. These are sublime objectives but are not enough to form an effective Islamic personality that is able to achieve the Islamic way of life, including the skills of dealing with contemporary problems and their challenges. This personality would have excellent Islamic values of good conduct with others. Muslims start off from the fact that Islamic rules shape human behaviour. Behaviour depends on thinking and belief. Therefore, if Islamic Education wants to achieve right understanding and good behaviour, then Islamic Education must start from thinking. However, if Islamic Education continues to revolve around memorisation and dictating, students' personalities will not develop to full maturity. They will continue to be unable to face obstacles or address problems of the internal self or those of external origin (Aljalad, 2006).

Creativity education is considered the main way into reshaping learning and teaching generally, and learning and teaching Islamic Education specially, and is a huge field for research. Certain aspects of Islamic Education in the Quran and Alhadeth concern the development of various thinking skills. The Quran and Alhadeth have many educational affordances, such as dialogue, reciting stories and thinking. These enable the human mind to extrapolate, generate evidence, classify, compare, deduce and analyse. These skills may be developed through the teaching of thinking by brainstorming and creativity. For example, the Holy Quran subject has many verses which provide food for thought, such as questions without answers, stories from long ago and the huge creatures which God created. Moreover, the Alhadeth subject has many sayings of the Prophet Mohammed that promote thinking, for instance, self-dependence, dialogue with companions, assimilation, comparison, promotion of new ideas and the encouragement of reading and learning. Thus the content of the Islamic Education curriculum has many features which may be used to develop thinking skills, (Mualem, 2009) which will be explained later, in the chapter four in section "Thinking skills in Islam".

Consequently, the Ministry of Education in Saudi Arabia has attempted to integrate thinking skills into school curricula, including the Islamic Education curriculum, through its Comprehensive Curriculum Development Project. The aim is to foster the development of higher mental skills such as critical thinking, creative thinking and problem solving. The implementation of these new curricula started in 2007. The Ministry of Education provided a teachers' book called "Teacher's guide to developing thinking skills" to help them teach these thinking skills (Ministry of Education, 2002).

These thinking skills were embedded in the new textbooks. An example will now be given of a lesson in the new Jurisprudence textbook for the sixth-grade, to give evidence of some of the skills and activities involved; this is the "Eid prayer" lesson (Jurisprudence textbook, p.11). The lesson begins with an explanation of the social meaning of Eid as a day of joy and pleasure that renews relationships between people.

The first activity: "Read the previous article carefully and explain your practical program for the feast day in the following table:"

Time	Activity

The second activity: "Use the outline cards below to write greeting cards for your father, mother, uncle, aunt, friend and next-door neighbour:"

The third activity: "There is some wrong behaviour in this list of things which may happen at Eid. Write your opinion of these behaviours. To get more information to help you there are some specialist websites on the internet (websites written)."

The fourth activity: "Review the learning resources your teacher has provided, to make sure you know why the festival is called 'Eid'."

The fifth activity: "By referring to the book "Guidance to the style of the best one among Muslim people" for Ibn Alqaeem, sum up the style of the Prophet Muhammad during Eid.

During these activities, students were given the opportunity to express their own opinions, and had practice in planning, research, and expressive writing.

It is noteworthy that the new textbooks have included activities to encourage thinking skills; however, where the problem lies is how to teach these skills. As reported by Aljalad (2006), most Islamic Education teachers still use traditional methods. Consequently, the next section outlines some studies conducted in Saudi Arabia which have looked at the teaching methods currently employed by Islamic Education teachers and which have made recommendations for improved teaching methods. So, the researcher in this study decided to focus on teaching the skills of creative thinking and chose the method of electronic brainstorming, as explained in the objectives of the study.

2.3.5 Previous research studies in Islamic Education in Saudi Arabia

Many studies have found that most Islamic Education teachers use traditional methods in their lessons such as Almofada (2000); Alassem (2001) and Al-Shafi'i (2004). Although some of these studies have suggested the use of brainstorming as a more effective teaching method, I was not able to find any study using electronic brainstorming in the classroom to improve the learning environment. For example, the study by Almofada (2000), entitled "Most important problems of the teaching of Islamic Education in primary schools in Riyadh", aimed to identify the most important problems in teaching the subject; it formulated proposals to overcome these problems, to develop the curriculum and to improve teaching. The major finding was that

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educators agreed that the teaching methods employed in Islamic Education lacked excitement and did not inspire the students' interest. One of the main recommendations was to make the teaching of Islamic Education more interesting and exciting in order to hold the attention of students.

Secondly, the study by Alassem (2001) entitled "Evaluation of teaching methods during Qur'an lessons in schools for the teaching of Qur'an". The researcher carried out the study to evaluate the current methods used by teachers of the Qur'an, in order to improve these methods and motivate teachers to adopt new methods to enable students to master the recitation, memorisation and understanding of the Qur'an. The sample of this study was 25 teachers of the Qur'an and the researcher used a questionnaire for data collection. The most important results of the study were that a large percentage of teachers of the Qur'an only used traditional methods and they were not willing to make a major effort to change their teaching. Furthermore, the reason for students' weakness in the Holy Qur'an in these schools was that the teaching methods were old-fashioned and traditional. Most teachers had not adopted more up-to-date methods. The researcher recommended that Qur'an teachers should use modern educational methods throughout the course.

Thirdly, there was a study by Al-Shafi'i (2004) entitled "Causes of the drop-out of students from the study of Islamic Education in Saudi Arabia". This study used a questionnaire to collect data, sent to one hundred teachers in intermediate and secondary schools in Saudi Arabia. The aim of this study was to identify the most important problems facing Islamic Education in schools, which were likely to cause drop-out of students from the course. The main result of this study was that student drop-out was caused by the use of traditional teaching methods that did not permit student participation. Teachers did not even use teaching aids in their lessons.

Fourthly, the study by Esmail (2005), entitled "Learning using brainstorming strategies", claimed that brainstorming strategies were adopted in many subjects, including Islamic Education, because they made learning processes more active. An important aspect of using brainstorming in the classroom was found to be the promotion of creativity skills. The research showed that environments in which learning was supported by using brainstorming strategies encouraged students to improve their creativity skills. However, it was found that most teachers, especially in Islamic Education, used traditional methods and had not incorporated brainstorming into their lessons.

A fifth study which I found came from the United Arab Emirates, which has the same problems and similar culture because it is located next to Saudi Arabia. The study, by Aljlad (2007), is entitled "The Effectiveness of Using Brainstorming Strategy on Fifth Grade Students' Achievement and Development of Their Creative Thinking Skills in Islamic Education in United Arab Emirates". The aim of this study was to investigate the influence of using brainstorming to develop creativity skills in fifth year students, and to investigate the possibility of changes to teaching methods in Islamic Education. The result of this study was that there were statistically significant differences between the control group, which used traditional methods, and the experimental group, which used brainstorming. This study recommended the use of brainstorming in teaching Islamic Education. This study may contribute to teaching in this region because there have been so few studies in the Arab world dealing with the development of creative thinking in Islamic Education.

These research studies have attempted to develop the learning environment in different ways. They have also suggested some new teaching methods for Islamic Education in light of the fact that most Islamic Education teachers still use traditional

methods. Consequently, the present study attempts to improve the learning environment in Islamic Education lessons in Saudi Arabia with a new method, that of electronic brainstorming. The importance of the present study is highlighted by the findings of the few existing studies described in this section, which concur with the experience of the researcher as a teacher of this subject in Saudi Arabia.

Finally, this chapter has presented an overview of the Saudi educational system. The next two chapters (3 and 4) will focus on a review of the literature related to the key issues in this study and its aims, including: the effects of EBS, as an application of ICT, on increasing students' interest in Islamic Education; the effects of ICT and EBS pedagogy in helping students to understand Islamic Education and its features; the effects of ICT and EBS pedagogy on promoting students' creative thinking skills and dialogue within their educational context; and ways of measuring students' creative thinking ability. Consequently, it is necessary to focus in the next two chapters on the position of electronic brainstorming (EBS) in the educational field and, since EBS is considered a kind of technology, it is essential to examine ICT and its standing in educational studies and explain its advantages for education. In addition, Chapter 4 examines creativity skills including their definition, the types of creativity skills and their place in teaching. Given the focus of this study on the Islamic Education curriculum in Saudi Arabia, Chapter 4 offers a quick overview of the concept of thinking in Islam.

2.4 Chapter summary

This chapter has focused on giving an overview of the education system in Saudi Arabia, its policy and the aims of the primary stage, which are relevant with the context of this study. Illustrations have been presented of the Islamic Education

primary school curriculum, which is the area targeted in this study. The learning environment of the primary stage has also been described. The recent development projects which have introduced thinking skills to the Islamic Education curriculum have been outlined. Finally, this chapter has reported the findings of studies of Islamic Education in primary schools. The next chapter presents a review of the literature on EBS and ICT topics relevant to this study.

Chapter Three: Electronic Brainstorming and Information and Communication Technology

3.1 Introduction

This chapter constitutes the first part of the literature review for this study. It is divided into three areas. The first area focuses on electronic brainstorming (EBS), including its definitions, types and methods. The second area explores the use of technology, and information and communication technology (ICT), in education, while the final area concerns the integration of this technology with pedagogical methods and emphasises the affordances of ICT.

3.2 Electronic brainstorming (EBS)

This section examines the definitions of EBS, its types and methods, as well as the comparison of EBS with Verbal brainstorming (VBS). Finally, the advantages and disadvantages of EBS are enumerated.

3.2.1 Introduction

Coined in 1953 by Alex Faickney Osborn in a book called 'Applied Imagination,' brainstorming has become a popular group technique that has aroused attention in academia (Holubová, 2010). Brainstorming is a group creativity technique whereby a group tries to find a solution for a specific problem by gathering a list of ideas spontaneously contributed by its members. Multiple studies have been conducted to test Osborn's postulate that brainstorming is more effective in the process of generating ideas than individuals working alone. Yet, some researchers have concluded that brainstorming is not that effective, whilst others uncovered flaws in their research and determined that the results were inconclusive. Nevertheless, several variations have been designed to improve the productivity of brainstorming. One such

variation is called 'electronic brainstorming,' whereby its use may eliminate some perceived barriers encountered with traditional (verbal) brainstorming (Holubová, 2010). Therefore, the next section will examine the concept of the electronic brainstorming in more detail.

3.2.2 Definition and stages of EBS

Electronic brainstorming is a computerised version of the traditional (verbal) brainstorming technique typically supported by an electronic meeting system (EMS); however, simpler forms may be conducted via email, browser-based, or peer-to-peer software. With an electronic meeting system (EMS), participants share a list of ideas over a network (Easton, 1992). Ideas are entered independently and may be entered simultaneously, without having to wait for their turn. Hence, individual contributions become immediately visible to everyone and responses are anonymous to encourage openness and reduce personal bias. Modern EMSs also support asynchronous brainstorming sessions over extended periods of time, as well as typical follow-up activities in the creative problem solving process, such as categorisation of ideas, elimination of duplicates, assessment and discussion of prioritised or controversial ideas (Gallupe et al. 1992). Clearly, the modern EMSs are a demonstration of how technology can change and eventually improve the traditional brainstorming.

Gallupe et al. (1992) asserted that electronic brainstorming eliminates many of the problems of standard brainstorming, including production blocking and evaluation apprehension. A perceived advantage of this format is that all ideas can be archived electronically in their original form, and then retrieved later for further thought and discussion. Electronic brainstorming also enables much larger groups to brainstorm on a topic than would normally be productive in a traditional brainstorming session

(Gallupe et al. 1992). Some web-based brainstorming techniques enable contributors to post their comments anonymously through avatars. This technique also allows users to log on over a certain period of time, typically one or two weeks, to offer participants some "soak time" before posting their ideas and comments (Easton, 1992). This technique has been used particularly in the field of new product development, but can be applied in any number of areas requiring collection and evaluation of ideas, such as education. Electronic brainstorming, by the virtue of computer technology, is capable of reaching and engaging into its process far more people that would be feasible with the traditional form of brainstorming.

Therefore, brainstorming is often described as a means of getting a large number of ideas from a group of people in a short time. There are six stages of brainstorming: State the problem and discuss; Restate the problem; Select a basic restatement and write it down; Warm-up session; Brainstorm; and finally wildest idea (Sefertzi, 2000). Furthermore, these stages follow a set of four rules establishing a non-evaluative situation and enhancing the process of idea generation: criticism is ruled out; free thinking is welcome; quantity is wanted; and combination and improvement are sought (Michinov and Primois, 2005).

This section outlined possible benefits of using electronic brainstorming, from which the most important one is the ability to integrate large group of people into a discussion or decision process. These people are then 'shielded' by the anonymity provided by electronic brainstorming, hence, presumably, their creativity and quantity of inputs are encouraged as any form of criticism is technically ruled out.

3.2.3 Electronic brainstorming in education

In an educational setting, the pressure to perform is ever-present and thus creating stress among students and educators. When educators introduce new concepts for student mastery, these concepts entail various teaching methods to accommodate the various learning styles of students. One of such new idea is the electronic brainstorming that could be beneficial in certain learning situations by, for instance, engaging students without fear of retribution from their peers, enhancing their learning of course material and their sharing of information (Holubová, 2010). Such benefits can be well illustrated in the educational process. In contrary to electronic brainstorming, throughout the standard brainstorming, students may be hesitant to render their ideas for fear of premature judgment and peer ridicule; therefore, potentially great ideas are suppressed. Furthermore, while conducting whole class discussions about a particular subject, educators could include electronic brainstorming as a teaching tool, whereby each student could participate anonymously and therefore more fully (Easton, 1992). In another illustration, this tool could be used in small group settings in which students work on projects together but in which some may be intimidated by other members of the group. Consequently, by employing electronic brainstorming, one could avoid the situation where productivity is hampered because of team dynamics and students being reluctant to share their thoughts and feelings about a topic, and thus affecting creativity. The benefits of using electronic brainstorming in classes are based on anonymity which supports increased numbers of ideas being created. Moreover, given the flexibility of the ICT, these ideas are floating around in real time without any delay, thus further encouraging emergence of a creative environment in which students can post their

ideas and react on ideas of their peers immediately, thereby advancing these ideas in mutual discussions.

Additionally, electronic brainstorming may prove beneficial to the educators as well. In-service meetings are professional requirements, and often brainstorming sessions are integral to this process: rendering suggestions to improve student learning, teaching techniques or school policies. Such educators are experts in their respective fields; unfortunately, in this open discussion forums, productivity is hindered because of the inadequacies of verbal brainstorming, such as free riding, evaluation apprehension, blocking, social matching effect and the illusion of group productivity (Gallupe et al. 1992). To bypass such inadequacies, a computer-aided approach for dealing with multiple experts would be prudent. In illustration, each educator will have a laptop at the meeting, with the posed issue or question visible on the computer projection. Subsequently, each educator presents his or her opinions through their laptops without having to wait for his or her turn. Comments or suggestions are displayed electronically on a large screen without identifying the source. Moreover, this approach protects the introverted experts and prevents tagging comments to individuals (Coskun, 2011). In results, the benefits include improved communication and more effective discussion regarding issues that warrant input from all stakeholders. Electronic brainstorming thus offers similar benefits to educators as to students, and therefore it is clear that implementation of electronic brainstorming in the educational system might entail positive changes for both sides of the learning process. However, there are some negatives in using electronic brainstorming, which will be mentioned later.

In another demonstration of the possible use of electronic brainstorming, Pinsonneault et al. (1999) in their study inform, that electronic brainstorming was offered by management information system (MIS) researchers as a solution to alleviate the aforementioned problems inherent to group brainstorming, such as production blocking and evaluation apprehension, while enhancing its strengths. Electronic brainstorming was used to implement the brainstorming treatment. With this tool, a group of people, each at their own computer, exchange ideas typed on unnamed idea collection dialogs. At any one time, a participant is only able to see the ideas in one dialog, but is able to move to another dialog at will, with or without entering an idea. Thereby, the multiple dialogs are automatically rotated among participants as ideas are submitted. The foregoing underlines the already mentioned benefits of utilising electronic brainstorming in educational system.

However, the one important question about electronic brainstorming (as an application of ICT) is whether it has advantages over verbal brainstorming. In this regard, Craft (2005b) offers a model for using ICT to support learners' creativity in the creative subjects of the primary curriculum, in light of the challenges for teachers and schools to find ways of making time available in a crowded curriculum. In my study, I am going to use a brainstorming method with ICT tool during teaching as it can help to draw out and develop creative ideas (Gowan et al., 1967). In addition, brainstorming involves a measure of critical thinking to evaluate which ideas work and which do not (Mathilda, 2001). Brainstorming is a simple and widely known strategy for promoting creativity skills and is suitable for use by both young children and adults. It has a substantial history as a management technique, having been invented and used during the 1930s by Alex Osborn (Sefertzi, 2000). To further

elaborate on the question from the beginning of this paragraph, the differences between electronic brainstorming and verbal brainstorming are examined.

3.2.4 Electronic brainstorming vs. verbal brainstorming

Ultimately, the goal of brainstorming is to solicit potential creative solutions to a problem or issue. The Osborn's central hypothesis maintains that listening to the ideas of others should spur idea generating of new ideas. However, creativity may be affected when the verbal brainstorming methods are employed. Osborn postulated four general rules for conducting brainstorming with the intention to reduce social inhibitions among group members, stimulate idea generation, and increase the overall creativity of the group (Cooper et al. 1990). By extension, the participants of such conducted brainstorming should strive to following: focus on quantity, withhold criticism, welcome new ideas, combine and improve ideas. Yet, certain inadequacies have emerged through application of the verbal brainstorming method.

These inadequacies were classified into five processes that derailed brainstorming efforts, as identified by Stroebe et al. (1992). These were: free riding, evaluation apprehension, blocking, the social matching effect and the illusion of group productivity. With free riding, individuals may feel that their ideas are less valuable when combined with the ideas of the group at large. Indeed, Stroebe et al. (1992) demonstrated that even when individuals worked alone, they produced fewer ideas if told that their output would be judged in a group with others than if told that their output would be judged individually. Similarly, the evaluation apprehension was found to occur when personal evaluation was warranted, but if the expectation was to gather a collective assessment, then evaluation apprehension had a marginal effect. Blocking, however, had a profound effect on brainstorming. Blocking describes the

reality that only one person may gainfully voice his or her ideas in a group at any given time. In essence, one person would have to wait to render a suggestion, and during this time, another person may forget his or her response. Such a delaying effect could reduce the generation of ideas, which then tend to be suppressed or even subsequently forgotten. Furthermore, due to the social matching effect, individuals have a tendency to match their own level of productivity with that of others in the group. When one or a few group members feel that they are contributing more to the brainstorming process than the others, they tend to reduce their overall contribution to the group. Lastly, the illusion of group productivity is evident as groups use to overestimate their productivity. Unfortunately, groups rarely have objective standards to determine their performance, thus resulting in individual members having to "guesstimate" the group's effectiveness and individual contribution levels subjectively by themselves. It can be concluded, therefore, that such brainstorming inadequacies refute the central hypothesis held by Osborn. In fact, research indicates that the act of listening to others may even stifle creativity (Cooper et al. 1990).

The evidence provided in this section support the relevance of this work's focus on the electronic brainstorming as a potential way of overcoming the limitations related to the traditional methods of brainstorming. In the next section, the types and tools of EBS are explained.

3.2.5 Types and tools of EBS

According to Alothman (2006), there are two main types of methods used in electronic brainstorming. First, there is the method of one computer (lonely computer). This method requires using only one computer and it is similar to the traditional method but it abolishes the blackboard. Students are motivated to start

thinking creatively by the computer, and every member in the group shares their first ideas. They are encouraged to move from these first ideas to practical solutions and to note them, and then all ideas represent an input for the computer. Second method is the method of multiple computers, where every member in the group has a private computer, and begins the thinking process around the problem from a different direction. Such a process generates many ideas, and the leader of the group is responsible to put these ideas in order. The method of one computer per child is ideal when the following conditions are available:

- If group members are able to work alone and to think creatively in any location.
- If the aim is a gradual transformation of traditional creative thinking into creative thinking on the computer.
- If the group members are good at playing roles, like creating ideas alone, and do not like spontaneous or unregulated discussions.

There are many tools that can be used with electronic brainstorming. Firstly, electronic mail groups, which are composed of people who share the same interests. A problem is delineated and distributed to members. It is here that the role of the leader will appear, because this method is similar to the traditional method, but it differs in not being located to one particular place or time. Many contributors may be participating whereby more than one school shares the problem, but time is limited. Secondly, forums, in which the case (problem) is displayed, discussion are opened for all, and the teacher helps the students in searching for solutions, if required. The two previous tools are rather traditional. This second method is considered suitable for website owners, who can state their ideas simply and take suggestions from visitors of

their site. I personally used this tool in my study in the classroom. I designed a website for students where they could have discussions regarding solutions to the problems posed by the teacher from the curriculum. Moreover, students' opinions about this problem were shown on an interactive whiteboard, as will be further explained in the Methodology chapter (Chapter 5). Thirdly, there are new, ready-made, programs available yet they may need to be changed to be suitable for the specific students' age-groups and the subjects being studied. These programs are produced by specialists such as: Group Systems, Brainstorm Bungy, Brainstorming Toolbox, Brand Delphi, Dss InfoTech, Solutions Genie, Windows Graphical Brainstorming Tools, Para Mind Brainstorming Software and Software for Brainstorming and Mind Mapping (Alothman, 2006). In addition, there are other programs such as Idea Generator Plus and Idea Fisher (Sefertzi, 2000).

The aforementioned tools enable students and others participate directly and automatically. The structure of the program eliminates the need to identify the participants, so any embarrassment for individuals can be avoided. The benefits of using these tools are numerous: the large number of participants, questions posed without giving away clues, ideas speedily identified when needed, main subjects developed quickly and problems were solved without a delay. This third method incorporates an electronic survey revealing results clearly for all participants, what consequently ensures a high level of sharing in evaluation of contributions, generates many good ideas, gives consistent results, and reduces the role of the leader thereby enabling him/her to focus on more important tasks. Finally, electronic websites such as the above-mentioned allow people who are interested in the same field to contact each other to share ideas and opinions in brainstorming sessions through programs, electronic dialogue or e-mail. Examples of such websites are:

http://www.theworldideasfactory.com/small-business-ideas.htm

http://www.facilitate.com/productfunctions_brainstorming.htm

http://www.advancedstrategycenter.com

(Alothman, 2006).

http:/ideaprocessor.citi.doc.ca

http:/www.maxthink.com

http:/www.ozemail.com.au

http:/www.inspiration.com

http:/www.signet.com.sg/axon2000

(Sefertzi, 2000).

As this section demonstrated, there are various tools that can help to facilitate electronic brainstorming whilst getting the most of its advantages. How these tools can be employed efficiently and in cooperation to provide the best results is the focus of the following section.

3.2.6 Methods of electronic brainstorming

There are three methods of electronic brainstorming that use programs and websites only. First, paralleling (synchrony), where members enter their ideas at any moment, which then appear simultaneously for all members. Second, group memory (asynchrony), where members enter their ideas and these ideas are saved. These two methods show the name of each person. Third, secrecy (synchronic or a-synchronic), where ideas are put forward anonymously; this method often produces surprising and excellent ideas (Alothman, 2006). It can be said that these sessions must be available for all the participants; ideas and information must not be censored because this delays the development of the creative environment. The internet is ideal in

distributing creative ideas to all participants. By using electronic brainstorming, participants are able to create new ideas and process tasks easily.

The electronic brainstorming typically involves individuals typing their ideas about an issue on a computer while they are exposed to ideas generated by others doing the same task in other groups. Also, electronic "group brainstorming" entails from 4 to 18 individual brainstorming taking place at the same time in a room specially designed for such group activities. Facilitators often guide the process from the instruction phase to later phases in which there is group consensus **(**Isaksen and Gaulin, 2005**).** Groups generate ideas on a specific subject on individual computers that are connected to a central computer. This central computer gathers the generated ideas and controls their display on a large screen at the front of the classroom (Pinsonneault et al. 1999), this is an advantage. Naturally, as with any method or tool so with EBS.

Furthermore, the study addresses methods and types of electronic brainstorming. In this regard, it is worth noting that Mind Mapping can be seen as a kind of brainstorming, generating new ideas and helping to set them into a context (Alexandra and Okamoto, 2001). Thus, this study is aware of Mind Mapping's importance and its crucial role in generating ideas. However, it could be argued that Mind Mapping requires extensive training for teachers and students, hence the increased demand on time for applying this method in schools. Furthermore, Mind Mapping relies on use of special software that is not readily available in most Saudi schools. In addition, the research design of this study focused on EBS, VBS and Traditional methods, thus it would not be fair to use Mind Mapping in one or two (EBS and VBS) methods and not in the other whilst all methods are being compared. Finally, this study focused on divergent thinking through brainstorming, yet Mind Mapping provides opportunities for convergent thinking (Alexandra and Okamoto, 2001). Based on the

abovementioned, this study excluded Mind Mapping due to its lack of compatibility with the research design.

There are certain advantages and disadvantages related to its use. Therefore, the next section will examine this issue in more details.

3.2.7. Advantages and disadvantages of electronic brainstorming

In this study, electronic brainstorming was chosen for its numerous advantages. In an optimal environment, brainstorming groups can outperform verbal groups (Coskun, 2011). An embracing group system, as in electronic brainstorming, enables individuals to submit suggestions on a computer that become instantaneously visible, even if anonymously submitted, to the entire group. Hence, this method removes the effect of blocking as ideas can be communicated immediately upon being generated. Additionally, electronic brainstorming leads to convergence of ideas, helps to set final specifications, and results in a joint ownership of the solution (Coskun, 2011). Furthermore, it allows students to work in their own ways. In addition, it provides fast and easy communication methods which transcend borders, time zones and cultural differences. Also, it opens up opportunities for students to explore their creative skills, and can help to develop many skills more effectively than traditional methods. Moreover, it facilitates the involvement of students with physical or cognitive disabilities, and improves students' and teachers' overall skills in using technology (Comenius and Technology, 2005).

Presumably the most important advantage of electronic brainstorming stems from the way it reduces the harmful inhibiting effects that occur in verbal brainstorming, such as production blocking, evaluation apprehension, social loafing and social comparison (Michinov and Primois, 2005). By and large, the advantages of EBS over verbal

brainstorming can be categorised as 'efficiency advantages' and 'stimulation advantages'. In the case of verbal brainstorming, members who participate in the group cannot see ideas being produced, so one idea may be generated by several persons in the group. On the other hand, users of EBS can see other people's ideas on their screens and this reduces the time wastage in generating ideas as members of nominal groups. Also, working in a group encourages members to do better than when they work individually. Seeing others' ideas on a screen makes persons in EBS groups more creative and productive than in verbal brainstorming groups (Pinsonneault et al. 1999). Because EBS increases anonymity it reduces evaluation apprehension and, as a result, produces a greater number and variety of ideas, more new topics, and increased participation (Isaksen and Gaulin, 2005).

Research on EBS has also focused on issues of equality of influence, and quality of decisions by the use of the e-mail opposed to face-to-face meetings. Formal hierarchy has been found to reduce the benefits of using EBS, as there are negative effects of formal hierarchy on real groups, such as reduced sharing, elaboration or flexibility of thinking (Isaksen and Gaulin, 2005).

Electronic brainstorming has in several ways improved the basic concept of brainstorming. Brainstorming or group idea generation through verbal interaction was introduced with the notion that it would be a more effective method of generating ideas compared to the nominal group technique (individuals working alone). Group members in brainstorming sessions were encouraged to generate as many ideas as possible without regard for quality. Participants articulated the ideas that came to mind and were instructed not to criticise or evaluate as the ideas were being presented to them. Also, group members were persuaded to build upon the ideas of others. Yet, electronic brainstorming is a technique where computerised software is used to

generate ideas. In the brainstorming individual or group of individuals usually have less time to think due to time constraint. Also in group brainstorming, the individuals do not take much interest because of fear of evaluation and criticism, yet in EBS individuals are independent in generating and presenting ideas. In education, EBS is being used as students use e-libraries to gather data for their assignments (Michinov and Primois, 2005). Similarly, DeRosa at al. (2007), conducted a meta-analysis examining the effect of electronic media communication on the idea generation of groups. The purpose of this study was to compare verbal brainstorming groups with electronic brainstorming groups. The study concluded that the groups which used EBS were more creative and productive as compared face to face (FTF) groups. The authors suggested that electronic brainstorming could be effective if applied in academic and institutional settings.

Technological innovation, whether the invention of the printing press in the fifteenth century or the latest information technology, acts as a powerful driver for the development of education. Many institutes of higher education have adopted CMSs and other information technologies to supplement traditional face to face instruction and to provide distance learning (Greene, 2001; Pollack, 2003 and Bickelmeyer and Molenda, 2006).

In conclusion, it is claimed that electronic brainstorming has the potential to eliminate some perceived barriers encountered with verbal or traditional brainstorming. Notwithstanding these barriers related to either electronic or traditional brainstorming, brainstorming itself is considered a popular method of group interaction in both educational and business settings. Although experts continue arguing about its productivity, brainstorming is still a widely used method for developing creative solutions in a group setting. As variations and improvements evolve, brainstorming

research will ensue to study its productivity effectiveness. Within the educational arena, its use will improve student engagement and educators' contributions to academic causes insofar as viable solutions are spawned from uninhibited input, thus resulting in a higher probability of quality problem solving.

However, EBS is just one of many kinds of technologies being implemented into educational process. Therefore, the following section examines the broader matter of how the literature tackles the issue of the overall increased use of technology in education.

3.3 Integration of Technology and ICT with learning environments

This section presents some current literature on the integration of technology and Information and Communication Technology (ICT) in education, the barriers to use of technology and ICT in education and the affordances of technology and ICT in education. It must be pointed out that this is a limited survey focusing on literature that seemed relevant to this particular study.

3.3.1 Introduction

In this study, EBS was used as an example of application of technology and ICT in the classroom. In this section, I begin by explaining a critical component of the theory of constructivism - the concept of proximal learning - based on the work of Vygotsky (1978), which posits that learning takes place when the learner completes tasks for which support (scaffolding) is initially required. This support may include a tutor, peer or computer application. This has led to the use of the term 'computer supported learning.' Computer supported learning environments are those in which computers are used either to maintain a learning environment or to support the student-learner in Vygotsky's sense (Mevarech and Light, 1992). The technology and ICT are therefore

used to help create the types of learning environments and the types of support for learning that are known to be ideal.

The aim of integration of technology and ICT into education is to create learning environments centred on students as learners based on a belief that they learn more from what they practice and think about than from what they are told. If the aim is to offer new learning opportunities, or to improve the way in which current learning activities are implemented, then the overall effectiveness of learning environments and episodes is of paramount concern. Thus, the fact whether they are more effective with or without computers are of lesser relevance. It is significant that the ever-changing nature of computer-based technology does not dominate the permanent nature of learning or the solid and ever increasing base of knowledge about learning. This knowledge is not superseded by new technologies; rather, it can inform the use of new technologies when applied to learning. Therefore, for implementing computer support of learning, it is necessary to start by deciding what teachers, educational institutions or schools want to achieve. Whatever the desirable outcomes, to achieve them, teachers can depend on long traditions of educational theory, their own experience and knowledge of the educational situation, for example of student attributes, to make decisions about what the learning environment should look like, and what inputs into the learning process are required. Finally, teachers or educational researchers can identify what problems are affiliated with providing these environments and inputs, and design suitable computer programs and other support to provide necessary solutions (Newhouse, 2002). Thus, evidently teachers and their ability to use the benefits offered by technology are critical for the process of integrating ICT in the learning process.

The foregoing describes an ideal situation when the right type of technology meets teachers able to use this technology within the existing structures of the learning system as the main goal is to enhance this system not to overhaul it. So far, the focus has been more on the role of teachers and schools in this process. Therefore, the next section provides an account of different ways of incorporating technology into educational system.

3.3.2 ICT and Technology in Education

There are many studies on the role of technology and ICT in education. Pedersen (2003) saw the computer as a means to perform traditional work better and more efficiently, but not essential to accomplishing assignments; she presented demonstrations and students performed calculations on computers. Preble and Gordon (2011) viewed computers as a way of transforming educational/learning processes by using them as means for students to ask and answer their questions using technology and ICT resources like the internet and multimedia authoring programs.

Many agencies and governments have devoted considerable resources for integrating technology in public primary and secondary schools. The Technology resources have taken many forms: hardware, software, professional development and technical support (Puma, et al. 2000 and Smerdon, et al. 2000).

The close connection between technology and education can be demonstrated on the example of the Information literacy. Information literacy (IL) is an essential skill to have in today's world. The American Library Association's (ALA) Presidential Committee on IL defines IL as a set of abilities whereby an individual is able to recognise the need for information, as well as to locate, evaluate, and use the needed information effectively (ALA Presidential Committee on IL, 1989). More specifically,

information literacy can be regarded as "the set of skills needed to find, retrieve, analyse, and use information" (ALA, 2007). As the world becomes more technologically advanced and dependent on the quick transfer and retrieval of information, IL will be equated with the ability to formulate informed decisions in many aspects of life. In post-secondary education, IL might be introduced through writing research papers or studying from textbooks; however, IL skills are not adequately obtained simply by doing basic coursework tasks alone (ALA, 2007). According to the Association of College and Research Libraries (ACRL) (2007), IL enables individuals to master content and extend the range of their search to become self-directed and obtain better control over their learning. Therefore, IL serves as a foundation for lifelong learning in that it can be shared between various learning environments and disciplines (ALA, 2006).

Marshall (2006) insists that instructors should design higher education courses that promote IL as the object of learning as well as the medium by which student learning can occur. In tandem with Marshall's views, ALA (2007) suggests that there is a need for an IL parallel curriculum in order to develop a solid base of IL in post-secondary education, but ALA does not elaborate further on the meaning of the term "parallel curriculum" with respect to IL.

The acquisition of appropriate and timely IL skills (i.e., in terms of online courses and online search) are important for graduate students, as the lack of these skills may affect graduate students' success in keeping up with the technologically oriented demands of their programs such as on-line courses, on-line research. Indeed, graduate students' lack of adequate IL skills can negatively affect their ability to perform research related tasks. Many researchers have concluded that IL skills are important for graduate students (Barrett, 2005; Beile O'Neil, 2005; Cannon, 2007 and Sadler

and Given, 2007). The IL skills represent the key to successful utilisation of ICT as these technologies, on the whole, are based on the need to transfer, receive and process a large amount of information every day. Therefore, a person lacking adequate IL skills might not be able to use ICT efficiently and thus deprive themselves from the full benefits that ICT offers.

Besides the research related to the importance of technological skill for students, there is also a wide variety of research on the importance of technology and ICT for teachers. Norton, McRobbie, and Cooper (2000) examined two questions in a case study of five mathematics teachers at a private girls' high school in Australia. The authors framed their study with two images of teaching and learning (transmission, or teacher-centred; and construction, or student-centred) that described teachers' beliefs about teaching and learning mathematics. The two foci of inquiry were: (1) the connections between teachers' beliefs about teaching mathematics and their attitudes toward using computers in their teaching of mathematics; (2) an examination of the ways staff discourse facilitated or hindered the use of computers. The authors conducted the research at a school with substantial technology and ICT resources in which the student to computer ratio was 2:1. Based on initial survey data from eight mathematics teachers, Norton et al. (2000) selected three senior teachers to be interviewed and observed. The authors chose the participants based on the criterion that these teachers were educational leaders whose ideas have strongly influenced the way mathematics was taught. In other words, "their ideas, actions, and beliefs about the nature of mathematics and their images of teaching and learning" (p.90). Two of the three teachers represented the teacher-centred transmission mode of teaching and one teacher represented a student-centred constructivist mode of teaching.

In a study on the acceptance or rejection of technology and ICT in the classroom, Laffey (2004) selected participants from a large initial pool, looking for "evidence of technology use and ways in which students showed valuing or resisting the use of technology" (p.364); in this sense meaning acceptance or rejection of technology. As the study progressed, Laffey noted that new students entering the education program had more experience with technology. Their technology and ICT comfort level rose because of prior experience before entering the program and the training they received in the program. However, as they worked in the Early Childhood Education (ECE) program, gaining understanding of ECE classrooms and the expectations of administrators and parents, they anticipated lower levels of technology use (thus, rejection of ICT) in the classroom with students. ECE pre-service teachers felt their students would be too young to be taught to use technology; they argued for concrete empirical experience. Laffey's findings have shown that participating pre-service teachers planned to use technology outside the classroom (research, communication with peers and administrators, materials preparation) but resisted seeing technology as a part of their relationship with children. Again, rejecting ICT as an education innovation occurred even among teachers who demonstrated moderate to high efficacy with technology and ICT resources. However, this might be also explained by the type of interaction that is common in the ECE programs. This interaction is generally more personal, as pupils require more of face-to-face contact with their teachers. In addition, the amount of processed information in class is presumably lower than on higher levels of school system hence using ICT in ECE programs might not entail as much benefits. Therefore, the rejection of ICT might be seen in the context of the ECE programs' specifics rather than as a rejection of technology per se.

Analysis of explicit technology and ICT expectations as they have appeared in government policy papers during the past decade in Denmark forms the basis of Mathiasen's (2004) study of a Danish high school with extensive technology resources. In this school, all students and teachers had laptop computers. The author observed 10 teachers and 22 students over three years, the course of a Danish student through high school. He explored the expectation that communicative media, exemplified by the laptop computer, would change the nature of teaching and learning. He asked the following questions: what did teachers and students actually do when the intensive application of technology in teaching became a possibility? And, what were students' approaches to and experiences with the use of laptops in teaching?

Considering the foregoing, my study applied the method of electronic brainstorming using computers that incorporated a specially designed forum for students' ideas in which they could write their proposed solutions to the problems presented to them on an interactive whiteboard. In addition, it incorporated face-to-face debate between the students and a teacher after the completion of the presentation of views on the interactive whiteboard. This method has met certain level of resistance in form of various barriers as it was new for Saudi primary schools. The next section gives an account about some general difficulties and obstacles to the integration of technology and ICT in education.

3.3.3 Barriers to integration of technology and ICT into teaching and learning

Integrating technology and ICT into education is a complicated action and as such it may face certain obstacles (Schoepp, 2005). Some of these obstacles may be of

internal or external character (Rogers, 2000). For example, external barriers would be lack of time to prepare lessons, limited access to suitable hardware and software, and insufficient technical support. Muir-Herzig (2004) emphasises that the main barriers to integrating technology in schools are lack of time, limited access, lack of reasons for using technology, lack of teacher training support and the general lack of necessary skills. If schools do not supply sufficient support, training, time, and equipment, teachers may not be able to integrate technology into their lessons (Ertmer, 1999). Several studies have confirmed lack of time as a major barrier for teachers in using technology and ICT (Franklin et al. 2001). Other barriers include shortage of computers for teachers and students, shortage of suitable software, breakdown and slowdown in Internet access, lack of time to learn or practice, limited accessibility including home access, lack of pedagogic and advisor training for using technology in the classroom, insufficient part of class schedule set aside for students to use computers, not enough training opportunities, missing administrative support, inadequate support for integrating technology into the curriculum, and overall lack of technical support and advice (Smerdon, et al. 2000; Williams, et al. 2000; Downes, et al. 2001; O'Mahony, 2003 and Sicilia, 2005). These evidences point at conclusion that the main barrier to integration of technology into teaching and learning revolves around the human capital that educational institutions operate with. Teachers are the main facilitators and as such, they have to be equipped not only with means of ICT (software and hardware), but what is more important with they have to posses knowledge how to utilise these means effectively.

To underline the importance of integration technology in educational system, the following section explains many affordances of technology and ICT in education which allow learning processes to take place in a way that the traditional classroom

could not provide.

3.3.4 Affordances of Technology and ICT

In this section, affordance theory is explained, some previous studies dealing with the affordances of technology and ICT are outlined, and the application of the findings of these studies to the use of electronic brainstorming and technology in the present study are discussed.

Theory of affordance

The theories of affordance of information and communication technology and its development describe the attributes of the online technology's interaction with other learning elements including teachers, learners and the physical environment. Before introducing technology, the exact meaning of "affordance" should be clarified to define the role of online technology in the learning process. Gibson (1979) introduced the term "affordance" as a component of his theory of human perception (Day and Lloyd, 2007). Affordances are perceived opportunities for an action in the environment (Gibson, 1979). Also, affordances are defined as perceived potential utilities of an object (Oxford English Dictionary, 2010). Affordances can be based on the visual perceptions of the natural world (Gibson, 1979), as well as on industrial design (Norman, 1988), with the notion that our past knowledge and experiences are applicable to our perceptions of the things around us (Sadler and Given, 2007).

The term "affordance" has been used to refer to the ability of an organism to act according to the properties of its environment and its perceptual characteristics; there are also constraints on its action determined by the environment and its perceptual characteristics. A further definition of affordance is "the attribution for action

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potential provided," while constraints are the relationships between action guidance and the attributes that provide structure (Kennewell, 2001, p.106). This theory emphasises that perception of the environment directs the course of action (Learning Theories Knowledge Base, 2010).

James Gibson, the principal founder of the field of ecological psychology, and the chief promulgator of affordance theory, argued that one's behaviour (including information-seeking behaviour) should be studied in the context of one's environment (Sadler and Given, 2007). In "The Ecological Approach to Visual Perception," Gibson (1979) described the fundamental components of affordance: "The affordance of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. The verb 'to afford' is found in the dictionary, but the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarily of the animal and the environment" (Gibson, 1979, p.127).

Gibson claims that the world consists simply of things perceived by an organism in its environment. Thus, for Gibson, the world consists of affordances or opportunities for action. For instance, a large rock might be perceived by a reptile in a desert as a place to sunbathe, while for a human, that rock might be perceived as a building material. Hence, there is no unique use for the rock except for the affordance assumed by those who perceive it. The core concept of affordance lies in the relationship between an organism and the environment (Gibson, 1979; Sadler and Given, 2007).

From this point of view it cannot be said that constraints are the opposite of affordances, but they should be perceived as complementary and equally necessary for an activity to take place (Kennewell, 2001). Gibson's (1979) theory of affordances depended on the everyday objects designed by Norman (1988), who confused the concept of affordances. Norman showed the difference between two affordances: "perceived" and "real" affordances that determine usability are "perceived" affordances (Day and Lloyd, 2007). While Gibson's views of affordance were based on the visual perception of the natural world, Norman's (1988) were associated with industrial design (Sadler and Given, 2007). Norman supported the notion that our past knowledge and experiences are applicable to our perception of the things around us. Ten years later, Norman (1999) observed that individuals are able to interact with thousands of objects even though they might have only encountered them once before, explaining thus, that the appearance of an object can provide crucial signs necessary for its operation. This perspective suggests the necessity to distinguish between the intended use (and real affordances) of an object and its perceived affordances. For instance, affordances presented by a knife are defined by the individual who uses it, not necessarily by its designer. More specifically, although a designer envisaged the knife as a cutting tool, the user might not utilise the knife for cutting. While Gibson (1979) suggested that the knife does not have any affordance on its own, except when an individual has attributed a meaning to it, Norman suggested that the designer's real or intended affordance for the knife was for cutting purposes. Although there are debates in the field of ecological psychology about the nature of affordances (distinction and overlays between intended and perceived affordances), affordances' perspectives are a crucial area in the study of usability (Sadler and Given, 2007).

Categorisations of affordances based on Gibson's original ideas have been developed by other theorists (Norman, 1999). Gaver (1991), for example, working in the human computer interfaces field (HCI), put forward a definition which incorporated the idea of complex affordances, namely nested, grouped in space and sequential affordances (Gaver, 1991). Warren (1995), on the other hand, developed the concept of degrees of affordance, and pointed out the over-simplicity of Gibson's view about affordances as either existing or not existing. In addition to this, Turner (2005) suggested that affordances should be viewed as complex or simple affordances that include things like history and practice.

The concept of affordance regarding the use of technology will be discussed in the following section.

Affordance of technology and ICT

Technology, although just one component of the complex setting of the classroom, is important due to its special features which can be applied to the subjects of the school curriculum (DfEE, 1998), such as the easy amendment of work that has been carried out, immediate feedback to the learner, automatic processing of data, and capacity, speed and range of access to information. There is a difference between the nature of affordances and constraints of technology and ICT from the direct relation between the features of settings and the subject matter being taught. Furthermore, technology's abilities may affect the techniques and processes selected during the application of the subject. The introduction of technology and ICT that can change relationships within learning settings has a special place in the framework for teaching and learning in classrooms (Kennewell, 2001).

For example, there is a relationship between the subjects being learned and other generic matters like literacy and meta-cognition, and with technology, if it is included in the activity. For example, in a biology classroom, the task of describing the heart may be afforded by a large heart diagram on the wall or by a film show. In this case, pupils may be less able to complete a task in which they must fill in the required missing key words for describing the printed version. In foreign language classrooms, the active role of buying a train ticket may be afforded by a list of useful vocabulary that may be constrained by appropriately using all the listed words to be used in the conversation (Kennewell, 2001).

Teaching activity will be affected by interactive technology. There is a common expectation that technology, by the nature of the medium, provides learners with interactive experiences. The initial and in-service teacher training in technology in the UK curriculum specified a number of features of technology and ICT tools and resources that teachers should learn how to exploit (DfEE, 1998): speed, automaticity, range, capacity, interactivity and provisionality. These features make ICT special as an educational aid compared with the other tools and resources (Kennewell et al. 2008). In spite of ICT's apparent synergy with interactive teaching, there is a gap between the technical interactivity experienced by students when they use ICT and the teacher's and learners' interactivity (Smith et al. 2005). This may reflect the difference between direct instruction and the greater autonomy usually accompanying the engagement of students with activities. However, when ICT was incorporated into whole class teaching plans by the help of the low cost of the technology, there was a change in the relation between pedagogy and ICT (Smith et al. 2005). The Interactive Whiteboard (IWB) caused a particular change by combining a large display for a

whole class to see with a user-friendly interface. Yet, ICT has not been able, up to now, to provide sustained and reflective qualities in the classroom of the sort associated with learning improvements (Kennewell et al. 2008). These qualities are completely dependent on the teacher, and it is not yet clear how IWB may facilitate the development of the deeper forms of learning. A study conducted by Smith et al. (2006) in England, observed that IWB lessons contained less group work and more whole-class teaching, and proceeded at a faster pace with the increasing number of Initiation-Response-Follow-up (IRF) moves and a reduction in the length of the students' responses. Although the aim of these changes was to have a positive effect on attainment, this improvement was not achieved (Kennewell et al. 2008). However, Wegerif (2007) suggested that the IWB creates a space for dialogue and provides the opportunity for discussion between children. It is likely that the value of technology is enhanced with collaborative learning.

Conole and Dyke (2004) noted some affordances when including ICT in the learning environment. Firstly, accessibility that means ICT now offers easy access to vast amounts of information in many different fields via online access such as websites, knowledge networks and user sharing communities. However, the increase in information entails certain problems, so users need more critical evaluation and quality assurance; this requires a change in the user's learning and skills in analysing information. Consequently, there are challenges in knowing how to use what is available. Perhaps the balance has shifted from increasing the amount of information to selecting the right information. Secondly, speed with which new technology helps to access information about changing events enables us to know about world events as they are happening. This speed can also raise the general awareness level of teachers

and learners as well as raise the quality of used information. However, how can teachers and learners be enabled to find their way through ever-changing flow of information and make their own decisions? This is a challenge for the educational use of the new technologies. Thirdly, ICT gives a great variety of ways to use this information, such as websites and simulations to analyse complex behaviour. Fourthly, there is another key affordance presented by communication and cooperation, which presents the possibility of learning through connections with others. New forms of communication and dialogue have been opened up by new technologies. ICT gives a way to develop new forms of online communication and present new means to share information and communicate, from signing up to mailing lists to involvement in chat rooms. Critical social theory and the speech situations idea connect with difference and communicative discourse (Conole and Dyke, 2004).

Wegerif (2007) confirmed that expanding the possibilities and modalities of dialogue is an affordance of ICT in education and that ICT can give students the opportunity for in-depth dialogue. A further affordance is the reflection that becomes possible with asynchronous technologies because more time is allowed than in face-to-face discussions. Moreover, users can access and build on archived material that is available from the earlier discussions. Asynchronous technologies have been a successful method, especially in the use of discussion forums for supporting learning. In addition, they can use ICT to enable reflection to be better. Asynchronous technologies present new chances for knowledge are used more widely and within more diverse communities of practice (Conole and Dyke, 2004).

The multimodal and non-linear nature of ICT presents other affordances. The non-linearity of the web leads us to the possibility of moving beyond the linear way of learning, and thus adopts more individual plans and pathways. Dewey's approach is that non-linear learning is more characteristic of experiential learning, and this is consistent with ICT (Dewey, 1933). The possibility of using non-linear learning approaches is therefore another affordance of ICT (Conole and Dyke, 2004). In addition, ICT and electronic resources used for face-to-face activities are called "blended learning". This term captures the integration of teaching technology based on a wide range of educational methods, with various forms of electronic technology in the classroom, such as multimedia, CD ROM streaming videos, virtual classes, and transfer of text and video over the Internet (Cucciare et al. 2008). Nevertheless, despite the mentioned benefits, Wegerif (2007) commented that computer-based activities in the school tend to be non-productive because they are poorly designed or because the programs act as a distraction to the real task.

Finally, surveillance is another affordance which new technologies present that enables people to secure large amount of person-specific information which eventually provides these people with a formidable power and control over others. For example, Land and Bayne (2001) have a critical opinion about the increase of monitoring tools within real learning environments which gives teachers power to monitor student activity more closely than ever before. McKenna (2002) critiques the blind copying of e-mail used as a power tool to recipients of the mail. Also, there is disquiet about the new devices and personal tags that enable providers to personalise products more accurately.

The above studies have reported the affordances of technology and ICT in the educational environment as including rapid access to information, interaction in the classroom and increase in dialogue among learners. They have also pointed to the benefits of the interactive whiteboard as part of the technology used with electronic brainstorming. Through use of this technology, the researcher used the online forum and provided electronic resources related to the lessons, while the interactive whiteboard was used to display students' ideas. This study seeks to discover the affordances of this technology, in conjunction with appropriate pedagogical methods, within the Saudi primary school environment.

Pedagogical affordances of technology and ICT

John and Sutherland (2005) defined the "pedagogical affordances" of ICT as the technological tools that can be used to enhance learning process. The authors maintain that nowadays, the introduction of digital tools into the classroom setting has enhanced classroom learning. Similarly, Webb's (2005) study on the affordances of ICT-rich environments demonstrated how they can support students' learning of science under a suggested framework for pedagogical practice. Webb (2005) identified the main effects of these affordances: promotion of cognitive hastening, facilitation of a wide variety of experiences which enable students to relate the experiences of science with their real world, and an increase in self-management by facilitating students' gathering and presentation of data. Moreover, the researcher concluded that pedagogical affordances had helped students in their science learning yet there was a possibility for even greater enhancement of learning experiences had these affordances been integrated with other pedagogical innovations (Webb, 2005). Pedagogical affordances thus demonstrate a degree by which the learning process can be improved through implementation of technologies into educational system.

Various technology tools are used in science-based subjects; these include the internet as an information resource, email and social media for communication simulations and micro-worlds, modelling software, data-logging, and text and multimedia-editing software (Webb, 2005). An ICT learning environment is made possible through interactions between hardware, software, teachers and other resources. The degree of personal perception of affordance relates to the information available to the individual (Webb, 2005). McGrenere and Ho (2000) commented on the context of the software design and the effect that this can have on a person. In the educational setting, an increase of technology-based affordances can be employed to give students clear and precise information and can also integrate the different components involved in students' learning. Technology-based research indicates that well designed software and the use of student collaboration can be pivotal and very useful for effective pedagogical approaches. The Cognitive Acceleration in Science Education's (CASE) activities highlight the importance of reflection and social exchange in the development of children's thinking. Students who are encouraged to talk to each other and work together to solve problems eventually become more aware of their conscious thinking processes, which in turn promotes their cognitive development (Webb, 2005). Therefore, ICT learning environment has to be created in a way that cater for the specific needs of students who are the potential beneficiaries of efficient and fruitful interaction of the tools of ICT (hardware and software) and teachers.

In addition, Huppert et al.'s (2002) study suggests that the level of affordance can be raised through the use of simulations and interaction with other students. Huppert et al. (2002) found that students who could be described as being at the 'concrete operational Piagetian stage' attained much higher cognitive levels than their counterparts in the control group. Also, the Collaborative Learning Projects (CLP), a

collaboration at the University of California (Linn and his, 2000), demonstrated how much of an important role the questioning played in pedagogy. They found that spending 5-10 minutes in whole-class discussions would prepare the students to lead class investigations, leaving the teacher to take on the role of a facilitator to the students, and thus elicit and lead the students towards the learning objectives. Once the activities were over, the teacher would then invite students to give open feedback and share their results with the rest of the class. The foregoing points at the need for students to be active participants in the all levels of learning process rather than just its passive receivers. In this regard, the suggested involvement of students in discussion and class assessment procedures by seems to be the right approach to achieve increased participation of students in the learning process.

In addition, a key benefit of formative assessment lies in the transfer of responsibility from the teacher to the students (Black and Wiliam, 2004). Furthermore, the foregoing is a typical process in ICT-supported software that is software that can be used to scaffold learning and allow students to track their own progress (Linn and his, 2000). ICT can open up many more opportunities to support students and provide teachers with formative information about their progress. A good example of this is the Diagnoser software (Minstrell, 2001) which evaluates the students' current understanding by looking at the reasoning that leads them to the responses that they make to the software's questions. The software also provides additional problems to solving that are relevant to the students' learning objectives which allow them to explore the topic further. Studies have provided support for the using of ICT to be fully integrated into the curriculum (Linn and his, 2000; Mayer-Smith et al. 2000).

The CLP project demonstrates how ICT creates 'new affordances for developing understanding of science and affordances for student self-management.' Students are

able to collaborate and share ideas, which in turn increase the amount of information available about affordances. Teachers must be aware of these affordances, but at the same time understand the level of abilities that students require to access these ICT-related tools. Cox and Webb (2004) claimed that teachers must carefully plan the use of assignments and provide the students with appropriate materials to help them to achieve their learning goals. However, if successfully implemented, the software enabling formative assessment can become a tool of 'drawing' students more into the logic of the learning process. Thus they become aware, what are they goals teachers are trying to achieve, what are the benefits of achieving these goals and last but least how they can contribute to achieving of these goals.

The aforementioned illustrates how the means and methods that teachers have now at their disposal have changed in the last decade. John and Sutherland (2005) stated that teachers have resorted to adopting more constructivist approaches towards learning in combination with didactic strategies through the use of Interactive Whiteboards (IWBs). IWBs have clearly helped teachers to improve the quality of their presentations and to create purposeful interaction patterns between students. It has also offered a solution to the 'tension between individual and common knowledge in the classroom.' However, it should be cautious the IWBs enhance classroom's interest rather than inspire a new approach to pedagogy and learning. Armstrong et al. (2005) looked at the affordances of IWBs and argued for a stronger focus on the teachers' use of IWBs in terms of the choices made over resources, and how those resources are perceived.

The Interactive Whiteboards are not the only new technological 'gadget' being tried or even employed by teachers in their classes. In their study, Morgan, Butler and Power (2007) focused on evaluating ICT in education, comparing the affordances of

the iPod, DS and Wii. They aimed to assess the potential educational benefits of electronic appliances such as the iPod, The Nintendo DS (NDS) and Wii, by systematically investigating the nature of the benefits and constraints of each device's potential learning effects. Morgan et al. (2007) put forward a detailed evaluation scheme which focused on the cognitive impact of such learning activities. This evaluation scheme is made up of three sections. The first section outlines the present affordances, uses and constraints of the 'mediating artifact;' the second part looks at cognitive considerations; and the final section examines the modifications that could be made to the employed electronic appliances to positively influence the cognitions of learners. The NDS provides more opportunities for learners to access interact with and manipulate content. Learners are free to interact with their peers and the teacher in collaborative activities through wireless connectivity. The vast affordances of NDS open up an array of generative processing activities such as argumentation, application, summarisation, exploration, experimentation, restructuring and construction, whereby learners are able to manipulate content through a range of base cognitions such as accretion, elaboration, tuning, restructuring, internalisation, and transfer. The fact that these devices are wireless enables collaboration to continue outside the classroom; on class trips, for example, learners can use NDS consoles to download information appropriate for a specific place such as a museum (Morgan et al. 2007).

Technological, educational and social affordances are all aspirational goals of the education system and can support team working (Whatley, 2010). An example of this includes Billett's (2001) research pointing out that workplace training opportunities were not always taken if motivation was not seen as being present. From the foregoing, an important relation can be inferred that is also relevant for integration of

technology in the learning process: the effectiveness of using new technologies is dependent on two factors. First, on the sufficient amount of information about the benefits that employing such technology might entail. Second, on the existence of adequate incentives for people, in this case teachers and students, to integrate this technology into their working routine.

There are some unusual subject areas where the ICT can be used to improve the existing array of teaching techniques. In their study about music, Gall and Breeze (2005) looked at how the use of 'contemporary signage' allowed the use of music composition software to be transparent and accessible to children. They also discussed the 'tradeoff' affordances which create a sense of complementarity, as the pre-programmed samples of music acted both as a stimulus and facilitator for composition. However, this was also a constraint on the user's creativity because it restricted the range of composition for more able students.

As an example of yet another utilisation of ICT, Hammond (2010) found that storing presentations allowed teachers to make more coherent presentations and provided more variety for pupils, yet on the other hand they could prevent teachers from exploiting more classroom discussions. Furthermore, Hammond (2010) argued that teachers' early exposure to computers offered another insight into the opportunities that computers provide. This is highlighted in an account of a participant who described a spreadsheet as a mathematician's tool, and how this 'machine' allowed them to fulfil tasks in a fraction of the time that it previously would have taken them.

Studies of the integration of the ICT into educational system are not focusing only on the potential benefits and varieties of possible utilisation of new technology, but these studies also deal with several concerns regarding the use of ICT in the learning

process. Mathiasen (2004) proposed that, from a pedagogical perspective, the question of whether teaching is enriched when all students have a laptop computer is debatable. One teacher observed that because of the presence of laptops "teaching the subject takes at least twice the time" (p.284). Data examining communication content showed that study related subjects were not a major part of the total number of emails sent between students. Mathiasen (2004) noted, "Differentiation [reform, transformation] of teaching occurs only to a limited extent" (p.290). The grades of students in the four laptop-classes that passed their graduation exams demonstrated that their grade averages corresponded to the national average. Thus, the government system's expectations regarding the goal of educational change in teaching and learning through ICT were not reflected in significantly higher grades. Teachers still preferred physical interaction as a method of teaching. Likewise, students expressed a preference for teaching based on interaction. For the most part, laptop-based teaching corresponded to the traditional way of delivering instruction. The foregoing might spur certain degree of pessimism among facilitators of learning process that the ICT might not cause a noticeable positive transformation in short time. Yet, this might just confirm what has been already mentioned: the successful integration of the ICT into educational system is based mostly on the human factor: the ability of teachers to use new technological tools and the enthusiasm on the side of students to employ these news tools in their studies.

In this regard, Mathiasen (2004) concluded that the educational system, learning environments, and teachers' training needed rethinking based on the opinions and attitudes expressed by students and teachers. Implementation is the stage of the innovation-decision process in which an individual, or members of a particular group,

have decided to adopt an innovation and strive to make it an effective part of their routine or practice (Rogers, 2003). Once they have decided to adopt an innovation, adopters make ongoing decisions about whether they will continue or discontinue the use of the innovation. Implementation can take place at two levels: the individual level, in a teacher's classroom; and the group level, as cohorts of specific teachers by grade or content area, and as the cohort of all teachers in a school or district. The above evidence points at two pertinent questions: 1) In what ways do teachers work to make ICT part of their teaching? 2) What factors encourage continuance or discontinuance of using the ICT in teaching process? (Mathiasen, 2004).

In order to get answers to the above-mentioned questions, one should look at the practical examples of implementing the ICT at schools. In a survey-based study of teachers and students at an independent English secondary school (private, girls-only) with significant commitment to ICT, O'Mahony (2003) investigated the interrelationship of three areas pertinent to ICT implementation: access, staff ability (perceived and desired) and use of technology. Access to ICT resources at the school was high, but most teachers used these resources infrequently. Teachers perceived the level of ICT training as low, criticising the lack of time available for training. O'Mahony (2003) framed the study in terms of action research: the school administration needed to know why teachers underutilised ICT (a form of rejection) resources and then, how the administration might rectify the situation. A six-point model of effective ICT use provided criteria for the study components which included: ICT resources, policy, executive ICT commitment, professional development, evaluation of technology use, and student ICT skills. The ultimate aim of employing this model, in particular the professional development program for staff

in ICT, was to improve the overall technology skills of the teaching staff to improve student learning.

Data from surveys showed that a major challenge facing the school was not access to ICT resources, but the provision of relevant and supportive training for staff to support implementation of ICT. Statistical data derived from the surveys indicated that teachers indeed used the technology resources available to them. However, teachers used these resources for administrative and planning tasks rather than for instructional activities with students, as observed in the previous section about decisions. The statistical data also suggested the teachers were moderately competent with technology. The main obstacles to increased ICT use in teaching were: "a lack of time, a lack of training, and a lack of ICT resources in the classroom" (O'Mahony, 2003, p.308). In conclusion, O'Mahony (2003) underscored the need for practical and responsive training programs in computer applications (for example, presentation, web design, and using digital whiteboards), positive home-school network links, and more defined ICT planning to improve the ICT implementation. Training programs, also known as professional development, provide opportunities to negotiate perceived characteristics of an innovation. In ICT training programs, teachers (adopters) encounter opportunities to reduce the complexity of ICT resources while learning to implement them in the educational context. In addition, they try out the resources (trial ability) and communicate with peers about use of ICT (observability). Engaging in these activities helps teachers understand compatibility and the relative advantages inherent in implementing ICT.

The evidence from the survey conducted by O'Mahony (2003) might be used to answer the two questions proposed by Mathiasen (2004). First, teachers employs the ICT in their teaching yet this use is not entirely related to teaching per se. Rather, the ICT are often used as tools of personal daily administration so common for most office jobs these days. Furthermore, the quality of human capital, in this case teaching staff, seems to be fundamental for success or failure of the implementation of the ICT. Therefore, as evidence in the aforementioned survey demonstrate, there is necessity to focus on thorough training of teaching staff before full implementation of the ICT can take place.

However, notwithstanding the foregoing, the successful integration of the ICT requires also an active participation from the side of students. Focusing therefore on a learner, Day and Lloyd (2007) highlighted that ICT can have positive effects on the concentration and motivation of a learner. Wijekamar, et al. (2006) investigated how the prior experiences of students influenced how useful computers were for them. They acknowledged the importance of both an individual learner and other contextual factors and how this could shape the learner's experience. They noted that the current generation of students had grown up spending plenty time using computers to play games and for social media purposes, which made them relate to computers in more of an entertainment and communication way rather than as an education tool. They claimed that teachers must be cautious to ensure that ICT is used to motivate and engage learners so that it did not become a distraction from learning itself.

This section has presented a summary of the ways that integration of technology in education can entail impressive benefits for both teachers and students. Through the presentation of the above studies on the pedagogical affordances of technology, the

researcher has benefited by gaining insight into how to use technology in the teaching of Islamic Education in a way that will attract students and promote active learning in the classroom. The presentation has also highlighted the importance of reflection and social exchange in the development of children's thinking and the benefits of encouraging them to talk to each other and work together to solve problems in their lessons. In this research, such communication was facilitated by the forum and by providing students with educational Internet sites, videos, photos and blogs related to their lessons.

In addition to the researcher benefiting from these studies, the teacher also benefited by being enabled to assume the role of facilitator for students, and thus led students toward educational goals. The teacher and students were encouraged, then, to give feedback and an open exchange of ideas so that students became active participants.

Furthermore, the researcher used the assessment of groups of students by other groups through the forum posts, which was described as another benefit of technology in education in the foregoing literature review.

The researcher also benefited from these studies in being made aware of the need to understand the level of students' technological ability, which permitted an appropriate selection of technological tools, in collaboration with the teacher. This encouraged students to cooperate and exchange ideas as they were able to master the technology needed to participate in the forum. The researcher was also made aware of the need to enable teachers to exploit technology in the classroom and to motivate them to introduce technology into their teaching

This study accrued an additional benefit from previous studies in how to make use of the interactive whiteboard in the learning and teaching of Islamic Education, through

educational activities with cognitive impact, such as cartoons and animations to support the educational process.

However, as demonstrated at various points in this section, for the benefits to occur, numerous preconditions must be fulfilled, primarily, the pivotal role of the teacher in the process of using ICT in the classroom. Therefore, a substantial part of the overall effort has to be exerted to provide adequate training for teaching staff. Only then will the way for thorough and successful integration of technology in education be open.

In addition, digital video is a tool for developing understanding, and it has been suggested that its affordances can help teachers to understand the potential benefits of technology for education. The present study explores the educational use of ICT, notably the EBS method, and one of its aims is to explore the pedagogical affordances of EBS in Islamic Education in Saudi primary schools. It investigates how EBS can enhance classroom learning and what it offers for the learning environment. A further aim is to investigate the improvement of creativity skills with the EBS method, in light of the popularity of brainstorming as a technique to improve creativity (Nickerson, 1999; Adams, 2005). This leads on to the next chapter, which reviews literature relevant to creativity skills.

3.4 Chapter summary

In this chapter, I have reviewed the literature relevant to my research in EBS and ICT and defined the academic and research areas of relevance to this research focus. The literature in this chapter explains how factors such as ICT and EBS may influence the development of learning. Both ICT and EBS are examples of a broader process of integrating technology into the educational system. If used properly, they can both have a profound effect on the learning process deals through advanced pedagogy.

Furthermore, technology together with EBS can play a great role in the development of education by promoting deep understanding. Therefore, I conclude that I need to explore these factors for primary Islamic Education teachers, students and curricula and to focus on how they can be implemented to improve the learning environment. Since creativity skills are a critical part of my study, the way in which I intend to explore these issues is explained in the next chapter.

Chapter Four: Creativity skills in learning environments

4.1 Introduction

The focus of my research is on developing the creativity skills (CS) of primary school students. Therefore, in this chapter I discuss definitions of creativity skills, types of creativity and the abilities related to creativity. Assessment of creativity by the Torrance Test for Creative Thinking is explained and critically evaluated, as well as how to teach creativity. In addition, this chapter describes the relationship between creativity thinking skills and technology. The chapter finishes with literature on the place of thinking as a process in Islam.

4.2 Definition

Creativity can be defined as an association of thinking and innovation. This is achieved by using an integration of 'seeing, thinking and innovating.' The inquiry by Wheeler, Waite, and Bromfield (2002, p.270), which built upon the previous work of Boden (2001), investigated the phenomenon of surprise, and defined creative thinking as an ability to discover new ideas "that are surprising yet intelligible." For this reason, the process of creative thinking in the learning environment separates divergent thinking from the usual convergent thinking (Wheeler et al. 2002).

The report 'All our Futures' by the National Advisory Committee on Creative and Cultural Education (NACCEE) introduced its definition of creativity: "imaginative activity fashioned so as to produce outcomes that are both original and of value" (1999, p.29). In relation to teaching, Allegra et al. (2001, p.1) suggested that, "creativity has to be considered not only as the skill of fantasy and imagination but also as an educational process that trains teachers to re-evaluate the processes and to appreciate different ways of thinking, social links within the classroom, and language

aimed at comparing and integrating different points of view". In addition, Torrance (1963) defined creativity as "the process of sensing problems or gaps in information, forming ideas of hypotheses, testing, and modifying these hypotheses, and communicating the results. This process may lead to any one of many kinds of products-verbal and nonverbal, concrete and abstract" (Stouffer et al. 2004, p.1).

Having examined the definitions of creativity, one is in position to attempt to define creative thinking. Yet, to do might be problematic, since it is difficult to decide what is creative. Is it a quality related to a person, a characteristic, or an idea? This matter can be solved by looking at the elements that affect educators. Inquiries in the fields of learning and creativity have highlighted the ideas of creativity across different fields. What is seen as creative in one discipline might not be viewed as such in another. Creativity involves social processes in which people have ideas relevant to their own environments, and they share them with people of similar cultures and experiences (Reid and Petocz, 2004).

Furthermore, Reid and Petocz (2004) proposed that creative thinking in relation to education is seen as a component of the environment. They linked theories of creative thinking to established educational hypotheses such as the Structure of the Observed Learning Outcome, also known as the SOLO taxonomy. This taxonomy explains the significance of students merging several different factors to produce a unique idea, and assists in measuring the depth of thought that has been used to solve a problem. Linking the creative thinking theories with established educational learner theories presents a strong argument for addressing a holistic procedure to encouraging creativity in the classroom. Reid and Petocz (2004) further emphasised the importance of developing a classroom environment that is conducive to encouraging creative

thought. Creativity is not a uniform phenomenon. Therefore, several types of creativity skills are presented in the following section.

In addition, creativity involves two different types of knowledge: declarative and procedural. Declarative knowledge can expedite creative thinking by providing information, and procedural knowledge can help with improving strategies to explore and judge views (Sternberg, 2003). Several pieces of psychological research into creativity advise that creative thinking is linked to knowledge, motivation, problem finding, ideation and evaluation (Runco and Chand, 1995; Collins and Amabile, 1999 and Nelson, 2005). Hence, a person's ability to define a problem is affected by the person's existing knowledge (Northcott et al. 2007).

Moreover, there are contemporary theories of creativity which Kozbelt, Beghetto and Runco (2010) sorted into ten categories including Developmental, Psychometric, Cognitive, Problem Solving and Expertise and Problem Evolution. The authors further reviewed distinguishing features of each category which enabled them to draw a comparison between them. This study depended on the outcomes of students' ideas in order to design and create a suitable environment for students that would support their creativity brainstorming activities and associated technological tools. Thus, the researcher relies on Developmental theory that focuses on ways of designing the environment that effectively advances and employs the creative potential of children (Kozbelt et al. 2010). In addition, this study used the concept of Torrance abilities (Fluency, Flexibility and Originality) in classroom activities as explained in the next section.

In light of the above, I argue that there are some elements within the classroom and lesson activities which lead to stimulation of students' thinking during the learning

process. This creates an environment that allows students to interact, participate, produce and develop creativity through fluency, flexibility and originality. The application of the Torrance test and observations made in this study may promote students' freedom of expression and dialogue skills as well as their ability to produce creative ideas.

Considering the aforementioned, this study defines creativity as a process of creating a suitable learning environment that enables and supports students to produce creative ideas and creative alternative solutions through fluency, flexibility and originality.

To further examine the connection between creativity skills and creative thinking, the next section focuses on defining creative thinking abilities.

4.3 The creative thinking abilities

Creativity skills have diverse measurements and tests. In this study, the Torrance measurement of innovative thinking was selected because it is one of the most established benchmarks used to measure creativity and innovation. In addition, it is a popular test used in Saudi Arabia and has been used by King Abdul Aziz and his Companion Foundation for the Gifted (Mawhiba, 2000). The Torrance measurement has been translated into many languages and it has been used in an array of studies (Agel, 2005). This study used a measurement of verbal creative thinking because it was commensurate with the Islamic Education curriculum and thus helped to achieve one goal of the study, which was the development of creativity (according to my third research questions). Torrance (1962) divided creative thinking abilities into six dimensions, as follows:

Fluency

This is an ability to produce the largest possible number of creative ideas. This capability is measured by calculating the number of ideas which are submitted by students on a particular topic in the specific time, which is then compared with the performance of peers. This ability is divided into four parts. Firstly, "word fluency," which is a student's ability to generates words. These words must begin with a specified prefix or end with a specified suffix, or begin and end with a specified letter. Secondly, "ideational fluency," is a student's ability to write as many ideas as possible about a particular topic. Moreover, "expressional fluency," corresponds with a student's ability to formulate multiple ideas on a specific topic. Fourthly, "associational fluency," or the ability to produce a word that can be associated with two given words, as well as writing synonyms for given words.

Flexibility

This is an ability to change one's mind when a situation has changed. Flexibility is further divided into two parts. Firstly, "spontaneous flexibility", that is the speed with which a student issues as many ideas as possible about diverse and related problems in a situation. Secondly, "adaptive flexibility", that is a student's ability to change mental direction in dealing with a problem, enabling the student to adapt readily to new conditions within a given situation.

Originality

This term represents here an ability to produce unusual ideas rather than using repeated ideas and traditional solutions for problems. For example, writing clever titles for story plots can assess one's level of creativity.

Elaboration

This is a student's ability to provide multiple details for a limited topic and to expand on summarised ideas or elaborate ambiguous topics; for instance, filling in as many details as necessary to make a briefly outlined activity work.

Sensitivity to problems

This is an ability to recognise weaknesses or deficiencies in a situation and to adjust one's actions accordingly.

It has been shown which elements constitute the creative thinking. By extension, is it clear that if one wants to improve the creative thinking abilities of students, the focus should be on the development of the aforementioned six abilities which together contribute to advancement in creative thinking skills. Thus, the Torrance's division has substantially affected the strategies for a betterment of the educational process.

The important model of the creative process involves the creative attributes mentioned by Torrance et al. (1990) as creative thinking abilities. These creative attributes are: fluency, flexibility, originality, elaboration, abstractness of the title, resistance to closure, emotional expressiveness, articulateness, movement or action, expressiveness, synthesis or combination, unusual visualisation, internal visualisation, extending or breaking the boundaries, humour, richness of imagery, colourfulness of imagery, and fantasy. The Torrance Test of Creative Thinking (TTCT) is an instrument that can be used to operationalise these creative attributes. According to Torrance et al. (1990), the term "creative thinking abilities as used in the TTCT, refer to that constellation of generalised mental abilities that is commonly presumed to be brought into play in creative achievements. The author has maintained that high degrees of the abilities measured by tests such as the TTCT increase the chances that

the possessor will behave creatively. Certainly, the author of these tests would never argue that possession of these abilities guarantees that an individual will behave creatively, any more than a high degree of intelligence guarantees intelligent behaviour. Creative motivations and skills, as well as abilities, are necessary for adult creative achievement" (p.1). These processes may or may not be linear. Each repetition is different in time and shape, depending on its interaction with the other motivations and obstacles described in the model. It is even possible that a full repetition may not be completed because of factors such as motivation.

Sternberg and Luppart (1991) identified two key types of motivation which are important in creativity: intrinsic motivation and the motivation to excel. Firstly, intrinsic motivation is an important factor since students are more likely to be creative if they enjoy what they are doing. Secondly, motivation to excel is important because these individuals are willing to work for creative excellence.

This section explained the concept of creative thinking abilities and what is more important, it showed that these abilities are not vaguely defined, but as Torrance demonstrated, they can be 'decoded' into a set of commonly known abilities or skills such as originality, flexibility and others. Furthermore, the foregoing allows for an assessment of the creative thinking abilities, by measuring the level of the partial 'decoded' abilities, and thus eventually gauging the level of the creative thinking abilities. Therefore, in the next section, the focus is on one of such assessments - the Torrance Test.

4.4 Torrance Verbal Test of Creative Thinking (Form A)

The aim of the Torrance Verbal Test of Creative Thinking (TVTCT) is to assess students' creative thinking in terms of three cognitive skills: fluency, flexibility and originality. Each battery of Torrance's Verbal Test of Creative Thinking (Forms A and B) consists of seven parallel tasks. Each battery requires a total of 45 minutes in addition to the time necessary for handing out booklets and giving instructions (Torrance, 1974). Each task is believed to bring into play different mental processes, yet each requires the subject to think in divergent directions, in terms of possibilities. Torrance (1971) provided the following description of the test activities. The full tests are given in Appendix 7. These activities involve an unusual picture of an elf with pointed ears and pointed shoes looking at their reflection in a stream.

- *Activity 1: Asking questions about a drawing (5 minutes)*

On this activity the subject is shown a picture and writes out all the questions related to the picture, which they can think of. The wording of the question for this activity is: "Ask all of the questions you would need to ask to know for sure what is happening. Do not ask questions that can be answered just by looking at the drawing."

- *Activity 2: Making guesses about the causes of the event on a picture (5 minutes)*

After five minutes, subjects are given instructions for the second task. Using the same picture, they are asked to generate as many possible causes as they can. The question of this activity is: "List as many possible causes as you can of the action shown in the picture. You may use things that have happened just before the event in the picture or something that happened a long time ago and made the event happen. Make as many guesses as you can. Do not be afraid to guess."

- *Activity 3: Making guesses about the possible consequences of the event (5 minutes)*

After a further five minutes, subjects are given instructions for the third task. Students write possible results of events in the same picture. The question of this activity is: "List as many possibilities as you can of what might happen as a result of what is taking place in the picture. You may use things that might happen right afterwards or things that might happen as a result long afterwards in the future. Make as many guesses as you can. Do not be afraid to guess."

- *Activity 4: Product improvement task (10 minutes)*

This task calls for the production of clever and interesting ideas to change and improve a stuffed elephant toy so that it will be more interesting and fun for children to play with.

- *Activity 5: Thinking of unusual uses of tin cans (or cardboard) (10 minutes)*

This activity asks the test taker to list some unusual uses for tin cans or boxes.

- *Activity 6: Asking provocative questions (5 minutes)*

This activity requires the subject to compile a list of unusual questions about tin cans or boxes.

- *Activity 7: Listing the consequences of an impossible event (5 minutes)*

This activity concerns the unlikely scenario of having clouds with strings attached. What would happen?

These activities underline the principle of the TTCT, which intends to test various abilities attributed to the advanced creativity thinking skills, and thus determine the level of these skills for an each and every test-taker.

4.5 A Critical Evaluation of the Torrance Test for Creative Thinking (TTCT)

"The construction of a reliable and valid instrument for measuring creative potential has been the most challenging problem facing researchers and teachers interested in creative human behaviour" (Heausler and Thompson, 1988, p.463). Of the measurements available, the Torrance Test of Creative Thinking (TTCT) (Torrance, 1966, 1974) is perhaps one of the most familiar test and procedures used to assess creative thinking (Heausler and Thompson, 1988 and Kaufman et al. 2008).

There are several reasons why measuring creative thinking skills has become an essential part of social research. These reasons stem mostly from the rising prominence of creative thinking itself. The nurturing of creative thinking has become increasingly important and is seen as a means of assisting society to solve the many problems that it faces (Mokaram et al. 2011). This priority has also surfaced in management literature which has been increasingly focusing on how to stimulate creativity in the workplace as a way of managing the constantly changing environment of business. The European Commission have also made the promotion of creativity one of its key objectives by stating its intention "to promote creativity for all as a driver for innovation and as a key factor for the development of personal, occupational, entrepreneurial and social competences through lifelong learning" (Villalb, 2008).

According to Kim (2006), Torrance developed the Tests of Creative Thinking in

thinking research and this test is best used in education to evaluate individuals' abilities for creativity. Thus the TTCT has been highly recommended for the education sector, and has also been used in the corporate field. It is the most used test of creativity and is also well referenced. "E. Paul Torrance was an international leader in creativity research and was best known for developing the Torrance Tests of Creative Thinking (TTCT), which are used in the business world and in education to assess individuals' capacity for creativity."

It is worth stating at this point that, creativity can be defined as a manifold phenomenon that arises from the interaction of four major elements: person, process, product and environment (Wechsler, 2010). The TTCC can be defined as a creativity test based on the divergent thinking creativity theory of Guilford (Guilford, 1986). In this test, 'creative thinking abilities' are considered to be 'the constellation of generalised mental abilities' and include five measures: fluency, originality, abstractness of titles, elaboration and resistance to premature closure (Kim and Kang, 2002). Torrance's central focus was to understand and nurture the qualities that help people to express their creativity. Therefore the tests were not simply designed to measure creativity, but also to serve as a tool for enhancing creativity (Hébert et al. 2002). Torrance (1966, 1974) suggested the following uses for the tests:

- To develop and understand the functioning of the human mind;

- To explore the basis for individualising instruction;

- To supply evidence for remedial and psychotherapeutic programs;

- To assess the influence of educational programs, materials, curricula and teaching procedures;

- To raise awareness of concealed possibilities.

The test results are recorded as scores on the creativity index (CI), however Torrance discouraged the interpretation of scores as a static assessment of a person's ability, but rather he argued that the profiles should be used as a way of understanding and nurturing a person's creativity (Hébert et al. 2002). Therefore, it is clear, that, Torrance understood creativity in its dynamic nature and as such it cannot be examined by system of numerical results from tests but must be understood as a part of a man's personality. Furthermore, abandoning of the strict focus on mere assessment of creative thinking skills accompanied by a shift of focus to an effort to understand these skills in wider concept of personal skills, enabled Torrance to formulate principles for advancing creative thinking.

The enhancement of creative thinking has always been an attractive idea for educators (Mokaram et al. 2011). In the past, IQ based identification methods appeared to be an obvious and logical way to identify 'gifted' students in an education system; however one of the main difficulties with these methods stems from the problematic reliability and validity of the specific scoring method. Respondents with higher scores may struggle to replicate this performance in a creative way outside of the test environment and may eventually not be able to produce any working creative ideas, or demonstrate the ability to engage in creative problem solving in working situations (Alexander and Shoshani, 2010).

The IQ based tests were clearly limited by their focus on numerical score. Such a limited selection criterion often left creatively 'gifted' children undetected and therefore neglected their needs. Torrance (1962) was concerned that a large number of creative students went unacknowledged and claimed that if gifted children were identified only on the basis of the IQ and scholastic aptitude tests, that lead to eliminating approximately 70% of the top 20% of creative students from

consideration (Kim, 2006). Drews (1961) also found issues in the methods that were used to test attainment of students. He found that, among gifted high school students, studious achievers accomplished the highest teacher grades, whereas creative intellectuals received the lowest (Kim, 2006).

As a consequence of academic expectations and the specific needs of creatively gifted children, the potential of these children may be overlooked by teachers who label them as "troublemakers" rather than potential young scholars. Getzels and Jackson (1958) found that highly creative adolescents are likely to be alienated from their teachers and peers. Torrance's findings support this assertion as he also claimed that children with high IQs were considered more highly, better understood and more studious than children with high creativity (Torrance, 1962). In practical terms this may be because teachers are likely to prefer 'gifted' children who are low in creativity as opposed to those who are highly creative (Kim, 2006). Research from Rimm and Davis (1976), Ritchie (1980), Robinson (1980) and Davis and Rimm (1998) support this claim, as teachers were seen apt to identify students who were achievers as gifted rather than creative students, who may also be disruptive and unconventional. Furthermore, energetic and unconventional students could be labelled as having Attention Deficit Hyperactivity Disorder (ADHD) by their teachers (Cramond, 1994).

From the provided evidence in this part, one might see why the TTCC has gained on prominence among various methods of measuring the creativity and creative skills. Mostly, it was due to the Torrance's understanding of creativity as a dynamic process which is part of the wider personal development, and thus it cannot be gauged simply by a numerical score. Furthermore, it was demonstrated how the IQ based tests, through using the numerical score system, are often misleading in their narrow selection of 'gifted' students. Therefore, the TTCT seems to be a welcomed

alternative to these tests. This is might also explain the effort to implement the TTCT on a larger scale, which is a focus of the following part.

Implementation of TTCT

The TTCT can be administered as a group of tests or individual test for all levels ranging from primary to graduate level. It requires a minimum of 30 minutes working time, thus making speed an important factor. Torrance (1996) suggested the development of a game-like, thinking or problem solving atmosphere to create the best environment for the TTCT. This, he suggested, would help to remove the psychological barriers often related to a stressful situation associated with tests and exams. Torrance argued that the examinees should be encouraged to enjoy themselves and 'have fun'; they should be psychologically comfortable and stimulated (Kim, 2006).

The TTCT is seldom used in isolation to make decisions about admissions into programs for 'gifted' children. Torrance suggests that additional information should be considered alongside traditional assessments. The TTCT-Figural offers a less biased and more efficient process than previous expert based methods that rely on subjective and biased teacher recommendations (Torrance, 2002). As illustrated by the Georgia Department of Education (Kim, 2006), eligibility for admission is confirmed only if "(a) a student must score either at the 99th percentile (for kindergarteners–2nd graders) or the 96th percentile (for 3rd–12th graders) on the composite or full-scale score of a standardised intelligence test and meet the achievement criteria, or (b) Qualify through a multiple-criteria assessment process by meeting the criteria in three of the following four areas: intelligence, achievement, creativity, and motivation." Evidently creativity is not the only area used to identify a

gifted student because the idea behind Torrance's development of the TTCT was for inclusion of students rather than exclusion of them (Kim, 2006).

In addition, researchers have identified that combining the TTCT with computer programming can enhance creative thinking. For instance, in Alomari's experiment using seventh grade students, were reported in training programs which used computers and TTCT to increase students' creative thinking skills (Alomari, 2006). In addition, Barton (2005) reported similar findings, and went further by suggesting that information and communication technology (ICT) would help teachers to design creative activities for their classes in order to enhance thinking skills of students.

To sum up, notwithstanding the achievements of the TTCT-Figural (Torrance, 1998), this method is not without its critics. Certain demographic characteristics such as gender, community, race and speakers of English as a second language were not included in creation of TTCT (such as Torrance, 1990, 1998). This oversight may be due to the assumption that the TTCT is fair in terms of race, socioeconomic status and culture (Torrance, 1971; Torrance, 1972; Torrance, 1977; Cramond, 1994 and Kim, 2006). However, the aforementioned demographic characteristics are of essential importance, and could lead to a greater understanding of the TTCT and other creativity tests. Moreover, an understanding of the different ways that creativity is expressed within each environment or culture is also very important. Values and personal beliefs have a profound effect on the kind of behaviour considered to be creative within a society (Wechsler, 2010).

However, it is possible to balance this supposed shortcomings of TTCT. In this regard, Howieson's (1981) findings support the credibility of the TTCT. He points out that, in a comparison of achievement, in a variety of activities, such as writing,

science and arts, of people who completed a number of creativity measures including the TTCT, the results indicated that the predictions improved if the results from the TTCT were combined with other tests, i.e. Torrance's Leisure Interest Checklist. This indicates a need to consider more background information on the individual, such as personal interests and the effect that these will have on future productivity of that individual (Wechsler, 2010).

Regardless of the criticisms that the TTCT has received, it is an excellent alternative to standardised testing that relies on expert opinions for identifying 'gifted' students. It was largely successful in overcoming the difficulties associated with using IQ based assessments by which, as Cramond (1994) and Kim (2006) highlighted, experts had failed to identify incredibly talented individuals in the past, such as Van Gogh, Einstein and Edison. By using the recommendations made by Torrance and suggestions from various other theorists, the TTCT arguably remains the most accurate test for creativity. At the same time, it is not only the ability of much precise and comprehensive testing the TTCT possess that makes it so unique, but even more important is the way these tests offer solution and means for people to improve their creative thinking skills as a part of their personal and professional development.

4.6 Teaching of creativity skills

In order for creativity to thrive in schools, teachers must first create an environment that stimulates innovation in the classroom and helps students to feel safe, encouraging any ideas and solutions presented from students. Students' questions should be also accepted and strengthened. In addition, the teachers should work to raise the wealth of imagination in students. The curriculum must include subjects which promote creativity and help the teacher in developing innovation, imagination

and expanding students' awareness of the world around them (Aljalad, 2006). Jones and Wyse (2004) proposed that the teacher should use words to promote inspiration, imagination, excitement and enthusiasm in primary education, for example, "you are creative," and "you have a good imagination." The teacher should teach students to face the challenge of problems, presenting realistic problems from within the community which affect the lives of individual, the problem being specific, not general (Craft, 2005a). Evidently creative environment in schools will hardly emerge without a direct support from teachers who thus play crucial role in creating conditions in the classes where students are encourage to come up with their own ideas and solutions for problems they face.

However, as Wegerif (2002) pointed out, creativity as a part of thinking skills that cannot be just 'given' or conveyed to students as it would be the case for ordinary subject related knowledge. One can argue then, that creativity requires an active approach from teachers, who create the suitable environment in their classes, as much as it requires active response from children who are engaged in the right classroom activities that ignites creativity. Therefore, creativity has to be facilitated as it can be neither taught nor just pass down to students.

NACCEE (1999, p.90) identified three related tasks in teaching for creativity: "encouraging, identifying and fostering". Firstly, encouraging must instil confidence among students and encourage their creativity, through motivation, independence, toleration of problems and seeking for solutions, and all this without fear of failure. Secondly, it is important to identify the different creative capabilities of students. Teachers and curricula assist students to develop their creativity through teaching methods and subject knowledge that are balanced between the different capabilities of students. Thirdly, fostering, which relies on creativity coming from many ordinary

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abilities and skills rather than being one special talent. The concept of fostering is in compliance with the above-mentioned Torrance's testing method (TTCT), which also does not perceive creativity as a one single unique ability or skill, but rather as special combination of various common personal characteristics such as flexibility or originality. Thus teachers can help in the development of many common capacities to promote creativity, such as curiosity stimulation, memory training and awareness enhancement. These types of learning can be further improved and enriched by working with personal models and advisors who are prepared to share their experience. Therefore, in my study I used these methods during the application of electronic brainstorming in classroom teaching.

According to Moseley et al. (2005), the terms "teaching thinking" or "thinking skills," often used in the educational field, indicate the use of specific strategies and procedures to make learning more effective. The term "thinking skills" means that there are instances of learning and teaching that can stimulate processes that produce the desired mental activity. It can be reinforced through the provision of skilled teachers to improve the practice of thinking through interventions which contain the mental processes used in planning, describing and evaluating the thinking and learning. It can include educational approaches to thinking skills that make aspects of thinking explicit to teachers and learners. This term focuses attention on the psychology of goal-oriented thinking, which can include the strategic management of attention and working memory, the support of different "habits of mind". In addition, the term 'thinking skills' may be concerned with the goals of thinking and learning, with the collection of information, building of understanding, with thinking that generates fruitful results, or with dynamic groups. All these variations in the meaning of the term 'thinking skills' underline the already mentioned 'feature' of creativity:

the possibility to create environment or pursue teaching strategies that would naturally ignite an advancement of creative thinking skills in students.

Clarification of the language of thinking can help to enhance the teaching of thinking skills. There are many impacts of focusing on cognition in education. Firstly, most teachers put the emphasis on knowledge acquisition rather than on treatment of mental processing. There is also a prevailing slant towards the preparation for, and accurate assessment of the behavioural goals and objectives of the curriculum. In reaction to the mechanical nature of such an approach, a renewed interest has been aroused in the cognitive processes that appear to support learning (Elliott, 2000). If the focus on knowledge acquisition is not balanced with encouragement to actively use this knowledge, whether by writing or discussing about various issues where this knowledge can be applied, the students will remain just passive receiver of huge amount of information. In result, this is having detrimental effect on the development of creative thinking skills.

The emergence of stage theories of development, for example Piaget's theories, which proposed that the individual goes through a series of steps to reach the higher levels of thinking, may have contributed to limit the influence of ideas of teaching thinking skills. As Vygotskian theory emerged, it encouraged teachers to engage learners in higher levels of thinking. Then Bruner complemented Vygotskian theory with his concept of "scaffolding" (Wood, Bruner and Ross, 1976). In addition, the idea of cognitive apprenticeship attracted many teachers. This refers to supporting the learner by the process whereby the "expert" (teacher) progressively structures the learning, so that the student eventually gains the ability to master the skills independently (Rogoff, 1990).

Thinking skills then emerged widely in the field of education, taking the form of highly structured programs or curricula dependent on cognitive education principles. Further, educational initiatives introducing philosophy were implemented (Moseley et al. 2005).

"Teaching thinking" programs became abundant (Deutsch, 2001). In general, these programs had positive impacts which had a strong resonance with teachers (Higgins et al. 2004). While some teachers claim that their mission is the delivery of school or college subjects, others believe that they are teaching more widely applicable skills or problem-solving operations, and enhancing learners' thinking and reflecting (Moseley et al. 2005). It is the latter group which is naturally more inclined to consider creativity as necessary tool for student to use in their studies as well as later in their professional life.

Participants in learning need to have some understanding of the environment and aims of education. These can be used as the framework for understanding thinking and learning over various ranges, as well as for enhancing communication with the outside world. This should be of direct benefit to teachers and learners. The importance of understanding thinking lies not only in academic study; it can also be used effectively in vocational training and work-based educational programs.

Nevertheless, there is a good rationale for thinking and learning to form the nucleus of vocational studies. An understanding of the frameworks of thinking and learning should inform the planning of a curriculum devoted to all types of learning that are realistic and achievable (Moseley et al. 2005).

This section presented various ways of integrating creativity into educational process and what benefits such integration might entail. One of those benefits is advancement

of creative thinking skills, which were defined not as set of unique skills but rather as a specific combination of ordinary skills and abilities. These skills, when adequately advanced and in cooperation, can spur the process of creative thinking, ergo creativity. Furthermore, it was demonstrated how this 'decoding' of creativity into commonly known categories of thinking skills is crucial both for assessing the creative thinking skills in students (TTCT method) and the teaching of these skills. However, this 'teaching' is not in form of classic passing down of knowledge, but it requires a skilled teacher - facilitator who helps to create an environment in which creativity may thrive.

Since my study examines the role of ICT, including EBS, in improving creativity skills, the next section examines the relationship between ICT and creativity skills in education.

4.7 Creative thinking and ICT

In this section, I describe the relationship between ICT and creativity skills as one aim of this study is the encouragement of creativity skills using electronic brainstorming. Firstly, knowledge construction starts with the learner articulating an intention to build knowledge. That may be stimulated by a question or problem, a failure to achieve something, a general curiosity, an argument or anything that perturbs a person's understanding enough to want to make sense out of it (Jonassen et al. 2000).

Furthermore, I used a kind of technology which aids the development of creativity skills. In Loveless' (2002) review of the literature on creativity and technology, she described the complicated relationship between creativity and technology. There are many tools in technology, such as digital audio, video devices and computers that can contribute to creative processes by several means. She emphasised that the

technological features such as speed, interactivity, range, capacity and automatic functions allow students to make professional products efficiently. Consequently, students can make changes on the computer and find alternatives ways to keep track of their work. In addition, the interactivity of technology provides feedback for users and gives students access to a range of information because users can perform complex operations easily and quickly. They can also achieve results through thinking processes such as analysis, interpretation and synthesis of information. She also explained that teachers in their classrooms can use technology to provide facilities for students to participate in activities such as brainstorming, evaluating ideas, making connections, collaborating and communicating. Furthermore, it can be used to achieve aims in creative ways that encourage creativity in a technological environment (Loveless, 2002). Therefore, it can be said that technology plays a crucial role in development of creative thinking, either as a tool that helps to enhance already existing creative environment, by providing better quality of creativity igniting processes, or it can be used to build such a creative environment, by allowing for new methods like electronic brainstorming to be implemented.

According to McGuinness (1999), advances in learning mediate the way in which technology-based applications are used and assessed in classrooms. In computer-assisted learning, the pedagogy was largely drill and practice of skills such as arithmetic facts, word recognition and spelling. Recent innovations are more consistent with a thinking skills approach. For example, interactive exploratory environments or micro-worlds allow students to direct their own learning through guided discovery processes. They help make thinking more explicit, enable pupils to hypothesise and experiment with immediate feedback, and facilitate reflection and discussion with peers. Software applications are available such as Geometry

Sketchpad for exploring geometric relationships and STELLA for systems thinking, Thinker Tools for teaching the laws of force and motion. Also, video and multimedia technology is used to create exploratory environments. They permit students to form rich images of problem situations in multiple modalities and prompt alternative perspectives. Furthermore, local and networked communication (databases, email, WWW) provide unique opportunities for collaborative learning. Jonassen et al. (2000) sorted ICT-based cognitive tools into the following types: conversation tools, semantic organisation tools, dynamic modelling tools, interpretation tools and knowledge construction tools. Having declared a desire to know, learners must then collect and interpret information that relates to the declared intention. There are tools available to support learners in this initial phase of the learning process. The internet is an enormous repository of information but aimlessly surfing the internet will not result in meaningful learning unless learners articulate an intention to use relevant information to do something meaningful. They then need help to find beneficial sources of information. Search engines and intelligent search agents are available to help learners. Intelligent searching is likely to engage critical, creative and complex thinking. The primary skills engaged by intentional search are critical thinking skills, especially those focused on evaluating information. Synthesising skills are needed to formulate search strategies for use with search engines. Intentional information searching tools are intended to help learners find information that they need to better represent their views (Chan, 2006). This, points out the significance of the relation between technology, its utilisation and a person who facilitate this utilisation (a teacher or even a student himself). In other words, a learner should know what he wants to achieve, which technological tool is the most suitable and how to use this technology in the most effective manner. Throughout this process, a learner should

benefit from the guidance of a teacher or skills and knowledge he acquired in training courses conducted by teachers.

Similarly, it must be emphasised that ICT in schools is not about the teaching of software and technical skills. This is a thought pattern that applied when computers first appeared in schools and it has proved to be hard to change. The power of ICT emerges when the technologies are utilised as tools that increase a teacher's professional performance and increase the chances for a student's learning. In the classroom, the need is to focus on learning and teaching because the acquisition of technical skills will occur naturally within the context of learning. ICT is not a solution that creates learning and " PL + ICT = PL (poor learning plus ICT equals poor learning)" (Boned, 2007). Thus, even with the best intention and quality of provided technology, the pivotal element of the successful integration of ICT into learning process is a teacher as a key facilitator of this process.

Finally, educational technologies have often tried to do the thinking for students, to act like teachers and guide the learning. Derry and LaJoie (1993) argued that "the appropriate role for a computer system is not that of a teacher/expert, but rather, that of a mind-extension cognitive tool" (1993, p.5). Cognitive tools, according to them, are unintelligent tools, relying on the learner to provide the intelligence. This means the thinking and self-regulation of learning should be the responsibility of the learner, not the computer. Students cannot use cognitive tools correctly without being engaging in higher order thinking skills (Derry and LaJoie, 1993). In conclusion, this section demonstrated how effective and useful the ICT can be in promoting creativity thinking skills. However, it also highlighted the common misconception that the technology itself or its use in class is enough indicator of successful integration of the ICT into learning process. Yet, for the ICT to serve its purpose, this purpose has to be

defined (within curriculum), then the right type of the ICT has to be selected and finally, students have to be equipped with adequate technical skills to utilise the benefits of the ICT. Thus, the role of a teacher in this process is indispensable.

The present study investigates the use of the EBS method to improve creativity skills in Islamic Education so, in the next section; the role of thinking in Islam is addressed.

4.8 The Theoretical framework of thinking in Islam

In this section, I review the literature in relation to how thinking is perceived in Islam. There is ample evidence in the literature to show that Islam has encouraged the thinking skills which are mentioned in the Holy Quran, the Sunnah and by Muslim scientists. In addition, it explained the most significant issue of Islam that makes it a mobile idea is the concept of "Ijtihad": "innovation or critical legal thinking in search for answers to new problems" (Abd- Allah, 2006, p.1). This is of high relevance to my study as it explores creativity, which is a type of thinking skill; and because this creativity is developed in the context of Islamic Education. The first examined text is an argument for the opinion which says that there is lack the creativity in Islamic society.

There have been accusations that Islamic societies lack the 'creativity' of Western societies and that Islam is torn between 'the authenticity in matters of life and doctrine which it derives from its past and the modernity which refers it to a present and a future (Troll, 2005). Others have contended that many Islamic societies are "oppressed by religion, and inhumanely governed" (Mazrui, 2004, p.118). Arguably this opinion is a result of comparing Islamic societies to secular democracies. This cultural distance has led to many incorrect and inaccurate judgments being made about Islamic societies. Thus, I will now focus on the accusations that Islamic

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societies lack the capacity of creative thinking in comparison to their Western counterparts.

There is cross-cultural research in creativity that suggests that there is a difference in the performance of divergent thinking among representatives of different cultures (Kharkhurin and Samadpour Motalleebi, 2008). Creativity can be broadly described as a process of creative thinking or the product of creative thought (Eysenck, 1994). Therefore, lack of creativity could be explained as inadequate use or insufficiency in development of creative thinking skills. This supports the focus of this section on the creative thinking in Islam.

Prior to a discussion about creative thinking within Islam, it is necessary to provide some context of the religious principles which characterise Islamic societies. Islam is a religion which depends upon a scripture which Islam maintains to be the revelation of God. This scripture is considered to be an eternal text which is applicable for "every place and time" (Troll, 2005). Whilst the notion of an eternal scripture may make Islam appear to be an outdated and somewhat irrelevant way of life for the era of globalisation that it is presently in, Islamic scholars have attempted to demonstrate that this is not the case. Abd-Allah (2006) argues that there are two important aspects of Islam that make it a 'mobile' religion, these are Bid'a (innovation) and Ijtihad (critical legal thinking in search for answers to new problems). Both process attempts to apply general principles in real-life circumstances and thus provide guidance in rapidly changing world. The idea of Ijtihad provides Muslims with the chance to be innovative because it is an inherently creative and optimistic concept (Abd-Allah, 2006). Close attention to Bid'a and Ijtihad gives Islam great historical mobility, enabling it to preserve continuity with the past while renewing its vitality as a dynamic faith.

These concepts can be found in all traditional Islamic thought, and their "shades of meaning" are not always fully understood by critics of Islam. Those who misunderstand Bid'a may take the concept too far and silence critical and creative discourse (Abd-Allah, 2006, p.8). Muslims who do not understand the legitimacy of their own experiences of the present miss out on the opportunity for legitimate innovation, change and adaptation. This can be linked with the apparent pathological belief in the superiority of the past. In this way, Muslims overlook their opportunity to engage in the Enlightenment and modern humanities (Troll, 2005).

In contrast, the West is characterised by modernity, which is seen as a progressive approach to development. Modernists do not consider anything, whether it be spoken or written, as being "eternal." As far as modernity is concerned, everything can be further developed by the human mind (Troll, 2005). This makes Western societies fundamentally different from Islamic societies, because the foundation of Western societies hinges on continually adapting and trying to improve systems, whilst Islamic society beliefs in adaption of the current environment by Muslims in line with their belief system and not in adjusting their believes to comply with the changing circumstances. In other words, Islam is believed to be the complete way of life with faith as its core principle and not just of one its attributes. This is often misunderstood by the Western society as being a symbol of something stagnant, old and not suited for modern times.

Yet, if it returns to the founding principle of Islamic societies, the Qur'an, there is further evidence of the creative dimensions within the religion. The Quran has been described in many ways and contains a multitude of narrative tones, ranging from "inquisitive, objective, positive, hypothetical, rational, reflective/contemplative, visual, metaphorical, analogical, emotional, perceptual, conceptual, intuitive,

scientific, and wishful thinking styles" (Badi and Tajdin, 2004, p.134). These all are words that one would presumably associate with advanced thinking skills, rather than with narrow-minded and stagnant perception of the world.

Moreover, if it examines the early portion of Islamic History (Islam's Golden Age), it can see that knowledge, trade and the construction of complex organisations thrived. Work and creativity have always been honoured in all of their forms, and this is reinforced by the Quranic principles and prophetic examples (Ali, 2008). Ali (2008) proposes that Islamic principles and the original thinking of the early Muslim generation were beneficial for building business institutions and business management that were founded on justice and competition. The eternal moral principles, such as hard work, commitment and community are still very much relevant today, and are vital for independent thinking and creativity (Ali, 2008).

Kharkhurin and Samadpour Motalleebi (2008) identified how cultural differences and influences may affect perceptions of creativity. Firstly, people from different cultures may have different concepts of creativity and may use different psychological processes when they engage in creative activities. Secondly, language may affect the development of creativity. This demonstrates that the results of a growing number of studies claiming superior creative performance in Western samples may be due to the differences of perception of creativity per se. Furthermore, the cultural biases of the tests depend on a culture specific definition of creativity. These findings issues suggest that more research and investigation is needed in future studies (Kharkhurin and Samadpour Motalleebi, 2008). The introductory part of this section indicates a certain portion of misunderstandings in relation Islam, the Islamic society and how creativity and creative thinking is perceived by them. Therefore, next section presents evidence from Islamic resources which encourage creativity.

4.8.1 Thinking in the Holy Quran

Islam has discussed the concept of thinking, along with other concepts, sometimes intensively. The Holy Quran includes many verses which discuss thinking, considered by many methods and from many aspects. In this regard, the description of a believer according to the Holy Quran is important. First of all, those who reflect want to know the Creator who made them and the universe in which they live, gave them life when they were nothing, and bestowed countless blessings and beautiful things on them. Someone like that also wants to learn what kind of conduct He would be pleased with. The Qur'an, which Allah sent through His Messenger, is a guide answering the above questions. For this reason, people need to know this book, revealed by Allah as a guide to people and in which He distinguished good from evil. They need to ponder over each verse and fulfil what Allah orders in the most proper and pleasing way. Thus, it can note that the Holy Quran addresses thinking by many different words, such as mind (understanding or realisation), meditation, seeing, thinking, remembering, viewing, forming opinions, considering and reflective thinking. The invitations to these ways of thinking were via many methods, as follows:

Mind (understanding or realisation)

The verb "realise" and its derivatives are mentioned in the Quran 49 times. (Jerwan, 1999). This verb was used to invite people to think in the world and about the Quran and consider the results of their actions, and to dispraise the dissenters. "Mind" (understanding or realisation) has many meanings. The meaning of "mind" in the Quran sometimes refers to pondering over something while giving careful consideration to its consequences, or pondering over (a plan) considering the state of affairs that it would achieve. Allah has emphasised the exercise of mind regarding the Quran, i.e., to ponder over it while giving careful consideration to the consequences

and the results that ensue, following its principles, precepts and commandments. For example, in chapter 'Al-Baqara,' Allah says: "Do ye enjoin right conduct on the people and forget (to practise it) yourselves and yet ye study the Scripture? Will ye not understand?" (Qur'an, 2:44). Also, in chapter 'Sad', Allah says that the very purpose of the Book is realise and remember, i.e. to ponder upon it and stay mindful of it: "This is a Book that we have revealed unto you (O Prophet), full of lasting Bliss that they may ponder upon its Messages and that those who have understood may (take them to heart and [always] be mindful" (Qur'an, 38:29). "Will they not then ponder over the Qur'an, or is it that they have locks on (their) hearts (which bar them from reason)?" (Qur'an, 47:24). "We have cited in this Quran (all kinds of examples), that they may take heed. But it only augments their aversion." (Qur'an, 17:41), (Jerwan, 1999). Thus, one can argue that the text of the Holy Quran in very clear manner encourages people to think and to use intellect as Islam appeals to logic as well as it appeals to ones heart. The Holy Quran calls for reading its text, seeing the world around, then pondering, and thereby believing.

Meditation

Four places in the Quran mention the need to concentrate on the importance of thinking by mind, in verses such as verse 82 of chapter 'An-Nisa' "Will they not then ponder on the Qur'an? If it had been from other than Allah they would have found therein much incongruity". "Do they not reflect on the Qur'an that its different parts are harmonious and support each other and it further contains that which the Prophet commands them? (If it had been from other than Allah) if this Qur'an had come from anyone other than Allah (they would have found therein much incongruity) much contradictions whereby its different parts are not harmonious." (Ali, 1982, p.218-219). Thus, believers are urged to use higher thinking skills in comparing and

analysing different parts of the Holy Quran, and even assess the consistency of its statements.

Seeing

"Seeing" means "thinking in the mind", not only abstract seeing, as shown in the Quranic verses that deal with phenomenon of the universe and concept of the Islamic society in order to support the meanings of faith in the people's hearts. As for the phenomenon of the Universe, the verse 185 in chapter 'Al-Araf' chapter states (Qur'an, 7:185): ("Have they not considered), the people of Mecca (the dominion of the heavens) the sun, moon, stars and clouds (and the earth) and the dominion of the earth: the trees, mountains, oceans and beasts, (and what things Allah hath created) and all the things that Allah created, (and that it may be) 'may be' ['asa] when used in relation to Allah denotes a requisite (that their own term nigh drawing) their destruction draws near? (In what fact after this) in what Scripture after Allah's Scripture (will they believe) if they do not believe in this Scripture".

The concept of Islamic society is mentioned in chapter 'Al-E-Imran' (Qur'an, 3:137): "(Systems) with reward and forgiveness for those who repent and punishment and destruction for those who do not repent (have passed away before you) have passed in bygone nations. (Do but travel in the land and see) and reflect upon (the nature of the consequence) how the ultimate end was (for those who did deny) the messengers and did not repent of their disbelief." And the verse 21 in chapter 'Ghafir' (Qur'an, 40:21): "(Have they not travelled) i.e. the disbelievers of Mecca (in the land to see) to reflect on (the nature of the consequence for) the requital of (those who disbelieved before them? They were mightier than these in power) in physical strength (and (in the) traces (which they left behind them) in the earth) they were more keen to possess the

life of this world and to travel much farther in its pursuit. (Yet Allah sewed them for their sins) yet Allah punished them because of their sins and disbelief, (and they had no protector from Allah) from Allah's punishment".

The appeal to believers to adjust their conduct, (Qur'an, 27:14): "(And they denied them) they denied the tokens, (though their souls acknowledged them) after being accepted by their souls that they were from Allah, (for spite) out of opposition and enmity (and arrogance) and haughtiness and pride. (Then see) O Muhammad (the nature of the consequence for the wrong-doers) how was the end result of the idolaters, Pharaoh and his people, how we destroyed them in the sea" (Al-Hadrri, 2004). It is evident that Islam urges to reflect upon everything one sees or does and put it in the context of Islamic teaching, and thus Islam supports connection of one's spirituality with one's intellect.

Viewing

"Viewing" means the mental viewing that was mentioned in the Quran 98 times, akin more to idea of understanding and considering. In addition, it was mentioned to encourage mindfulness of the universe. The evidence for this occur in verses such as verse 44 in chapter Al-Anbiya (Qur'an, 21:44): "(Nay, but we gave these) the people of Mecca (and their fathers) before them (ease) a reprieve (until life grew long for them) until their lifespan grew long for them. (See they) i.e. the people of Mecca (not how we visit the land) how we seize the land, (reducing it) conquering it, for Muhammad (of its outlying parts) from its sides? (Can they then be the victors) are they then going to be victorious over Muhammad"?

And to consider the opinions of the unbelievers (Qur'an, 2:258): "(Bethink thee) have you not been informed (of him who had an argument with Abraham about his Lord)

about the Religion of his Lord, (because Allah had given him the kingdom) he is Nimrod bin Canaan; (how, when Abraham said: My Lord is He Who give the life and cause the death) gives life upon the resurrection and causes death by ending the life of this world, (he answered: I give life and cause death. Abraham said) give me proof of what you say. So Nimrod brought two prisoners, killed one and spared the other and then said: this is my proof. When he saw this, Abraham said: (Lo! Allah cause the sun to rise in the East) from the direction of the East, (so do thou cause it to come up from the West) from the direction of the West. (Thus was the disbeliever abashed) the one who disbelieved kept quiet and could not argue. (And Allah guide the not) to the right argument (wrong-doing folk) the unbelievers, referring here to Nimrod" (Al-Hadrri, 2004).

Considering

Seven times the Quran refers to the importance of thinking positively and not negatively as in example of verse 2 in chapter 'Al-Hashr', that humans can benefit from considering the fate of earlier people and thus avoiding punishment (Qur'an, 59:2): "(He it is Who hath caused those of the People of the Scripture who disbelieved)" (Al-Hadrri, 2004).

Reflective thinking

Qur'an has always required its readers to be critical. In several verses, it uses the reflective thinking style that invites the believers to use their critical thinking powers so that they could reflect and ponder meticulously, as in chapter Imran: (Qur'an, 3:190): "Behold! In the creation of the heavens and the earth, and the alternation of night and day, these are indeed signs for the men of understanding." Further, in

chapter 'Al-Araf' verse 185 (Qur'an, 7:185): "Do they not look in the dominion of the heavens and the earth and all the things that Allah has created".

Thought provoking questions are used in the Qur'an many times. For example, verse 3 in chapter 'Fatir' (Qur'an, 35:3):"O men remember the grace of Allah unto you! Is there a Creator, other than Allah, to give you sustenance from heaven or earth? There is no God but he, then how are ye perverted." (Al-Hadrri, 2004).

Overall, the Qur'an is a critical tool that encourages the believers to use their intellect and reason in order to make the world a better place to live, to realise social justice and eradicate all the evils that are plaguing the Muslim world. In this book of guidance, it finds numerous thinking styles that are granted to Muslims so that it may think and use their intellect to see the world a little differently beyond their material desires and lusts and to reflect upon the signs of Allah, become better individuals and work for the betterment of humanity, thereby facilitating social justice. In short, the Quran has a unique nature, which appeals to the minds of its readers whilst it encourages using higher thinking skills to ponder and understand the meaning of verses, which is also a religious duty. The reader feels as if the particular passage he/she is reading is being directed utterly to him/her. Indeed, Islam even calls upon its followers to ask questions to affirm their faith. The prophet Abraham exercised critical thinking when he questioned the existence of the sun and moon as gods, reaching the conclusion that whatever sets and disappears cannot be all-powerful, so that the Creator of all these created things was the One God. Bilquis, Queen of Sheba, is another example of a human being's ability to come to the right conclusion through critical thinking. The Quran emphasises and demands that Muslims observe, think, ponder, reflect and question creation, including the wonders of the universe and what is within us to recognise God's existence. In addition, the Quran relates stories of the

past generations to make us think critically of what they were doing wrong so that it did not repeat the same mistakes. At the same time, Islam discourages them from blindly following any tradition just because that is how it was done in the past, rather it encourages and urges its followers to learn, read, write and do research.

At many places in Holy Quran, learning and thinking are encouraged. The first verses revealed in the Holy Quran say (translation): "Read in the name of the Lord, who created man from congealed blood." This means that the first revealed word was "read," reflecting thus the importance of reading and learning according to Islam. The Holy Quran repeatedly orders Muslims to contemplate about the universe, creatures, animals, seas, stars, the human body and plants. The Holy Quran is scientific in its approach and thus it gives Muslims an example of scientific objectivity and the scientific reasoning. Moreover, the Holy Quran often gives proofs to its statements (Qutb, 1965).

In addition, the scientific approach of the Holy Quran is illustrated by its request of proofs from the disbelievers for whatever claims they make. The Holy Quran gives another example of scientific objectivity by repeatedly blaming disbelievers for their blind imitation of their forefathers. This is certainly an invitation from the Holy Quran to the believers and people to think independently and critically. Independent thinking is an essential condition for creativity, which is the first condition to scientific innovation and technological progress. Prophet Muhammad, urged his companions to use their own judgment if they faced problems for which there was no specific solution in the Holy Quran or the traditions of Prophet Muhammad. This encouragement of free judgment is a green light that stimulates people to think, but without going against the principles of Islam (Qutb, 1965).

From the numerous evidence provided above, it can be concluded that the Holy Quran, as a cornerstone of Islamic faith, is not only on itself a masterpiece that requires higher thinking skills to grasp its full meaning, but it encourages believers to use their intellect, curiosity, questioning other thinking skills in everyday situations. Thus the statement, that the Holy Quran on itself would be just a summary of rules and orders that have to be blindly followed can be refuted.

Having discussed the ultimate source of Islamic faith, the Holy Day, the next section will examine the second major source: the Sunnah of the Prophet.

4.8.2 Thinking in the Sunnah of the Prophet (Prophet Traditions)

The Prophet was interested in developing people's thinking and developing the strength of mind in way of thinking, remembering, observing, and considering. He was helping humans to follow the idea of strong mind. This was the tradition of the prophet before and after the mission. People's everyday language is not the only language, but language can be versified to include ways of approach to be understood by people who are addressed in accordance with their intellect, way of thinking and the intellectual bases on which they rely. The prophet Mohammed said: "Make it a habit for your hearts to be observing, thinking, and undergoing". Thinking allows human beings to model the world and to deal with it according to their objectives, plans, ends and desires. Words referring to similar concepts and processes include cognition, sentience, consciousness, idea and imagination. Thinking is the way of the mind to understand life and without thinking it would not reach this environment. Critical thinking involves logical thinking and reasoning, including skills such as comparison, classification, sequencing, cause/effect, patterning, webbing, analogies, deductive and inductive reasoning, forecasting, planning, hypothesising, and

evaluating. In the Sunnah, critical thinking is the ability to think clearly and rationally. It includes the ability to engage in reflective and independent thinking. Someone with critical thinking skills is able to understand the logical connections between ideas, identify, construct and evaluate arguments, detect inconsistencies and common mistakes in reasoning, solve problems systematically, identify the relevance and importance of ideas, and reflect on the justification for one's own beliefs and values (Al-Hindi, ND).

"Creative thinking" involves creating something new or original. It involves the skills of flexibility, originality, fluency, elaboration, brainstorming, modification, imagery, associative thinking, attribute listing, metaphorical thinking and new relationships. The aim of creative thinking is to stimulate curiosity and promote divergence. The Prophet Mohammed considered thinking to be like worship, where he said: "Thinking for an hour is better than praying for a night" (Al-Hindi, ND, p.155).

The Sunnah of the Prophet encouraged people to see the phenomena of the universe and consider the affairs of the world. The Prophet Mohammed dealt with his friends and followers by many different means of encouraging them to think and consider creatively and asking them many questions to develop their power of deduction and analysing of meanings and symbols. For example, Ibn Umar said that the Messenger of Allah said: "From the trees, there is a tree whose leaves do not fall, and it is like Islam, what is it? People mentioned several trees and the Prophet said 'Palm tree' (Al-Bukhaari, No 59).

Giving examples enhances understanding and consolidates information in the mind; giving puzzles and riddles challenge the mind. The Sunnah of the Prophet gives encouragement for the training of the mind by syllogisms and extracts. For instance,

someone came to the prophet and asked him that his wife had given birth to a black baby and the person said: "I denied, the prophet said: do you have camels? He said: yes I have, and then the prophet said: what are their colours? The person said brown is the colour; after that the prophet said do they have children who has a white colour, yes he said then the Prophet said: as well as you" (Al-Bukhaari, 1991, No 677). In this story the Prophet used a creative analogy to bring understanding of this situation (Bin Hajar, 1990, chapter 13).

The Prophet also used motivational expressions with his companions to give them questions for stimulating their thinking and encouraging their interest in the subject. For example, the Prophet said: "Did you know that (Alghebah)? They said: God and His Messenger know. He said: someone says abusive words to another person when he is not present" (Muslim, 1989, No 4690).

Furthermore, the Prophet used dialogue and discussion methods during conversations with other people and during his teaching of his companions, to stimulate the attention of the listeners. For example, the Prophet said: "If there is a river near the door of your home and you are washing from it five times every day, do you think dirt in your body remains? Then his companions said: no it does not remain. So the Prophet said: this is like the five prayers that erase the sins" (Muslim, 1989, No 1071).

Prophet Muhammad ordered people to record knowledge in books. As Muslims know, Islam as a religion holds that science alone is not enough to bring real progress. In secular countries that are technologically advanced, it notices that technology itself may create serious problems to those countries and others. For example, science has led to the invention of atomic bombs that are capable of destroying a whole city with millions of civilians in a minute. Killing one million civilians or more in a minute is a

terrible act of brutality. This act is the product of science with the absence of true religion or any other source of morality. According to Islam, civilians should not be harmed during war (Qutb, 1965). Finally, science has led to the invention of bombs that destroy plant life. Again, this is an act of extreme materialism devoid of spiritualism. According to Islam, civilians, animals and plants should not be harmed during war. This shows that while science gives the instruments that might be used for destruction, the misuse of these instruments do not take place through science. These destructive instruments are employed through a political decision. This means that it has to go back to the politician's psychology to determine what kind of behaviour is expected. Therefore, science and technology alone are not enough to achieve progress in society; on their own they may, in fact, be used in a way that hinders or even destroy healthy development of society. However, Islam maintains, that if science is accompanied with the practice of the true religion and submission to Allah, it will be used to serve man and not to torture or destroy him (Qutb, 1965).

The Sunnah of Prophet is thus complementary with the Holy Quran in promoting thinking and higher thinking skills. As Muslims are urged to follow the example of Prophet Mohammed, who himself was known for very high intellect and level of thinking skills, they are trying to emulate his way of thinking and use similar methods in solving problems, such as deduction, analogy, questioning, imagination and others.

By observing the Sunnah of the Prophet together with following the appeals of the Holy Quran to see, ponder and believe, Muslims are exposed to many instruments of thinking in Islam, which are discussed in the following section.

4.8.3 The instruments of thinking in Islam

In Islam there are many tools to encourage the employment of the thinking. Following part is a brief overview of them.

Senses

The senses are the physiological methods of perception. The senses and their operation, classification, and theory are overlapping topics studied by a variety of fields, most notably neuroscience, cognitive psychology (or cognitive science), and philosophy of perception. The nervous system has a specific sensory system, or organ, dedicated to each sense. Senses are the instruments that lead to the human mind; hence a man who does not use his senses cannot consider any thing around him. Islam ordered man to do good, consider his works in this life to reach successfully to the next life. So, senses have great importance in Islam and provide the mind with information and obtain the facts and knowledge needing consideration (Al-Zahori, 2002).

Mind

The mind has a great position in Islam. Allah made sound mind as a condition to perform the duties of Islam, as without it, people would become similar to animals. Mind can be a key for a person to be sensible, rational, reasonable, intelligent and wise, while the use of the mind or faculty of reasoning can be used to understand and withhold or restrain oneself from doing what is not befitting. Allah has repeatedly commanded in Quran to use 'Aql' or intelligence and be sensible, reasonable and rational. For example: "Do you exhort the people to be righteous, while forgetting yourselves, though you read the [scripture? Will you not be sensible and reasonable and use your Aql]?" (Qur'an, 2:44). "The life of this world is nothing more than a

distraction and diversion [from what is desirable] while the abode of Hereafter is far better for those who keep on guard [from its distractions and diversions]. Will you not then be sensible and reasonable and use your Aql]?" (Qur'an, 6:32). "Did they not roam the earth and see the consequences for those before them? The [end and the] abode of the Hereafter is far better for those who lead a righteous life. Will you not then be sensible and reasonable [and use your (Aql)]?" (Qur'an, 12:109). "It has sent down to you a Book. It will give you eminence, honour and nobility. Will you then not be sensible and reasonable and understand it?" (Qur'an, 21:10). "Shame upon you that you obey, serve and adore others beside Allah! Have you no sense, at all?" (Qur'an, 21:67). "He is the One who gives life and death and alternates the day and the night. Will you not be then sensible and reasonable [and use your mind (Aql)]" (Qur'an, 23:80). "Everything that is given to you is only the material of this life, and the glitter thereof. What is with Allah is far better, and everlasting. Will you not understand?" (Qur'an, 28:60).

Islam considers the mind as a tool of reasoning and thinking in a good way, hence reaching good deductions in all fields of life. Mental knowledge is the knowledge that can be reached by intelligence because mind frees man from blind traditions; mind helps to reach new places through experimental theories and fixed facts. Thought is a mental process which allows an individual to model the world, and so to deal with it effectively according to their goals, plans, ends and desires. Words referring to similar concepts and processes include cognition, idea and imagination. Thinking involves the cerebral manipulation of information, as when it forms concepts, engage in problem solving, reasoning and making decisions. Thinking is a higher cognitive function and the analysis of thinking processes is part of cognitive psychology. Mind

makes the human think of the positive things and meanings in life and considers everything around him (Al-Shareef, 1992).

The two main instruments of thinking in Islam, senses and mind, are both described in Islamic teachings as being indispensable for believers and their proper and effective use is of utmost importance for worldly and also spiritual reasons. In addition, both these instruments are critical in their support of the kind of thinking that is desirable in Islam. What exactly are the specifications of thinking according to the Islamic traditions is a focus of the next section.

4.8.4 Specifications of thinking in Islam

Thinking is not specialised thinking for a particular subject but it can be directed towards many subjects and all situations that face humans in the world. Thinking in Islam depends on the following logical rule. Firstly, it is impossible to confirm a fact and refute at the same time. Secondly, scientific thinking sees that each event has reasons, and these reasons lead to results (Obeddat, 2003). Thinking in Islam has many specifications, as follow:

Accumulative

Thinking in Islam starts from the reality of the world around people. Many scientists have participated in building knowledge in different ages. Each scientist completes the road that previous scientists began and does not make it their own original philosophy. Scientific theories can cancel the previous theories or complete them or change them. This means that scientific facts are developed quickly and change continually from time to time. So, Islam ordered its followers to follow thinking and apply it in all fields of life, thereby benefiting from its earlier results and using the latest knowledge in his life (Al-Qurashi, 2008).

Organising

Thinking in Islam is a method of research so it differs from the usual thinking. Thinking depends on a predetermined method in composing theories in an organised way whereas normal thinking is less structured. Ideas should not be arrived randomly but thinking should keep the relation between the different phenomena and apply them in daily life (Qutb, 1965).

Muslims are supposed to spend time in learning sciences and the ideas that benefit them in life now as well as in the future. Scientific thinking is a way or method of thinking which differs from normal thinking. Scientific thinking depends on the organising of the external world as scientific thinking is a method of organising ideas and not letting them wander freely without constraining them with laws and rules. The scientific researcher examines the relations between phenomena. Scientific thinking in Islam is related to reality, whether in fields or tools, and it continues with the live reality that deals with facts. Also, Islam refuses the idea or the principle of science for sake of science or thought for sake of thought, but science as everything should be done in the name of and for Allah; in Islam, science must be followed by practical realisation of the new facts. And as long as humans consider the specifications of things they must consider the job of thinking. Muslims try to use time in doing what benefits them and their society according to the instruments of Islam (Qutb, 1965).

Searching for reasons

Science aims at understanding the phenomena that it studies by discovering information and facts. It is necessary to understand these facts and identify the way of developing and analysing them by determining reasons for their development. Scientific thinking does not consider ultimate reasons because they cannot be

measured and evaluated. In addition, scientific thinking in Islam is a clear method which depends on the right approach and obligation of thinking requirements and applied scientific requirements. Searching for reasons achieves two main purposes: achieving the desire of knowledge and increasing the ability to control different phenomena via considering their reasons. Therefore science thinking in Islam should ask particular rather than general questions (Al-Qurashi, 2008).

Intensive

Scientific thinking in Islam is intensive, so a Muslim is asked to consider every field of life and do their best to devise tools and instruments to feel with, not the ability to perform other, new tasks. The researcher does not study a predetermined problem but studies a problem to obtain results. Scientific knowledge imposes itself on all people and scientific facts are applied all people (Morsi, 1998).

This section demonstrated that thinking, especially scientific thinking, has quite elaborated specification in Islam. The most important element of this specification seems to be the stress that is put on practicality of scientific thinking, and of possible utilisations of new facts and knowledge. Therefore, it is necessary to examine if there is any specific area on which thinking should focus, that is given precedence in Islam. Hence, the next section describes the aims of thinking in the Islamic religion.

4.8.5 The fields of thinking in Islam

There are many fields of thinking in Islam, such as "horizons." Horizons include thinking about sky and earth and sun and moon, stars, day, night, rains, plants, trees and mountains. Furthermore, there is the field of "selves" that means understanding the nature of oneself. Allah said in Quran: "Soon will we show them Our Signs in the

(furthest) regions (of the earth), and in their own souls, until it becomes manifest to them that this is the Truth. Is it not enough that thy Lord doth witness all things?" (Chapter 'Fussilat', 53). "Tell me if it is from Allah; then you disbelieve in it, who is in greater error than he who is in a prolonged opposition? And said (What did He create him from? From a tiny drop, He creates him and designs him. Then He points out the path for him." (Qur'an, Chapter 'Abasa', 18-20), (Al-Hadrri, 2004).

There is also the field of "beliefs" where Islam confirms that the foundation of faith is the allegiance to God and his prophet, Mohammed, who lived around 570-632 CE, and who came from a family of traders in Mecca. The religion's book of revelation, mediated by the prophet, is the Quran. Right belief in Islam means believing in one, unique, incomparable God, who has no son or partner, and thus none has the right to be worshipped but Him alone. He is the true God, and every other deity is false. He has the most magnificent names and sublime perfect attributes. No one shares His divinity, or His attributes. In the Quran, God describes himself: "He is God, the One God to whom the creatures turn for their needs. He begets not, nor was He begotten, and there is none like Him." (Quran, 112:1-4), (Al-Hadrri, 2004).

Islam thus urges its believers to use their thinking effectively, by pondering about things which can bring them closer to their Lord spiritually, as they recognise the Truth, but also things that help them to understand the world around them and themselves better.

From the evidence presented about the position of thinking in Islam is evident, that to encourage development of Islamically desired thinking skills, there has to be institutionalised effort to facilitate such a process. This institutionalised effort, in the

same way as in non-Islamic society, is part of the educational system. Therefore, the next section presents the concept of the Islamic education and creativity.

4.8.6 Islamic education and creativity

Islamic Education has taken a great interest in the issue of creativity in many fields. The foregoing has been of substantial benefit to Islam, Muslims and the human race in general. Islam has controlled the creative processes to channel them in the right direction to avoid corrupted ways. What have been these directions is discussed below.

Scientific creativity

Islam came to people who were in ignorance of the rituals, beliefs, morals, sciences and knowledge; then the number of people of Quraish (tribe of Prophet Mohammad and Mecca population) who could read and write was just seven men (Bakkar, 2000).

After Islam came to contribute creative excellence to those people's minds, this creativity accompanied every step in creation of the Islamic civilisation. As a result, this gave rise to science and products of knowledge. It was not given to just anyone to acquire this knowledge. For example, Imam El-Shafei was the first recipient of the principles of jurisprudence, Malik bin Anas was the first to receive jurisprudence knowledge, Abu Ubaida bin Muammar Al Muthanna was the first proponent of the Quran of unfamiliar, Alkhaleel bin Ahamad was the originator of Prosody in Arabic Literature, Abu Al aswad Aldwli was the first writer in parsing and expression in Arabic language and Abdullah bin Almatz was the first practitioner in the craft of poetry (Al-Qurash, 2008). This demonstrates very organised and hierarchical approach to knowledge, research and science. The following part illustrates the benefits of such an approach.

In addition, Muslims had superiority in the experimental sciences, and they established the basic rules in several sciences. For instance, in pharmacology, they invented alcohol in medicine using emulsions and extracts of aromatic oil. Moreover, Al-Razi was the first person to use mercury in the synthesis of ointments, and he was the first person to coat bitter tablets of medicines in sugar so that the patient would find the medicine palatable. Furthermore, they were the first ones to manufacture drugs in the form of pills, and create dressings, medical powders, and sticking plasters as well as making medical ointments which dried after a time as waxes to cover new wounds. The famous person in pharmacology was Abdurrahman bin Mohammed bin Abdul Karim bin Waked who died in 1074 (Al-Qurash, 2008). In the science of autopsy, the small circulatory system (pulmonary blood circulation) was discovered, as well as the pulmonary artery circulation, by Bin al-Nafis. Also, they discovered the number of cardiac membranes, their function, and the direction of flow of blood (Obeddat, 2003). In the mathematical sciences, they established the first foundations of logarithmic science, which had been invented in Islamic countries due to the efforts of mathematicians, such as: Sinan Alharani, Bin Yunus Alsadafi AI-Masri, Abu Al-Hassan Al-Nasawi, and Bin Hamza Al-Maghribi (Obeddat, 2003).

These have been given as evidence that Islam encouraged those minds for creativity in all fields of science and knowledge, although they were not able to read and write. This demonstrates the depth of Islamic Education for promoting creativity of mind, and how it has served human wellbeing.

Vocational creativity

Vocational creativity does not depend on professional expertise or manual skills, but there must be a factor of intelligence, thinking, and looking forward to improvement, reform and development. Islamic Education does not oppose this but it stimulates the mind to creativity and innovation in practical and vocational fields. For example, when the Prophet Muhammad, (blessings and peace be upon him) was preaching, standing a trunk in the mosque. He said: "It may be difficult to do this." Then Tamim Al-Dari said to him: "I suggest I make a pulpit for you, as I saw made in Al-Shaam on the north Arabic island at that time". Then, the Prophet Muhammad counselled the Muslim people to make it and they agreed. So, someone made a pulpit for the Prophet Muhammad. In this story, the Prophet Muhammad encouraged and supported work in useful creativity and improved the advice from his friend (Al-Qurash, 2008).

Poetic creativity

Islamic Education has focused on poetic creativity, and guided poetic geniuses in the right direction who then made good use of this. For instance, the Prophet Mohammad guided and encouraged Hassan Bin Thabet, Ka'b ibn Malik and Abdullah bin Ruahah, for focusing and continuation in poetry skills (Al-Qurash, 2008).

Ijtihad

The most significant issue of Islam that makes it a mobile idea is the concept of "Ijtihad": "innovation or critical legal thinking in search for answers to new problems". Close attention to Ijtihad gives Islam great historical mobility, enabling it to preserve continuity with the past while renewing its vitality as a dynamic faith. (Abd- Allah, 2006, p.1).

Al-Baji, a traditional Sunni jurist, defined Ijtihad as "expending one's fullest [intellectual] capacity in search of the right ruling." The art of Ijtihad requires "utmost scholarly exertion on the part of the individual jurisconsult [legal scholar] with a view to arriving at a personal opinion" regarding a new matter of legal concern. Bernard Weiss notes: "The law was not something to be passively received and applied; it was rather something to be actively constructed by human toilers eager to gain the approval of their Lord for their effort." (Abd- Allah, 2006, p.8).

In addition, Prophet Mohammed called for Ijtihad in understanding the verses of the Quran, an endeavour that brings us to the phenomenon of texts. For example, when he asked Moath bin Jabal a judge in Yemen. "What is your guide to judge?" And Moath bin Jabal said: "The Quran". Then, he re-asked: "Suppose you do not find the answer in the book of God?" And Moath bin Jabal said: "Judgments of the Messenger". After that, the Prophet said: "If you do not find it in judgments of the Prophet?" And Moath bin Jabal said: "I try to form my own opinion". Then, the Prophet said: "I thank my God for guiding my messenger to a good idea". In addition, The Prophet encouraged Ijtihad, even to tell Muslim people that when any person makes Ijtihad, Allah rewards him, even if it is not correct Ijtihad. "If he make a correct Ijtihad, Allah will give him a double reward and if he make a wrong Ijtihad, Allah will give him a single reward (Al-Bukhaari) (United States Institute of Peace, 2004).

The foregoing has given a general perception of the philosophy of Islam about thinking, which relies on education in Saudi Arabia. Furthermore, Islamic Education contains these principles, as in the descriptions in the Holy Quran and Alhadeth, as well as the role of Islam in the school curriculum.

This section provided an account of the position of thinking in Islam. It demonstrated in several ways how development of thinking, science and creativity is at the core of Islamic teaching. Moreover, the very pragmatically and practical approach to scientific thinking was illustrated on example of the Holy Quran and Sunnah. In conclusion, this chapter should thoroughly refute the notions about Islam and Islamic teachings being stagnant, against science and human development, and being discouraging towards creativity in the name of upholding traditions. On the contrary, as this section proved, Islam offers ways for people to develop their thinking skills and encourage them to do so.

4.9 Summary of the chapter

This chapter has reviewed the literature on creativity skills and given a theoretical framework for thinking in Islam. It is divided into two sections. The first section discussed creativity skills in education and explained their definition, abilities and the TTCT measure of creativity skills. Also, it explored the integration between ICT and creativity skills. The second section outlined the Islamic perspective on thinking from the holy Quran, Sunnah, and Islamic scholars including the most significant issue of Islam that is the concept of "Ijtihad". In the Methodology chapter, I intend to explore issues arising from the literature review, as explained in the next chapter.

Chapter Five: The Research Design

5.1 Introduction

As I explained in the first chapter, the aims of this study were to examine the effect of EBS affordances, as the result of applying ICT, on increasing students' interest in Islamic Education in comparison to VBS and traditional method. In addition, this study observes the impact of pedagogical affordances of EBS on students' understanding of Islamic Education and its features. Moreover, this study analyses the influence of ICT and EBS pedagogy on promoting students' creative thinking skills and dialogue within their educational context. The foregoing creates a platform on which following five research questions are formulated:

- What are the pedagogical affordances of EBS in the context of Islamic education in Saudi Arabia from teachers' and students' perspectives in primary school?

- What are the key features of EBS that have pedagogical affordances in comparison with VBS and traditional methods?

- What are the affordances of EBS for creativity skills?

- What are the impacts of EBS on Islamic Education and its role in Saudi education?

- What are the hindrances in using EBS in Islamic Education in primary school?

This chapter describes the research methodology used in this study. To outline this chapter, firstly the research approach based on the interpretive paradigm and the research design are introduced. Secondly, the data collection methods (semi-structured interview, classroom observation and pre-test and post-test (TTCT

procedures) are depicted. Thirdly, the methods of quantitative and qualitative data analysis are outlined. Finally, it should be acknowledged that I benefited in preparing the research design and test instruments from a few previous theses such as Amer (2003); Emmanouilidou (2007) and Mansour (2008). The outline of the research methodology is shown in Figure 1 below.
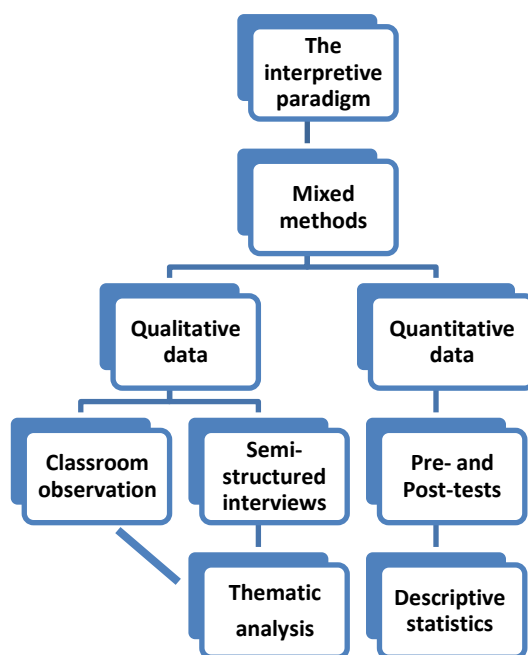
Figure 1: Outline of the research methodology

5.2 Research paradigm and approach

There are many different paradigms in educational research, notably the positivist, critical, constructivism and interpretive (Guba and Lincoln, 2004). Choosing a paradigm and, consequently, the methodology relies on one's epistemological views of knowledge and meaning (Gray, 2004). Initiating the paradigm concept, Kuhn (1970) proposed the idea that knowledge (including scientific knowledge) exists within certain paradigms.

According to Pring (2000, p.56) "educational research seems to fall into two philosophical and competing camps. One (positivist) embraces a scientific model for understanding educational practice; the other (interpretive) emphasises that human beings cannot be the objects of science and that research must focus upon the 'subjective meaning' of the learners".

It is broadly asserted that there are different paradigms in social science such as the positivist and interpretive paradigms (Pring, 2000). Consequently, one of the important issues facing social science research including the education relates to the intense criticism and attacks against its methodological approaches which have been called 'paradigm wars' (Creswell, 2005; Teddlie and Tashakkori, 2003). These 'wars' have particularly affected research students and novice researchers (Nudzor, 2009). Regardless of these 'paradigm wars', the interpretive paradigm had become firmly entrenched within several fields, including that of education (Denzin and Lincoln, 2003; Ridenour and Newman, 2008).

In addition, the significance of the criticisms of positivism which the interpretivist theoretical perspective is built upon reflects a growing awareness and acknowledgement that scientific knowledge has boundaries and limitations. For instance, it has been suggested that natural science and its approaches to research do not answer all questions (Denscombe, 2002). So, the research in this study followed an interpretive inquiry procedure and it took place within an interpretive research paradigm and used both qualitative and quantitative data in form of interviews, observations and pre- and post-tests.

The interpretive paradigm is used extensively in social science research because its objective is to explore, understand and give explanation of causes of a current situation (Bryman, 2001). Interpretive research does not pre-determine dependent and independent variables, but it concentrates on the full complexity of human behaviour as the situation emerges (Kaplan and Maxwell, 1994). Additionally, the purpose of interpretive research should be to understand the way people act, to "search out culturally derived and historically situated interpretations of the social life-world" (Crotty, 2003, p.67). Interpretative researchers assume that access to reality is via social constructions like language, consciousness and shared meanings. The philosophical base of interpretative research is hermeneutics and phenomenology (Boland, 1985). Studies generally try to consider the phenomena via the meanings that people give to them and researchers using interpretive methods in information systems, for example, "want to understand the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham, 1993, pp.4-5).

The present study used mainly the interpretive paradigm because it attempted to understand the reflections of teachers and students on different teaching methods, to understand the influence of these methods on the behaviour of students and to explore teachers' and students' views. Hence, it can be seen that this study is primarily interested in knowing and understanding teachers' and students' perceptions, feelings and views. The researcher looked at the construction of meaning through the interaction amongst participants in exploration of the adoption processes of new technology, and considered factors behind the decision to make use of EBS, through interpretation of responses in interviews and their reflection in observation.

Every interpretation requires an understanding of how people construct the meanings of situations, and these meanings are naturally conveyed to people through a discussion or interaction. Therefore the interpretive approach was thought to be a suitable choice in this study because qualitative methods make it easy to understand the complex nature of teachers' and students' experiences, feelings and emotions (Strauss and Corbin, 1998), whereas with quantitative methods it would be difficult to measure these things (Babbie, 2001 and Silverman, 2001).

5.3 Epistemology and ontology

Epistemology deals with "the nature of knowledge, its possibility, scope and general basis" (Hamlyn 1995, p.242). It is "a way of understanding and explaining how we know what we know" (Crotty, 2003, p.3). Also, Grix (2002) defined epistemology as follows: "Derived from the Greek words episteme (knowledge) and logos (reason), epistemology focuses on the knowledge-gathering process and is concerned with developing new models or theories that are better than competing models and theories" (Grix, 2002, p.177). In addition, epistemology according to Biesta (2005) is an idea about the nature of knowledge. Crotty (2003) claimed that there is a range of epistemologies. First of all he defined the objectivist epistemology (objectivism) in which a meaningful reality exists as such, apart from any consciousness. A contrasting epistemology is constructionism, which rejects the idea of objective truth waiting to be discovered and claims that "meaning comes into existence in and out of our engagement with the realities in our world" (p.8). In this understanding, different people may construct different meanings in different ways about the same phenomenon. The third epistemology explained by Crotty (2003) is subjectivism, in which "meaning does not come out of interplay between subject and object but is

imposed on the object by subject. Here the object as such makes no contribution to the generation of meaning" (p.9).

According to Crotty (2003, p.10), ontology can be defined as the study of being and "is concerned with 'what is', with the nature of existence, with the structure of reality as such". There are certain assumptions prevailing in educational research; the one of them called the scientific, also referred to as positivist, and assumes that reality consists of objects that exist in physical space outside the mind. This type of knowledge is referred to as realism and is often associated with objectivism. The second major ontological assumption is interpretivism, also referred to as constructionism, which "looks for culturally derived and historically situated interpretations of the social world" (Crotty, 2003, p.67).

This research focuses on teachers and students various interpretations of the three teaching methods (EBS, VBS and T) and the research aims and questions lead into an interpretative research design. Since teachers' and students' various interpretations are the main concern of the study, interpretivism is the most suitable position. Interpretivism is a term which opposes positivist epistemology (Bryman, 2001).

According to interpretivism, social scientists should seize "the subjective meaning of social action" (Bryman, 2001, p.13), depending on a study's research questions. Since the study seeks to understand the teachers' and students' interpretations of EBS, it is interpretive in nature. This research deals with teachers' and students' interpretations and implementations of the EBS from a constructionist position. In other words, the study is about teachers' and students' meaning making of the EBS through their

engagement with it. Teachers' and students' engagement with the EBS can only be understood through a constructionist perspective with interpretivist research tools.

In short, the ontology in this study was mainly interpretive. I attempted to explore the extent to which this method (EBS) improved knowledge and creativity skills, and to understand the views of teachers and students in their learning and teaching environments for which qualitative methods such as interviews and observation were employed. However, this study also attempted to measure the improvement of students' creativity skills, whilst using a quantitative method as the key research method. Generally, sample sizes used in quantitative method are larger than those in qualitative method. Given the samples are representative of populations, statistical methods of analysis can be used (Sale et al. 2002), thus providing a researcher with a wider picture of the current situation, and enables him to generalise the findings of his research. As a part of the quantitative method (pre- and post-tests), were used in this study. In addition, combining interviews and observation with pre- and post-tests in this study represents an element of interpretivist paradigms, whereby, qualitative and quantitative methods are combined, thus giving a study more breadth (Bryman, 2001).

5.4 The research methodology

According to Wellington (2000), methodology aims to describe, evaluate and justify the use of particular methods. According to Crotty (2003, p.7), "methodology is the research design that shapes our choice and use of particular methods and links them to the desired outcomes". It is possible to use either quantitative or qualitative methods (Crotty, 2003). Furthermore, educational research has a variety of approaches which can be used to answer various questions (Pring, 2000).

Cohen et al. (2000) identify eight broad categories of educational research methodology, labeled broadly as naturalistic and ethnographic research, historical research, longitudinal, cross-sectional, trend studies and surveys, case studies, correlational research, ex post facto research, single case research, and action research. Of these, the qualitative methodology most relevant to the current study was the interpretivist approach, used within a case study.

Gomm, et al. (2000) emphasise that, all research can be considered as case studies because "there is always some unit, or set of units, in relation to the collected and analysed data" (p.2). In addition, several methods of research contain life history (Goodson and Sikes, 2001), or action research (Cohen, et al. 2000) and use cases in their trials. Moreover, Gomm et al. (2000) point out that the case study concept has been used beyond the context of research, especially by professionals such as medical doctors, lawyers, and social workers. Thus the idea of "case study" may extend into other approaches and is not something separate and distinct. However, the in-depth identification of features which characterises case studies may be a difficult task.

Some limitations have been set by Gomm et al. (2000) as to the acceptable meaning of a case study. They claim that this form of investigation examines a few cases or just one case (an individual, a group of people, a community or organisation, an event, a society) deeply. This requires great amounts of information to be collected from these few cases. It also involves listening to the voices of participants in naturally occurring social situations. Capturing cases in their uniqueness is the aim of the case study, rather than to form a basis for wider simplification or for theoretical deduction of some kind.

A case study requires certain analytical procedures, investigatory style and way of reporting the findings because it is a form of inquiry implying some assumptions of constructionism. According to Hammersley and Atkinson, in the interpretivist' and positivists' view, accounts are considered as a "simple world representation". Conversely, constructionists try to explain how accounts "are parts of the described world" (1995, p.126). From the above, it can be claimed that investigating ways in which participants develop meaning in talk and interaction is the aim of constructionists' observations and interviews. Silverman (2001) emphasises that constructionists' concern is for exploring the developing of meaning through social communication. Bryman (2004, p.412) recommends that, for understanding approaches through which meaning is constructed within qualitative analysis, researchers should move their attention from "what actually happened" to "how people make sense of what happened". So, researchers may cooperate with participants for revealing the meaning. Silverman (2001, p.111) states that "in spite of the naturally occurring data power, it does not follow that it is illegitimate to carry out interviews in research. Everything depends on the status that is accorded to the data gathered in such interviews". This view clarifies the approach used in this research, using guides in semi-structured interviews and classroom observations, rather than using standardised survey instruments.

This study used three teaching methods (EBS, VBS and traditional) as basic structure for three case studies in which each method was observed individually and independently with its own teachers, students and classes because its aim was to reach the best possible understanding of the situation in one school in Saudi Arabia, reaching a deep understanding of the particular case in its natural context without

attempting to generalise the results to other cases. A case study may also be used to address problems and find solutions; and this was a further focus of this research.

Mixed methods of research

This case study used mixed qualitative and quantitative methods of data collection: interview, observation (classroom and forum), and pre- and post-tests. As a case study, mixed methods could be applied to yield detailed information in many forms about a situation (Yin, 2003).

Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. This study is concerned with teachers' and students' perspectives about issues related to effective learning and teaching environments, with the use of EBS, VBS and T (traditional) methods in Islamic education as well as with the analysis of an eventual improvement of creativity skills in case of one of three researched methods (EBS,VBS and T). To explore and understand them, the most suitable method for data collection might be expected to be purely qualitative. However, Maxcy (2003) rejects the mechanical connection between epistemology and methodology. Given a constructivist epistemology, they suggest that "it is perfectly logical for researchers to select and use differing methods, mixing them as they see the need" (Maxcy, 2003, p.59). In my study, I have chosen to combine interview, observation (classroom and forum) and pre- and post-test data collection in order to increase the interpretability and meaningfulness of my findings (Greene et al. 1989), provide a broader understanding of my research problem, explain and build on the results by incorporating multi-method approaches, and obtain a wider picture of the current situation (Creswell, 2009).

A mixed methods design that combines qualitative and quantitative data collection and analyses (Johnson and Christensen, 2004 and Creswell, 2009) was utilised in this research study. Such a design, which includes qualitative and quantitative used in a way that has complementary strengths and non-overlapping weaknesses, is supported by the research literature (Thompson, 2005). I complemented qualitative with quantitative methods to add richness of information in my findings (Fraser and Tobin, 1991) and corroborate my research findings (Rossman and Wilson, 1991). Figure 2 represents a diagram showing the relation of qualitative and quantitative methods to interpretability and meaningfulness of research findings.
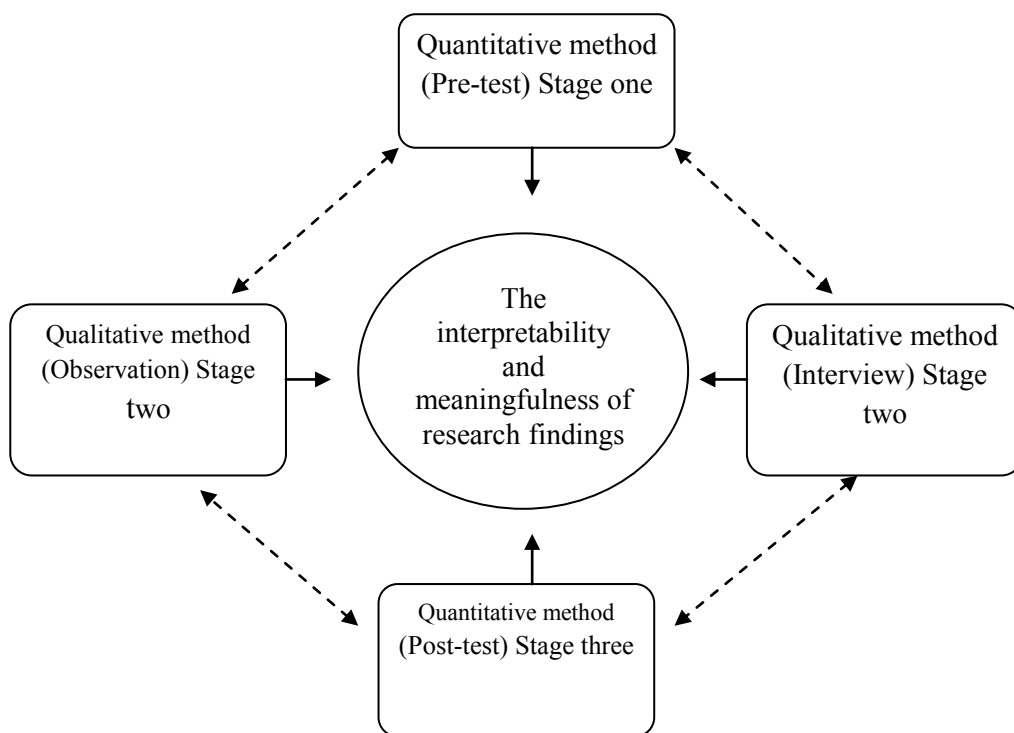
Figure 2: Relation of qualitative with quantitative methods to interpretability and meaningfulness of research findings

Through triangulation of qualitative and quantitative methods, credibility in the results was enhanced because they emerged consistently "from data obtained using a range of different data collection methods" (Fraser and Tobin, 1991, p.290). Brewer

and Hunter (1989) reported, "The multi- method approach is a strategy for overcoming each method's weaknesses and limitations by deliberately combining different types of methods within the same investigations" (p.11). Similarly, Johnson and Christensen (2004) argue that by combining two or more research methods, like interviews, observation (classroom and forum) and pre- and post-tests in my study, with different strengths and weaknesses, the researcher can enhance the adequacy of the interpretation.

Furthermore, mixed research can expand a set of results, and discover something that would have been missed if they used solely a quantitative or a qualitative approach. Finally, mixed research is desirable and feasible because it gives a more complete view, and because the requirement during the different phases of the intervention (or research project) make very specific demands on a general methodology. While it is demanding, it is more effective to choose the right tool for the job at hand (Johnson and Christensen, 2001).

Part of this research used a qualitative methodology, for several reasons. Firstly, this research used descriptive and interpretive methods, asking what and how. Qualitative research is well suited for the purposes of description and interpretation (Lee et al. 1999). Secondly, qualitative research gives more in-depth data about what the researcher will investigate. Johnson and Christensen (2004) suggest that qualitative research uses a "wide-angle and deep-angle lens, examining the breadth and depth of phenomena to learn more about them" (p.31). In my study, exploring participant's perspectives about practice in their teaching and learning could be done effectively by qualitative research. Johnson (1997) asserts that the interpretation of participants'

thoughts is a primary qualitative research activity. Through the inductive analysis of the interviews and observation (Janesick, 2003), a qualitative approach provided a rich description that revealed participants' insights and experiences which, in turn, was used to understand how EBS could support learning and teaching environments in classrooms.

While a qualitative approach was the dominant paradigm used in this research study, a quantitative component was also included. In my study, the quantitative method, pre- and post-test, was chosen as a means of accessing the improvement in creativity skills of a large number of participants to provide clarification of the qualitative data with a larger population and to see if similar answers were gained in relation to the research questions (O'Donnell, 2002), or to corroborate research findings (Rossman and Wilson, 1991).

Hence, for this research both qualitative and quantitative methods were used. This helped to investigate the research questions, which required identifying the effect of EBS affordance, as the result of application of ICT, on increasing students' interest in Islamic Education in comparison to VBS and traditional method. In addition, this study observes the impact of pedagogical affordances of EBS on students' understanding of Islamic Education and its features. Moreover, this study analyses the influence of ICT and EBS pedagogy on promoting students' creative thinking skills and dialogue within their educational context. The next section examines the particular methods in more detail.

5.5 Methods of data collection

This section focuses on the methods of data collection used to answer the research questions in this study, which were classroom and forum observation, semi-structured interview and creativity tests (pre and post-tests). Methods of data gathering stem from the paradigm, the methodology and from the research topic under investigation (Silverman, 2001). The aim of this study was to explore the effect of EBS affordance, as the result of applying ICT, on increasing students' interest in Islamic Education to comparing between VBS and traditional method. In addition, this study observes the impact of pedagogical affordances of EBS on students' understanding of Islamic Education and its features. Moreover, this study analyses the influence of ICT and EBS pedagogy on promoting students' creative thinking skills and dialogue within their educational context. Thus the study used interviews in order to understand the perspectives of the teachers and learners involved in ICT-based practice (EBS) compared with the perspectives of teachers and students in other methods (VBS and traditional). Interviews were chosen as providing a deep understanding of the learning conditions in these environments with different types of teaching methods (Bryman, 2001).

Classroom and forum observation was a second qualitative method employed. While interviews were used as the primary data collection method, observation was used for the researcher to see for himself how the teachers and students acted and interacted in the three methods and their corresponding learning environments. Accordingly, field notes were made from observations of the participants' activities.

As a quantitative method, pre- and post tests were used for measuring the creativity skills of students before and after the intervention, to show any improvements in creativity skills in the three groups and to identify any difference between the groups. More specifically, the Torrance Tests of Creative Thinking were used in this case. The critical evaluation of the Torrance Test for Creative Thinking is presented in more details in Chapter 4.

5.5.1 Qualitative method of data collection

Interviews

The interview seeks to describe the meanings of central themes in the life world of the subjects. The main task in interviewing is to understand the meaning of what the interviewees say (Kvale and Brinkmann, 2009). An interview needs to cover both a factual and a meaning level, though it is usually more difficult to interview on a meaning level (Kvale and Brinkmann, 2009). Interviews are particularly useful for getting the story behind a participant's experiences. The interviewer can pursue in-depth information around the topic. Interviews may be useful as follow-up of certain responses to questionnaires. Researchers can use interviewing to gain access to ideas, thoughts and emotions that they cannot readily identify through observation alone (Bloland, 1992).

In addition, the interview as a method of research is most useful for developing programs that are aimed at individualised outcomes, capturing and describing program processes, exploring individual differences between participants' experiences and outcomes, evaluating programs that are seen as dynamic or evolving, understanding the meaning of a program to its participants and documenting

variations in program implementation at different sites. Interview allows the participant to describe what is meaningful and important to him or her using his or her own words rather than being restricted to predetermined categories; thus participants can relax. In addition, interview in qualitative research provides high credibility and face validity; the results "ring true" to participants and make intuitive sense to lay audiences. Added to this, interview allows the interviewer to probe for more details and to ensure that participants are interpreting questions in the way they were intended. Interviewers can use their knowledge, expertise and interpersonal skills to explore interesting or unexpected ideas or themes raised by participants (Silverman, 2010).

Using interview in qualitative research has some disadvantages, however. It cannot be used in impact evaluations, deciding whether a particular intervention caused changes or effects in participants (since determining causality requires more controlled conditions). It may be experienced as more intrusive than quantitative approaches; participants may say more than they intended to say, and later regret doing this. Additionally, this method may be more reactive to personalities, moods and interpersonal dynamics between the interviewer and the interviewee than methods such as surveys. Also, analysing and interpreting interviews in qualitative research consumes more time than analysing and interpreting in quantitative (Silverman, 2010).

There are three types of interviews which are useful in qualitative research. Firstly, the unstructured interview in which the interviewer has no presuppositions about what to expect from the encounter and, consequently, does not formulate questions in

advance but allows the interview conversation to follow the interviewee's lead. The second type is the semi-structured interview, in which the interviewer-researcher has some pre-determined questions or fairly specific topics to discuss; however, the interviewee has a great deal of space for replying. The final type is the structured interview, where the interviewer has a set of predetermined questions to be answered by each respondent (Robson, 2002).

In this study, semi-structured interviews with open-ended questions were used to allow the researcher to understand the meanings that people hold about their everyday activities. Semi-structured interviews should include a list of pre-prepared questions, which is only a guide, and a follow-up with relevant comments for the interviewee to respond to. This allows for greater elaboration of emerging themes in the course of the interview, rather than restricting both the interviewer and the interviewee to a schedule (Cohen et al. 2000). The researcher can compare different responses to the same questions, while Lankshear and Knobel (2006, p.202) say; "at the same time remaining open to important but unforeseen information or points discussed". This would allow for the generation of further qualitative data which could be used to enlighten and inform the researcher. In addition, the semi-structured interview with open-ended questions affords more flexibility for the interviewer to ask extra questions and for the interviewee to provide more information (Kvale and Brinkmann, 2009).

Purpose and design of the interview

The themes explored in the interviews related to the research questions on Islamic Education classes using the three different teaching methods (EBS, VBS and T;

especially EBS). The potential for improving creativity skills using these teaching methods, a comparison between these teaching methods, pedagogical affordances of EBS in relation to other teaching methods and, finally, impacts and barriers to using these methods, were all investigated. The design of the interview questions also followed from reading of the relevant literature Creative thinking (such as Moseley et al. 2005) and ICT (such as Laffey, 2004) where I benefited from previous work which was close to my field of study. The interview questions are to be found in Appendix 3.

The interview procedure was as follows. Firstly, I took permission from the Ministry of Education (MoE) to carry out my study in their schools. After that, I went to Princes Sultan Primary School which used ICT and Thinking Skills programs with their students. Then I met the headteacher and Islamic Education teachers to explain the aims and approach of the study. A letter was given to them, signed by the researcher, to explain the aims and approach of the interview and observation, to assure them of the confidentiality of their responses and that their data would be used for research purposes only; and they returned a letter of permission. In addition, the school sent a letter to parents of students, signed by the researcher, to explain the aims and approach of the interview and observation. After receiving agreement letters from the teachers and parents, the intervention started with interviews of teachers and students.

Teachers were interviewed once before and once after the intervention period for 30 minutes, as well as interviewed after every lesson, which means additional six interviews, each lasting for about 10 to15 minutes. Thus, all together, there were eight interviews for each teacher. All teacher-participants were interviewed individually in order to evaluate their views towards the study, the students' performance, and their

interest in learning as revealed in the lessons. As many students as possible were interviewed individually after each lesson. Specifically, there were 12 students in EBS group, 13 students in VBS group and 11 students in traditional group. They were interviewed once, individually after each lesson for about 25 to 30 minutes as shown in Table 2 below. This ensured data privacy and confidentiality, and that the experience of the lesson was fresh in their minds. Each interview was recorded by a high quality digital recorder and the recordings were subsequently transcribed to enable more complex qualitative data analysis.

Table 2: Amount of interviews

Participants	Interview before teaching	Interview during	Interview after teaching
	Time: 30 minutes	Time: 10-15 minutes	Time: 30 minutes
Teacher EBS	1	1-2-3-4-5-6	1
Teacher VBS	1	1-2-3-4-5-6	1
Teacher T	1	1-2-3-4-5-6	1
Students (EBS, VBS and T)		1 for each 25-30 minutes	

Most of the interview questions were prepared in advance by considering the relevant literature. However, the interview questions were organised and modified, and extra questions were added, as the interview unfolded. Also, the questions were varied for the participants to ensure that they comprehended the meaning and aim of the questions. Transcriptions of interviews were made immediately after the interviews. The initial transcripts were then returned to each of the teachers and 36 students

before starting the subsequent interview, for the respondent's feedback, with the aim of confirming that the transcript was an accurate representation of what had been said. In addition, after each interview I performed an initial analysis and made notes as a plan for subsequent questions, due to concern with "the unique, the idiosyncratic and the wholly individual viewpoint" (Guba and Lincoln, 1989, pp.155-156). Glaser (1978) emphasised the importance of combining interview data with observational because it allows the researcher to get at the meaning of what has been observed. The procedure for conducting the observations will be described next.

Observations

Qualitative data can help researchers to find out the reasons behind certain actions, so that they can focus on the correct aspects of the problem and increase the chance of improving the situation. In this research, observations were used to collect qualitative data. Observation was carried out by the researcher of the participants in the classroom situation, in a way that was exploratory and open-ended, taking extensive field notes. Analysis was carried out later to see how interested the students were in such a learning activities and how they reacted to the on-line activities concerning creativity skills. The researcher tried to observe the ordinary classroom interactions for long enough to understand what normally went on and to ensure that a special performance was not being put on caused by the researcher's presence (Stake, 1995). Having obtained participants' permission to observe in the classroom meant that a good relationship was established with them and that the researcher was not seen as a threat to the way the classroom normally functioned.

Observation refers to the collection of data by observers who become involved for a relatively long period of time in a field setting, long enough to observe group and individual interactions as the participants repeat and evolve behaviours. Participant observers, while involved in the setting, have no personal stake in what occurs but are sufficiently detached to find the time to observe and record routine and unusual activities and interactions as they occur naturally and spontaneously in the field setting. Direct observation or non-participant observation, in contrast, sets the researcher aside as an uninvolved reporter, as a member of an audience, so to speak (Cohen et al. 2000). I chose to take the role of non-participant observer rather than participant because this helped to preserve the natural classroom environment.

Observation has certain strengths as a method. Firstly, data can be collected on non-verbal behaviour. The observer is able to see what is happening and make appropriate notes about its features and what was said. In addition, observations allow for the researcher to have a relationship with the people he/she is observing (Cohen et al. 2000 and Merriam, 2001).

On the other hand, there are many limitations to observation. Firstly, the teacher knows what is expected and might perform for the person observing. The learners' responses and the classroom setting might be artificial while the observer is there. In addition, some teachers are not used to teaching while there is an observer in the class, therefore the presence of the researcher makes them uneasy and they perform to less than their full potential. Moreover, the fact that schools differ in the way they are managed, and the way teachers prepare their work, might make it difficult to generalise the results from the study. Also, the management of schools influences the

way teachers conduct themselves and how prepared they are for a change in routine (Merriam, 2001).

Purpose and procedure of the observation

Observation was used in this study in order to answer research questions on key features of EBS compared to other methods, its pedagogical affordances for creativity skills, its impact on Islamic Education, its role in Saudi education and the barriers against its use in Islamic Education in a primary school.

The procedure of observation was that, during the second week, I met the head teacher and teachers of Islamic Education and explained the study's aims and methods. Next, I prepared a workshop for students and their teacher where I used an example of lesson to describe the new teaching methods (EBS), however, even before this workshop, the students were aware of VBS as the teacher had used it before. Then, during week three, I administered the pre-test to measure students' creativity skills and marked this test. During weeks four to eleven, the three teachers used either the traditional method (T), verbal brainstorming (VBS) or electronic brainstorming (EBS) in their classrooms. During these weeks, the researcher observed the three classrooms for one lesson per week per group. The researcher asked each teacher before his lesson about his plans and what exactly would be observed, which meant that agreement was reached on the outlines. Thereafter, the researcher wrote reports about the observation including all the important events that occurred in the classroom and forum. Then the researcher and individual teachers compared and discussed the observation reports. In total, the researcher observed 10 lessons in EBS group include forum, 11 lessons in VBS group and 12 lessons in T group. Each observation lasted

45 minutes for each group, as explained in the research design and case studies interventions section.

Initially, the researcher intended to use video camera for recording the lessons; however he was advised by the school's head-teacher not to do so, as from his experiences, most parents would have strongly opposed such an idea. So, the researcher used an audio recorder and made open-ended field notes during the observation of the lessons. Particularly noted were teachers' teaching activities, students' activities, students' dialogue, interaction among students, and student contributions. These constituted the observation schedules (see Appendix 4) that led to insights on what happened during lessons (Wragg, 1994). Furthermore, because I had teachers' plans in advance I was able to make more detailed field notes.

Schedule of interviews and observations

In order to ensure the quality of the collected data were collected, the activities were recorded according schedule presented in Table 3.

Table 3: Schedule of observations and interviews

Weeks	Participant		Data collection	Amount of interviews and observations					
	Teachers	Students		EBS		VBS		T	
				Teacher	Students	Teacher	Students	Teacher	Students
Week 1	Explain the objectives, treatment of data, etc, to gain the support of the school's headteacher and teachers involved. • Gather documentation and organise the classrooms. • Explain and describe the method for teachers and students.								
Week 2	✓	×	Interview before teaching	1	0	1	0	1	0
Week 4-11	✓	✓	Classroom and forum observation	10 lessons for classroom observation	10 lessons for classroom observation	11 lessons for classroom observation	11 lessons for classroom observation	12 lessons for classroom observation	12 lessons for classroom observation
			interviews during lessons	6 during interviews	1 interview for 12 students	6 during interviews	1 interview for 13 students	6 during interviews	1 interview for 11 students
Week 12	✓	×	Interview after teaching	1	0	1	0	1	0

The next section describes quantitative data of this research.

5.5.2 Quantitative method of data collection

Pre-test and post-test

Creativity tests for children have been designed by Guilford and Torrance. The Guilford tests were designed to "test creativity in children" in 1950, and the Torrance

tests were designed to test "creative thinking in words" and "creative thinking in pictures" in 1974, and "thinking creative voices and words" in conjunction with Khatena in 1973 (Khatena and Torrance, 1973). In this study, the Torrance test of creative thinking in words was implemented as a pre-test and post-test, as explained in the Chapter 4.

Purpose and implementation of pre-test and post-test

In this study, the Torrance test of innovative thinking was administered to the students in each of the three methods used for case studies (EBS, VBS and traditional methods) to answer the third question in this study also it used because it is one of the most widely used and highly regarded benchmarks for measuring creativity and innovation and is in popular use in the Saudi education system (Mawhiba, 2000). Another reason for choosing the Torrance test was because it can be codified to be commensurate with the students' age (10 – 12 years), even though the test as a whole is not age-specific and is applicable from kindergarten to graduate age (Torrance, 1974).

Torrance Tests of creativity skills work on the measurement of three creative capacities: "fluency", "flexibility and "originality". The tests can be applied individually or collectively. These verbal tests include the following activities: asking questions about a drawing, making guesses about the causes of the event pictured, making guesses about the possible consequences of the event, producing ideas for improving a toy, thinking of unusual uses of tin cans or cardboard boxes, asking provocative questions and thinking of the varied possible consequences of an impossible event (see Appendix 7) (Torrance, 1974). The environment in which the

tests are carried out must have an atmosphere of playing, thinking and problem-solving. Students should find it enjoyable, receive encouragement and work interactively (Torrance, 1974). The test is available in an Arabic version translated by Abou Hatab and Souliman (1976), validated in the Saudi context and prepared for use by Khan (1990), and has been used in many studies in Saudi Arabia, such as by Dewadi (2005), Mualem (2009) and Zamzami (2009). In addition, it has been applied and standardised for the Saudi environment by the Ministry of Education (2010) and by the research team from King Abdul Aziz City for Science and Technology (National Committee for Education) for the detection program for gifted children (Al-sharee, 1995 and Tatweer, 2006).

Procedure for pre-test and post-test

The Torrance measurement of thinking creatively with words, Form A, was presented as a pre-test before the intervention for the whole student sample on15[th] January 2010 in week 2, and the same test was also used as a post-test after the intervention on 15th April 2010 in week 12. After marking and analysing the results of the pre-tests, the three teaching methods were implemented in the classes. At the end, the post-tests were administered, followed by marking and analysing the results.

The Torrance Test for Creativity skills (TTCT) scoring

In this section, the technique of TTCT scoring is presented. I scored the students' booklet in the pre- and post-tests using the scoring instructions in the Test Guide of the TTCT test (1990). Test takers were students of year 6 in primary school; a total of 61 students (20 EBS, 21 VBS and 20 T) took the paper-pencil format tests, and all

booklets of the returned tests were effective. All students took pre- and post-test at the same time and under the same conditions. The researcher followed Khan's classification (1990), which validated this test in the Saudi context and adapted it; he used same system of scoring of the Torrance test (1974).

The answers from the 61 effective test papers consisted of 17 categories: family, physical properties of objects and events, physical characteristics of the situations, time, person in the picture, people not in the picture, whole picture, magic and imagination, weather and natural disasters, elements of origin, emotions, clothing in general, clothing specifically, location, profession, physical activity out of the picture and physical activity within the image. Each of these consisted of several response items and each of the seven activities in each test was scored for three skills: fluency, flexibility and originality (as explained in Chapter 4). The fluency score was obtained by counting the number of responses related to the question given by a student in each activity; an example is shown for fluency, in Table 4, below.

Table 4: Example of fluency scoring

Name code	Activities	Pre-test in EBS Fluency scoring							Post-test in EBS Fluency scoring						
		A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
1EBS	Number of responses	1	0	0	3	1	1	2	2	2	1	7	4	2	3

The flexibility score was obtained by counting the number of different approaches or categories used in responding to the task; this did not give credit for repeated responses. The number of different categories that a student's effective answers fell

into made the flexibility score for that student. An example is shown below for flexibility (Table 5).

Table 5: Example of flexibility scoring

Name code	Flexibility categories frequencies	Pre-test in EBS													
	Activities	Family	Physical properties of objects and events	Physical characteristics of situations	Time	Person in the picture	People that out of the picture	The whole picture	Magic and imagination	Weather and natural disasters	Elements of Origin	Emotions	Clothing in general	Location	Physical activity within the image
1EBS	A1	3	3	3	4	2	-	1	3	2	2	3	4	-	1
	A2	3	2	1	0	4	0	1	3	0	1	0	0	1	2

The originality score is based on the concept of scoring on the normal distribution, or statistical rarity. Torrance (1990) based the scoring system for originality tests on percentages; the score was arrived at from a tabulation of frequencies or percentages of the responses given. Response given by 5% of respondents scored 0 points, by between 2% and 4.99% scored 1 point, and by under 2% scored 2 points. The process of originality scoring was, firstly, to count all test students' effective answers, and then find out the number of responses for the same effective answer. After that, divide the number of responses for a same effective answer by the number of test takers, to produce a percentage, which represents the degree of originality for that particular answer. Then apply the percentage to the scoring standard for originality to get the originality score for the particular answer, as shown in Table 6.

Table 6: Originality scoring

Coding responses	Number of responses	Percentage	Originality score
R1AC1	46	77.54%	0
R2AC1	2	3.27%	1

The scores students obtained from the pre-test and the post-test were compared to see if there was any difference in their creative thinking ability before and after the implementation of the three teaching methods. The quantitative analysis showing the differences between pre-test and post-test scores was carried out using SPSS in order to compare results by the three teaching methods.

Reliability of pre- and post-test scores

To ensure reliability of the scoring, the students' pre-tests and post-tests were scored by two different scorers. The different sets of scores obtained were correlated together to ascertain the extent to which they are in agreement. Due to time constraints, only the fluency and flexibility scores were used, and not the originality scores. As explained in the Chapter 7, the pre-test scores were normally distributed while post-test scores were no longer normally distributed. Therefore, the table 7 below gives the Pearson correlation coefficient for the pre-test scores as this is a parametric test, and the Spearman correlation coefficient for the post-test scores as this is a non-parametric test.

Table 7: Correlation between scorer 1 and scorer 2

Scores	Correlation coefficient	Sig level
Total pre-test fluency (score 1) and Total pre-test fluency (score 2)	0.905	0.000
Total pre-test flexibility (score 1) and Total pre-test flexibility (score 2)	0.902	0.000
Total post-test fluency (score 1) and Total post-test fluency (score 2)	0.973	0.000
Total post-test flexibility (score 1) and Total post-test flexibility (score 2)	0.971	0.000

Table 7 shows a very high correlation coefficient (> 0.9) between the two sets of scores, all of which were significant at the p = 0.000 level. This indicates an excellent level of agreement between the two scorers, giving us confidence in the reliability of the scoring. In the quantitative data analysis, scorer 1's scores will be used.

Kappa test for inter-rater reliability of pre- and post-tests scores

Rather than simply finding the correlation coefficient between the total scores on each aspect of creative thinking, a more stringent measure of inter-rater reliability is Cohen's Kappa (Landis and Koch, 1977 and Wood, 2007). This measures the agreement between two raters on the assignment of categories to a categorical (nominal) variable. A crosstab table is produced by SPSS which shows the frequencies with which certain scores were assigned by each of the raters to the students' work (an example is shown in Appendix 1). The statistic Kappa is computed to show the extent of the agreement between the two raters on the piece of work (Landis and Koch, 1977 and Wood, 2007). Table 8 below summarises the values of Kappa for pre- and post-tests of fluency and flexibility. Originality scores were not included because of the difficulty and time consuming nature of asking a second person to rate them. Values of Kappa can range from 0 to 1, with 0 showing that any agreement is due to chance and 1 meaning perfect agreement. It was not possible to compute Kappa for those activities were one rater gave a mark for a piece of work that was not given by the other rater to any piece of work. These are shown in the table 8 by an asterisk (Cannot be computed, CC).

Table 8: Summary of the values of Kappa for pre and post-tests of fluency and flexibility

Skills test	Pre-test of Fluency							Post-test of Fluency						
Activities	A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
Kappa	.726	.915	.875	*	.733	.824	.597	*	.702	*	*	*	*	*
Interpretation of Kappa	SG	APG	APG	CC	SG	APG	MG	CC	SG	CC	CC	CC	CC	CC
	Pre-test of Flexibility							Post-test of Flexibility						
Kappa	.449	*	.555	.654	.551		.648	.535	*	*	.606	.738		.641
Interpretation of Kappa	MG	CC	MG	SG	MG		SG	MG	CC	CC	SG	SG		SG

Table 8 shows that the level of agreement between the two raters was good. Out of the 16 values of Kappa that could be computed, 5 showed a moderate agreement (MG), 8 showed substantial agreement (SG) and 3 almost perfect agreement (APG). Because of this high level of reliability it can accept the first rater's scores with confidence to proceed to do the statistical analyses.

5.6 The design of the study

Initially, this study embarked on a literature review to understand the various techniques used in brainstorming with a special focus on EBS. The researcher examined existing data relating to similar research situations and looked at the results of various experiments conducted in this area showing advantages or disadvantages of EBS in contrast with other brainstorming methods. This initial review also looked at various factors that may influence the outcomes and productivity of EBS.

The second phase of the research explored factors that could influence the productivity of EBS as revealed in the pilot study. These factors were peculiar to Saudi society, leading to a consideration of the possibility of using this method in the

Saudi education system. This phase also looked at ways of minimising the negative effects posed by Saudi social and cultural barriers, in order to increase the productivity of EBS.

The third phase of this research was based on the qualitative and quantitative research methods, as described above. The tools used in this study were quantitative (pre-test and post-test) to measure changes in students' creativity skills under the three teaching methods, and qualitative (lesson observations and interviews) to obtain teachers' and students' perceptions of the three teaching methods.

The fourth phase, which was concurrent with the third phase, was the intervention which took place within the students' primary school over more than three months. In the first group, case one, the teacher used traditional teaching methods; in the second group, case two, the teacher used verbal brainstorming; and in the third group, case three, the teacher used electronic brainstorming. The Torrance tests, observations and interviews were performed before, during and after the intervention, as described above and illustrated in Figure 3, below.
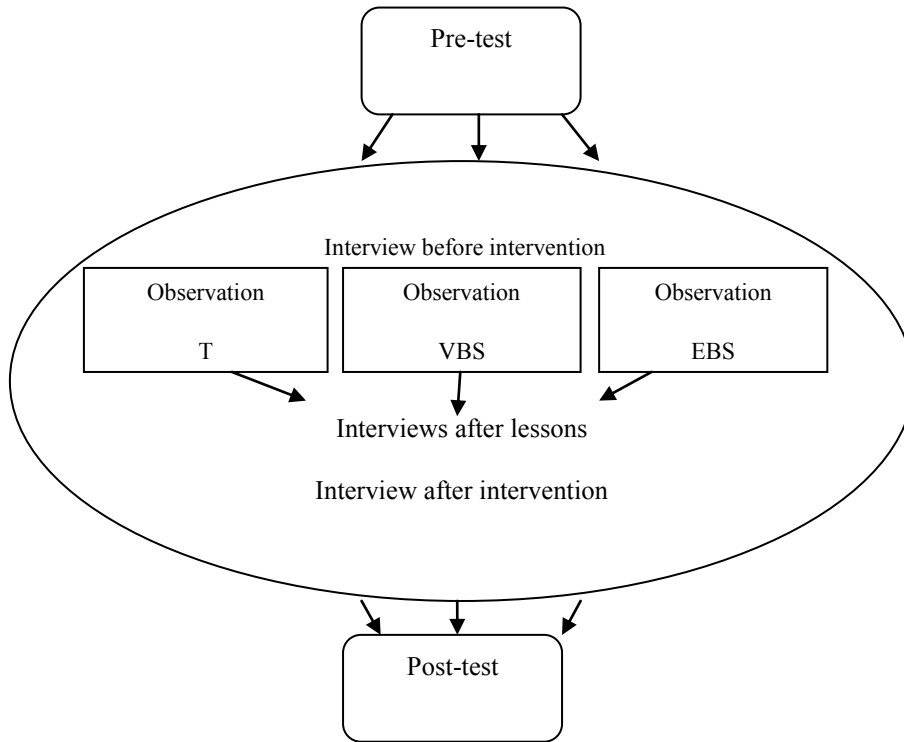
Figure 3: Research design

The fifth phase was that of data analysis, quantitative using SPSS and qualitative using thematic analysis. This analysis relied on all the relevant data that had been gathered, and included all the main interpretations as explained in the literature review (Chapter 3 and 4), which were used to analyse the collected data. This phase focused on understanding the teaching and learning actions and events within their settings and in the context of the school and the classroom. Mouton (2001) claimed that data analysis is the process of bringing system, structure and meaning to the large amount of collected data. These phases led to the outcomes and findings of this research and to answering the research questions. The next section gives an explanation of sampling.

5.7 The Sampling

Stake (1995, p.4) stated that a "case study is not a sampling research". The objective of a case study is to understand that particular case; however, it is not to understand other cases. In scientific research, the case study has two types of sampling, probability and non-probability, which refers to its representativeness of the population from which it is drawn. Nevertheless, in interpretive research, there are different sampling techniques, such as purposive sampling, convenience sampling, theoretical sampling and snowballing (Cohen et al. 2000). This research used a purposive sampling technique to select the participants who would satisfy the needs of the study (Merriam, 2001).

In regard to the above-mentioned this research used a purposive sampling technique, one state upper primary school, recommended to the researcher by MoE, provided teachers and students for interview and observation and these students and teachers were selected using a purposive sampling technique. Purposive sampling increases the diversity of samples and enables the researcher to explore different properties of the subject of the research. In the end, 3 teachers were invited to participate, and they were recommended by head-teacher upon explaining to him the aims of this research. These teachers have attended ICT and teaching thinking skills courses and their students (n = 61) had been trained in ICT, as well as having a program for gifted students. This sample was appropriately selected given the objectives of this research as they had ICT laboratory in school and teachers and students had been trained in ICT. The three classes were: one group using the traditional method, one using VBS and one using EBS. These groups had different teachers, their students had a range of abilities and they used the same curriculum for Islamic Education in year 6 (aged 11-12). The rationale behind the decision to have three different classes as a case study

from each category was to be able to comprehend the characteristics of EBS. The reason for using the purposive sampling technique to select participants was to achieve a variety of responses and to explore their differences. It is necessary to mention that this primary school was for boy students and had only male teachers because the educational system and cultural background in Saudi Arabia is gender segregated.

Also, this primary school was in Al Qassim city in Saudi Arabia. The researcher obtained permission from the local Ministry of Education in Al Qassim. I chose the school that satisfied the criteria for applying this study as explained above. The profiles of the teachers and students are described later. The next section gives explanation of intervention.

5.8 Intervention and case studies

5.8.1 Intervention

Intervention provides a good preparation for the main study, and may provide advanced warning for one to avoid possible pitfalls in the main research (Edwin et al. 2001). The proposed interventions needed to be considered in advance as they might eventually prove to be inappropriate or too complicated and resulted in waste of time and effort. So, this research used a pilot study, which was carried out using observations of one teacher and 20 students as well as pre- and post-tests of students using the EBS method. The term pilot study is employed in studies which use a small-scale sample in order to prepare researcher for the main study in the form of a trial run (Polit et al. 2001). A pilot study can also be used as an experimental use of a particular research tool that is being examined (Baker, 1994). This teacher and his

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students in pilot study were the same teacher and students as in main study, as well as following the same curriculum, as explained later. This lasted a month and a half, including distributing the initial observations to teacher and students as well as administering the pre- and post-tests. The pre- and post-test results revealed an improvement in creativity skills as showed in Appendix 1.

The main part of this study's research explored teachers' lesson practices and students' classroom activities; so, it used a case study approach in order to observe teaching and learning activities in a natural learning environment. In addition, the case study gave the researcher insight on participants in real life conditions; a concentration on these few cases allowed an in-depth understanding of a real situation (Cohen et al. 2000).

In this study, there were three cases (EBS, VBS and T) as explained in the sampling section. This study focused on the different pedagogical affordances of EBS, VBS and traditional (T) methods. These teaching methods were used in three different classrooms within the same grade (year six, age 11-12) and using the same curriculum (Islamic Education). I will now draw the schedule of the intervention of this study.

Schedule of the intervention of this study

In order to ensure that quality data were collected, the activities were followed as laid out in Table 9, below.

Table 9: Weekly milestones

Weeks	Milestone
Week 1	▪ Obtain permission from Ministry of Education and headteacher of school, teachers and parents. ▪ Explain the objectives, treatment of data, etc, to gain the support of the school's headteacher and teachers involved. ▪ Gather documentation and organise the classrooms. ▪ Explain and describe the method for teachers and students.
Week 2	▪ Carry out pre-tests to measure creativity skills for students. ▪ Interview teachers before intervention.
Week 3-11	▪ Observe classrooms using traditional method, verbal brainstorming and electronic brainstorming. ▪ Interview teachers and some students after each lesson.
Week 12	▪ Perform post-tests to measure creativity skills of students after the three teaching methods. ▪ Interview teachers after intervention. ▪ Compare these methods and results and discuss the results of observations, pre-tests and post-tests with teachers.

The three cases (EBS, VBS and T) are presented in more details in the following section.

5.8.2 Case studies

Case one: Electronic brainstorming (EBS) group

The teacher in this case had graduated from the Teachers' Faculty in the Islamic Educational Studies Department and had twenty years' experience of teaching Islamic Education in primary schools. Also, he had attended many courses and workshops on teaching creativity skills, ICT in the classroom, using IWB in the classroom and successful teaching methods. He normally used verbal brainstorming in his class before this research but he trained with the researcher for three weeks to learn how to

use the EBS method. This training, as a part of pilot study, consisted of 3 lessons' examples and 1 workshop. The 20 students in this case had a range of abilities, academic achievement, learning skills, thinking skills and computer skills as gleaned from their school reports and from the viewpoint of their teacher. They were also trained to use EBS in the classroom and to use the EBS forum, for three weeks in the pilot study. The curriculum was the part of Islamic Education called Jurisprudence (Al Figh). This curriculum was covered in one lesson per week, and had textbook containing topics including provisions for Islamic worship, such as prayers, charities (Zakkat), fasting and pilgrimage (Hajj). The classroom for the EBS method had an Interactive White Board (IWB) connected to the teacher's and students' computers and their ideas in the EBS forum appeared on the IWB. The teacher could show these ideas to the class and discuss them with his students. The use of the EBS forum is explained later and in Chapter 6. The teacher divided the students equally by skill and ability into five groups, according to his experience of teaching them and according to their results reports; each group having one computer. The teacher's computer administered the system. The shape of class is shown in Figure 4, below.
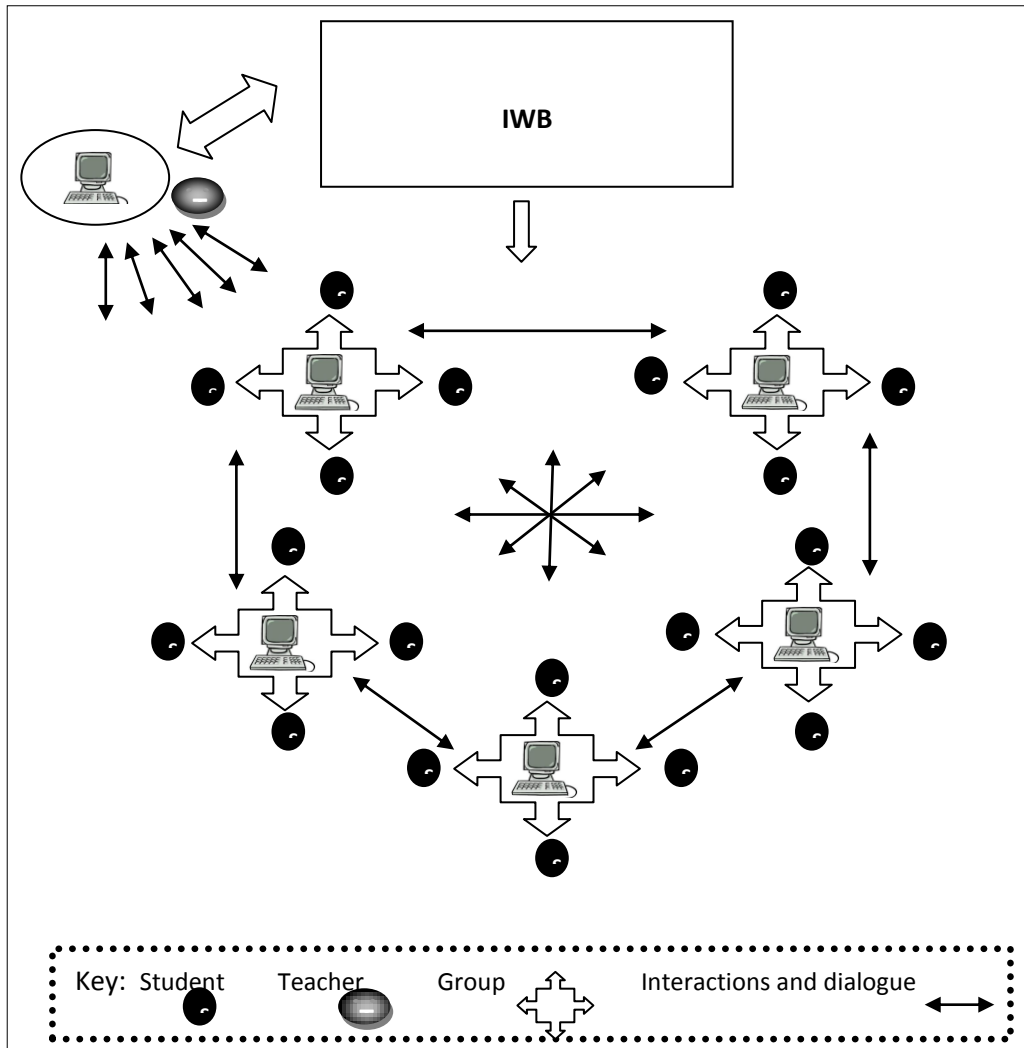
Figure 4: EBS classroom

In addition, the researcher designed a Forum (see Appendix 2), which teacher and students used in the classroom. They registered in this forum and were given a username and password; the researcher also accessed the Forum by a username and password. Electronic information in this Forum was stored on a secure system, with recognised virus protection. In this Forum, the teacher put forward the idea or problem to be discussed, which was relevant to the Islamic Education syllabus. These were written in the Forum and also appeared on the interactive whiteboard. Then the students wrote solutions to the problem or ideas to enrich the issues which appeared to

all on the IWB and in the Forum. The teacher thereby collected ideas and solutions for discussion with the students.

The researcher interviewed the teacher before the intervention for around 30 minutes and after the intervention for another 30 minutes. The teacher was also interviewed six times during the intervention for about 15 minutes each. In addition, the researcher interviewed as many students as possible individually during the intervention (12 students) for around 25 minutes each. Furthermore, I observed this group every lesson (one lesson per week) for three months, making 12 lessons of around 45 minutes each. Two lessons were missed because of lack internet access, as shown Table 10 below.

Table 10: Interviews and observations for participants in EBS

Participants in EBS	Interview before teaching	Interviews during teaching	Interview after teaching	classroom observations
Teacher	1	6	1	10 lessons
20 Students	-	1 for 12 students	-	10 lessons

Case two: Verbal brainstorming (VBS) group

This case applied the verbal brainstorming method. The teacher for this group had a B.A. degree in Islamic Studies from Imam University and seventeen years' experience of teaching Islamic Education in primary schools. He had attended several courses and workshops about creativity and thinking skills in teaching, as well as workshops and training in interactive teaching, teaching methods and pedagogy that had included the brainstorming method. In addition, he mentioned that he had read books and articles about thinking skills and teaching methods. The curriculum was the same as in the EBS group as explained above.

This group consisted of 21 students, divided by the teacher into five groups matched by their skills according to his experience and previous student reports. The VBS teacher offered the problem or issue for students and he made it into a dilemma to be solved by looking for solutions or generating ideas; he gave each group around ten minutes to discuss it. Each group was then asked for their solution and discussion ensued between groups. Finally, the teacher summarised students' ideas and a conclusion was reached. He organised the seats and desk groups in his classroom as shown in Figure 5 below.
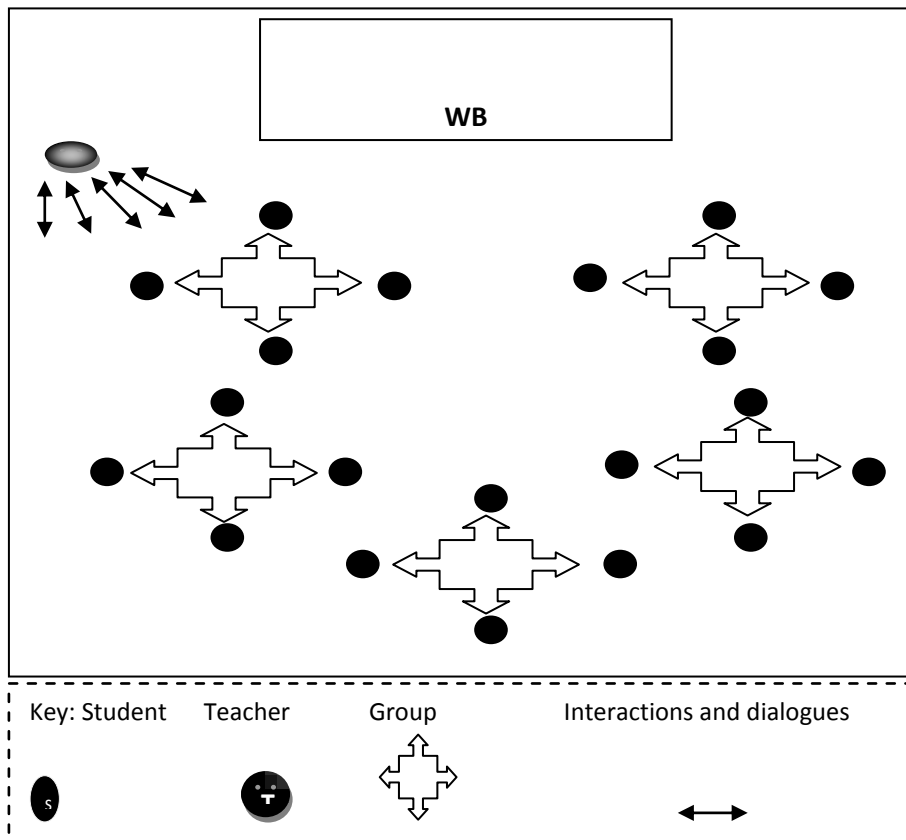
Figure 5: VBS classroom

As with the EBS class, the researcher interviewed the teacher six times during the application of the intervention, for around 15 minutes each after his lessons, as well as one interview before teaching and one interview after teaching for around 30 minutes each. In addition, the researcher interviewed 13 students individually during the intervention for around 25 minutes each. Furthermore, I observed this group every lesson (one lesson per week) for three months, making 12 lessons; one lesson was missed because the teacher was ill, as shown in Table 11 below.

Table 11: Interviews and observations for participants in VBS

Participants In VBS	Interview before teaching	Interviews during teaching	Interview after teaching	Classroom observations
Teacher	1	6	1	11 lessons
21 students	-	1 for 13 students	-	11 lessons

Case three: Traditional (T) method group

The Traditional (T) group used the lecture method consisting of a teacher, standing at the front of the classroom whilst talking to students. This is seen as one-way style of communication, since the lecturer is the only one speaking. An effective use of this is a short talk providing students with the background information they need for their studies (Marchese, 2000).

The teacher in the T group had a B.A. Education degree from the Islamic Studies Faculty of a teachers' college and had taught Islamic Education in primary schools for twelve years. In addition, he had attended courses and workshops on teaching methods, as well as creativity and thinking skills in teaching including the CoRT (Cognitive Research Trust – De Bono) program for creative thinking. The group

consisted of 20 students of various levels of ability following the same curriculum as the other two groups. For the study, the researcher interviewed the teacher once before the intervention for around 30 minutes, once after for around 30 minutes, and six times during the intervention for around 15 minutes each, making eight interviews altogether. In addition, 11 students were interviewed once during the intervention for around 25 minutes each, individually. Moreover, I observed this group every lesson (one lesson per week) for three months, making 12 lessons of 45 minutes each, as shown Table 12 below.

Table 12: Interviews and observation for participants in T group

Participants in T	Interview before teaching	Interviews during teaching	Interview after teaching	Classroom observations
Teacher	1	6	1	12 lessons
20 students	-	1 for 11 students	-	12 lessons

The classroom was a traditional classroom set-up with students facing the teacher and whiteboard, as shown in Figure 6 below.
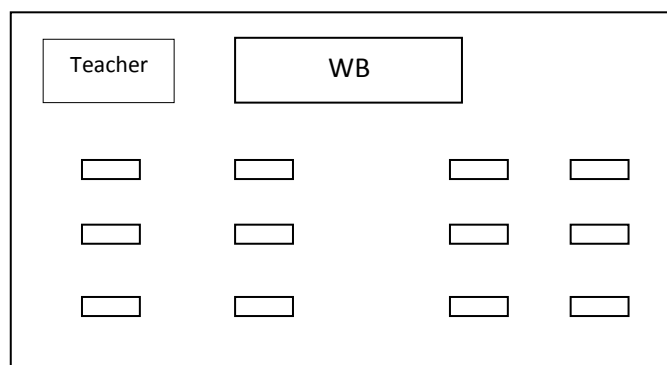
Figure 6: T classroom

The next section describes a typical lesson in each of the three cases (EBS, VBS and T).

A Typical lesson for three teaching methods (EBS, VBS and T)

In this section, an example is provided for a typical lesson in each of the three cases (EBS, VBS and T). The topic was 'Fasting (Alsyyam)' from Islamic education textbook (page 106). Each lesson lasts 45 minutes and has following structure:

Table 13: Aims and content of typical lesson in three teaching methods

Lesson aims	Lesson content
1. Explaining the concept of fasting in Islamic tradition. 2. Describing the provisions of fasting. 3. Identify the things that invalidate the fast.	• The fasting rules. • He/she must of fasting Ramadan • When to start fasting and when does it end • Things which invalidate the fast

- ***EBS lesson:***

Instructional aids:

IWB, WB, computers, forum and electronic resources.

Procedure of the lesson

Teacher divided his students into five groups with each group having at its disposal a computer as explained earlier in intervention section of this chapter. Teacher used principles of brainstorming as teaching method with online discussion in the forum as of part electronic brainstorming. These groups used technique whereby a group tries to find a solution for a specific problem by gathering a list of ideas spontaneously contributed by its members. The goal of brainstorming is to solicit potential creative solutions to a problem or issue which lead to generating of new ideas (Osborn, 1953;

Cooper et al. 1990 and Holubová, 2010). Therefore, the teacher presented a particular issue on the forum together with necessary explanation for students. The next section describes different activities during the lesson.

Lesson activities:

The teacher put some questions in the forum for students to answer in creative way requiring dialogue within a group. The following is an example of such question:

With your group, discuss these issues with the help of the textbook and electronic resources (website and video clips):

- What is the main thing that Muslim people do in Ramadan?

- What is special about the month of Ramadan, What is the definition of fasting?

- Mention the evidence from the Qur'an and Sunnah on the necessity of fasting during Ramadan?

- Discuss with your group the importance of fasting in Islam?

- Discuss with your group the religious benefits and health benefits of fasting?

- According to the textbook and the video clip, what are the things that invalidate the fast?

- Mention other terms and names of fasting?

- When a man had an appointment at the hospital, the doctor needed to analyse his blood type and the level of sugar in his blood. Then, doctor took the blood samples from this man for the analysis. How did this effect the validity of the man's fasting? And why?

Work within group:

After description the issues posted in the forum, the groups started discussion, and began to work on resolving these issues in the forum. Meanwhile, the teacher was walking around, assessing whether the groups were following the course of appropriate debate and was ready to answer students' queries. To find out about the given topic, students were reading the textbook together with the information found on the website. In addition, they watched the video clip which contained information related to fasting. As an illustrations of the aforementioned, Picture 1 shows image from video clip of fasting whilst Picture 2 shows students working in their group.

Picture 1: Carton video clip of fasting

Picture 2: Work group

An example of discussion in a group:

In this part, I present one example of a group discussion regarding the already mentioned issue with a man having taken blood samples whilst fasting:

"When a man had an appointment at the hospital, the doctor needed to analyse his blood type and the level of sugar in his blood. Then, doctor took the blood samples from this man for the analysis. How did this effect the validity of the man's fasting? And why?"

Student A: I think his fast is invalidated because the exit of blood is one of the things that invalidate fasting.

Student B: Yes that is true, yet it also depends on the amount of blood.

Student A: But we read in the textbook and watched in the carton video clip that exit of blood is one of the things that invalidate fasting.

Student C: I agree with student B because we learnt that the exit of blood is invalidating fasting but if the blood is of little amount as in the case of this man, his fasting is still valid.

Work between groups:

After work within groups, the teacher demanded that groups discuss these issues between themselves, whilst he would manage and control the dialogue itself. Following is an example of such discussion regarding an issue " Discuss with your group the religious benefits and health benefits of fasting".

Teacher: Each group tells us what are you conclusions regarding this issue.

Group A: The benefit of religious fasting is remembering the poor and the needy, which motivate us to donate charity.

Teacher: That is good point

Group C: The benefit of religious fasting is that fasting trains human patience.

Group B: We think that fasting trains the human patience cannot be considered as benefits of religious fasting. This is benefits of personality.

Teacher: Good point, group C what do you think?

Group C: Patience is in the things that God (Allah) and Prophet Mohammed commands us, and it is mentioned in the Qur'an and Sunnah, so they are among the benefits of religious fasting.

Teacher: Good answer and I agree with group C but still, the point of group B was good one.

Group D: The benefit of health fasting is in cleaning the body from harmful things thus reducing potential for disease.

Teacher: Well done

Following this, the teacher evaluated the group work and summarised the lesson.

- ***VBS lesson:***

The lesson had the same aims and same content as the EBS lesson.

Instructional aids:

WB, textbook and board containing verse from the Quran and an narrative from Sunnah about fasting.

<u>Lesson procedure</u>

Teacher divided his student into five groups with each group having a table. Teacher described the topic of fasting and gave his students some issues to solve through dialogue between groups. The issues were:

- What is the reason behind making fasting obligatory in Islam?

- Do all Muslims have to fast?

- What is the evidence for the necessity of fasting?

- What invalidates the fasting of a person?

<u>Work within group:</u>

After explanation of the given issues by the teacher, the groups started to discuss these issues together and seek the solution through the textbook. Teacher set 5 minutes for each issue to be discussed within a group and he was managing the discussion. Following is an example of discussion with issue " Do all Muslims have to fast?":

Teacher: Asked the groups about their solution of this issue.

Group C: According to textbook, there are some conditions for those who need to fast such as being capable of fasting.

Teacher: Good start, and how about other groups?

Group A: There is another condition which is being adult.

Teacher: That is good, but what about the adult who is not able?

Group B: Both these conditions should be present at the same time.

Teacher: Well done, yet there is still another condition left.

Group E: A sane person as opposite to being crazy.

Group D: Being Muslim is last condition

Teacher: Good, then there are four conditions for fasting in Ramadan.

After that, the teacher conducted similar dialogue for all issues, and then he summarised his lesson.

- ***Traditional method lesson:***

This lesson had the same topic, aims and content as the other two already mentioned.

Instructional aids:

WB and textbook.

Lesson procedure

- Introduction

Teacher started by giving an introduction for the fasting topic, including the importance and wisdom behind prescription of fasting. Then, he wrote down the main points of lesson which were as follows:

Definition of fasting, Evidence from Quran and Sunnah regarding fast, the rules of fasting and things which invalidate the fast.

- Description of the lesson points

Teacher in this stage took 25 minutes to talk and explain the factors of topic by using the textbook as a resource and WB to write ideas supporting the lesson objectives.

- Questions of students

The last 10 minutes of lesson was set for students' questions followed by the teacher's repeated explanations of certain points.

In the next section, the analysis of research data is explained.

5.9 Data analysis

In this study, there were two different types of data collection: qualitative (interviews and observation) and quantitative (pre and post-test) methods. In this section, analysis of both methods is presented.

5.9.1 Analysis of qualitative data

According to Bogdan and Biklen (1996), data analysis is the process of systematically arranging the collected data. Analysis involves working with data, organising it, breaking it into manageable units, discovering what is important and what is to be learnt, and deciding how the report analysing and sumarising the data will be written (De Lisle, 2011). In addition, Kelle (1999) explains that qualitative data analysis is the process employed to "reduce" data from intensive interviews or holistic observations in such a way that they becomes distilled to their essentials, rather than simply being diminished in volume.

In this study, two qualitative data collection methods were used to provide basis for answering the research questions: interview and classroom observation. The reasons for choosing these very methods were given earlier in this chapter. The qualitative data obtained by these methods were analysed using some principles of grounded theory, particularly the constant comparative method. The constant comparative method is a technique for analysing data to develop a grounded theory (Glaser and Strauss, 1967). This method of analysis is inductive, whereby the researcher begins to look into the data critically with the intention to extract new meaning from data; a stark contrast to deductive approach when the meanings are known at the outset of the data analysis (Glasser, 1965). Therefore, the themes and sub-themes in this study were identified inductively. The interview and observation provided the coding of

themes and sub-themes. In addition, the constant comparative method was important for this study since the researcher had to develop, using teachers' and students' views on three teaching methods in school, a holistic perspective of the current situation and use these views to identify emerging patterns and develop the interviews and observation (Babbie 2001 and Denzin and Lincoln 2003). This method relies on to taking one piece of data such as one interview, and compares it with all the others that may be similar or different. This is necessary for developing conceptualisations of the possible relationships between different parts of the data. Thus, constant comparison analysis is suited to explain factors of human behaviour and experience as the researcher assumes human phenomena are fundamental social processes (Thorne, 2000). Consequently, this study is based on exploring human behaviour and experience of the participants in the three teaching methods and on understanding human phenomena within the context in which they are experienced.

Grounded theory is a systematic methodology for generating theory from data, an approach that may be considered more pure than the traditional theory-driven approach whereby a theory is tested against data in a complex deductive analytical process (Mansour, 2008). This study focused on the qualitative research approach. As it was already mentioned, the qualitative method of data collection was selected because it can provide valuable descriptive information, in this case concerning the teachers' and students' perceptions of the influence of electronic brainstorming on the learning environment in Islamic Education lessons, the affordances of EBS and how EBS supports development of creative thinking skills. Thus, the construction of meaning by the participants in the research was the major concern of the study and for this very reason; the grounded theory was the most suitable analytical procedure.

There are different sorts of grounded theory analysis, such as constructivist analysis and realist (or objectivist) analysis (Charmaz, 2003). The coding and categorising of data differ between realist and constructivist theories (Flick, 2007). The main concern in constructivism is to make meaning from the participants' constructions of phenomena; therefore constructivist analysis is an experience between researcher and participant in which the researcher's thinking reflects this experience. However, objectivist grounded theory analysis is about the "real data" which is found in the world and the researcher's role is to find such data (Charmaz, 2003).

Therefore, given the aforementioned, this study employed the constructivist grounded theory to analyse the qualitative data. This research is about interpretations and implementations of the three different teaching methods. Therefore, participants' construction of meaning is the main concern of the study. For this reason, constructivist grounded theory is the most appropriate analysis procedure in this research. In addition, analysis procedure of this study is based on the experience between the participant and the researcher. In other words, the analysis has been constructed through the relationship between the participants and the researcher. Moreover, the data analysis reflects researcher's thinking processes.

Qualitative data must depend on the interpretations of the researchers. In the analysis of qualitative data, researchers collect data from what they see or hear from the participants and then they interpret them (Denscombe, 1998). It is described as "iterative" which means data collection and the analysis are interrelated (Bryman, 2001, p.399). The consequences of the analysis could lead to gathering further data. Therefore, qualitative data analysis (grounded theory and analytical induction) can

also be considered as part of the data collection process (Bryman, 2001, p.399). In addition, the qualitative data analysis is based on researchers' interpretations.

In this study, there were four kinds of textual data: interview transcripts, observational reports, texts from the EBS Forum and field notes influenced by grounded theory, for it provides principles for the methodological analysis of data (Charmaz, 2003). Grounded theory recognises five phases of data analysis: coding data, writing notes or memos, sampling of theory, integration of literature, theoretical planning and sorting (Rhine, 2009). This procedure is similar to other principles provided by Stirling (2001), Charmaz (2003), Glaser (2005) and Flick (2007). In this study, some of the grounded theory analysis procedures were used such as writing notes or memos, coding data, and integration with the literature. These procedures will be explained in the following part.

Coding procedures

The qualitative comparative method of data analysis (Ragin, 1987) was used to construct categories and themes that captured the recurring patterns that emerged from the data. The analysis of the data was cyclical, consisting of initial coding, reflecting, and re-reading, then sorting and sifting through the codes to discover patterns and themes. These methods were used to triangulate the data-based findings (Lincoln and Guba, 1985). The constant comparative technique was adopted for continuous comparison of emerging themes and categories. The constant comparative method involves four stages: comparing incidents applicable to each category, integrating categories and their properties, delimiting the theory and constructing a theory (Glaser and Strauss, 1967). In this research, the last two stages of Glaser and

Strauss' approach were not used because of their exploratory nature. Given that the main focus of this study is developing and obtaining an in-depth understanding of teachers' and students' views on three teaching methods (EBS, VBS and T) in education, only the first two stages of constant comparative method were used in this study. The first stage, "comparing incidents applicable to each category" was conducted using manual techniques. First, when the transcripts were completed, the researcher used a hard copy of them to manually identify 'open codes'. This stage involved using coloured highlighters and writing notes in the margins of transcripts, as well as referring to the field memos made earlier. It also included identifying differences and contradictory views among informants.

Strauss and Corbin (1998) explained some flexible guidelines for coding data when engaging in a grounded theory analysis: open coding, axial coding and selective coding. Grounded theory research is a qualitative tradition built on compared concepts (Glaser and Strauss, 1967). The constant comparative method groups similar data together and conceptually labeled them during a process called open coding, followed by categorising of concepts. Categories are linked and organised by relationship in a process called axial coding. Conditions and dimensions are developed, and finally, through an interpretive process called selective coding, a theory emerges (Glaser and Strauss, 1967; Glaser, 1978 and Strauss and Corbin, 1998).

In this study, the first step in the data analysis was breaking down, examining, comparing, conceptualising, and categorising these data for open coding such as "affordance of teaching methods (EBS, VBS and T)" which was done inductively and emerged from the data. The second process of the data analysis was axial coding

which organised categorical structures. In this step, the data analysis focused on understanding how the categories related to each other, examining relationship between categories as well as making connections between categories. For example, what are the relationships between the different kinds of teaching methods and creativity skills, what is the impact of that controlling category on the other categories. Finally, the third step was selective coding, which is process of selecting the core category whilst systematically relating it to other categories, validating those relationships, and filling in categories. In Table 14 below, open, axial and selective coding is presented in the context of this study.

Table 14: Open, axial and selective coding in qualitative data analysis

| Code number | First step: Open coding | Data collocation | | Teaching methods | | | Second step: Axial coding | Third step: Selective coding |
		Int	Obs	EBS	VBS	T		
1	Anonymity encourages students to express themselves more freely	✓	✓	✓	×	×	The affordances of the EBS forum	The general affordances of teaching methods
2	Increased confidence in the students	✓	✓	✓	×	×		
3	Forum added excitement to the lessons.	✓	✓	✓	×	×		
1	Internet, pictures, blog, links and video played an important role in the classroom	✓	✓	✓	×	×	Affordances of the electronic resources	
2	Students can find information on the Internet, create and build information through useful educational websites	✓	✓	✓	×	×		
3	the electronic resources facilitated students' learning	✓	✓	✓	×	×		
1	the EBS forum enabled the students and teacher to	✓	×	✓	×	×	Ongoing communication	

	continue communicating, even after school hours						
2	Students able to continue our discussions at home	✓	✗	✓	✗	✗	
3	continue students' discussion at home	✓	✓	✓	✗	✗	
1	IWB with the Forum, kept students interested, enthusiastic	✓	✓	✓	✗	✗	Interaction in the classroom
2	Enjoyed learning with EBS and they experienced more interaction	✓	✓	✓	✗	✗	
3	watched some interesting videos or images to make Interaction in the classroom	✓	✓	✓	✗	✗	
4	Interact with peers and teachers.	✓	✓	✓	✓	✗	
1	Online facilities helped to provide easier access to information and offered enriched information	✓	✓	✓	✗	✗	Enrichment and accessibility of information
2	Provided additional information for students to help them enrich their knowledge	✓	✓	✓	✓	✓	
1	It helped them to discuss and debate	✓	✓	✓	✓	✗	Improvement of dialogue
2	Improved dialogues among students	✓	✓	✓	✓	✗	
3	The students in the class have a conversation with each other and with groups	✓	✓	✓	✓	✗	
4	Dialogue taking place between student and teacher	✓	✓	✓	✓	✓	
1	Used during the lessons several ways to search for information	✓	✓	✓	✓	✗	Improvement in construction of knowledge
2	Organised information and elements of knowledge, thereby being able to finally construct appropriate knowledge	✓	✓	✓	✓	✗	

The rightmost column "Pedagogical affordances of teaching methods" spans the lower portion (from "Interaction in the classroom" downward).

#	Item	1	2	3	4	5	Category	Theme
3	Used previous experience and new knowledge to building knowledge	✓	✓	✓	✓	✓		
1	This method promoted and encouraged creativity skills for students	✓	✓	✓	✓	×	Promoting and encouraging creativity skills	Affordances of teaching methods for creativity skills
2	Produce ideas	✓	✓	✓	✓	✓		
3	Generated different views and originality	✓	✓	✓	×	×		
4	Stimulated students' thinking by formulating problems that needed to be resolved	✓	✓	✓	×	×		
1	It is possible to use it	✓	✓	✓	×	×	Possibility of incorporating EBS into the teaching of Islamic Education	Impacts of teaching methods
2	Ministry of Education provides school with suitable materials	✓	✓	✓	×	×		
1	Change in routine and keeping boredom at bay in classroom	✓	✓	✓	✓	×	Benefits of using the teaching methods	
2	Creates a strong competition between groups	✓	✓	✓	✓	×		
3	Changed my attitude to ICT	✓	×	✓	×	×		
4	Students participating and engaged	✓	✓	✓	✓	×		
5	Detailed explanation of the subjects made more learn	✓	✓	✓	✓	✓		
1	Students' motivation to learn were changed	✓	✓	✓	✓	×	Motivation of students	
2	Motivated to consult my peers	✓	✓	✓	✓	×		
3	Students became engaged and active	✓	✓	✓	✓	×		
1	Students understood their lessons	✓	✓	✓	✓	×	Comprehension of Islamic Education	
2	Topics became easy	✓	✓	✓	✓	×		
3	Helped to learn as it passes stages and steps to reach the right solution	✓	✓	✓	✓	×		
4	Most students did not find difficulty in	✓	×	✓	✓	✓		

	understanding							
1	Technologies require financial and human capabilities	✓	✓	✓	×	×	Technical problems	Hindrances
2	Training	✓	×	✓	×	×		
3	Lack access	✓	✓	✓	×	×		
4	Break down	✓	✓	✓	×	×		
1	Not suitable for the large of numbers students	✓	✓	✓	✓	×	Learning problems	
2	Time constraints	✓	✓	✓	✓	×		
3	not have high enough ability to use the computer	✓	✓	✓		×		
4	Design of classrooms	✓	✓	×	✓	×		
5	Continuous assessment	✓	×	✓	✓	×		
6	The large amount of information in the curriculum	✓	✓	✓	✓	✓		
1	Have not internet access at home	✓	×	✓	×	×	Lack of communication	
2	Do not have a computer at home	✓	×	✓	×	×		
3	Parents prevent me from using the Internet	✓	×	✓	×	×		

Coding of data enabled identification of relevant themes from the interview transcripts (Charmaz, 2006). I colour coded the parts of the interview transcripts that were related to the research questions as part of selective coding. Then, I collected all the texts of the same colour and posted them under the related research question (see Appendix 9 for an example of colour coding).

After reading the interview transcripts several times, looking for points related to the research questions, different themes emerged. The constant comparison method enabled the researcher to continuously compare new emerging codes with existing codes, and thus establish a conceptual link between codes. This initial stage produced

a wide range of codes. Codes under each category were grouped into four major thematic sections, namely: the pedagogical affordances of EBS compared to the other teaching methods, the affordances of EBS for creativity skills compared to the other methods, the impact of EBS on Islamic Education and its role in Saudi education compared to VBS and traditional methods and the hindrances and difficulties of using EBS in Islamic Education in primary school vs. VBS and traditional methods. Colour coded texts were organised to create coherent meaning according to the emerging themes and sub-themes of each research question. I read the colour coded texts again and made tables of meanings for the further analysis. I explained the transcripts and wrote notes about the relevant literature alongside them. Here, I compared the three different teaching methods (EBS, VBS and T). This stage of the analysis provided an outline of the overall analysis of the study. Data on related themes were also brought into juxtaposition. For example, the data that mentioned participants' views about the advantages of the EBS teaching method were related to the pedagogical affordance of EBS. These data were identified and compared to each other. Integrating the literature involved gathering relevant literature on topics according to the selected codes (Glaser, 2005). After note writing, where necessary the researcher organised the structure to put all the data and information together. In this step, I combined all the selected codes and compared them with the relevant data. For example, the data that mentioned participants' views about the advantages of the EBS teaching method were related to the pedagogical affordance of EBS. These data have been identified and compared to each other.

The interview transcripts provided valuable information about the influence of the teaching method on pedagogical and learning processes in Islamic education lessons.

Observations and field notes further supported these issues. Among other things, observations and field notes showed that participants implement their methods without any consideration of its power-control features.

Furthermore, observation field notes were also used with the same procedures that were applied in the interview data analysis. Therefore, it was beneficial for me to link useful texts from the observations and field notes with the interview themes and sub-themes. Firstly, I gather texts which were related to the codes. Then, I organised these texts according to the interview data. In addition, I added information from observational data in order to support the interview. The observations of classroom sessions and field notes were re-played and careful observations made. Data were written during classroom observations and reported after the lessons. Evidence was gleaned from students feeling excited, bored, interested, or focused, discussing and engaging in dialogue related to subject content with classmates, following instructions properly, thinking of critical ideas, or improving their thinking skills; these were all written and reported in the field notes. Through the observations, the researcher was testing whether the EBS method was suitable for the Saudi educational context. Moreover, the research showed the differences between the three analysed methods. After presenting analysis of qualitative data, the next section describes and explains various aspects of quantitative analyses in the context of this study.

5.9.2 Analysis of quantitative data

This study used one quantitative data collection method, that of pre- and post-tests (TTCT test) to investigate improvements in creativity skills by the three teaching methods, and most importantly, to answer the third research question relating to the

creativity skills (What are the affordances of EBS for creativity skills?). To analyse the data from these tests, first, the researcher followed the TTCT Test Guide (1990) to score the tests, as explained earlier, and second, further analysis was done through a suitable software application, namely SPSS (Statistical Package for the Social Science, 2011).

This study used quantitative data analysis to asses improvements in creativity skills between three groups, by comparing pre-test and post-test scores. Consequently, certain tests were conducted to analyse data obtained through these tests. Firstly, normality test was applied to check for the distributions of the pre-test and post-test scores, and to decide on the type of statistical tests to be used in the following stages (Parametric vs. non-parametric tests). Then, the Shapiro-Wilk test for normality was used because each individual teaching group consisted of only 20 or 21 students. Also, for scores from the whole sample (N = 61), the Kolmogorov-Smirnov test for normality of distribution was used. So, parametric statistics were used to analyse the three normally distributed variables in the whole sample (total pre-test, total pre-test fluency and total pre-test flexibility). Non-parametric statistics were used for the remainder of the variables because they did not follow a normal distribution.

Following this, the Wilcoxon Signed-Rank test was used to test whether the post-test scores were significantly different from the pre-test score for each skill in each group separately, as the same set of students was tested before and after the course of lessons.

In addition, using parametric statistics in normal distribution which there were independent variable (teaching group) has three values, an ANOVA test was used. Tukey's post hoc tests were performed to show where the significant differences in resulting values lay.

Furthermore, for a non-normal distribution, non-parametric testing was performed. In this case, the Kruskal-Wallis (K-W) test for three independent samples was used. Also, Mann-Whitney U (M-W U) tests used to show where were the significant differences lay because the Mann-Whitney U test was repeated three times which used normally distributed, the non-parametric Kruskall-Wallis test was performed.

Finally, ANCOVA test was performed to compare the effectiveness of the three teaching methods taking into account the initial differences in performance between the three groups. This is the one-way between-groups analysis of covariance. Linearity plots and Levene's Test of Equality of Error Variances were used to show since parametric techniques are reasonably tolerant of violations of normality, and with sample sizes greater than 30, this should not cause major problems. For more details about these tests, see Chapter 7 and Appendix 1. The following section explains the issue of trustworthiness in this study.

5.10 Trustworthiness of the research

The extent to which the research results are trusted will depend on how well the validity and reliability have been ensured (Merriam, 2001). To ensure validity and reliability in qualitative approach, examination of trustworthiness is decisive Lincoln

and Guba, 1985; Seale, 1999, whilst development of qualitative studies in good quality ensures reliability and validity. In this regards Seale states that "the trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability" (Seale, 1999, p.266). In qualitative research, trustworthiness is essential. Lincoln and Guba (1985) stated that trustworthiness consists of four criteria: credibility, transferability, dependability, and conformability. The next section addresses these terms in details.

5.10.1 Credibility

Internal validity in quantitative research is called credibility in qualitative research (Shenton, 2004). So, in this study, attempts were made to meet these criteria in data collection and analysis. After the transcription of interviews was completed from the digital recordings, I provided all interviewed teachers with transcriptions of their interviews and asked them to verify the content (Lincoln and Guba, 1985). Some student participants were also asked to verify their answers, a procedure which added to the credibility of the study (Bryman and Teevan, 2005 and Marrack, 2006). The researcher also undertook "member review" that involved feeding back the analysis to some of the interviewed participants for their criticism of the researcher's primary interpretation of the data. The member review also acted as a check which helped to build up credibility and meant that data, categories, interpretations and conclusions of analysis were examined with participants (Lincoln and Guba, 1985).

In addition, I discussed the analysis of my results with candidate PhD students and obtained feedback from skilled qualitative researchers at the Junior Researchers of EARLI (JURE) Conference held at Exeter University in August-September 2011; thus

my findings were peer reviewed at an international conference. This gained me many interpretations of the data and therefore reduced researcher bias (Lincoln and Guba, 1985). Likewise, I discussed my analysis with my supervisors, two academics at my university. Also I used cross-reviewing to avoid contradictions during the interviewing, which asked the participants to clarify any issue which seemed confusing, as suggested by Minichiello et al. (1995). Furthermore, three different methods of data collection were employed to allow triangulation, and thus help to ensure credibility as it is understood in the broad interpretivist sense of triangulation (Bryman and Teevan, 2005).

5.10.2 Transferability

Another criterion for trustworthiness is transferability, which is external validity in quantitative research whilst in qualitative research it is called transferability (Shenton, 2004). As the researcher, I attempted to provide detailed explanations of the context of the study, the participants themselves and their lessons. Also, I provided quotations and illustrations to give the reader a clear perspective of the original data. However, because this research is a qualitative study, whose data are very specific to its own context and time, transfer of data would entail transferring it into a different context or time, which would be problematic (Donmoyer, 2000).

5.10.3 Dependability

"Dependability" is more appropriate 'approximation' of the term "reliability" used in quantitative research. To preserve dependability, which is a criterion for trustworthiness which parallels reliability, it is necessary to maintain a record of the

data collection process. Therefore interview transcripts, field notes of classroom observations and results of pre- and post-tests were kept, with a view to enabling other interested parties to confirm the data and demonstrate whether appropriate procedures had been followed (Bryman and Teevan, 2005).

5.10.4 Conformability

Triangulation, contributed to trustworthiness as a technique for achieving conformability (Lincoln and Guba, 1985) which parallels objectivity. Objectivity means an ability to conceive issues without being influenced by personal attitudes and feelings. To maintain trustworthiness, the researcher aimed to be objective by following certain techniques in his approach. However, as this study is interpretative, how the data are portrayed relies on the researcher's perceptions; and readers also construct their own understandings of the research.

In this study, data was collected by interviews, observations and pre- and post-tests; one reason for this was triangulation. Triangulation is a form of cross validation and is a good method for establishing whether the conclusions are true (Taylor et al. 1995). According to Yin (2006), triangulation can be used to ensure construct validity through the use of different sources for measuring one phenomenon. In ensuring validity in research, multiple methods of data collection can overcome the limitations of a single method (Cohen et al. 2000). In addition, the researcher could ascertain whether the aims and procedures of his research were understandable after delivering a clear explanation to participants to avoid confusion and to reduce the effect of the random elements which may impact the accuracy of data collection (Wolcott, 1994). Furthermore, the researcher discussed his interpretations of the interviews and

observations with teacher participants and with other qualified researchers (two PhD candidates) in the same field. This was because, to be considered valid, respondents should have a common understanding of the reality shown by the research (Cohen and Manion, 1984). Furthermore, the validity of this study was also confirmed by doing the constant comparison process, a technique which aims to give critical insight into the data and to organise it to reach more valid findings (Silverman, 2001).

In sum up, using member checking, peer debriefing and triangulation of methods and sources using interviews, observations and pre- and post-tests, with teachers and students, contributed to the trustworthiness of the study (Lincoln and Guba, 1985).

5.11 Ethical issues and concerns

Ethical issues play a considerable role in the field of educational research, and most universities, including the University of Exeter, and other research institutions in Britain and the United States subscribe to the British Educational Research Association (BERA) and the American Educational Research Association (AERA) who have set codes of inquiry, principles and rules that should be followed by researchers in education. Therefore, it is of utmost importance that this research takes into account the ethical issues in order to be in full compliance with the criteria advised by BERA (BERA, 2004) and the University of Exeter (see appendix 10).

Three main ethical aspects to be considered when conducting educational research involve the researcher's responsibilities to participants, sponsors and the community of educational researchers. For example, researchers should treat participants with respect, obtain voluntary informed consent, avoid deception, explain the rights to

withdraw protect the rights of children and protect the confidentiality and anonymity of participants. Researchers should reject any attempts by sponsors to exert influence on the outcomes of the research. Researchers should make their data and methods amenable to reasonable external scrutiny (BERA, 2004).

The following procedures were applied to satisfy these ethical concerns. First, approval from school authorities was obtained before carrying out the research. Second, all personal data of participants involved in the research were kept confidential, accessible only by the researcher, and were not exposed to the public. In addition, the researcher protected the data in EBS forum by secret password. Also, the interviews have not been disclosed to preserve good relationship between teachers and their students. Third, no real names of persons involved in the research appeared in the research report. Fourth, all data collected were for educational purposes only and were not used in any other way. Fifth, oral approval from the school authority, teachers, parents and students was obtained before doing the observations, audio recording and interviews. Sixth, the researcher informed the teachers, school authorities, children and parents of the aims and procedures of the research. After the research, copies of the draft research report were distributed to the school authority, teachers, parents and students. Lastly, modifications were made to the report in light of any objections from participants, before publicising it.

5.12 Summary

This chapter has given an explanation of the research design, methodology and procedures followed in the study. The chapter has attempted to justify the selected

methodology and methods. It has illustrated the two main approaches (qualitative and quantitative) followed in the study, corresponding to the three methods of data collection and analysis. Also it has explained the case studies and described issues of trustworthiness.

In light of the above methodology, I believe that these methods were helpful for gaining an understanding of teachers' and students' perspectives about the three different teaching methods and their effectiveness in the development of learning environments in Islamic Education in primary schools in Saudi Arabia. This chapter has explained how the data were obtained, classified and analysed; the actual qualitative data analysis is presented in the following chapter.

Chapter Six: Qualitative data findings

6.1 Introduction

The purpose of the study was to explore teachers' and students' views of the pedagogical affordances of electronic brainstorming in the context of Islamic Education in a primary school in Saudi Arabia, compared with verbal brainstorming and traditional methods. In addition, the study investigated the key features of EBS that have pedagogical affordances for students' creativity and for the role of Islamic Education in the Saudi educational system as a whole. The study sought to achieve these aims using semi-structured interviews and classroom observation as qualitative methods, in addition to a quantitative method, as explained in Chapter 5.

Data from the interviews and observations were coded and grouped into themes and sub-themes, as described in Chapter 5. Table 15 provides the initial version of these themes and sub-themes:

Table 15: Summary of themes and sub-themes

Research questions	Theme	Sub-theme and categories
1-What are the pedagogical affordances of EBS in the context of Islamic Education in Saudi Arabia from teachers' and students' perspectives in primary school? 2-What are key features of EBS that have pedagogical affordances in comparison with VBS and Traditional methods?	Pedagogical affordance of EBS vs. VBS and Traditional methods.	1. General affordances of teaching methods • Affordances of EBS forum. • Electronic resource facilities in EBS. • Ongoing communication between students and teacher. • Interaction in classroom in three teaching methods. 2. Pedagogical affordances of teaching methods • Enrichment and accessibility of information • Improvement of dialogue • Improvement in construction of knowledge
3-What are affordances of EBS for creativity skills?	EBS affordances for creativity skills vs. VBS and Traditional methods.	Promoting and encouraging creativity skills
4-What are impacts of EBS on Islamic Education and its role in Saudi education?	Impacts of EBS on Islamic Education and its role in Saudi education vs. VBS and Traditional methods.	1- Possibility of incorporating EBS into teaching of Islamic Education and into the learning environment 2- Benefits of teaching methods in the learning environment 3- Motivation of students in Islamic Education lessons 4- Comprehension of the topics of Islamic Education
5-What are the hindrances in using EBS in Islamic Education in primary school?	Hindrances in using EBS in Islamic Education in primary school vs. VBS and Traditional methods.	1- Technical problems 2- Learning problems 3- Lack communication

In this study, there were three case classes (EBS, VBS and T). Each case will be briefly described and then the findings on the five themes given in the table above will be presented.

6. 2 Case one: Electronic brain-storming method

The EBS class is the first case in the study and this group used computers in the classroom as explained in Chapter 5. The teacher using EBS had previously used ICT in his Islamic Education lessons, by asking students to prepare a lesson on PowerPoint and show it to other students and other classes. Also, he had encouraged students to research educational websites to prepare projects in Islamic Education (as revealed in an interview before the intervention). Therefore, one can assume his positive attitude toward using ICT in his lessons in general as well as his motivation to choose the EBS method. The EBS teacher held his classes in the computer laboratory.

The EBS students were distributed evenly between groups based on their academic ability and ability to use the computer. Roles were assigned to the five students in each group: group manager, vice-manager, speaker, writer and organiser, and these roles were rotated each week. During the lesson, the teacher introduced the problem in the Forum, which appeared on the students' screens and on the interactive whiteboard. He then explained the problem thoroughly, and that it had causes, and that they should seek solutions to it in light of those causes. He sometimes provided them with videos or photos to illustrate the importance of the problem; examples of these will be given later in this chapter. The teacher then provided websites to help them research the reasons and solutions, in addition to information in the textbook. Each group discussed the problem together, read the content, made the electronic links to select and download suitable information. Then each group offered their

solutions and reasons for the problem to the whole class, discussing them with the other groups and the teacher. The teacher tried to encourage the groups to discuss, to consider other views and generally to control the discussion, as will be illustrated later in this chapter. The pictures 3, 4 and 5 (below) show the discussion activities in progress in the classroom and the presence of interactive whiteboard in the classroom.

Picture 3

Picture 4

Picture 5

Table 15, above, shows the four themes derived from the qualitative data and related to the research questions. The first theme is the pedagogical affordances of EBS compared to the other teaching methods, divided into two categories - affordances and pedagogical affordances. The second theme is the affordances of EBS for creativity skills compared to the other methods. The third theme is the impact of EBS on Islamic Education and its role in Saudi education compared to VBS and Traditional methods. The final theme is the hindrances to using EBS in Islamic Education in primary school vs. VBS and Traditional methods. These themes were divided into categories as shown in Table 15 above. These themes will now be explained.

6.2.1 Pedagogical affordances of EBS

Particular technologies (such as EBS) offer pedagogical opportunities which were not provided by earlier technologies and it is important for educators to understand the development and consequences of these opportunities in order to make the best use of them. These opportunities, known also as "affordances", indicate the range of potentialities provided by ICT tools that shapes prompt and constrain particular uses. These affordances of ICT should be integrated into the pedagogical structure (Woolgar, 1991). It is the interaction between technology and pedagogical practice that contains great potential for enhancing learning process (Lai et al. 2007). Therefore, this section reports on the characteristics and qualities of the EBS teaching method, its "affordances", as revealed throughout the interviews with teachers and students and extracted from my classroom observations. Given the amount and complexity of analysed data related to this theme, the following section is divided into two sub-sections, each dealing with one of the two distinctive set of affordances: the general affordances of EBS and the pedagogical affordances of EBS.

6.2.1.1 The general affordances of EBS

This sub-theme constitutes the affordances of EBS in the Islamic Education classroom and what they facilitate in lessons. The interview and observation data revealed that these affordances can be divided into following categories: the EBS forum, electronic resources (such as the internet, picture, links and video), ongoing communication between students and teacher, and interaction in the classroom.

6.2.1.1.1 The affordances of the EBS forum

Data for this sub-theme were derived from the interviews with the EBS teacher and students, who were asked about their views on the affordances of the Forum and other electronic facilities, related the EBS method. These interviews thus represent an important and valuable extension of findings gained through direct classroom observations. The data for this category of general affordances are of three kinds: anonymity and freedom of group members, confidence and excitement.

- *Anonymity and freedom*

One of the most obvious advantages of electronic Forum is its anonymity which encourages students to express themselves more freely than before as their ideas are not subject of immediate critical assessment that would be addressed directly to a particular student. Generally in traditional classrooms, students are often reluctant to participate for fear of mistakes or criticism. For example, student D said: *' I am not afraid to participate in the Forum and to express my ideas, but in the past I was afraid of giving a wrong answer or receiving a criticism from the teacher or my classmates.*' The EBS teacher concurred with this view: *'In the EBS method, we use the anonymity of group members in favour of the freedom of the group's opinion, and thus contribute to the general feeling of freedom in the Forum.'* (Interview during

lesson 6) Anonymity is an important factor stimulating the creative process in the class and increases the amount of ideas students, are sharing with their peers and the teacher without feeling that they might be critised.

- *Confidence*

The environment of Forum instills increased confidence in the students. For example, student F said: '*I feel confident when I log on to the Forum'*. He added: *'When I add my opinion in the EBS forum I always feel confident because I took it from trustworthy sources and that increased my knowledge and information.'* Student H mentioned: '*this forum gave us a confidence because our ideas were shown to other groups'*. The EBS teacher also *'noticed that the forum ... gave them confidence.'* (Interview during lesson 3). Confidence among students regarding their sources of information as well as regarding their own work can ignite even greater enthusiasm to learn, seek the knowledge and actively use it in a creative process such as writing or presenting ideas.

- *Excitement*

As well as giving them confidence, the electronic Forum added excitement to the lessons. Student B, for example, said: '*this forum made the classroom exciting by using computers'* whilst student D added: *'The classroom became very busy, all students or groups gather around the computer screens and enthusiastically discussing with each other. This enthusiasm does not happen in other methods'*.

The teacher also noted pupils' excitement about using EBS. He commented that pupils '*were absolutely fascinated'* and that it *'gets them engaged.'* He added: *'They're*

interested and it's bright and you know it's not just a boring piece of paper any more. They love EBS.' He also saw that they were: *'Focused, you've got them looking at one place and that one place is the board with you operating it'* (Interview during lesson 5). In addition, he mentioned: *'I find it that EBS allows me to maintain a pace within the lesson with the children looking at you, involving the children'.* (Interview after teaching)

Therefore, it can be said that the Forum is a tool of direct engagement of students into EBS. Moreover, the Forum gets students excited to participate in the class, makes them feel confident about the knowledge they are receiving, and enables them to share their ideas in a safe and anonymous way, thus strongly supporting the creative process. Hence, the Forum represents an indispensable part of the EBS.

6.2.1.1.2 Affordances of the electronic resources

This sub-theme emerged from teacher and student interviews as well as classroom observations, and it centered on the provision of electronic resources such as the Internet, pictures, blog, links and video, which all played an important role in the classroom (see appendix 8, an example of electronic resources). The EBS teacher gave examples of these electronic resources and the difference they made in the classroom: *'In the EBS classroom students can use the Internet to seek for right solutions or good ideas……Students can find information on the Internet, create and build information through useful educational web sites, and communicate and share knowledge through the Internet and give ideas to other students'* (Interview during lesson 4). In addition, the EBS teacher mentioned several tools that facilitated

students' learning, such as the *'video link from educational website, images and electronic library.'*

Most students had similar view to that of their teacher. In this regard, Student C said: *'We can look for solutions in websites. Also, we are able to support our ideas by using audio or video links and show it to other groups'*. Student G mentioned: *'Through the EBS forum, the teacher provides us useful educational website links and sometimes he showed us video or audio clips. From these, we then, as a group, chose the information related to the subject.* Student A added: *'Our teacher showed us information either via the Website or PowerPoint presentation.'*

The teacher noted that the electronic resources enabled him to teach in a way that raised the motivation level of his students: *'In the EBS method I could do a professional presentation, the quality's far better than handwritten stuff on the board, plus you can put animations, videos, images, colour,* (and) *sound.'* Also, he added: *'I can make a slide show of images ...which have captions to reinforce learning. I think it often enhances something and it also provides a change of routine instead of doing everything in the same way; it keeps the interest levels up I think.* (Interview during no 1)

In practice, the teacher used a variety of activities. For example, in the topic 'fasting rules,' the teacher supported his lesson with cartoon video clips about fasting rules for children, (below Picture 6 represents shot from such video clip). After the presentation was over, the teacher asked students to deduce the rule of fasting from the clip.

Picture 6

A very important fact that emerged during my observations was the teacher's commitment to implement various types of additional electronic resources into his lessons in the manner described in the interview. The importance of this observation lies in realisation that very often, the teacher has a favorable attitude towards new technologies in general, but he is not capable or not willing to use them in full measure during his lessons. In addition, this confirms how important is the pivotal role of a teacher in introducing new technologies or methods into educational system.

6.2.1.1.3 Ongoing communication

This section explained how the Forum enabled the students and teacher to continue communicating, even after school hours. The teacher emphasised that, *'....communication between students and teacher is ongoing, and continues also in their homes'* (Interview during no 4). The teacher further commented: '*... another way was to use the Internet as a method of continuous teacher-student and student-student communication. This communication would take place either by email or EBS forum*' (Interview after teaching).

Some EBS students also mentioned the continuity of communication with each other through the Forum. For example, student B mentioned: *'during forum we're able to continue our discussions at home or through weekends'*. Student F added: *'I asked my*

teacher sometimes about our homework through the Forum if I want more explanation about it'.

Nevertheless, a few students mentioned a lack of communication as being a problem, which will be explained later in the topic 'Hindrances'.

In my observations of the Forum, there was some communication between students when their teacher asked them to continue their discussion or do their homework, such as in the 'charity' topic (Zakkat). If the level of the communication can be maintained even after the class, especially regarding Student - Teacher interaction, learning might acquire a new dimension. In this way, students are engaged in learning process in pleasant and comfortable way, even at home, what might prevent them from procrastination and 'wasting' of their time. Also, the teacher might get better understanding of his students, of their interests and plans which might be later used to facilitate more effective career development programs in schools.

6.2.1.1.4 Interaction in the classroom

This section illustrates the extent of interaction and enthusiasm of the students in the classroom related to EBS. The views of the teacher and students were elicited in the interviews, in addition to observation of the classroom and EBS Forum. Before the introduction of the EBS method, teachers of Islamic Education and most students mentioned that they felt bored during some of the lessons **(**Interview before teaching**)**. In order to highlight the change EBS method brought into the classroom, the following part presents views of the teacher and his students about interaction in the EBS classroom.

- **Views of the teacher regarding interaction in the EBS classroom:**

The teacher noted that EBS, and especially the presence of interactive whiteboards with the Forum, kept his pupils interested, enthusiastic, motivated and focused on learning during the lesson. He said: '*Students often felt bored in Islamic education lessons because teachers provided for their classes in monotonous and boring methods. So, many students do not interact with the teacher in the classroom because the teacher takes the lion's share of speech and does not give the student an opportunity for dialogue, discussion and interaction*' (Interview before teaching).

- **Views of the Students regarding interaction in the EBS classroom:**

Most students enjoyed learning with EBS and they experienced more interaction in the classroom. For example, student A said: '*Yes, the use of EBS makes the classroom more interactive.*' He further added: '*as I said, using the EBS is a new way, we enjoyed being in the classroom with it*'. Student B commented: '*EBS is better than other methods and I am waiting eagerly for this lesson because it is interesting. We watched some interesting videos or images and had good conversations and competitions with groups in EBS forum*'. Student C added that he found EBS: '*Very interesting and useful. And there was more enthusiasm in the classroom*'. Student D also said: '*EBS is an excellent method and there was more vitality, enjoyment and understanding. I have enjoyed it very much. I told my parents about this way*'. Student E declared: '*Wonderful thing - I cannot believe I used that in school!*'

Just as the teacher and students mentioned, it was evident from my observations that the EBS method made students more active by using the Forum, creating ideas, doing various activities, building solutions, having an active classroom atmosphere and

more conversations. For example, in the 'charity' topic, when the teacher told students about the issue for the next lesson, most groups designed PowerPoint slides for their issue even though the teacher had not instructed them to. This is an example how EBS overcomes the burden of traditional methods of teachings where the little interaction or lack thereof is usually a hallmark of overall decrease in active participation of students in the learning process. Without a chance to interact with their peers and teachers, students often lose motivation to use creative forms of utilisation of their newly acquired knowledge. Thus, they remain just its passive recipients which are in the long term the most ineffective way of learning.

6. 2.1.2 Pedagogical affordances of EBS

This theme focused on the interaction between technology and pedagogical practice that has potentials for the development of learning (John and Sutherland, 2005). In addition, this section explains the characteristics and qualities of the EBS teaching method as revealed by the teachers' and students' interviews and from my classroom and Forum observations. During the analysis of obtained data, three sub-themes emerged: enrichment and accessibility of information, improvement of dialogue, and improvement in construction of knowledge.

6.2.1.2.1 Enrichment and accessibility of information

This section examines the opinions of the EBS teacher and his students on whether the EBS method provides them with more information related to the subject of Islamic Education, and whether it facilitates their access to it through the Forum and

the Internet. My observations of this aspect in the classroom and EBS Forum are also reported.

- **Teacher's views on the enrichment and accessibility of information in the EBS method:**

The EBS teacher mentioned some facilities that helped to provide easier access to information and offered enriched information during his lessons. *'It offers easy and quick access to all sorts of information, encourages students to search and read more, advances teachers' knowledge through research. Student skills acquired during EBS lessons can be used in other subjects and students can help teachers prepare lessons and present them to their classmates in PowerPoint.'* He also added: *'Technology always provides us new information. When I used it in the classroom it helped us to enrich our information. Also, when I provided for my students useful websites, images and video clips in the EBS forum, their knowledge was enriched. In addition, access to this information was easy and quick.'* The teacher explained that, *'when I used this method, I noticed my students increased their knowledge because we used various tools for getting information. Firstly, I presented with a problem or issue and I explained it to them, then I sometimes showed them a video or provided them with extra information from websites. Following this, they discussed the pertinent issues with their groups in the Forum. As a result, students gained more knowledge and information than before.'* (Interview during no 3)

- **Students' views on the enrichment and accessibility of information in the EBS method:**

Most of the students emphasised that this method increased their knowledge and that they felt confident that they were building their views from the correct information which was taken from websites, video or audio clips that were provided in the Forum. For example, student C said: *'Useful websites and electronic conversations with classroom groups increased informativeness of the lesson.'* Student H emphasised: *'Certainly, when I have a vast amount of information, whether the opinions of students in the Forum or the opinion of the teacher, as well as useful websites, these will enrich my knowledge and information because I have them in front of me and it's easy to access them.'* Student F gained confidence from the trustworthiness of the information available to him: *'I always feel confident because I took it [information] from trustworthy sources and that increased my knowledge and information.'*

In the classroom, I observed in relation to the 'fasting rules' video clip mentioned earlier, that most students in the groups brought out the rules and wrote them in the Forum. Hence, the video can be considered in this case as a vital source of useful information and valuable knowledge for students.

6.2.1.2.2 Improvement of dialogue

An objective of this study was to explore the improvement of dialogue and discussion through the use of EBS. In the interviews, the teacher and students were asked whether the amount of dialogue had increased in the classroom when EBS was used. The conclusions from these interviews were supported by observations of the lessons and EBS Forum.

- **Teacher's view of whether EBS encouraged dialogue in the classroom**

Dialogue and debate make a lesson more interactive between the teacher and students. Therefore, the question is whether EBS has the same effect and offers students more scope for dialogue and debate in Islamic Education lessons? The teacher emphasised that, *'most students interacted with their peers in the classroom with the EBS Forum when we used this method, as it helped them to discuss and debate more than others. Even a student who was embarrassed and diffident had acquired this skill.'* (Interview after teaching)

Furthermore, the EBS teacher explained how this method improved dialogues among students: *'In the EBS lessons, I offered a problem or issue that required using dialogue and debate in the EBS forum. After that, I introduced it in all computer screens of all groups as well as on the interactive board. Then I asked all groups to discuss this problem with the members of their group. When the group arrived at a final view, they should write it in the EBS forum to show to other groups. Next, the groups debated their views with each other in the EBS forum. Finally, I discussed with all groups about their views and we chose the best or right solutions or results. As you observed, the students passed through this method with a series of processes that made them discuss and debate more than the other methods.'* (Interview during no 6)

In the classroom and forum observations, the EBS teacher let all the students in the class have a conversation with each other, through a series of three steps. For the first step, he asked the students to discuss within their group; for the second step, for the groups to discuss with other groups; and for the third step between the teacher and all

the groups. These steps made the students debate three times in one lesson. These three steps are illustrated in Figure 7, below.
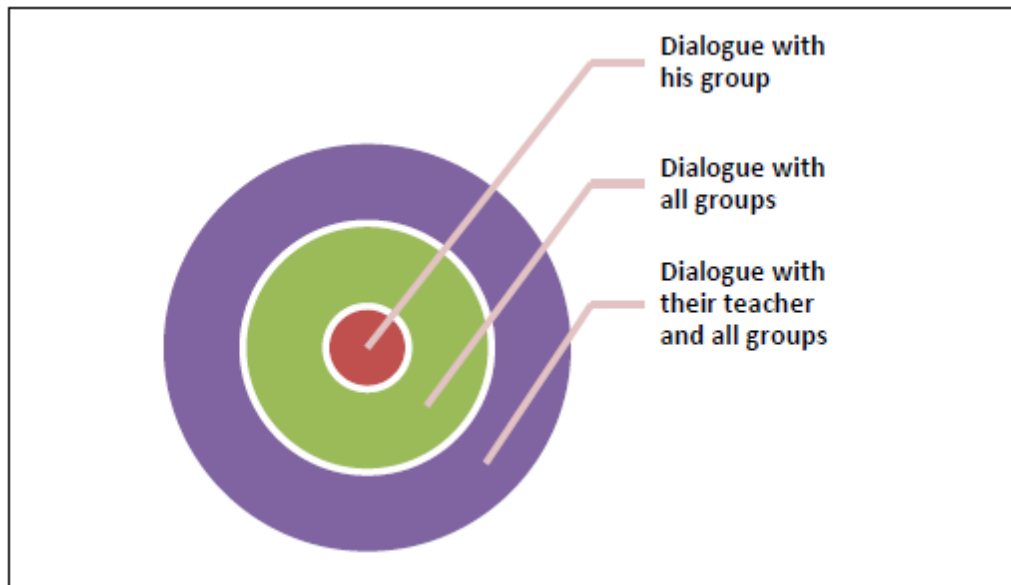
Figure 7: Steps of dialogue in EBS classroom

- **Students' view of whether EBS encouraged dialogue in the classroom**

Most the student interviewees agreed that this method had helped to promote their dialogue and discussion skills, and had given them more chance for participating in discussions. In this regard, student G commented: *'Throughout the lesson we had dialogue and discussion on the EBS forum with my group, then with other groups, after that with the teacher. So, my dialogue skills have improved.'* Students C agreed: *'We had dialogue several times in one lesson. This helped me to improve my dialogue skills and express my opinion.'* Similarly, other students, B, D, E and F, said: *'This method has lots of scope for dialogue and discussion. So, it provided us with very good dialogue skill.'*

This was particularly important for the more reticent students. For example, student A said: *'I am very embarrassed in the lessons and I could not give my views because I fear being wrong and the laughter of my classmates. But in this Forum, I can give my*

view freely and comfortably. As well as with my group, I opened up a dialogue with them without embarrassment. I think the Forum has given me confidence in my opinion.'

In my classroom observations, I saw that the EBS teacher introduced some dialogue practice in the 'Following the guide (Imam) in prayer' lesson. He asked students to discuss the reason for following the guide (Imam) in prayer, the reason for not preceding the Imam in prayer, how to follow the Imam in prayer, and the ruling when someone did precede the Imam in prayer. Then the students held a debate through three steps as mentioned before. In this topic, the groups put forward answers to these questions, such as that this teaches us how to respect the rule, or to accustom us to organisation and order in our life. Then all groups discussed their answers together to arrive at a best answer. Finally the teacher tried to lead his students to a correct answer.

The above-mentioned demonstrates how EBS engages students in activities that develop wide range of skills, one of them being the skills of communication, so vital for a personal and professional development of students in the future. Especially in the case of students who might otherwise feel uncomfortable to speak, EBS and its Forum offer ways for students to overcome feeling of embarrassment and start developing their communication skills which later leads to improvement in their level of interaction with the rest of the class and the teacher as well.

6.2.1.2.3 Improvement in construction of knowledge

This sub-theme focused on the construction of knowledge through the use of electronic brainstorming. Construction of knowledge needs to be an active process in which the learners interact with new information and understand it. Evidence is presented from the viewpoints of the EBS teacher and students supported by my observations in the classroom and of the EBS Forum.

- **Teacher's views of improvement in the construction of knowledge with EBS:**

The EBS teacher attempted to help his students to construct knowledge. The EBS method provided a new way for him to achieve this. In this regard, the teacher believed: *'Technology in EBS allows students to construct knowledge, to think and to learn because it improves students' level, increases independence among students, assists in self education, offers continuous student-teacher communication, and improves students' research skills'* (Interview during lesson 4).

Furthermore, the EBS teacher emphasised that *'the creation of learning communities in the EBS forum gives empowerment to learners to construct knowledge through the Internet and electronic communication as learning tools. For example, in the EBS classroom students can use the Internet to seek for right solutions or good ideas that help and allow students to construct complex knowledge bases…Students can find information on the Internet, create and build information through useful educational web sites, and communicate and share knowledge through the Internet and give ideas to other students.'* (Interview during no 4)

The EBS teacher mentioned some tools that help students to construct knowledge, such as the *'video link from Educational website. Electronic brainstorming employs video as an active tool that requires learners to produce information, as opposed to consume information, and show it in the EBS forum'.* Furthermore, the teacher explained that active learning helps students to construct knowledge and improve it *'because they used during the lessons several ways to search for information. There was the forum, internet, discussions and dialogue between groups, as well as discussions with their teacher and his evaluation. So this is active learning, which increases the student's knowledge structure.'* (Interview during lesson 4).

In my observations of the classroom and EBS Forum, there were indeed some activities and means of constructing knowledge, as the teacher mentioned, including educational website links, video clips and images. For example, in the lesson 'funeral,' the teacher put up a website link about funeral prayer (Janazzah). Students opened this link and researched about funeral prayer, and later presented their findings in the EBS forum. Thus, this method made students construct their knowledge. The teacher then showed them an image of how to pray at a funeral from this website link, as shown below in Picture 7:

Picture 7

- **Students' views of improvement in the construction of knowledge with EBS:**

Student interviewees mentioned some ways in which the EBS method had improved their knowledge construction, hence confirming what the teacher had said and what I had observed. For example, student G noted that they had to select and organise information: ' *Through the EBS forum, the teacher provides us with useful educational website links and sometimes he showed us video or audio clips. Then as a group, we chose the information related to the subject from these. After that we coordinated and organised information and elements of knowledge, thereby being able to finally construct appropriate knowledge'.* Student A thought it was useful when they were asked to classify knowledge: *'The teacher gave us the information in the Forum and asked us to classify this information according to the areas to which they belong…And then he asked us to classify this information, by categories as the causes, solutions or outcomes. This helped me to understand the lesson and to build my knowledge.'*

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Other students noted that the EBS method facilitated their comprehension of the subject matter, such as student F: *'During using this method, I could understand the lessons well, especially some of the concepts, because in the Forum, I find useful links that provide us with a lot of information and concepts; also they help to firm up many of our previous information'.* Student B agreed with this view: *'I remembered the lesson 'times of prayer' from the last year. I did not understand it, but this year I understood very well because the teacher showed us a video in EBS forum where we saw the time differences between prayers. During that I had a sound understanding of this lesson.'*

However, there was one student, E, who had the opposite view: *'When the teacher gave us the links from the Internet or audio, video clips to support his teaching, I feel confused so I misunderstood some information and I cannot configure my knowledge and concepts because I prefer the teacher who is teaching us by normal way and then asks us to discuss in groups.'*

Regardless of the perception of student E, it can be concluded that EBS has substantial effect on the way information and knowledge is being processed in the class. The idea of students 'constructing' their knowledge from the means and resources provided by the teacher, rather than just being handed down the same knowledge and information in form of a lecture represents a formidable change. This change is based on a shift from the traditional methods of learning based on students being passive recipients of knowledge to a state when students are encouraged to actively and creatively use sources of information to extract the most important elements of knowledge. As my research illustrated, EBS can be of great benefit in this

matter with the Forum being the major tool of help for teachers and students to facilitate the aforementioned shift.

6.2.2 Affordances of EBS for creativity skills

In this category, I interviewed teacher and students for their views on whether students' creativity skills had improved with the EBS method. These interview findings are supported with my classroom observations.

6.2.2.1 Promoting and encouraging creativity skills

- **Teacher's views on creativity skills with EBS:**

The teacher had a positive view of the effect of the EBS method on students' creativity skills. He said: *'This method promoted and encouraged creativity skills for students more than before. The students produced more ideas when I asked them about issues in Islamic Education'.* He explained why his students produced more ideas: *'the reason was the Forum encouraged them and helped them to produce ideas and gave them confidence - because I sometimes used traditional brainstorming without technology and I did not see a result like this. In addition, when I presented a task in the Forum, I observed that most students began to participate more than before'* (interview during lesson 3). And he added: *'increasing of ideas production contributed to promotion of flexibility and fluency skills in students and this method did that.'* (Interview during lesson 4)

He gave reasons for the increased creativity as being the anonymity and freedom of EBS: *'This method gave students a chance and freedom for explaining their opinions.'* Also: *' In the EBS method we use the anonymity of group members in favour of the freedom of the group's opinion and that contributed to having more freedom in the Forum.'* (Interview during lesson 6)

He explained that greater originality resulted from avoidance of repetition: *'When students were sharing their ideas together in a group and they watched other ideas in the Forum from the other groups, so, the students did not repeat ideas because they saw ideas of other groups in the Forum and this enhances the originality of the students and they generated different views. These processes encouraged and improved their creativity skills but in VBS or other methods they were repeating ideas when I asked them what they generated or wrote on their pieces of paper.'* (Interview during lesson 6)

In the classroom, I observed what teacher EBS said above regarding students' creativity skills. In the topic 'prayer', he stimulated students' thinking by formulating problems that needed to be resolved. For example, the first problem was: 'Where does someone stand who wants to pray when the line is full?' This problem can occur because the rule of Islam is that the person praying is not allowed to stand alone. Students made several attempts to solve this problem through their group discussions which appeared on the EBS forum, such as waiting until somebody else comes, asking someone to move from the first line and join them in a new line, and moving people closer together to find a place in the first line. This process supported the skill of flexibility by generating ideas and the skill of originality by creating unique ideas.

In addition, there was an example of the skill of fluency in 'Nafelah prayer', meaning that this prayer is not obligatory. The teacher invited students to give other names for this prayer. In addition, he offered some imaginary problems in the 'patient's prayer' topic. For example, he asked how someone with a broken leg who was unable to stand, or someone who had had an operation on his back and was unable to kneel, would be able to pray. The picture 8 below is from EBS forum which explained these imaginary problems.
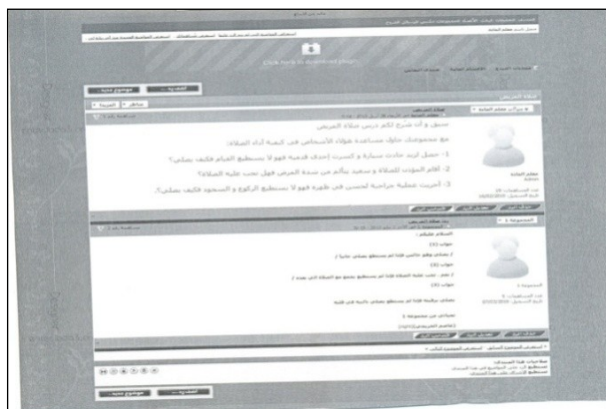
Picture 8

- **Students' views on creativity skills with EBS:**

Most students also had positive views about the EBS method, believing that it encouraged their creativity skills in Islamic Education lessons. Student F illustrates this positive view: *'This method gave me more chance for creative thinking because I am able to create and produce more ideas or solutions when I log on to the Forum... and I look at my peer participants.'*

The reasons given by students for their increased creativity were extra confidence, excitement, seeing the ideas of other groups, and dialogue. Student H ascribed this

enhanced creativity to the extra confidence it gave them: *'I am able to think of solutions or generate my ideas with my group because this method gave us a confidence to show our ideas to other groups. Therefore, I believe that this is encouraging my creativity skills.'* Student B, on the other hand, maintained that it was due to the excitement of using the computers: *'This method supported me in using my thinking to create more ideas or solutions in many subjects because this method made classroom exciting when using computers with this method. So, this method promoted me to use this forum to generate more ideas.'* Student C thought it was being able to view the ideas of other groups that encouraged him to use his creativity skills: *'I reviewed other groups' ideas when I am seeking for solutions or generated more ideas; this is making me a creative thinker.'* Student G attributed his improved creativity skills to the opportunity for dialogue: *'Dialogue and conversation with the EBS forum stimulated me to using creativity skills such as producing many ideas.'*

It was evident from my observations that the EBS classroom practices matched what students said in their interviews about encouraging creativity skills. In the EBS class, students carried out activities and discussions in the EBS forum that employed their thinking to generate new ideas and create several solutions in their lessons. For example, in the 'patient's prayer' topic, I observed groups' conversations and their writings in the EBS forum, and saw that they created ideas about how the patient could pray and that they tried to avoid repeating other groups' ideas. In addition, their conversations represented a useful hive of ideas. Students generated solutions regarding the issue of a patient wanting to pray, such as the patient sits to pray, moves only their head, moves only their finger, leans on a wall, stands with a stick, or postpones their prayer until they have recovered.

The development of creativity skills among students is often neglected category of desired learning outcomes. This development requires fairly different approach than the traditional teaching focused on increase in level of knowledge has. Creative skills cannot be taught yet their development can be supported and stimulated by elements of active learning, where students work with information to create something or to solve a given task. In this regard, EBS offers a way for student to collaborate with their peers in groups in a convenient virtual space of the Forum where ideas are formulated in 'real time' in a process that is influenced by ideas of other groups. This not only prevents repetition of ideas, but can provide students with an incentive to outdo their colleagues in other groups by bringing even more creative and complex ideas.

6.2.3 Impacts of EBS on Islamic Education and the role of EBS in Saudi education

This sub-theme included four categories, which were the possibility of incorporating EBS into the teaching of Islamic Education and into the learning environment, the benefits of this teaching method in the learning environment, the role of EBS in students' motivation in Islamic Education lessons, and its role in students' comprehension of the topics of Islamic Education. There was a link between the teacher's views on electronic brainstorming in school and the positive effects and influence he believed it had on the teaching and learning process. Students, teacher and the teaching and learning process are all beneficiaries of these effects. The teacher viewed students as being more independent, achieving to a higher standard and improving their study skills as a result of using EBS in their learning. This section

will start with the EBS teacher's views and then his students' views, and then go on to the classroom observations.

6.2.3.1 Possibility of incorporating EBS into the teaching of Islamic Education and into the learning environment

In this category, the opinions of the teacher and students regarding the possibility of integrating technology into Islamic Education lessons, and of the compatibility between the EBS and Islamic Education topics were explored.

- **Teacher's views:**

The EBS teacher recognised that, *'incorporating ICT with EBS into the Islamic Education curriculum causes extra work for teachers. At the same time, it is possible to use it because the electronic libraries or worldwide webs have many of the materials that contribute to finding suitable material for students and also the Ministry of Education provides us with electronic materials on their website. For example, I found many videos teaching how to make pilgrimage (Hajj) and how to pray explained in easy way for students. We have got lots of websites that can help explain concepts much easier than may have been done in the past, because students can see these concepts visually whilst you talking about it'.* He said: *'I would say that ICT including EBS supports the National Curriculum a lot, but we've had to do quite a lot of work to get to that point'.* Also, he said: *'We've got to be able, haven't we, to move forward and use ICT with EBS to its best advantage ...we do need to teach the ICT skills discretely but equally we need to make sure that we're using them across the curriculum really as much as we possibly can'.* And he added: *' What we've done*

here, it is the best example of the possibility of integrating this method with the Islamic Education curriculum, I think it was successful.' (Interview after teaching)

- **Students' views:**

Most students in the EBS classroom emphasised the possibility of the integration of EBS technology into their lessons in Islamic Education. For instance, students B and G said: '*... there was a harmony between educational materials displayed in the Forum and between the subject matter of Islamic Education'.* Student C added: *'I did not expect Islamic Education to be good, but using electronic brainstorming in these lessons proved to be very useful and suitable.*

As mentioned above, in all categories, the EBS teacher was observed to manage his lessons using EBS methods for Islamic Education topics. He used brainstorming with electronic tools such as the EBS Forum, websites links, video clips, images and interactive whiteboard. Various examples were given above to demonstrate that the using EBS method was appropriate to improve the quality of teaching subjects of Islamic Education, and my observations only further confirmed the foregoing. However, there were some drawbacks facing the EBS teacher which will be explained in Section 2.4.

6.2.3.2 Benefits of using the EBS method in the learning environment

This section will examine the consequences and results of using the electronic brainstorming as perceived by the EBS teacher. The teacher said in the interview: '*There were many benefits when I used EBS in the classroom such as a change in routine and keeping boredom at bay in classroom, increased interaction among*

students as the students found the EBS forum interesting. The EBS method is based on combination of using technology and the principles of brainstorming.' He further stated: *'this method creates a strong competition between groups more than other methods do; in addition, it saves my time and effort necessary for delivering of my ideas or information'* (Interview during lesson 5)

The use of EBS in education has had an effect on the teacher too. After he used EBS and experienced the change, the teacher indicated that, *'the use of EBS in teaching was beneficial to me, for example, changing and developing my experience when I used EBS and ICT to obtain and retain information when I teach lessons.* He also emphasised *'its benefits regarding information reinforcement by offering different methods to convey information, using pictures, sounds, videos, and practical application'.* He added: *'I have changed my attitude to ICT in my teaching practice after using EBS in my teaching'.* (Interview after teaching) Finally, the teacher commented: *"I am going to use computers with EBS as long as they are going to add something different to the lesson, a new dimension that cannot be added without using them, because the interaction between the teacher and students is far better and cannot be replaced. Moreover, using EBS as a reinforcement of the curriculum through which the teacher would use ICT as a medium to convey information, either by using an educational forum, software, presentation, stimulation, etc.'* Also, he added: *'The absence of ICT in a lesson delivered in this way would hugely affect the quality of the lesson or even at times jeopardises its delivery.'*

There were some students who shared the teacher's opinion that the EBS method was beneficial. The reason they gave for this was that this method was collaborative in its

nature and proved to be helpful in encouraging cooperation and communication with. In this regard, student B commented: *'During the lesson, the group helped each other in explaining the ideas or problems'*. Student A further emphasised: *'They collaborated in the group for solving the problem or generating ideas. This is learnt by my initiative in helping my peers and learning'*.

In most lessons I observed, the situation was as described by the teacher and students; these lessons were interactive and students were encouraged to use their initiative to solve problems. There was also substantial level of interaction between the groups in the Forum when topics were discussed. In addition, most students understood their lessons well because there were provided with useful links, pictures and video clips to support presentation of the given topics such 'pilgrimage,' 'prayer' and 'charity '

From the comments of the teacher and the students as well as from the conclusions made during the observation, it can be suggested that there are elements of EBS that are supporting and improving teaching of Islamic classes. The most important in this regard seems to be the technological factor that enables the teacher to use variety of informational sources whilst students are being excited by the ease by which they can interact with the teacher and with one another. The following section discusses yet another benefit of EBS regarding teaching of Islamic Education lessons.

6.2.3.3 Motivation of EBS students in Islamic Education lessons

This sub-theme contained changes in students' motivation towards Islamic Education classes from the viewpoint of the teacher. Significantly, this change is of mostly positive character. The teacher confirmed this: *'Students' motivation to learn in*

lessons of Islamic Education when this method was applied was better than before; even the reluctant students increased their motivation, interactive understanding and positive feeling'. The teacher thought that this was because of the enhanced facilities of EBS for explaining topics, especially by incorporating pictures into presentation of subject matter: *'Islamic Education subjects became easier than before because I was able to add some pictures and links in the Forum to gave students more explanation about issues that is changing motivation of students to Islamic Education lessons.'* (Interview during lesson 2)

Some students of EBS reported that their motivation toward Islamic Education had changed. For instance, student C maintained that this was due to the greater interaction: *'The lessons become more interactive and more enthusiastic and it encouraged me in learning'* while student D emphasised the value of novelty: *'This method is new and I interacted with it'*. In addition, students talked about changes in their roles in the classroom. Student B asserted that, *' this method made me participate more in lessons and I was motivated to consult my peers or ask for help when I misunderstood something'*.

The observation revealed that most EBS students in the classroom and in the EBS forum were very active, as shown in the pictures above. They came early to the computer lab and they were keen to switch on the EBS Forum. In addition, there was competition between groups. For example, in the 'charity' (Zakkat) topic, there was an active environment when the teacher asked the students to write a creative letter to rich people to encourage them to help poor people, as shown in Picture 9.

Consequently, there were many amazing letters written by students in their group, such as the one shown in Appendix 6.
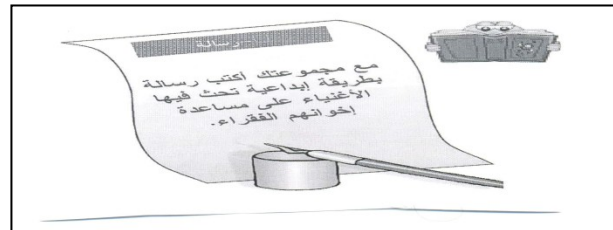
Picture 9

This observation encourages the perception of students as being generally keen to learn, discover and create but often not being given the right means or space to make their natural tendencies and talents flourish. Thus, EBS offers various solutions in this regard as it seems to have positive effect on students in motivating them and increasing their 'hunger' for new information. This is even more significant if one considers that once student is motivated, it is much easier for a teacher to deliver his lessons and for students to understand the subject matter.

6.2.3.4 Comprehension of the topics of Islamic Education by the EBS method

The EBS teacher believed that his student understood most topics with this method. He said: '*I think my students understood their lessons with this method because we provided them with many helpful tools such as video clips and extra information.'* (Interview after teaching)

Most EBS students mentioned a number of positive effects on their understanding. For example, student A said: '*I understood lessons with EBS quickly and it encouraged me in learning'*. Many students agreed with his views; for instance,

student H said: *'I understand the lesson more than ever before'*. Student D added: *'I think this way makes information or ideas in my mind more stable and I do not forget then'*.

In the 'pilgrimage' (Hajj) topic, which is usually a difficult subject to teach, I observed that the teacher added a video link with images and sound, enabling most students to understand it clearly. Because of these added sources of information, students comprehended the topic much easier. This link explained the topic of the steps of Hajj and how one proceeds in Hajj complemented by an explanation from the teacher. When the teacher had explained this topic before using the electronic link, most of students had not understood the lesson well and they had many questions. After showing the demonstration film about the Hajj on the computer screen, most students understood the topic.

In conclusion of this section, one can confirm that EBS has noticeably positive impact on the quality of teaching and delivering of classes of the Islamic Education. However, it can be also noted that this positive impact is of general character and is not limited to lessons with Islamic themes specifically. In other words, the benefits of using EBS in general education that were widely observed, maintain their value and relevance in Islamic Education as well.

6.2.4 Hindrances in using EBS in the classroom

This section illustrates the difficulties and obstacles which the EBS teacher and his students faced during the application of the method. There are three sub-themes here, namely technical problems, learning problems and Lack of communication.

- **Teacher's views of hindrances:**

The teacher mentioned several factors which hindered EBS usage, which may be divided into two sorts: technical problems and learning problems.

6.2.4.1 Technical problems

The teacher expressed his apprehension of possible technical problems: *I always fear of any technical problems occurring because I will be in big trouble*' (Interview during lesson 1).   He explained: *'Technologies require financial and human capabilities and ongoing training. Unfortunately, these are sometimes not available in all classrooms or schools'* (Interview before teaching). Therefore, he experienced certain technical difficulties: *'Sometimes I had some small problems such as technical problems, not enough hardware, limited access, old hardware, insufficient maintenance, lack of technical support, absence of learning resources (software), no access to the internet, slow internet connection. Although, these problems happened infrequently but if they do occur, they will affect the educational process'* (Interview after teaching). Getting help from computer lab staff could be problematic because as the teacher mentioned: *'when the teacher would like to use ICT in classroom or lab, he needs laboratory assistance for maintenance or solving technical problems but the headteacher usually assigns managerial responsibilities to the laboratory staff*'' (Interview before teaching).

6.2.4.2 Learning problems

The teacher went on to provide detailed explanations of these hindrances and their implications on applying EBS. Firstly, he said: *' This method is not suitable for the*

large of numbers students in the classroom. Thus, I sometimes lose my control of the class' (Interview during lesson 1). Secondly: *' Time constraints are the most important hindrance, because the time is sometimes not enough to complete our lesson with this method'* (Interview during lesson 2). Furthermore, he mentioned: *'Different abilities of students are a hindrance also. Some students did not have high enough ability to use the computer, and thereby this is hindering the work with other members of the group. Students in the classroom help each other, but the student at home who has a low ability could not communicate with his peers to do homework in the EBS forum'* (Interview during lesson 4)

In practice, I observed some of the drawbacks mentioned by the teacher. For example, in the third week when the class went to the computer lab, the assistant teacher of this lab told them he could not access the Internet. This meant that the teacher had to deliver his lesson in an ordinary classroom by using VBS instead. In addition, when the teacher gave students homework to do on the EBS Forum at home, a few students had not got internet access and were therefore obliged to do it in school at break time. Also, during several lessons, the internet connection was slow and, as a result, the students did not have enough time to complete the lesson.

- **Students' views of the hindrances:**

Most students listed many advantages and benefits of using the EBS method; however, they also mentioned some hindrances, which could be divided into technical problems, learning problems and lack of communication.

❖ **Technical problems:**

Only one student mentioned a technical difficulty, student E who said: *'Break down of the computer decreased my interactivity in the classroom.'*

❖ **Learning problems:**

Students mentioned various problems with learning when the EBS method was applied, namely: low level of skills, lack of training, inadequate amount of available time, difficulty in focusing, looking at a computer screen and group as opposed to individual feedback. Some related their difficulties to the lack of skills in using the computer: *'I find it difficult to use a computer'* (Student G). Student B felt that he needed more training in using the computer to benefit from EBS: *'We need more training about it. Otherwise, it takes me a long time to understand this method.'* The time-consuming nature of internet searches was a hindrance noted by student C: *'I faced difficulty finding appropriate information by searching in the World Wide Web.'* The difficulty focusing on the problem in hand was also apparent to student C, perhaps due to the many distractions that the Web throws up: *'We have many educational aids and electronic sources that distracted my focus.'* The physical problem of looking at a computer screen was noted by student B: *'Focusing on the computer screen made me tired throughout the school day.'* The complaint of student A, however, related to the teacher's methods, in that the focus was on the performance of the group rather than on that of individual students: *'Feedback of the teacher was often for the group skills; he was not focusing on the individual student's skills'.*

6.2.4.3 Lack of communication

Student D said: *'Unfortunately, I cannot communicate with my friends at home because I do not have internet access at home.'* Student F agreed: *'I do not have a computer at home.'* Student H said: *' My parents prevent me from using the Internet.'*

At the beginning of the EBS course, I observed that students encountered some difficulties because they were not used to this method, especially those students with low computer skills. After some time, however, the students were able to cope with the new method and interact with it. The majority of the above-mentioned issues are not related to the methodological base of EBS but rather they stem from the fact that this method is fairly new and initially it requires significant investments into equipment and training which not every school is capable of. However, once the necessary investments take place, the benefits of EBS largely prevail over any possible difficulties.

This section drew a positive picture about applying EBS into educational system. From the conclusions made during my observations, which in large extent confirmed the presented opinions of the teacher and his students, one can suggest that EBS improve the quality of teaching in noticeable and significant way. One of the most important changes that EBS brings into teaching is variety of options that a teacher can choose from in delivering his lesson. Consequently, students are presented with new, modern and for them exciting sources of information. Furthermore, they are encouraged to work actively with this information in order to construct the knowledge rather than being passively absorbing teacher's lecturing. Finally, the versatility of

EBS was demonstrated by its ability to increase the quality of lessons not only in general education but in Islamic one as well.

6.3 Case two: Verbal brainstorming group

The verbal brainstorming group consisted of 21 students, divided into five groups. During this study, the researcher interviewed the teacher eight times: before teaching, after teaching, and during application of the intervention. In addition, the researcher interviewed students during the application of the intervention, usually once for most students. Furthermore, I observed this group every lesson (one lesson per week) for three months.

6.3.1 Pedagogical affordances of the VBS teaching method

In this section, the affordances and qualities of the VBS teaching method are reported, as revealed through the teacher and student interviews and my classroom observations. The general affordance found was that of an increased interaction in the classroom, while the pedagogical affordances fell into three categories: enrichment and accessibility of information, improvement of dialogue, and improvement in construction of knowledge.

6.3.1.1 Interaction in the classroom with VBS

This sub-theme illustrates the extent of interaction and enthusiasm of students in the VBS classroom toward Islamic Education lessons from the teacher's and students' perspectives. In addition, comparisons can be made of their views before and after the

VBS lessons because both teachers and students had previously mentioned feeling bored in lessons of Islamic Education (Interview before teaching)

- **Teacher's view of interaction in the classroom with VBS:**

The teacher of VBS said: '*To be honest with you, some students feel bored in Islamic Education ..... but if the teacher gives his students a chance to express an opinion and he accepts students' ideas, this will encourage them*' (Interview before teaching). After using VBS for two lessons, the students' increased interaction had become apparent: '*The method of brainstorming promoted and encouraged the views of students - that increased students' interaction in their lessons, because with this method, students shared their ideas and solutions. Then, they were exploring the information by themselves due to being enthusiastic about the interactivity of the class.*' (Interview during lesson 2)

However, the VBS teacher talked about some students who were not interacting in levels observed in other students: '*It is true that there were some students who were not interacting with this method, and they prefer the traditional methods, for many reasons, such as the lack of self-confidence, preferring to gain information quickly from the teacher or the lack of encouragement*' (Interview during lesson 3)

- **Students' views of interaction in the classroom with VBS:**

Most students believed that the VBS method made their lessons in Islamic Education more interactive because it enabled them to contribute with their own ideas in the lessons. For example, student A said: '*Because it changed the classroom environment and eliminated boredom as well as it speeded up the whole lesson.*' Student B

mentioned that, '*in this method each student presented his opinion and his idea - that makes the classroom interactive...*'

On other hand, a few students mentioned the classroom was not interactive with the VBS method and they gave their reasons for this statement. For instance, student C commented: '*It did not seem an attractive classroom with this method because I feel discomfort with it and it distracts my mind; therefore I preferred the traditional methods...*' Student K emphasised: '*... I preferred the traditional method because I understood with it more. So I was not feeling interactive with VBS because there were many ideas from the groups and the teacher discussed them with the groups. That made me confused....*'

It was evident from my observations that students in the VBS classroom were interacting to generate and contribute with their ideas. For example, in the 'funeral prayer' topic, the teacher asked students in their groups to explain how we pray the funeral prayer, from their own experience. Then most students were interactive and engaged in sharing their ideas and there were lively discussions between them. In the group 3, for instance, some students said, '*It is the same as normal prayer*' while others said, '*No, it is different because I prayed before and there is no bowing and prostration.*' Despite this overall active engagement, some students did not interact with their team; such as the group 5 student who was reading his textbook throughout the lesson and did not participate at all.

It seems that the interactive element of VBS is not so pronounced as is the case for EBS. This may be due to the lack of virtual space, such the EBS Forum, where

students can interact all at once whilst in normal classroom setting, one student has to wait for the other to stop speaking before he can present his ideas. In result, this can hinder the overall creative process and make some students feeling 'left out' and disengaged from classroom's activities.

6. 3.1.2 Enrichment and accessibility of information in the VBS method

This section explained the teacher's and students' perspectives on whether the VBS method provided students with enriched information or enhanced their understanding of their lessons through extra information, pictures, books or models.

- **Teacher's view on enrichment of information in the VBS method:**

The VBS teacher said: *Sometimes we did not find the appropriate means for the Islamic topics. In general, I provided my class with some visual aids, such as the model of the Kabbah and the map of Mecca to know the places of pilgrimage (Hajj) in the 'pilgrimage' topic. In addition, in the 'prayer' topic, I brought some pictures that describe how to pray, and I also asked students to go to the school library to search for information related to the 'fasting' topic....'* (Interviews during lessons 4 and 6). He added: *'....I also provided additional information for students to help them enrich their knowledge, whilst through the brainstorming method within the groups, students enrich each other with their previous experience and knowledge.'* (Interview during lesson 5)

- **Students' views on enrichment of information in the VBS method:**

Most students mentioned in their interviews that the VBS method enhanced their knowledge because they shared ideas in their groups, and also because their teacher

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gave them necessary and detailed information before starting problem solving activity. In addition, the teachers provided pictures or models that helped students to increase the level of their knowledge. For example, student A said: *'Exchanging ideas in the VBS method with my peers in my group and with other groups increased my knowledge and I acquired new information'.* In addition, students B, D and H said: *'Showing them pictures or giving them resources such as books enriched their information - which the VBS teacher did'.*

During my classroom observations, when the 'fasting' topic was explained, the VBS teacher took the students to the school library which had book resources the matter of fasting, and he required students to research the issue of 'things that may invalidate the fasting'. Then one student from each group went to the Islamic Education section to choose a resource for his group. After that, all groups searched in the books for the 'things that may invalidate the fasting' and some of them obtained the right answers for this issue. As a result, this method increased students' knowledge and skills of an effective use of library resources. However, looking for the appropriate resources in the library took large portion of lesson's time, and eventually some groups did not manage to find the right answers.

The issue of accessibility of information illustrates the limitation of VBS in comparison with EBS which stems from the absence of access to digital sources of information in case of VBS. However, regardless this limitation, both the teacher and students confirmed that applying VBS in their class led to betterment of the way students acquire new information and knowledge.

6.3.1.3 Improvement of dialogue in VBS

The teacher and students were asked about improvements in their dialogue during the VBS intervention; this was also a matter included in my classroom observations.

- **Teacher's view of whether the VBS method encouraged dialogue in the classroom:**

Dialogue in the classroom is crucial element of learning process as it makes the classroom more interactive. In the VBS method, dialogue was used within the discussion groups when students discuss with one another, followed by teacher-led discussion with all groups about their ideas. The dialogue in VBS was therefore conducted in two stages, as shown in Figure 8 below:
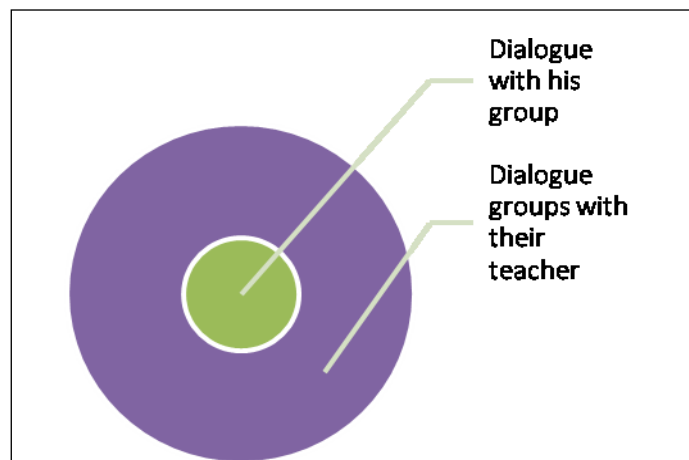
Figure 8: Steps of dialogue in VBS classroom

An example for this chart is given in the classroom observation, after the students' views.

The teacher attempted to hold useful conversations with his students within their groups during lesson and he emphasised that, '*the VBS method requires a dialogue between students inside their groups, and groups with their teacher, but dialogue must lead to the objectives of the lessons*' (Interview during lesson 1) and he added that, '*in my lessons, I used dialogue with my students, as well as my students had discussions and conversations with one another in their groups. For example, when we finished Friday prayer and Eid prayer, I asked my students "What is the difference between these prayers?" There was a useful discussion between students in their groups and that improved the students' dialogue.*' (Interview during lesson 3)

- **Students' views of whether the VBS method encouraged dialogue in the classroom:**

Most students said that this method allowed them to use more dialogue compared with methods used in other lessons. They indicated that the reason was due to the teacher encouraged them to discuss issues in Islamic Education within their groups. For instance, student A said: '*this method allowed me to debate and had a dialogue, to discuss with peers and then with the teacher.*' Students B, D and H agreed with student A.

However, a few students pointed out that, although this method helped them to engage in dialogue, they did not like it. They gave several reasons, including feeling inhibited, for example, student J said he was '*too shy to discuss with the teacher*'; the time-consuming nature of the discussions, as student K mentioned: '*too much dialogue in this method so the dialogue did not finish by the time the lesson was over.*'

Some students did not like having attention focused on them, as student M who complained that the teacher: '*singled out some of the students in dialogue*'.

In my observations, it was clear that there was dialogue taking place within groups and with the teacher. For example, on the topic of 'charity' (Zakkat), the teacher asked his students: '*With your group, discuss the wisdom behind the obligation of Zakkat*'. Firstly, all groups held discussions to solve this question. Then, after fifteen minutes, the teacher requested their answers. Group 1 said: *'They do that to help poor people'* and group 2 mentioned: *'They do that to take reward from Allah (God)*' while other groups gave different answers. Then the teacher discussed the groups' contributions with their students to find the best answers. This dialogue was very effective in making the lesson more engaging for students. Nevertheless, there was no discussion between groups to make this dialogue broader. Also, there was certain level of repetition of ideas between different groups.

From its very nature, applying VBS should entail increased focus on discussions and dialogue. However, discussion by itself is not the main goal but rather a means of improving students' communication skills, testing their abilities to present ideas and increasing their confidence in addressing groups of people. In addition, it was obvious from the students' responses that for a discussion and dialogue to have the mentioned benefits, teacher must play a role of skillful moderator in such discussions. If teacher is lacking in his moderating skills, then some students might feel not engaged whilst others might feel intimidated by too much of attention and focus. Hence, a teacher must know how to strike a balance in moderating dialogues and discussions during a lesson.

6.3.1.4 Improvement in construction of knowledge with VBS

This part presents the perspectives of the VBS teacher and students on the extent to which there were changes in the construction of knowledge through the use of verbal brainstorming. The students had conflicting views on this matter, while the teacher believed that this method builds knowledge better than other methods because a student has to use his previous knowledge, his own experiences and those of his colleagues, as well as what is offered by a teacher during the lessons to construct 'new' knowledge.

- **Teacher's view of improvements in the construction of knowledge with VBS**:

The teacher believed that with VBS his students could develop skills of construction knowledge: *'I explained the difficult terms or idioms before introducing the problem for the students, which helps them to build constructive knowledge before solving the problem or presenting their ideas. So, students used their previous experience and knowledge, together with what was explained. This increases accumulation of knowledge for the students by the teacher, the student and the other students....'* (Interview during lesson 2). He further added: '...*Because VBS students have three things - the textbook, their colleagues and teacher, but other methods have only the teacher'* (Interview during lesson 2)

In addition, the teacher commented that, *'the VBS teacher is required to prepare the lesson well to select appropriate questions that excite the minds of students and motivate them because the method of brainstorming requires it. Also, it must be linked with other subjects and the real life in order to help them build knowledge. This is what I had done in the 'fasting' topic, as I reported the health benefits of fasting that*

are not mentioned in the textbook. In addition, I took into account individual differences among the students when I chose the questions for problems or issues in order to help all students in the construction of knowledge' (Interview during lesson 4)

In my classroom observations, the teacher firstly explained the meaning of Nafelah. Then, he asked groups of students to think of events or days, other than Ramadan, when Muslims might fast. During this activity, students were able to construct knowledge about Nafelah fasting. In addition, the teacher linked various alternative names for Nafelah with aspects of Arabic language, and mentioned the health benefits of fasting, which he linked to topics from science, thereby encouraging students to build their knowledge.

- **Students' view of improvements in the construction of knowledge with VBS**:
Some students agreed that their ability to construct knowledge was improved with the VBS method, such as students A, B, D and H. For example, student A mentioned *'...seeking solutions and inferring them developed my construction of knowledge'* and student B said that *'...individual thinking for searching for a solution, with thinking as a group, helped me build my knowledge'*. Student D emphasised that, *' VBS is the best method to improve my knowledge because it gave us a chance to share our ideas'*.

On the other hand, some students like C, E and J believed that this method had not developed their knowledge. They explained that thinking as a group lost the main idea because some students were not enthusiastic or were fanatical in their opinion (student C and J). Sometimes they may be '*reluctant to accept my opinion because some people despise my idea*' (student E).

In my observations, some students in their groups were very engaged in offering their ideas while others were not. For example, in the 'Hajj' topic, the teacher asked some questions which the students answered in their groups, such as: '*What is the difference between Umrah and Hajj*?' and '*What are the similarities between Umrah and Hajj*?' I observed in the group 2 that some students were not serious with their ideas and that this affected their team, while in other groups some students were reluctant to share their ideas. These problems posed obstacles in improving the ability to construct knowledge in some groups.

6.3.2 Affordances of VBS for creativity skills

In this section, I present the teacher's and students' views about the VBS method, as discussed in their interviews and through my classroom observations. In addition, I offer improvements in creativity skills from the teacher's and students' perspective.

6.3.2.1 Promoting and encouraging creativity

- **Teacher's views on creativity skills with VBS:**

The teacher had a positive attitude towards the VBS method as a means of encouraging creativity among his students. However, he gave some advice for teachers about how to promote creativity skills in their teaching: *'Generally, the teacher must first be trained about teaching creativity skills. Also, the teachers should be aware of and understand these skills and know the abilities of their students and thus be able to give them the appropriate skills.' (*Interview before teaching)

He had posted some sentences on the classroom wall that encouraged his students to think, such as 'I think therefore I exist' and, 'Let's take the idea to a practical solution'.

He explained the reason for this: *'Every time I try to change my teaching methods, it encourages students to think. Sentences like these and brainstorming I often use in my lessons'.* He added: *'Brainstorming is one method to help the student improve their thinking. So, I often use it in my teaching. Yet the teacher should prepare the lesson well and formulate appropriate questions that make students to think. For example, when I taught them about prayer, I tried to introduce the students into the topic of the lesson through initial questions.'* (Interview during lesson 1)

He emphasised that this method encouraged creativity skills. *'This method stimulates their thinking and dialogue skills, as well as encouraging creation of new and realistic solutions. For example, in the lesson on prayer, when we talked about 'patient prayer', I posed a question to the groups: if someone is ill, how does he pray? Then, students suggested and created some ways how to pray. After that we chose the most suitable solution. In addition, I often used imaginary events with these groups, and they live like the event itself. I think this way helps students in their creative thinking '.* (Interview during lesson 2)

On the topic of 'pilgrimage' (Hajj and Umrah), I observed that the teacher introduced some terms about worship and he asked students to compare these terms and generate other names for them. For example, in this topic, worship in Islam has been built upon the pillars of duties and additional (non-obligatory) duties which include the Hajj. Students in their groups created many different names for these terms, thereby developing their fluency skills. Also, they generated many ideas about the differences between these terms that promoted their flexibility skills. Synonyms were required for

'obligation,' 'compulsory,' 'mandatory,' and 'bound.' The picture 10, below, shows a diagram from the group which produced several synonyms for the term 'duty':
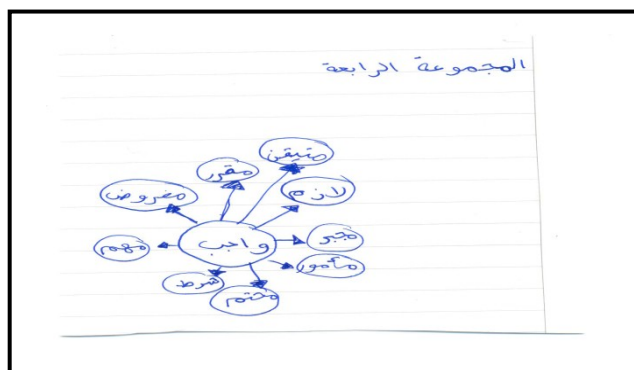
Picture 10

- **Students' views about creativity skills with VBS:**

In their interviews, some students had a positive attitude and others a negative one, towards this method as a way of improving their creativity skills. The reason for this was that some students had become used to the traditional methods over the previous years. However, there were some positive views. Student A said: *'Yes, we use lots of creativity thinking skills, such as creating or generating synonyms for terms in the classroom.'* He added: *'This method teaches us how to make right decisions in our life. For example, when my family want to travel, we try to find out the advantages and disadvantages; then we will decide'.*

Student C expressed his opinion about this method encouraging creativity skills: *'This method helps to storm my thinking more than other methods and gives me a greater chance of thinking'.*

Student D told us that this was the best method in this field, so I asked him why and he said: '...*because the student can think in his own group, that gives him more time to answer and think with his group for solving problems'.*

Student F believed that this method had developed his thinking: *'... help me to find a best solution......Also, collecting many ideas from my peers...in addition, it helps me to focus my attention....finally we found out a right solution through many processes that developed my creative thinking.'*

Student H insisted that he had learnt many things in this method, such as *'...learnt some ways of thinking, such as: how can I choose a right solution and how can I determine the causes of the problem? As a result, I generated various ideas for that.'* He added: *'As well as the teacher asking us to use the skill of making synonyms for terms in our lessons.'* Student I confirmed what H mentioned: *'Our division into groups developed my thinking and helped me to search for solutions'.*

On other hand, some students asserted that this method did not promote their creativity thinking skills. For example, Student B commented: *'Individual thinking is the best way for me to look for answers to the questions or solutions more than doing the same in groups'.* Students E, G and J emphasised that traditional methods and individual thinking helped them to focus on problems what in result enhanced their creativity thinking.

In the VBS class, I observed the groups studying the temporal and spatial aspects of the 'Hajj' (Al Ehraam and Almwaqet) topic, that is, what Muslim do before going on

pilgrimage (Hajj). They used their fluency skills to produce many synonyms of given terms and the names of the problems as shown above. In addition, groups generated new ideas not suggested by the teacher or the textbook when asked 'What is the benefit of knowing the time and places for performing pilgrimage (Hajj or Umrah)?' Then groups of students thought of benefits; for example, group 1 said 'to facilitate reaching the Hajj', another said 'to avoid crowds of people in one place,' while group 3 mentioned understanding of organisation. However, there was a repetition of ideas between groups. For example, groups 3 and 4 both presented the same benefit of knowing the time of the Hajj. Such repetition, if on large scale, can weaken the element of originality that is important for students to feel motivated to create new ideas. However, if they see, the ideas they worked hard on are not so much original, it might discourage them in the future. In addition, some students did not participate in generating ideas in their groups, which mean that not every student was equally engaged and thus the benefits of VBS were not fully shared by the whole class.

6.3.3 Impacts of VBS on Islamic Education and the role of VBS in Saudi education

The teacher and some students thought that the VBS method had a positive effect on improving students' learning process, and on increasing their understanding of Islamic Education topics. The sub-themes included in this theme were: benefits of this teaching method in the learning environment, motivation of VBS students, and comprehension of the topics of Islamic Education. This section presents the teacher's and students' views on how the teaching and learning processes within Islamic Education are affected by applying VBS.

6.3.3.1 Benefits of VBS in the learning environment

- **Teacher's views:**

In this section, the consequences and results of using VBS from the teacher's perspective are presented. The teacher mentioned that VBS requires students to be more active during lesson: *'One of the benefits brainstorming is that it makes students think and lesson is then a combination both of teacher's and learners' ideas.. Thus the knowledge acquired at the end of the lesson is of higher quality'* (Interview during lesson 2). Further, He stated that the aforementioned benefit is shared by all students: *'The most important is that it is shared by most students, even by the weaker ones. This an important fact, because already its name - brainstorming - indicates that it application should get the minds 'moving'* (Interview during lesson 3). Moreover, it made students more self reliant: *'This method made all students participating and engaged because the teacher took information or ideas from groups. That made the students relies on themselves'* (Interview during lesson 2). It also broadens the scale of informational sources available to students: *'The VBS method provided students with three resources for generating their ideas - teacher, textbook and classmates - hence widening the range of produced ideas. However, in the traditional method, students have at their disposal only a teacher and textbook.'* (Interview during lesson 3)

However, the teacher mentioned some negative outcomes after using VBS: *'There may be obstacles. It may be an inappropriate classroom and limited time, but good preparation for the lesson including preparing of good question to motivate students can help. In addition, there are negative consequences of sticking to one method, the major one can be students' boredom, and therefore diversification of methods and*

tools is required. Another issue might arise if some students are unwilling to use this method' (Interview during no 6)

- **Students' views:**

Through interviews with students, I recorded following opinions about the VBS method. There were some positive views on the effects of VBS on the teaching and learning processes from the students' perspective. Starting with the positive views, student A said: *'With this method, the students participated with the teacher regarding their ideas, as well as they were encouraged by him to offer their ideas….this method helps me to understand a given topic more than any other method because it makes me participate and I have benefited from this method in acquiring problem solving skills which helped me to learn better'*. Student B mentioned: *'this method helps me to generate ideas and encourages me to cooperative with peers, which makes these Islamic Education topics easier to learn.'*

Student D emphasised that in the VBS method, collective learning is used, which improves the quality of the Islamic Education lessons: *'We deduce the solution by ourselves...''* Student H agreed that the VBS method helped students to learn and understand their topics: *'Brainstorming helped us to learn as it passes stages and steps to reach the right solution'*; and student J added: *'Cooperation with the team eases a lot of difficulties'*.

However, some students had dissenting views about the effects on teaching and learning processes, such as students C, E and K. For example, student C said: *'Indeed,*

I prefer the traditional method because I can think alone but with the group you do not get a chance to answer and think'.

In practice, in the "Nafelah fasting" topic, the, teacher asked groups to discuss why Muslims fast on the 10th day of Muharram (the first month). However, during this discussion, I observed that in some groups there were students who did not share their ideas or engage with their groups because they did not like this method, as mentioned in their interviews (above).

Clearly, VBS bring with it positive elements into teaching of Islamic Education classes. The most valuable benefit seems to be engaging part of VBS including discussions, problem solving activities and presentation of one's own ideas. However, VBS's benefits cannot match the level of those entailed by using EBS as the absence of virtual space and access to electronic sources are significant advantages that EBS has over VBS.

6.3.3.2 Motivation of VBS students

This section presents the views of the teacher about changing the motivation of students towards Islamic Education lessons by the VBS method.

The teacher remarked on students' increased level of motivation using VBS: *'The VBS method made students very engaged in the classroom.'* He ascribed this to their more active role in the lessons: *'because they were exploring the information by themselves in their groups'.* And to working in groups rather than individually: *'This made student's feel affiliation with their groups and with their lessons.'* The fact that the

teacher was willing to receive information from the students also helped: *'Also, this method made students very happy and confident because the teacher took some information and ideas from them which motivated students to actively participate in their lessons.'* (Interview during lesson 5). In addition, most of students mentioned that the VBS method raised their motivation toward Islamic education lesson such as student B, C and F.

In my observations of the VBS classroom, some students were positively motivated to participate in giving their views and ideas as required by the teacher. However, I noticed in some groups that some students did not participate. I interviewed some of them who seemed not to prefer this method, and their views will be shown later, for example in the 'ethics of fasting' topic. I noticed the reluctance of two students in the second group, and one student in the fifth group, to participate with their colleagues. When interviewed they said they did not like this method. This discussed in more detail in the interview of students section.

6.3.3.3 Comprehension of the topics of Islamic Education by the VBS method

This theme comprises the teacher's and students' perspectives on whether the VBS method helped students better understand their lessons. The VBS teacher commented: *'Students discussed ideas first with their teacher then discussed with their peers; that lead to better understanding of our topic'* (Interview during lesson 6). He thought this was *'because the students discover the information by themselves.'* (Interview during lesson 4)

The students presented mixed views on whether VBS increased their comprehension. While student A asserted that, '*this method helps me to understand more than any other method because it makes me participate*'; and student H agreed: '*Brainstorming helped us to learn as it passes stages and steps to reach the right solution*', there were others who disagreed. Student C said: '*It helps me to understand but not necessarily more than others*'. Student E pointed out the problem that, '*... in the group, some students confuse your ideas.*'

In the lesson on 'Nafelah fasting' (fasting that is not obligatory), the teacher asked closed-ended questions that helped students understand the topic. He asked the groups to formulate the questions in a different way. The group's questions were: What do we mean by fasting? What is fasting? (groups1, 3 and 5), Fasting is..... (Complete please) (group2); Could you please explain fasting? (group 4). In this activity the groups were engaged and very active in creating a question like the teacher's, which was consistent with the teacher's goal of training students to create good questions.

VBS seems to have fairly positive effects on increased comprehension of subject matter by students. The teachers pointed out a significant advantage of VBS over traditional methods of learning when he mentioned that students 'discover information by themselves.' This is very important point as students are encouraged to use their own faculties in order to extract from information presented to them that what is relevant for their lessons. Such ability to filter through increased amount of information is becoming essential in the time where people are overwhelmed by the level of information they have to process each day.

6.3.4 Hindrances in using VBS in the classroom

This section illustrates the difficulties of the VBS method, and the obstacles to its effective use as experienced by the teacher and students.

- **Teacher's view of the hindrance in using VBS in the classroom:**

The teacher mentioned many hindrances which he encountered during the application of this method. For instance, *'...design of classrooms and the number of students may not allow the distribution of students into groups...'* (Interview after teaching). In addition, he mentioned another obstacle: *'the continuous assessment of students ... The teacher must be doing that for all students in each lesson, and with this method it is difficult because we did the groups...'* (Interview during lesson 6). Also, the teacher commented on difficulties he faced: *'I had made a plan to do a certain topic in the classroom but may have to change my plan due to the students' abilities. So, the capabilities of students can sometimes be an obstacle in the application of that method...'* (Interview during lesson 6). Finally, he mentioned lack of time for his lesson as another hindrance he faced: *'Time is short, which sometimes did not help us to finish or conclude our topic well'* (Interview after teaching)

- **Students' view of the hindrance in using VBS in the classroom:**

VBS students stated that they faced some obstacles when they used VBS in their lessons. In the view of student E: *'Some students inside the group messed up the issue because he misunderstood it and that spoilt the effort of the group'*. Furthermore, student G said *'...some students' disregard and lack of seriousness weakened the debate.'* Finally, many students mentioned lack of time.

In practice, it was observed that lack of time was indeed a problem with the VBS method. For example, in the 'Hajj' topic, the time finished before the teacher concluded the lesson because there was a lot of information and the class had spent a lot of time discussing it. The different levels of students' research skills was another problem. In the 'fasting' topic, for instance, the teacher faced a problem with the different skills of students in using the library, which led to a disparity of results between groups.

If VBS is to be compared with EBS, there are clear signs that there is difference in impact both methods have on the quality of teaching and learning. However, this difference is not based on a different type but rather strength of effects these two methods entail when they are applied. EBS leaves more visible mark on the quality of educational process due to implementation of technology which enables to take the principles of VBS and the benefits their application bring about even further. On the other hand, VBS can be employed in situation where the absence of adequate technological equipment would prevent EBS from being used effectively. Thus, students can still benefit from the VBS's focus on engagement of students, independence in knowledge constructing, increased level of communication and cooperation with peers.

6.4 Case three: Traditional method

As described in the methodology chapter, the observed group consisted of 20 students of varying levels of ability. For the study, the researcher interviewed the teacher before, after, and during the intervention, making eight interviews altogether. In addition, the students were interviewed once, individually, during the intervention.

Moreover, I observed this group every lesson (one lesson per week) for three months. The classroom was of traditional kind.

6.4.1 Pedagogical affordances of the traditional teaching method

This part presents the affordances and advantages of the traditional teaching method from the teacher's and students' perspectives, as well as from my observation data. Data are organised under the same categories as in the VBS method.

6.4.1.1 Interaction in the traditional classroom

This sub-theme illustrates the perspectives of the teacher and students about interaction in Islamic Education lessons with the traditional method, as well as events observed in the classroom.

- **Teacher's view about interaction with the Traditional method:**

The teacher of the traditional method believed that, *'students in all curricula feel bored, but the proportion of the boredom is different in different lessons. Therefore the teacher must diversify the methods of presentation of his lessons'* (Interview before teaching). The teacher emphasised that the teachers should use a method that attracts students and motivates them, citing some examples of how he attracted his students in his lessons: *'I see that most of the students are feeling bored but I try to tackle this by taking into account a given lesson topic and prepare for it thoroughly. Thus, students feel that their teacher takes care of them, and if the students feel this, they are much more attracted to their lessons and that what I did in my lessons'* (Interview during lesson 4). He further added: *'Good classroom management plays a role in the interaction of students toward their lessons. Because the success of classroom management leads to successful implementation of the teaching method,*

that results in student interaction. However I know there are still some students who feel bored with this method.' (Interview during lesson 5)

- **Students' views about interaction with the traditional method:**

Most students believed that with this method they felt bored and that there was not enough motivation to drive them to participate. Student C explained that, *'because the long explanations from their teacher made him lose the line and distracted his mind, which made him experience monotony with this method'*. Other students gave the same reasons, as detailed in the sub-themes above, such as the teacher taking over the lesson to speak most of time, not giving them enough time to discuss, and the lack of dialogue in the classroom.

In practice, I observed in the most of lessons in this method that there was a lack of enthusiasm or interest, for the above reasons, despite the teacher trying his best to excite his students. However, this is the nature of the traditional method, which often leads to the students to lose their interest all together. For example, during the lesson on 'eclipse prayer,' I observed that most students were bored after fifteen minutes and, due to the lack of attention to the lesson, they became busy with other things, such as talking together, looking at their textbooks or playing with their pencil cases.

The above-mentioned illustrates a typical example where the traditional methods lack most in comparison with EBS and VBS. The inability to attract students, lock and maintain their focus on lesson itself and excite them enough so they will become self-motivated to do their best in their studies is an unfortunate hallmark of the traditional methods of teaching.

6.4.1.2 Enrichment and accessibility of information in the traditional method

This section illustrates how the traditional method provides students with rich information and enhances understanding of their lessons by extra tools, from the teacher's and students' perspectives.

- **Teacher's view of the enrichment and accessibility of information in the Traditional method:**

The teacher of the traditional method thought that the textbook provided a rich source of information which he could interpret and expand on. *'The textbooks of Islamic Education contained plenty of information which enriches student's knowledge*'. The teacher explained that, *'when the teacher presents students with this information, that enriches knowledge of the students as is the case in the topic 'Hajj'* (Interview during lesson 2). In addition, he emphasised that, *'I added some important information that enriched students' knowledge, such as stories, narratives and the integration of students' previous experience.'* There was still room for discussion in the traditional method, which involved student participation. *'Also the discussion at the end of the lesson enriches the information.'* (Interview during lesson 3)

- **Students' views of the enrichment and accessibility of information in the traditional method:**

Some students thought that this method sometimes enriched their knowledge if their teacher provided them extra information. For example, student C said: *'The teacher sometimes added extra information which is explained more for comprehension and enriched their knowledge'.* Student F commented that, *'educational boards helped*

them to enrich their knowledge'. The rest of the students said the stories cited by the teacher included information which enriched their knowledge.

However, some students thought the opposite, that this method did not involve tools to enrich their knowledge. For instance, student B: *'The teacher often depends only on the information in the textbook'.* And student G added: *' The teacher often repeated the information within the lesson and there wasn't anything new to add for them to enrich their knowledge'.*

It was evident, from my observations, that in the traditional classroom the teacher brought educational posters with him which contained instructions of how to pray at a funeral and contained some pictures. Also, the teacher mentioned some extra information on what Muslims should do for the family of the dead person, such as visiting, offering condolences and praying for the dead person. On other hand, in most lessons the teacher was merely repeating information from the textbook. The lack of additional and for students interesting sources of information represents a major shortcoming of the traditional methods which rely heavily on a textbook being the sole source of information with teacher being 'just' the one who conveys this information to students.

6.4.1.3 Dialogue in the traditional method

This part examines the development of dialogue in the classroom with this method, giving teacher's and students' views. The teacher discussed with all students to gauge their comprehension and invite their ideas. Therefore, dialogue in the traditional method occurred between teacher and students, as shown in Figure 9 below.
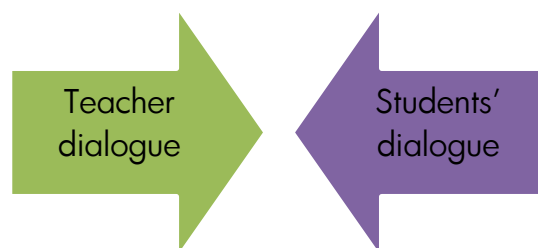
Figure 9: Dialogue in T classroom

An example of the direction of dialogue shown in this chart was recorded during the classroom observation.

- **Teacher's view of dialogue in the traditional method:**

The teacher claimed that he used conversation with his students during the last fifteen minutes of his lessons. This enabled students to discuss the topics, engage in dialogue with him, and raise any ideas or questions (Interview after teaching). He gave examples of conversations between himself and his students in the 'Hajj' topic.

- **Students' views of dialogue in the traditional method:**

Most students believed that in this method there was not enough time or opportunity for discussion or developing their dialogue skills. For example, student A said that, *'there was no chance for dialogue'.* Student C mentioned: *'The teacher does not give all the students an opportunity for dialogue'.* Student E added: *'This method did not help me to make conversation.'* However, a few students thought that this method sometimes provided them with a chance to question the teacher. For instance, student B said: *'Yes, at the end of the lessons, we had discussion with the teacher, if any students had questions or would want to add some ideas'.* Student H added: *'I asked the teacher about things that I hadn't understood'.*

In my classroom observations, in the 'Hajj' and 'Umrah' topics, a student asked his teacher: *'Why do Muslims do Hajj at just one time in the year but do Umrah at any time of the year?'* The teacher answered *'because Hajj actions are difficult and tiring; as well, Hajj actions need more time to do them compared to the actions of Umrah'.* When a student asked: *'Is there a difference in the reward of God among the actions of Hajj and Umrah?'* the teacher answered: *'Yes, of course, the person who performs the Hajj is rewarded more than those who perform the Umrah'.* Consequently, there was a good conversation between the students and teacher. However, there was no time for other students to ask questions or engage in dialogue with him. This was true for most of the lessons in the traditional method.

The aforementioned findings are in striking contrast with both EBS and VBS methods which very cores are based on discussion among students and dialogue with a teacher. Not only are communication skills of students neglected if there is an absence of dialogue and discussion during lesson, but such absence contributes to an overall passivity of students. In other words, students can hardly feel engaged if they are not given time and space to inquire about a given topic or presents their own answers to teacher's or their peers' questions.

6.4.1.4 Construction of knowledge in the traditional method

As explained earlier in this chapter, this sub-theme presents the perspectives of the teacher and students on the extent to which knowledge was constructed in the traditional method.

- **Teacher's view of the construction of knowledge with the traditional method:**

The traditional method teacher believed that, *'the construction of knowledge depends not only on how the teacher uses teaching methods in classroom, but rather it depends on how students receive information, as the teacher nowadays is not the only source of knowledge for the student. There are many sources, such as media and websites which contribute to the construction of knowledge of students. Therefore, majority of students understand most concepts in topics in Islamic Education....'* (Interview during lesson 1). He further explained that, *'...this does not mean I am not interested in trying to help students to build their knowledge, as I use the educational board to illustrate knowledge and information to build the accumulation of knowledge for the student, as well as using narratives and giving examples, which contributes to the construction of knowledge among students..'* (Interview during lesson 3). In addition, he said: *'...good preparation of the subject and dividing it into elements helps to contribute to the construction of knowledge for students....'* (Interview before teaching).

- **Students' views of the construction of knowledge with the traditional method:**

Some students mentioned that the teacher provided them with educational items to build their knowledge, through storytelling (student A), continuous clarification (student D) and the practical application of topics such as prayer and pilgrimage, though this was rare (student E).

I observed that the teacher took his students to the school mosque in the 'prayer' topic and he prayed in front of his students and then got some students to pray in front of their colleagues. Although this practical application, together with students' previous

experience, contributed to the construction of knowledge, in most topics there were not enough activities for the construction of knowledge. Examples of such topics are the topics 'fasting' and 'charity' (Zakkat), where the teacher relied solely on lecturing.

6.4.2 Affordances of the traditional method for creativity skills

6.4.2.1 Promoting and encouraging creativity

This sub-theme presents of the impact of the traditional method on creativity skills from the teacher's and students' perspectives as reported in their interviews, and from my classroom observations.

- **Teacher's views on creativity skills with the traditional method:**

The teacher believed that creative thinking was useful and important but in his opinion there are other more important things: *'Teachers in primary schools are required to do other things which are more important than creative thinking skills, such as completing topics before the end of the year'* (Interview before teaching). He supported the virtues of the traditional method: *'...the traditional method gives the teacher a wider area to develop thinking skills that gives students many examples and links information with the realities of social life. So, this expands their imagination and their minds.'* (Interview during lesson 1)

- **Students' views on creativity skills with the traditional method:**

Most students in the traditional method thought that this method did not help them to improve their creativity skills, such as students E, F and G. Student E said: *'This method breaks down my mind to improve my creativity skills'*. Other students added several reasons for this lack of improvement, for example, *'the teacher did not give*

appropriate time or chance to discuss or ask questions' (student H); also student G added that, *'the teacher speaks all the time'*.

However, there were a few students who said that this method helped them to develop creative thinking skills, for various reasons. For example, student D mentioned *'...topics included many interesting stories provided by our teacher in this method, which contribute to raising the level of thinking...'* Student B added: *'...questions posed by the teacher at the end of the lessons, including some of the questions that challenge our minds and make us think...'*

In the classroom observations, in the 'charity' topic (Zakkat), the teacher asked students in the last fifteen minutes of his lesson: *'What are your ideas for encouraging people to donate to the poor?* Immediately, some students raised their hand to answer this question. For example, one said: *'give them some pictures of poor people and explained their cases'*, whilst another student mentioned: *'We suggest that the imams of mosques advise people to donate to the poor'*. This activity helped students generate their ideas, which related to their flexibility skills. On other hand, students were inactive for most of the lesson and the teacher only gave them the last fifteen minutes to discuss their ideas, which was not enough time to think.

The traditional method intends primarily, as the teacher himself admit, to hand down certain amount of information that is deemed necessary for student to obtain during a year. Hence, the teacher cannot afford to spend much time applying his own methods or ideas given the ever-present time constraints. Therefore, the traditional method

focuses on doing what it does best - facilitating a transfer of information from textbook through teacher to students in form of knowledge.

6.4.3 Impacts of the traditional method on Islamic Education and the role of the traditional method in Saudi education:

This sub-theme presents positive influences during use of this method, from the teacher's and students' perspectives.

6.4.3.1 Benefits of the traditional method in the learning environment

- **Teacher's views:**

The teacher thought that the traditional method would be appropriate and good, and that it was considered the mother of all teaching methods because it fits most of the topics and also it fits most students' abilities. He said: *'I prefer this method because it is the most suitable for most Islamic Education subjects, as well as commensurate with the abilities of students'* (Interview before teaching). The teacher added that, *'this method provides me with time to communicate with students directly, and also gives me freedom from any systems or rules in the classroom'* (Interview during lesson 2). In addition, the teacher added another reason: *'...because Islamic education topics are mainly informative; that's why I used it'* (Interview during lesson 5).

- **Students' views:**

A few students thought that they learned well with the traditional method because of the detailed explanations they received and the level of discipline in the classroom. For instance, student A said: *'... a detailed explanation of the subjects made me learn more...'* and student B declared: *'... with this method, I learnt with it more because*

another method such as groups method is not organised and there is no discipline in the classroom...'

However, most students mentioned the negative effects of the traditional method, mainly based on their lack of active participation. For example, student E said '*...because the teacher spent most of the lesson time speaking and he did not give us the opportunity to inquire...*' Student F added: '*...feeling of marginalisation leads me not to be interested in learning...*' and student H mentioned: '*...boredom, there is no time for fun and pleasure...*' Student D emphasised: '*...there is no incentive to learn with that method...*'

In practice, I observed that the teacher spent most of the time talking and their student misleading their teacher and misbehaving. One can assume the foregoing stems from the students not being engaged enough. It is tiring for an adult to sit and listen for 45 minutes, let alone a child. The issue does not seem to be the topics themselves, as they are often interesting and for children in Islamic society essential. Thus, there should be a natural tendency in students to want to get something out of the lesson. However, the traditional method of teaching simply does not provide teacher with enough means to attract and maintain students' attention.

6.4.3.2 Motivation of students in the traditional method

The teacher recognised the problem with motivating students to learn Islamic Education by the traditional method. He said: '*in general education, Saudi schools face reluctance in Islamic Education within that system, but the teacher should make*

his utmost effort;' and he acknowledged: *'I faced this problem with my students'* (Interview after teaching).

Most students mentioned that there was no incentive for interaction in the classroom, as explained in the Interaction sub-theme above (4.1.1).

6.4.3.3 Comprehension of the topics of Islamic Education by the traditional method

The teacher claimed that comprehension was straightforward because *'most Islamic Education topics have been repeated for students because they may already have studied them in previous years. As well, most of the students have been taught these topics in the mosque or at home. So, most students did not find difficulty in understanding.'* However, this did not extend to all topics and all students: *'but there are some of them need to be explained to understand.'* (Interview during lesson 2)

Most students agreed with their teacher that it was not difficult to understand the topics of Islamic Education. However, they mentioned if they did encounter a difficult topic such as 'Hajj', it was not easier to understand it with this method. For example, student F said: *' I faced difficulty in understanding the subject of pilgrimage where the teacher gave a vast amount of information which leads to misunderstanding"*

In the classroom, I observed that students did not engage with their teacher and after 20 minutes most students had become distracted. For example, in the 'Hajj' topic, after explaining this topic, the teacher wanted to ask students questions to test their understanding but, unfortunately, many students could not answer the questions because during the lesson most of them had been distracted due to not having been given much opportunity for participation or interaction.

6.4.4 Hindrance in using the traditional method in the classroom

This part describes the difficulties and obstacles facing the teacher and students in the traditional method, from teacher's and students' perspectives, as well as my observations of the traditional classroom.

- **Teacher's view of the hindrance with the traditional method:**

The teacher mentioned the difficulties and obstacles that he faced during the intervention: *'I encountered bored students, the difficulty of preparing the topics and the large amount of information in the curriculum. In addition, there was the lack of attention of some students while I was teaching, as well as their different abilities and assimilation skills.'* (Interview during lesson 6)

- **Students' views of the hindrance with the traditional method:**

Most students believed that the main problem with the learning environment in the traditional classroom was that of boredom and difficulty in concentrating on the lesson. For example, student E said *'lack of attention'* and student F reported, *'lack of concentration'*. In this regard, student I added, *'dispersion of the mind and distractibility'* while student K said *'the teacher goes directly into the illustrations and he does not give us an introduction to his topics'*. Although most students experienced these difficulties, few students did not because, *'they were used to it'*.

In my classroom observations, I saw some of the barriers faced by students. For example, students did not gain a good understanding of the topics because the teacher dominated most of the time, which led to boredom and distraction as mentioned above, especially in the topic of 'pilgrimage' (Hajj). Moreover, obstacles stemmed

from the teacher's lack of interaction with his students, as illustrated by the situation with the evaluation questions at the end of the lesson. By and large, students lacked interest in their lessons and felt marginalised from the beginning.

To conclude this section, one might point out the clear difference between the impact the traditional method has on the quality and way of teaching and learning in comparison to the other two examined methods. In general, the traditional method is behind EBS and VBS regarding the benefits its application in educational processes entails. The absence of more pronounced focus on active forms of learning such as discussions, problem solving, direct engagement of students into learning's process and others, constitutes a major disadvantage of the traditional method. On the other hand, the role of teacher in traditional methods is limited by time constraints and unbalanced curriculum. Given the aforementioned, the traditional method remains based on passive approach to learning where students play the role of receivers of information rather than its active users.

6.5 Summary of findings

This study in the first section is illustrated two sub-section affordance of EBS and pedagogical affordance of three teaching methods. The sub-section of EBS affordance involves three categories; namely affordance of EBS forum, electronic resources facilities and ongoing communications.

This study found that the Forum in the electronic brainstorming method provided certain affordances (see 6.2.1) for the teaching of Islamic Education. It provided a wide space for children to participate and gave them freedom to generate their ideas

because their names were not shown, making them very confident; they found that this method gave them a more active role and that this made their lessons very exciting. They enjoyed the opportunities for interaction that the Forum provided. In addition, the EBS method provided electronic resources which led to improvements in their understanding of the lessons and to improvements of their skills in different areas such as learning, research and thinking. Furthermore, this method allowed them to continue their communications even after school. The fourth category in affordances of teaching methods was interaction in the classroom with the three methods, focusing on the extent of interaction and enthusiasm of students in their classroom towards Islamic education lessons.

The EBS method had a certain advantage over the VBS method because, with the latter method, while most students interacted, there were a few who abstained from participating (see 6.3.1). The teacher of VBS attributed the reason to students' lack of self-confidence, their preference for gaining information quickly from the teacher, or simply that they were used to traditional methods. In the Traditional classroom, the teacher observed that most students felt bored in his lessons but he claimed to be trying to attract student to his lessons. Most students in the Traditional method reported feeling bored because there was not enough motivation to drive them to participate (see 6.4.1).

The second sub-section was pedagogical affordances in the three teaching methods. The first category presented the improvements in construction of knowledge with the three methods, meaning the extent to which learners interacted with new information and understood it. On the EBS method, the teacher tried to provide a more effective

method for teaching students to think and to learn, and he and his students believed that EBS allowed them to construct knowledge, to think and to learn. They gave several reasons for this, such as increased student independence, and the EBS Forum giving empowerment to learners to construct knowledge through the Internet and electronic communication. The VBS teacher also believed that brainstorming enhanced students' construction of knowledge, and he ascribed this to students being able to use their previous experience and knowledge, together with that of their colleagues, as well as what the teacher explained to them. However, while some students agreed that VBS enhanced their construction of knowledge, others disagreed because some students were unenthusiastic or were fanatical in their opinions. The Traditional method teacher believed that storytelling and good preparation in the Traditional method contributed to construction of knowledge for students, but he recognised that technology like the Internet and other digital media could contribute more than teachers nowadays. His students believed that the practical application of subjects contributed to the construction of knowledge in their lessons, as illustrated by the 'prayer' topic.

The second category in the pedagogical affordances sub-section is concerned with enrichment of knowledge and accessibility in the three methods, focusing on the extent to which the methods provided students with enriched knowledge or enhanced their understanding of their lessons through extra information, websites, pictures, books or models. The teachers used a variety of activities to enrich the information provided to their students, such as website links and video clips in the EBS method, models and books in the VBS method, and narratives and the integration of students' previous experience in the Traditional method. Consequently, most students in EBS

and VBS believed that these methods enriched their knowledge but in the Traditional method some students did not think that the information available to them was enriched.

The third category in the pedagogical affordances sub-section focused on improvement of dialogue in the three methods. In the EBS method, the dialogue came from several directions: dialogue between the teacher and students, dialogue of students within their groups, and dialogue among groups. This amounted to an improvement of dialogue skills for students. In the VBS method, there were only two directions of dialogue in the classroom, namely dialogue between the teacher and students, and dialogue between students within their groups. However, there was no dialogue between groups to make this dialogue wider. In the Traditional method, there was just one direction of dialogue, which was between the teacher and his students, what limited the development of dialogue for most students.

The second section looked at the factors that improve the creativity skills of students in Islamic Education lessons. In the qualitative findings, two key differences emerged between the teaching methods in this sub-section. Firstly, in the EBS and VBS cases, teachers and most students believed that creativity skills were developed, whereas in the Traditional method most students thought that their creativity skills had not improved and that the classroom did not encourage them to develop their creativity. Comparing the EBS and VBS methods, originality was improved more by EBS than by VBS, because the former method helped to avoid repetition of students' ideas, which does not occur with the latter method.

The third section discussed the impacts of the three methods on teaching and learning processes. This sub-section included the categories of benefits teaching methods and the learning environment, teaching methods and motivation students to Islamic education lessons, and comprehension of lessons. In EBS, there were positive effects, as reported by the teacher, of greater independence among the students, who achieved a higher level and improved their learning skills. This was confirmed by most of the EBS students, who believed that EBS had stimulated their learning and made learning processes easier; this was also evident from the classroom observations. Likewise, the teacher and some students thought that the VBS method had a positive effect on improving students' learning processes, and improving their understanding of Islamic Education topics.

However, some VBS students in their groups did not contribute any ideas and did not engage with others in their groups, as I observed in the classroom, because, as they reported in their interviews, they did not like this method. In the Traditional method, there were differences of opinion between teacher and students. While the teacher thought this method helped students to improve their learning because it gave him enough time to explain his topics clearly, most students believed that this method did not help their learning. They gave several reasons for this, including boredom, marginalisation and lack of opportunity to participate.

The sub-section on 'The possibility of incorporating EBS into the teaching of Islamic Education and into the learning environment' was in the third section, which was a special sub-section for the EBS method only. This sub-section explored the extent to which EBS is compatible with lessons with Islamic Education topics. The EBS

teacher recognised that it was possible to use it because the electronic libraries or worldwide webs had many suitable materials for the students whilst the Ministry of Education also provided electronic materials on their website. Most students in the EBS classroom emphasised the possibility of the integration of EBS technology into their lessons in Islamic Education. In addition, during the EBS observations, I noticed that, there were events and methods which supported the teacher's and students' views on the possibility of successfully using the EBS method and that it was compatible with many topics of Islamic Education.

The fourth section dealt with the hindrances in using the three methods in the classroom as reported by teachers and students. There were obstacles in each of the three cases. For example, at first with EBS, there were technical problems and learning problems facing the teacher in using the equipment. There was insufficient hardware and limited access, together with students' differing levels of IT skill and time constraints. In addition, some students faced a problem doing homework because they did not have Internet access at home or their parents prevented them from using the internet. The difficulties facing the VBS teacher included the design of the classroom and the large number of students, which hindered the distribution of students into groups and the compulsory continuous assessment of students in each lesson. Students faced the obstacles of misunderstanding and lack of seriousness from some of their fellows. Lastly, in the Traditional method the teacher faced the hindrances of the difficulty of preparing the topics and the large amount of information in the curriculum. Students of the Traditional method faced hindrances such as problems in paying attention and concentrating.

6.6 Chapter Summary

This Chapter is divided into three cases (EBS, VBS and T) to present the findings derived from the interview and observation data regarding the pedagogical affordances of the three teaching methods, affordance of creativity skills, impact of these methods and their hindrances. The first case (EBS) involved two sub-themes of pedagogical affordances which were affordance of EBS and pedagogical affordance of EBS while the second and third cases (VBS and T) involved only pedagogical affordance sub-themes. The second theme (affordance of creativity skills) contained one sub-them which were promoting creativity skills and third theme (impacts of teaching methods) contained four sub-themes of EBS and three sub-themes of VBS and T. the final theme (hindrances) involved three sub-themes.

The most important conclusions of this chapter are the various comparisons between the three presented teaching methods. Due to using the same structure (with small exception in EBS section) according to which each of these methods were analysed, the comparisons are easier to make.

First and foremost, the resulting differences in the effect that EBS, VBS and the traditional method have on the quality of teaching and learning stem mostly from the type of tools these methods provide the teachers with. In this regard, EBS offers the biggest variety of teaching tools, whether it is the Forum itself or the access to electronic sources of information. The EBS teacher was thus able to provide students with additional pieces of relevant and interesting information, whilst enabling them to use this information creatively to construct new knowledge.

Secondly, the issue of students' engagement was highlighted several times during the interviews. Both EBS and VBS have advantage in this regard over the traditional method, as they incorporated in themselves mechanism of discussion, collaboration and active processing of information. All this together enabled teachers to keep students interested throughout the lessons. Moreover, students who engaged into lessons are often enthusiastic to learn more and more and thus making the job of teacher much easier and the whole learning process significantly more effective.

Furthermore, it was evident that the increased students' engagement entailed yet another benefit. These benefits, and at the same time the key pedagogical affordance of EBS, was an effective implementation of dialogue as a teaching tool in the lessons. The foregoing was confirmed by teacher and students as well as by direct observations. The implementation of dialogue was done through the Forum, representing in this case a platform for facilitation of dialogue and other related processes. The Forum offered the teacher various options how to present a task or subject of discussion for students, who, at the same time, were provided with user-friendly environment which helped to facilitate creation of new and original ideas. In addition, the Forum incorporates in itself elements of a 'comfort zone,' the fact that lead to an increased involvement of otherwise rather reticent students in class discussions. Even if VBS and the traditional method consider dialogue as an important part of the educational process, the absence of a tool similar to the Forum prevent them from implementing dialogue and benefiting from it in the way EBS is.

Thirdly, one of the most important outcomes of education is acquiring of new information - knowledge. In this case, all three methods presented their ways how to

facilitate such process and all three seem to be working. However, the main difference lies not in the way the information is obtained but in the way the information is then used and mastered. This is where EBS and VBS can offer more as their focus on discussion and debating represents a form of active and creative using of new information. On the other hand, the traditional method focuses on students to obtain all necessary information according to curriculum whilst not having enough space to facilitate active use of the new information. This certainly makes the learning process less effective.

Finally, all three methods have to deal with several issues that hinders their full potential. Yet, all these three methods depend and rely substantially on the relationship between teacher and student as a factor of utmost importance for any successful educational system. In the next chapter the quantitative findings are explained.

Chapter Seven: Quantitative data analysis

7.1 Introduction

This chapter presents the findings of the quantitative analysis to compare improvements in creativity skills by the three methods. As explained in Chapter 5, the Torrance Test of Creativity Skills Form A was used as a pre-test and then as a post-test after the intervention, to 61 year 6 students in a primary school (20 EBS, 21 VBS and 20 T). The procedure for scoring the tests followed the instructions in the Test Guide for the TTCT (1990), as explained in Chapter 5. To ensure the reliability of the scoring, pre- and post-tests were scored by two different scorers, and Cohen's Kappa test was used to measure the level of agreement between the two raters, as explained in Chapter 5.

7.2 Summary of pre- and post-test creativity scores for the three teaching groups

This section summarises the test scores for the three groups on the three skills. Table 16 shows the mean scores and standard deviations on both the pre-tests and post-tests for the three separate teaching groups, broken down into the three skill areas.

Table 16: Summary of tests scores for the three groups

Group	Skill	Pre-test mean	Pre-test SD	Post-test mean	Post-test SD	Change in mean
Traditional (T)	Fluency	7.95	2.665	12.75	4.767	4.80
	Flexibility	11.25	2.613	11.40	3.315	0.15
	Originality	3.80	3.548	3.95	3.364	0.15
	Total	23.00	7.160	28.10	9.431	5.10
Electronic brainstorming (EBS)	Fluency	9.20	1.852	26.85	5.733	17.65
	Flexibility	12.05	1.791	22.05	3.170	10.00
	Originality	4.95	2.724	10.50	7.052	5.55
	Total	26.20	4.213	59.40	13.520	33.20
Verbal brainstorming (VBS)	Fluency	6.52	2.732	10.67	3.120	4.14
	Flexibility	10.29	3.770	11.38	4.177	1.10
	Originality	3.24	2.914	3.90	3.491	0.67
	Total	20.05	8.316	25.95	9.897	5.90

Overall, Table 16 indicates that the mean scores on the three skill areas showed an improvement (positive change) in each of the teaching groups. While tests will be done at a later stage for statistical significance, the changes in scores that the table appears to show will be commented on first.

In the traditional teaching group, the mean fluency score improved from 7.95 to 12.75, an improvement of 4.80. However, the mean flexibility score improved slightly from 11.25 to 11.40, changing by a mere 0.15. Similarly, the mean score on originality only improved by 0.15, from 3.80 to 3.95.

The changes in the originality scores for the traditional group are shown in Graph 1, below, for illustrative purposes. It illustrates that some students improved their originality scores but several did worse after the lessons.

Change in Originality scores

Traditional group

Mean = .15
Std. Dev. = 3.731
N = 20
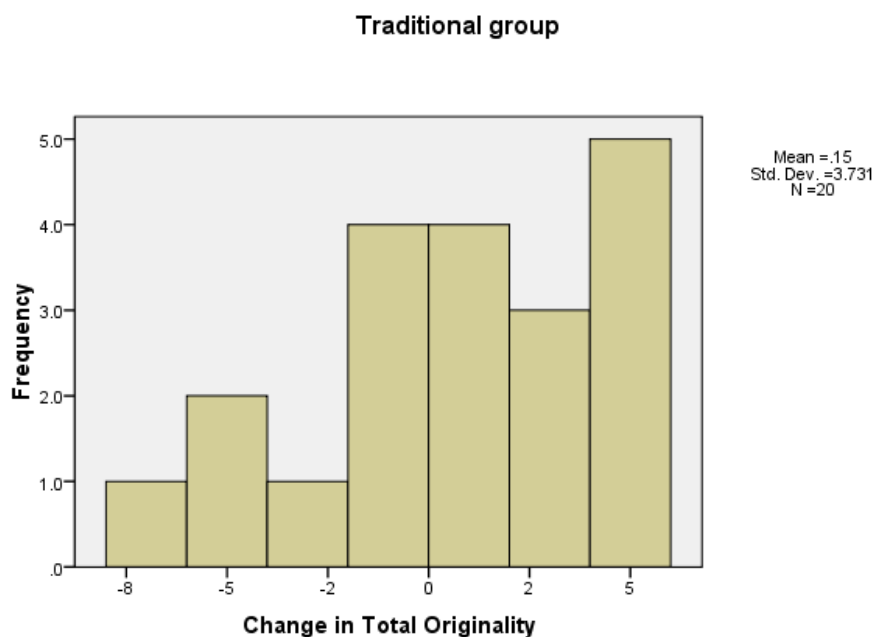
Graph 1: Changes in originality scores in Traditional group

Secondly, in the electronic brainstorming (EBS) teaching group, the mean fluency score improved from 9.20 to 26.85, an improvement of 17.65. In addition, the mean flexibility score improved from 12.05 to 22.05, a change of 10.00, and the mean score on originality improved from 4.95 to 10.50, a change of 5.55.

The standard deviations in the changes of the means for fluency and flexibility were fairly small (6.089 and 2.791) compared to the changes in the means (26.85 and 22.05) but for originality the standard deviation was larger (7.564) than the change in the mean (5.55). This indicates that, as in the traditional group, some students scored worse in originality after the lessons than they had before. However, unlike in the traditional group, most students in the EBS group improved their originality scores.

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To illustrate the changes in fluency scores for students in the EBS group, the bar Graph 2 below shows that improvements ranged from about 8 to about 32 points.

Change in Fluency scores
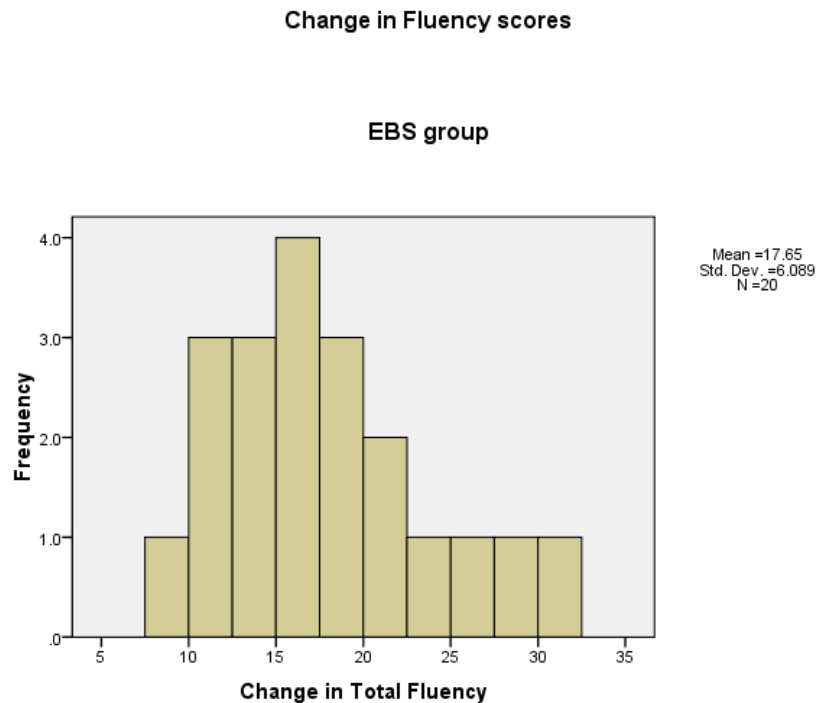
EBS group

Graph 2: Improvement of students for their fluency scores in the EBS group

Thirdly, in the verbal brainstorming group (VBS), the mean fluency score improved from 6.52 to 10.67, an improvement of 4.14. On the other hand, the mean flexibility score only improved from 10.29 to 11.38, a change of just 1.10. Similarly, the mean score on originality only improved by 0.67, from 3.24 to 3.90.

Overall these results show that the VBS group was similar to the traditional group in showing small improvements in the three skills, with improvements in flexibility and originality being particularly small, and with wide variations in the post-test scores. The EBS group showed much greater improvement in all three skills.

The next step is to test whether the changes of scores are statistically significant, that is, whether the improvements were likely to be real improvements and not due to random variations in students' responses.

7.3 The effectiveness of each teaching method, taken individually

In this section, each teaching group is analysed separately to ascertain whether the post-test scores were significantly different from the pre-test scores on each of the skill areas. Firstly, the distributions of the pre-test and post-test scores were checked for normality. To decide on the type of statistical tests to be used (parametric vs. non-parametric tests), normality tests are necessary. If the scores follow a normal distribution curve, then parametric tests are used, but if the distribution is non-normal then non-parametric tests are required. Because each individual teaching group consisted of only 20 or 21 students, the Shapiro-Wilk test for normality was used (See Appendix 1). The results are summarised in Table 17, below.

Table 17: Summary of results of Shapiro-Wilk tests for the three teaching groups

Group	Skill	Pre-test normal?	Post-test normal?
Traditional (T)	Fluency	Yes	Yes
	Flexibility	Yes	No
	Originality	No	No
	Total	No	Yes
Electronic brainstorming (EBS)	Fluency	Yes	Yes
	Flexibility	Yes	Yes
	Originality	No	No
	Total	Yes	No
Verbal brainstorming (VBS)	Fluency	Yes	Yes
	Flexibility	Yes	Yes
	Originality	No	No
	Total	Yes	Yes

Table 17 shows a roughly equal mixture of normal and non-normal distributions. It was decided therefore to use the conservative option of using non-parametric tests throughout so as to be less likely to find significant differences.

The Wilcoxon Signed-Rank test was used to test whether the post-test scores were significantly different from the pre-test score for each skill in each group separately (See Appendix 1). Since the same set of students was tested before and after the course of lessons, the samples are dependent, unlike the case of making comparisons between groups where different students are involved and the samples are independent (Field, 2009). Referring to Table 16, the mean scores increased on each test for each group between the pre-test and the post-test.

Table 18: Summary of results of Wilcoxon Signed-Rank tests comparing pre-test and post-test scores within each group.

Group	Skill	Significant difference between post-test and pre-test?
Traditional (T)	Fluency	Yes
	Flexibility	No
	Originality	No
	Total	Yes
Electronic brainstorming (EBS)	Fluency	Yes
	Flexibility	Yes
	Originality	Yes
	Total	Yes
Verbal brainstorming (VBS)	Fluency	Yes
	Flexibility	No
	Originality	No
	Total	Yes

Table 18 shows that, in the Traditional group, the improvement in the fluency score between pre-test and post-test was statistically significant, while improvements in flexibility and originality were not statistically significant. Adding the scores together to reach the total also showed statistically significant improvements, presumably due to the improved fluency score. The EBS group on the other hand, showed statistically significant improvements in fluency, flexibility and originality, as also in the total score. In the VBS group, as in the traditional group, there was a statistically significant improvement in fluency score but not in flexibility or originality. The total score showed statistically significant improvement, again probably due to the improvement in fluency scores. For more details see the Appendix 1. Thus the traditional and VBS teaching methods did lead to improvements in fluency, but failed to improve flexibility or originality. The EBS method, on the other hand, led to improvements in flexibility and originality as well as fluency.

Having established that there were differences in the degree of improvement in creativity between the three groups taken separately, the next step is to take the data set as a whole and compare the amount of improvement between the three groups to ascertain which teaching approach was the most effective.

7.4 Comparing the effectiveness of the teaching methods

The first step in making a statistical comparison between the groups is to determine whether the whole group data are normally distributed. This is reported in the next section.

7.4.1 Distributions of pre- and post-test scores

For scores from the whole sample (N = 61) the Kolmogorov-Smirnov test for normality of distribution was used, following the advice of Innes (2009), that the Kolmogorov-Smirnov test should be used when n > 50. The detailed results are given in the Appendix 1 and a summary is presented in Table 19.

Table 19: Normality tests summary table for the whole sample

Score	Normal?
Total Pre-test	Yes
Total Post-test	No
Total Pre-test Fluency	Yes
Total Pre-test Flexibility	Yes
Total Pre-test Originality	No
Total Post-test Fluency	No
Total Post-test Flexibility	No
Total Post-test Originality	No
Change in Total Scores	No
Change in Total Fluency	No
Change in Total Flexibility	No
Change in Total Originality	No

Out of the 12 variables in the table above, only three are normally distributed: total pre-test, total pre-test fluency and total pre-test flexibility. Thus, with the exception of originality, before the intervention students scores showed random variation on these skills. After the intervention, the scores were no longer normally distributed, because some groups had improved more than others so the variation in the skills was no longer random.

Parametric statistics were used to analyse the three normally distributed variables in the whole sample (total pre-test, total pre-test fluency and total pre-test flexibility). Non-parametric statistics were used for the remainder of the variables because they do not follow a normal distribution.

Having examined the distributions of the scores, it is now necessary to ascertain whether the three teaching groups were at a comparable level of creativity before the intervention, as any previously existing differences would be expected to affect the outcome of the intervention.

7.4.2 Comparison of groups' creativity scores before the intervention

This section looks at the scores of each teaching group on the Torrance tests before the teaching intervention took place, with the aim of identifying any pre-existing differences in their levels of creativity. While the means on these pre-tests were given above for each group, this section goes further and carries out statistical tests to tell whether any differences could be regarded as statistically significant.

Total pre-test scores

Starting with the total pre-test scores, a comparison of means was made between the three teaching groups, using parametric statistics. Referring back to Table 16, the total pre-test scores were 23.00 for the Traditional group (T), 26.20 for the EBS group and 20.05 for the VBS group. Since the independent variable (teaching group) has three values, an ANOVA test was used. Tukey's post hoc tests were performed to show where the significant differences lay (see Appendix 1). The results are given in Table 20.

Table 20: Results of ANOVA and Tukey tests on total pre-test scores by teaching group

Score	ANOVA Significance level	Significant difference?	Tukey Significant difference?
Total Pre-test	0.020	Yes	EBS > VBS

Table 20 shows that there were statistically significant differences among these Total Pre-test means, as revealed by the ANOVA test ($p < 0.05$). The Tukey post hoc test

showed that the significant difference lay between the EBS group and VBS group. That is, before the intervention, students in the EBS group were on average scoring more highly in creativity skills than students in the VBS group, but not significantly more highly than students in the T group. Therefore, as explained in Chapter 5, although these three groups were mixed ability classes, supposedly at the same academic level, it appears that there were pre-existing differences in their creativity. This has to be borne in mind when interpreting any differences in the outcomes of the intervention. The next step was to find in which components of creativity the pre-test differences lay.

Fluency and flexibility pre-test scores

Fluency and flexibility were tested next, using the same parametric tests. The results are given in Table 21. Starting with fluency, the pre-test scores from Table 16 were 7.95 for the Traditional group, 9.20 for the EBS group and 6.52 for the VBS group.

Table 21: Results of ANOVA and Tukey tests on pre-test fluency and flexibility scores by teaching group

Score	ANOVA Significance level	Significant difference?	Tukey Significant difference?
Total pre-test Fluency	0.004	Yes	EBS >VBS
Total pre-test Flexibility	0.151	No	

The ANOVA test confirmed a significant difference among these means. The Tukey test showed that the significant difference occurred between the EBS and the VBS groups in fluency. Thus the EBS group had an initial advantage over the VBS group in fluency, but not over the Traditional group. However, the total pre-test flexibility scores showed no significant difference between the groups, showing that the groups

started at an equivalent level in flexibility. Originality was tested separately due to its non-normal distribution.

Originality pre-test scores

Since the total pre-test originality scores had a non-normal distribution, non-parametric testing was performed. In this case the Kruskal-Wallis (K-W) test for three independent samples was used.

Table 22: Result of Kruskal-Wallis test on pre-test originality scores by teaching group

Score	Kruskal-Wallis Significance level	Significant difference?
Total pre-test Originality	0.165	No

The Kruskal-Wallis test showed no significant difference between the teaching groups on the pre-test originality scores. Therefore, the initial advantage of the EBS group was due to their higher fluency, not to flexibility or originality.

7.4.3 Comparison of groups' creativity scores after the intervention

In this Section, the scores of the three teaching groups on the creativity tests after the intervention are compared and tested for statistical significance. Since none of the post-test scores was normally distributed, the non-parametric Kruskall-Wallis test was performed followed by repeated Mann-Whitney U (M-W U) tests to show where the significant differences lay. Because the Mann-Whitney U test was repeated three times, the significance level used was $0.05/3 = 0.0167$ (Field, p 551, 2009). (See Appendix 1). A summary is presented below, in Table 23.

Table 23: Summary of results of Kruskal-Wallis and Mann-Whitney U tests on post test scores by teaching group

Score	Significance level on Kruskal-Wallis	Significant difference?	Mann-Whitney U	Significant differences?
Total Post-test	0.000	Yes	EBS > VBS EBS > T VBS & T	Yes Yes No
Total post-test Fluency	0.000	Yes	EBS > VBS EBS > T VBS & T	Yes Yes No
Total post-test Flexibility	0.000	Yes	EBS > VBS EBS > T VBS & T	Yes Yes No
Total post-test Originality	0.000	Yes	EBS > VBS EBS > T VBS & T	Yes Yes No

From Table 23, the Kruskal-Wallis test revealed significant differences among the groups in the post-test scores in the each of three skill areas and in the total post-test scores. The repeated Mann-Whitney U tests showed that the significant differences lay between the EBS and the VBS groups, and between the EBS and the Traditional groups. The VBS and the Traditional groups did not have significantly different post-test scores.

After the intervention, then, the EBS group was more fluent, flexible and original than the other two groups, which seems to suggest that the EBS method was more successful than the other two methods at stimulating creativity in pupils. However, the EBS pupils had started out with a higher total score and higher fluency score than the VBS group, so it is not certain that the outcomes resulted from the intervention. For this reason, the changes in scores between pre-test and post-test were computed, to compare improvements between the three groups and test any changes for statistical significance.

7.4.4 Comparison of groups' improvements in creativity scores

The improvements in scores between pre- and post-tests were computed by subtracting the pre-test scores from the post-test scores to find the changes in scores. These figures were given in Table 16, which indicates that all the changes were positive, showing that, on average, each group improved in the three creativity skills. However, some improvements were greater than others, so statistical tests were used to compare improvements and identify which were statistically significant. As the distributions were non-normal for all the change scores, non-parametric tests were used here (Kruskal-Wallis followed by repeated by Mann-Whitney U; see Appendix 1). The results are shown in Table 24.

Table 24: Summary of results of Kruskal-Wallis and Mann-Whitney U tests on change scores by teaching group

Score	Significance level on Kruskal-Wallis	Significant difference?	Mann-Whitney U	Significant difference?
Change in total score	0.000	Yes	EBS > VBS EBS > T VBS & T	Yes Yes No
Change in total fluency	0.000	Yes	EBS > VBS EBS > T VBS & T	Yes Yes No
Change in total Flexibility	0.000	Yes	EBS > VBS EBS > T VBS & T	Yes Yes No
Change in total Originality	0.015	Yes	EB S> VBS EBS > T VBS & T	Yes Yes No

The Kruskal-Wallis tests showed significant differences among the groups in the changes in the scores on the three skill areas and the changes in total scores. Again, the significant differences occurred between the EBS and VBS groups, and between the EBS and Traditional groups, but not between the VBS and Traditional groups.

Taken together with the changes in means given in Table 16, this indicates that the EBS group improved more than did the other two groups, on each aspect of creativity.

7.4.5 Overall comparison the effectiveness of the teaching methods

Finally, an overall test was performed to compare the effectiveness of the three teaching methods which takes into account the initial differences in performance between the three groups. This is the one-way between-groups analysis of covariance (ANCOVA). The independent variable was the type of intervention (Traditional group, EBS group and VBS group), and the dependent variable consisted of scores on the TTCT test administered after the intervention was completed. Participants' scores on the pre-intervention administration of the TTCT test were used as the covariate in this analysis and the SPSS output tables are shown in the Appendix 1.

Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity or homogeneity of variances. As shown in Table 19, the pre-test scores were normally distributed but the total post-test scores were not; thus the assumption of normality is not fully met. However, Pallant (2007) argues that most parametric techniques are reasonably tolerant of violations of normality and that with sample sizes greater than 30 it should not cause major problems. Linearity plots and Levene's Test of Equality of Error Variances are shown in the Appendix 1.

After adjusting for pre-intervention scores, a significant difference was found among the three intervention groups on the post-intervention scores on the TTCT test, $F_{(2, 57)} = 56.8$, $p = 0.000$, partial eta squared = 0.666. Thus, there were differences among the three groups in the effectiveness of the interventions. The pairwise comparison shows that the significant differences lay between the EBS group and the other two

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groups. The effect size was large as shown by the value of partial eta squared, which indicated that 66.6 % of the variation in total post-test scores could be accounted for by the differences in teaching method.

There was a moderate relationship between the pre-test and post-test scores on the TTCT test, as indicated by partial eta squared value of 0.327. this shows that 32.7 % of variation of total post-test scores could be accounted for by differences among the students in their total pre-test scores.

This analysis using ANCOVA confirms the earlier analysis using the computed improvements in scores but gives the additional information of the effect size.

7.5 Summary of chapter

Bringing together the key findings of this quantitative analysis, four main points emerge. Firstly, all three teaching methods resulted in statistically significant improvement in fluency and total scores on the TTCT test. Secondly, only the EBS group showed statistically significant improvement in flexibility and originality. Thirdly, the fluency, flexibility, originality and total scores showed statistically greater improvements in the EBS group than in the Traditional group or VBS group. Fourthly, no significantly different improvements were shown between the Traditional group and the VBS group in any of skill areas.

In the next chapter, the findings of the quantitative and qualitative data analyses will be discussed.

Chapter Eight: Discussion

8.1 Introduction

This study has endeavoured to discover the effectiveness and affordances of electronic brainstorming and its role in improvement of creativity skills in Islamic Education in primary schools in Saudi Arabia. In order to achieve this aim, the researcher used interviews, observations and pre- and post-tests to elicit participants' views on this teaching method, to ascertain how it worked in practice and to measure any resulting changes in creativity. A number of results from the data collection were presented in Chapters 6 and 7. The objective in this chapter is to summarise these results and discuss their significance in relation to the literature review in Chapter 3 and 4.

This study found that electronic brainstorming had positive benefits as a teaching tool when it was integrated with appropriate pedagogy. In addition, the possibility of applying this method in the Saudi education system seems clear, as the Saudi government supports the relevant technology, thinking skills and dialogue through the projects, as mentioned in Chapter 2. These projects of learning development in Saudi Arabia involve the development of new Islamic Education curricula, with textbooks that incorporate thinking skills and dialogue skills. However, although the electronic brainstorming method achieved positive outcomes, it faced several obstacles and difficulties which need to be overcome in the future. The present chapter discusses the main findings of the study in relation to the previous literature and context of the study. It addresses the following research questions:

- What are the pedagogical affordances of EBS in the context of Islamic education in Saudi Arabia from teachers' and students' perspectives in primary school?

- What are the key features of EBS that have pedagogical affordances in comparison with VBS and traditional methods?

- What are the affordances of EBS for creativity skills?

- What are the impacts of EBS on Islamic Education and its role in Saudi education?

- What are the hindrances in using EBS in Islamic Education in primary school?

This chapter is divided into two main sections: the first focuses on answering the research questions; and the second discusses the main themes in relation to the research questions and compares the findings with the literature reported in Chapter 3 and 4.

8.2 Answering the research questions:

8.2.1 Research question one

"What are the pedagogical affordances of EBS in the context of Islamic Education in Saudi Arabia from teachers' and students' perspectives in primary school?"

To answer this research question, the study carried out interviews of teachers and students in Islamic Education lessons in primary school. The results of these interviews showed that the EBS method had certain pedagogical affordances in the context of Islamic Education from the teacher's and students' perspectives. They stressed the development of dialogue skills, the contribution to the construction of

knowledge and the enrichment of information afforded by this method. This was made possible through the facilities offered by the Forum as a channel for dialogue and debate, and the access it provided to educational websites and video clips which added to the information provided by the Islamic Education textbook, thereby contributing to the improvement of knowledge and enrichment of information. Therefore the findings showed that the teacher and most students had positive views of how the EBS method helped them to improve their learning and teaching of creativity skills. As explained in Chapter 6, in some of the Islamic Education topics there were discussions on the EBS Forum between groups, and they were provided with video clips, images and educational websites, and these distinguished this method from the other methods. However, some students said that this method was not better than the other methods; also there were some difficulties which will be discussed later.

8.2.2 Research question two

"What are the key features of EBS that have pedagogical affordances in comparison with VBS and traditional methods?"

In reviewing the data to address this research question, some features have been identified in the use of the EBS Forum which illustrate some of the interactions which it made possible, and the connections between the teachers' and students' views and the researcher's observations of learning events in the classroom. Two main types of affordance were identified, the general affordances of EBS and its specifically pedagogical affordances. The general affordances of EBS cover the means, tools and facilities that EBS offers in the classroom, while the pedagogical affordances arise from the interactions between technology and pedagogical practice that enhance the

potential for the development of learning. The findings obtained through observation and interviews during three months indicated that there were differences in the pedagogical affordances of EBS compared with VBS and traditional methods, namely in the improvements of dialogue skills, in construction of knowledge and enrichment of information. Also, there were distinguishing affordances of the EBS method as revealed in the Forum because its resources and materials helped students prepare to learn and facilitated the process of teaching.

8.2.3 Research question three

"What are the affordances of EBS for creativity skills?"

Most students of EBS and the teacher expressed positive views of the development of creativity skills. In this view, the teacher was simply a presenter of the EBS method, used the Forum activities and the textbook activities to enhance their creativity skills. The lesson observations revealed that EBS allowed most students to improve their creativity skills by providing them with space for generating increased number of new and original ideas. Also, the creativity test showed there was a greater improvement in the EBS group than in the Traditional group or VBS group.

8.2.4 Research question four

"What are the impacts of EBS on Islamic Education and its role in Saudi education?"

The observation and interview findings indicated that there were a number of positive impacts of EBS that influenced learning and participants' views of their role in the classroom. The teacher and most students of EBS interacted with the EBS method

which led to a positive concept of EBS in Islamic Education lessons. However, there were a few students who held negative views of this method.

8.2.5 Research question five

"What are the hindrances in using EBS in Islamic Education lessons in primary school?"

The results of the qualitative data analysis in this study revealed some barriers and complicated issues facing the EBS method. Three main barriers were revealed: technical problems, learning problems and lack of communication. The findings showed that the constraint of limited time affected participants in the EBS Forum, as did lack of technical support, leading to difficulty in completing the lesson in the time available. Also, some students' lack of internet connection at home affected their ability to complete homework in the EBS forum.

8.3 Discussion of the main themes related to the research questions and findings

In analysing the findings, four main themes emerged which could be identified as:

- Pedagogical affordances of EBS and affordance of EBS

- EBS' affordances for creativity skills

- Impacts of EBS on Islamic Education and its role in Saudi education

- Hindrances to using EBS in Islamic Education in primary schools

There was a correlation between three themes during intervention and analysing stages: Pedagogical Affordances of EBS ("PE AFF"), EBS' Affordances for Creativity Skills ("AFF CR"), "Impacts" of EBS on Islamic Education and its role in Saudi education, which all influenced each other. There was a distinct pedagogical

affordance of the EBS method which led to the development of creativity and had positive impacts; the development of creativity skills led to distinct pedagogical affordances and the effects were positive; and the resulting positive effects from the development of creativity skills and distinct pedagogical affordances led to positive impacts on Islamic Education. One can suggest that the foregoing demonstrates how complex is the system of educating learners and how intertwined are its different aspects. Furthermore, this correlation indicates that an effort to improve educational processes does not have to be of comprehensive top-down character that covers the whole system. Rather, implementation of one educational tool, in this case EBS, can have profound influence on other areas of education. However, that does not mean that such implementation there are not does not entail difficulties and hindrances. Figure 10 shows the correlation between these themes.
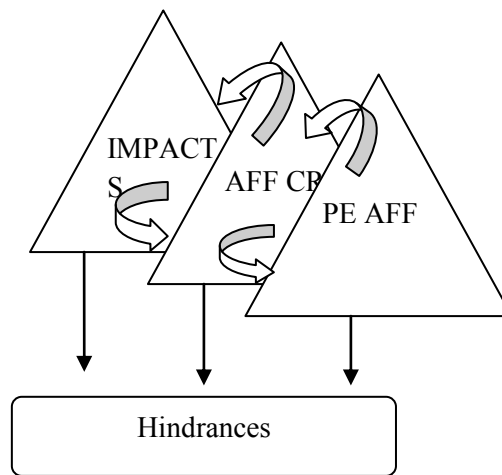
Figure 10: Correlation between main themes

8.3.1 Theme one: Affordances of EBS

This theme contains two sub-themes: the first is the general affordances of EBS, which focuses on the general features of EBS. The second sub-theme is the

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pedagogical affordances of EBS, focusing on the interaction between technology and pedagogical practice.

8.3.1.1 General affordances of EBS

According to the observations and interviews, the findings of this investigation revealed that the main affordances of electronic brainstorming appeared in the electronic Forum, which gave students a chance to participate in their lesson. Also, the Forum supported the learning environment and online discussions. The evidence revealed in this investigation is consistent with many of the findings of Pinsonneault et al. (1999), Isaksen and Gaulin (2005), Michinov and Primois (2005), and Alothman (2006). Furthermore, the interactive whiteboard and Forum associated with EBS prompted students to come to each other's aid with explanations and clarifications, which increased student interaction and made lessons more attractive to them. The foregoing is in line with findings of Smith et al. (2006), Wegerif (2007) and Kennewell et al. (2008), who highlighted an increased students' interaction when IWB is employed together with other benefits, for instance provision of better ways for explanation and clarification of a subject matter to students. However, there were some limitations, such as the different abilities of groups to use the Forum.

Integration of EBS into teaching and learning in Islamic Education allowed access to electronic resources (such as websites, pictures and video links) which facilitated understanding of the topics of Islamic Education. In this regard, the presence of the electronic Forum has proved to be crucial as it served as a connecting platform between the teacher providing different kind of tools and students who were encouraged to employ them in learning process. Therefore, these tools were carefully selected by the teacher and researcher to suit the students' age level. The availability

of these electronic resources in the lessons facilitated students' understanding by providing them with additional knowledge which led to increased dialogue and interaction within the forum and classroom. As explained in Chapter 6, these extra resources contributed to changing students' views and improving their motivation toward Islamic Education lessons; the interviews and observation showed this greater interaction and enthusiasm in the classroom. This finding concurs with other studies such as Conole and Dyke (2004) and Cucciare et al. (2008) which both pointed out that ICT and electronic resources helped to facilitate students' understanding by providing them with additional knowledge. While there were many benefits of using electronic resources, there were also limitations and constraints that require further consideration. There was a lack of electronic resources for children support topics of Islamic Education and lack of download facility to access some video links.

Through the findings of the interviews and observations, it was found that there was ongoing communication among students and between students and teacher in EBS. The Forum provided a continuity of communication between students and teachers within and outside the school, whereby the students could continue their dialogue after the end of the lesson, in their leisure time, in school or at home, as well as doing some of their homework through the Forum. As Conole and Dyke (2004) pointed out, another key affordance of this electronic communication is the possibility of learning through connections with others. However, some obstacles to this communication were mentioned by the teacher and students, as will be discussed in Section 3.4.

8.3.1.2 Pedagogical affordances of EBS

The findings of this study indicated that students had opportunities for exploration and manipulation to foster the construction of new knowledge, through a variety of

knowledge resources, namely the teacher, peers, textbook, electronic resources and online discussions (among students and with the teacher) which promoted the guided construction of knowledge. Knowledge construction, which arose through the sharing of different and conflicting perspectives and through online debate and dialogue, led to greater development in the construction of knowledge than with the other methods (VBS and T). This finding is in agreement with those of other researchers, such as Kennewell (2001) and Conole and Dyke (2004) who discussed how online debate and dialogue support an increased knowledge construction. Having the opportunity for students to display their work and discuss it within a forum of their peers afforded opportunities for group problem-solving and role reversal as students explained techniques and strategies to peers. Despite the affordances of the Forum, there were some constraints such as lack of time and lack of focus of group ideas. However, most work was a collective, co-operative activity, so that influenced the assessment of individual students because the teacher was required to evaluate the work of each student individually.

Secondly, the analysis and interpretation of data found that enrichment and accessibility of information was another pedagogical affordance of EBS in comparison with the other groups (VBS and T), through the classroom and Forum activities. This was due to the many resources available to students to research solutions to problems, to enrich their ideas, and to provide activities which helped improve their knowledge and understanding. Other researchers such as Conole and Dyke (2004), Laffey (2004), Webb (2005), Day and Lloyd (2007) and Morgan, Butler and Power (2007), have confirmed this finding by explaining how technology provides students with an access to wide range of information, and thus enriches their learning experience. While EBS permitted accessibility of information through the

online Forum, there were difficulties in choosing appropriate materials for students within the relevant topics.

The third area of the findings regarding the pedagogical affordances of EBS is the development of student dialogue. The EBS method and its tools offered affordances for dialogue. The EBS Forum mediated dialogue; it expanded the space available for dialogue by the facility it offered for online discussions, in parallel and in different voices and in different directions: between groups, within groups and teacher to group directions. Initially there was dialogue among members of each group, and this was followed by dialogue between the groups in the Forum and between the teacher and groups, ending with a plenary session with dialogue between the teacher and all the groups in discussion and evaluation of the problem. Although the pedagogy here was crucial this multiple dialogue was only made possible due to an affordance of the EBS technology. Dialogue in the classroom is of great importance for learning, and technology can be used to support a deeper dialogue among learners, as argued by Wegerif (2007 and 2008) and confirmed by Pinsonneault et al. (1999), Conole and Dyke (2004) and Hammond (2010). Dialogue helped students in learning Islamic Education through these multiple discussions. This helped them to understand the issues because the discussion was repeated in several directions, exposing students to different arguments and different points of view.

Based on the foregoing, it is clearly evident that there were pedagogical affordances of EBS that reflected the nature of EBS. The findings show that EBS has the facility to support the construction of knowledge, and the enrichment and accessibility of information and dialogic education. This concurred with the findings of Newhouse

(2002), Conole and Dyke (2004) and Sadler and Given (2007). Also, the Forum can open new spaces for debate, widening these spaces by introducing electronic resources, deepening dialogue and enabling new knowledge construction through the provision of continuity in the form of reflection and analysis as well as stimulating creative thinking. This leads to a discussion of the affordances of EBS for creativity skills, in the following section.

8.3.2 Theme two: Affordances of EBS for creativity skills

The qualitative and quantitative data relating to the third research question indicated that the EBS method encouraged students to think creatively in the context of Islamic Education. This was shown when they were asked questions that gave rise to creative thinking, as well as when they were given issues requiring deep thought to solve; also creative thinking emerged through dialogue and debate, as explained in some of the examples in Chapter 6. This finding agrees with other research, such as Nickerson (1999), Sefertzi (2000) and Adams (2005). Furthermore, the Islamic Education topics and textbook activities which played an important role in encouraging creative thinking skills included 'searching for reasons' or 'searching for the wisdom of legislation around certain forms of worship', as also found by Al-Qurashi (2008). In addition, the use of the electronic resources in the Forum, such as websites, video clips and online discussions, together with activities from the textbook, enabled students to access modern and diverse ideas and provided a source of additional information on Islamic Education topics. These tools provided students with extra knowledge so that they could base their discussions on several resources in the lesson; this helped students to think deeply and have wider discussions in the classroom and Forum.

The results related to the quantitative analysis showed that there were significant differences between the three groups (EBS, VBS and T) in the mean total scores in the pre- and post-tests. Statistically significant differences between the means were found between the pre- and post-tests and in improvement of creativity skills (fluency, flexibility and originality) between the three methods. The results showed that electronic brainstorming resulted in a greater improvement in the skills of creative thinking than did the other two teaching methods. This was due to the affordances of technology with the brainstorming method, as demonstrated in the interviews of the EBS teacher and students in which most of them mentioned improvements in their creativity skills. Also, these findings agree with Craft (2005b) that technology and brainstorming support creative thinking skills in learners by enabling them to generate ideas as they are given opportunity to debate various issues in more effective way. This method of electronic brainstorming has helped increase fluency, flexibility and originality in students through activities that gave them in their lessons in a variety of resources and exchange dialogue.

In addition, out of all the creativity skills, fluency, flexibility and originality had the greatest improvement in the electronic brainstorming method compared with the others, as shown in the several tests in Chapter 7 such as ANCOVA, ANOVA, Tukey's post hoc, Wilcoxon Signed-Rank, Kruskal-Wallis and Mann-Whitney U tests. These tests were also used in order to determine the differences between the groups and to compare the effectiveness of the three different groups. In result of ANOVA revealed statistically significant differences among three groups in total pre-test, while the Tukey test showed that the significant difference occurred between the EBS and the VBS groups.

To elaborate the above-mentioned, in the EBS method, the ANCOVA test showed that the significant differences lay between the EBS group and the other two groups. The effect size was large as shown by the value of partial eta squared, which indicated that 66.6 % of the variation in total post-test scores could be accounted for by the differences in teaching method. These findings indicated that the electronic brainstorming method used to teach the Islamic Education lessons was effective in improving creativity skills.

These quantitative findings agreed with the qualitative findings of improvement in students' creativity skills. From the viewpoint of the EBS teacher and his students, this method encouraged and developed creative thinking skills. The teacher emphasised that the EBS method contributed to the development of creativity in his students and helped them produce a large number of ideas which contributed to raising their fluency and flexibility skills, and also contributed to the non-repetition of ideas, which enhanced the skill of originality. Most EBS students also stressed that this method helped them to develop their creativity skills due to the availability of appropriate resources, as well as the enthusiasm of students with this method. In addition, the researcher observed in the Forum and classroom activities that most students were producing substantial number of creative ideas in their lessons so that this method may have been playing a role in encouraging students to be creative.

Consequently, I would argue that the EBS method raised students' creativity skills and that, mentioned before; this was due to the integration of online discussion in the Forum with e-brainstorming. Moreover, the EBS method gave students more chance for thinking creatively in problem solving activities; it prevented repetition of ideas,

as well as encouraging them to participate in creative activities. Facilities such as online discussions, video clips and educational websites are rarely used in Islamic Education lessons, as mentioned in some Saudi studies such as Alassem (2001) and Al-Shafi'i (2004). It was observed that this method led to improvement in creativity skills, which is in agreement with the findings of Nickerson (1999), Sefertzi (2000), Adams (2005), DeRosa et al. (2007) Isaksen and Gaulin (2005) and Webb (2005) who emphasised that EBS opened up opportunities for students to generate a large number and variety of ideas and increased their creativity skills. These quantitative and qualitative results give tangible value to electronic brainstorming, demonstrating how and to what extent it helped in the development of creativity skills.

In the quantitative findings, too, verbal brainstorming and traditional groups showed improvements in creativity skills but to lesser degree than in the EBS group. Although, the teacher and some students of VBS believed that this method had their developed creativity skills, there was a repetition of ideas between groups which reduced these ideas' originality, unlike the EBS method that helped to reduce the repetition of ideas because all the ideas appeared in the EBS Forum. Additionally, most of the traditional method students thought that this method did not help them to improve their creativity skills. Furthermore, in the traditional classroom student were inactive for most of the lessons and the teacher only gave them the last fifteen minutes to discuss their ideas, which was not enough time to think.

The above statements give a clear idea of the effect of electronic brainstorming in developing creativity thinking skills compared to the other methods. However, there was improvement in creativity in each group, which indicated that the syllabus topics encouraged students' creativity but that the teaching methods also played a significant

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role, as found in the EBS method. This study, through the methods of quantitative and qualitative data collection and analysis, has demonstrated the merits of this method, which raised the level of creativity thinking skills in students through the activities which were offered through the EBS Forum, websites, video links and images. Moreover, this method avoided the disadvantages of verbal brainstorming which are the fear of evaluation, repetition of ideas and the reluctance of some members to participate. Through this method, students were able to produce original and diverse ideas.

Additionally, EBS helped to improve understanding of syllabus topics and supported development of higher order thinking skills. The application of the EBS method along with principles of Islam contained in the Islamic Education curriculum helped EBS students to improve their creativity skills. In the past, the teacher was the source of all information and knowledge, but now new technologies allow easy access to information. Therefore, teachers need to focus on developing and encouraging other important learning skills, such as critical and creative thinking, dialogue, reasoning and reflection, which are also praised in Islam as emphasised by the many scholars reviewed in the Literature chapter 4 (Jerwan, 1999; Al-Zahori, 2002; Obeddat, 2003 and Al-Hadrri, 2004). In addition, the topics of Islamic Education helped create a learning environment that encourages dialogue and free thinking within the larger boundaries of Islam, a practice that has been undermined for a long time. In my view, the reason may be cultural rather than religious because in Arab cultures, students are very respectful of their teachers and they believe that teachers know best, hence they rarely question the information their teacher has given them. Another reason lies in acceptation of just one method of teaching Islamic Education the traditional method.

As this study maintains, a large number of verses from the Holy Quran encourages people to think and reason is praised and accepted. The Holy Quran addresses thinking by the use of many different words, such as mind (understanding or realisation), meditation, seeing, thinking, remembering, viewing, opinion and considering and reflective thinking. In addition, many verses from the Holy Quran include questions and responses, so there are no questions which cannot be raised. Enquiring is acceptable and should be encouraged in the teaching and learning process, as explained in Chapter 4. Another angle was that the Prophet Mohammed was interested in developing people's thinking and promoted higher order critical thinking, logic, rational thinking, reflection, reasoning and meditation, as explained in some of the Prophet Traditions in the Literature Review (Muslim, 1989; Bin Hajar, 1990 and Al-Bukhaari, 1991).

Furthermore, Islamic Education topics and textbook activities in combination encourage creativity skills. This was shown where the topics and their activities in the Islamic textbook contained queries "Why?" and then further probed "Why?" again. So this sort of conversation could move in several directions, eliciting issues such as "Why not use the second line in the prayer if the first line is not full?" or "What is the reason for the Islamic legislation of Zakkat, and what is the wisdom of that?" After answering this question, it can be asked again: "Why is the Zakkat legislation for rich people and adults only?" The point is that by asking "Why?" and "Why not?" one makes it clear that the answer given is inadequate because it still leaves room for doubt. However, a big obstacle to this sort of discussion was the limited lesson time. Also, there were some e-resources and Forum activities to develop creativity skills, namely websites, videos and cartoon videos. These findings concurred with

Abulatifeh (2011) and Lubis et al. (2011) that electronic communication and electronic resources have a very important role in influencing the teaching of Islamic Education.

It should be said that the Islamic Education textbooks contain appropriate activities and issues to develop learning and thinking skills, as a result of the Saudi education development projects mentioned in Chapter 2. However, there is a problem in using these new textbook activities without changing the methods of teaching the pertinent subject, but rather continuing to rely on unvarying methods. This can be seen in the difference in results between the three methods (EBS, VBS and T) in this study, where brainstorming integrated with ICT achieved superior results to other methods.

Therefore, it is necessary that the Saudi Ministry of Education policies in general and curriculum policies in particular are based on the Islamic theoretical framework. The Islamic theoretical framework is deeply situated within the culture and it may be linked with the new technologies. This link may act as an incentive for Islamic education teachers and students to use ICT in their teaching and learning as it enables them to see the connection between the new pedagogical practices and Islam in its approach to constructive thinking. Also, encouraging students and teachers to find links between the Islamic teachings found in the scriptures and the new technology is likely to assist in improving traditional educational practice.

Improvement in creativity skills was one of the effects of using these methods (EBS, VBS and T); there were other impacts as well, which are explained in the next section.

8.3.3 Theme three: Impact of EBS on Islamic Education and its role in Saudi education

In this section, the effects and impacts on the teaching and learning processes of the three teaching methods are discussed. This section consists of four parts, namely: the possibility of incorporating EBS into the teaching of Islamic Education and into the learning environment; the benefits of these teaching methods in the learning environment; teaching methods and the motivation of students in Islamic Education lessons; and comprehension of lessons. The first part applied to the EBS method only.

In general, there were many positive impacts of the EBS method on students and their teacher which emerged clearly from the results of the interviews and observations and from the perspectives of the teacher and most students. In the VBS method, as well, the teacher thought that the method had positive effects but the students had mixed views; some had negative views about the effects having negative impact on the classroom activities. In the traditional method, most students expressed their dissatisfaction and reported negative effects, giving reasons as presented in Chapter 6. However, the teacher of the traditional method believed this method to be appropriate in light of the large number of topics in the syllabus and the time constraints. The details of these four parts are presented below.

8.3.3.1 The possibility of incorporating EBS into the teaching of Islamic Education and into the learning environment

This section focuses on the possibility of using the electronic brainstorming method with the Islamic Education curriculum. According to the EBS teacher and most students, it would be possible to integrate technology into Islamic Education lessons, because the EBS method used the electronic Forum, e-resources and interactive

whiteboard. It was seen to have positive benefits which will be discussed later, and the teacher was able to apply this method and manage his class well. The use of EBS to learn Islamic Education topics had a positive impact on student achievement. It used e-resources and online discussions which may be useful in the educational process. The educational applications of the Forum and websites could be used in the teaching process and this finding is in line with other findings surveyed in the previous pages which provide evidence for the possibility and effectiveness of using EBS in the teaching and learning of Islamic Education. However, there were some obstacles, as will be discussed later. In the next sections, some positive impacts of the EBS method are discussed.

8.3.3.2 Benefits of teaching methods in the learning environment

In the EBS method, findings of interviews and observations indicated that there were positive benefits. These positive factors were the change in routine and reduction in boredom, fostering of strong competition between groups, saving of time and effort, collaboration which led to being helpful and taking an initiative with partners, and improved understanding of lessons; these appeared in most of the observed lessons. These factors influenced the learning environment and made for a more dynamic relationship between the subject, students and teachers. Similar points were raised by Kennewell (2001), Rogers (2003), Mathiasen (2004), Smith et al. (2005), Webb (2005), Wijekamar et al. (2006), Wegerif (2007), Kennewell et al. (2008) and Hammond (2010).

In similar vein, the VBS method also had some positive effects, such as stimulating student participation and their self-reliance in obtaining information. However, this was qualified by some negative effects, such as the lack of interaction of some

members when asked to work in a group. Likewise, some VBS students reported positive benefits of verbal brainstorming: it encouraged them to contribute their ideas and helped them to understand the lessons. However, they added the negative effect of the limited opportunity to participate within their group due to some members dominating the discussion. As for what was observed in the classroom, there were positive impacts as mentioned above, but the reluctance of some members to participate was seen to reduce the method's effectiveness.

In the traditional method, few students thought there were positive impacts because they were given a detailed explanation of the lesson, as their teacher asserted. Nevertheless, most students stressed that the traditional method had more negative effects than positive; this was borne out by the classroom observations.

Considering the aforementioned, it might be clear that the positive effects of using the EBS method outweigh those of the VBS and the traditional methods. There are many advantages of the EBS method such as the integration of the electronic Forum and e-resources in Islamic Education lessons which remove harmful blocking effects and change the nature of the learning environment; also the greater interactivity of students with the EBS method, as also found by Pinsonneault et al. (1999), Isaksen and Gaulin (2005), Michinov and Primois (2005) and Coskun (2011). The positive benefits include the greater motivation of students toward Islamic Education lessons, which is discussed in the next section.

8.3.3.3 Motivation of students in Islamic Education lessons

The qualitative findings concerning the EBS method showed that most students' motivation had changed. Learning Islamic Education in the past had been monotonous and boring as explained by the teachers and most students, but the EBS method

changed this view. This new method spread enthusiasm and competition among the students through the Forum, online discussions and interactive whiteboard; the technology played an important role in enhancing learners' motivation through the excitement of interaction and cooperation with others. These findings on enhancement of learner motivation and increased interaction in lessons agreed with Smith et al. (2005), Wijekamar et al. (2006), Day and Lloyd (2007) and Morgan et al. (2007).

Findings regarding the VBS method, too, revealed that this method changed students' motivation towards learning because they were engaged with their debating. However, in the VBS lessons some students were positively motivated to participate in giving their views and ideas, but some of them were reluctant. In the traditional classroom, most students had no incentive for interaction and their teacher admitted that there was reluctance among most of his students. Therefore, it can argue that the method of electronic brainstorming with technology and ICT through the Forum and online dialogue proved its superiority over verbal brainstorming and traditional methods.

This reveals the power of the EBS method in its ability to change the motivation of students towards learning and change their negative perception of Islamic Education lessons. This finding is in accord with many Saudi studies which have demanded change in the teaching methods in Islamic Education, such as Almofada (2000, 2008), Alassem (2001), Al-Shafi'i (2004), Esmail (2005) and Alshekh (2011). The positive benefits and motivation elicited by the EBS method led to a better understanding of Islamic Education topics, which is discussed in the next section.

8.3.3.4 Comprehension of the topics of Islamic Education

The power of EBS is due to its facilities and potential for high efficiency in achieving learning goals, understanding the learner and using the Forum, online discussion and e-resources. Furthermore, teachers can use the power of EBS to promote the unique content and skills relating to particular curricular topics. The electronic brainstorming teacher and his students stressed that understanding increased with use of EBS compared with other methods. In the EBS classroom observation, there was a relationship between students' ability to understand the issues of Islamic Education and the EBS method. Throughout this study, the findings are in agreement with the aforementioned studies, such as Norton et al. (2000), Kennewell, (2001), Pedersen (2003), Conole and Dyke (2004), Laffey (2004), John and Sutherland (2005), Webb (2005), Day and Lloyd (2007), Hammond (2010), Whatley (2010) and Preble and Gordon (2011). The findings further indicated that the Islamic Education topics and practices of the EBS teacher and students were influenced by the pedagogical affordances of EBS. Thus, teacher and students' positive views of the pedagogical affordances of EBS were based on the increased level of comprehension of Islamic Education topics.

From the other side, the VBS group also reported comprehension of the Islamic Education topics, as findings emphasised that this method helped them to understand the subject matter due to the nature of the brainstorming method. However, there was some difficulty understanding topics such as the Hajj because there were no visual aids, in contrast to the facilities available with EBS. In the traditional method, misunderstandings arose between students and teacher because most students had become distracted and were not paying attention.

Comparing these results, it can be seen that EBS and VBS teachers and students agreed that both methods had a major role in helping students to understand their topics. This was due to the involvement of students in the educational process and making it active and interactive throughout the lessons. In contrast, it is apparent from these findings that the traditional method did not properly deliver information to the students so they could understand their lessons. Having discussed the features and benefits of the three methods, it is now necessary to explain the barriers and hindrances facing the teacher and students in the three methods.

8.3.4 Theme four: The hindrances to using EBS in Islamic Education in primary school

Although the findings showed many positive advantages of the use of electronic brainstorming in Islamic Education, the teachers and students encountered some obstacles and difficulties with this method. These difficulties were technical problems or learning problems, and were not related to religious beliefs. However, there was one cultural obstacle arising from the beliefs of some parents due to which they prevented their children from using the internet. This hindrance was due to the unfamiliarity of the EBS method, which contrasted with the traditional educational methods not based on technology, as well as to teachers' lack of training with the new method. In order to complete the study successfully, the teacher and researcher tried to avoid these difficulties as much as possible, while addressing them at the same time.

One of the most significant current discussions in integrating technology into the education field centers around the obstacles to its use. Despite its long success, technology has a number of problems in its use; and EBS is one of the examples of

the integration of technology in education. A number of studies (Ertmer, 1999; Rogers, 2000; Smerdon et al. 2000; Williams et al. 2000; Downes et al. 2001; Franklin et al. 2001; O'Mahony, 2003; Muir-Herzig, 2004 and Sicilia, 2005) have found barriers that may affect the educational process, such as lack of time, limited access, lack of reasons for using ICT, lack of teacher training support and the lack of skills. In the final part of Chapter 6, the results showed that similar hindrances faced the EBS teacher and students as supported by the observations and teacher and student interviews. These hindrances may be divided into three sections: technical problems, learning problems and lack of communication in the EBS method.

The technical problems of the EBS method were mainly in the limited access, slow internet connection and lack of technical support. The learning problems occurred in meeting time constraints, the large number of students and some students' lack of ICT skills. The lack of communication occurred in cases where students did not have internet access at home. The results of the VBS method also revealed some hindrances. By way of illustration, teacher and students mentioned lack of time, capabilities of students and continuous assessment. The hindrances faced by the traditional method included some students' lack of attention, inability to concentrate and the general lack of participation.

In comparing the results of the three methods from the foregoing, it is important to point out that the difficulties faced by electronic and verbal brainstorming arose from minor obstacles in the school atmosphere or the tools used, but in the traditional method there were major difficulties related to the students, which may hinder the educational process and lead to failure to achieve educational goals.

It is necessary to emphasise here that the method of electronic brainstorming may have achieved even better results without these obstacles. Nevertheless, the positives outweighed the negatives. It is worth mentioning that any method has obstacles and difficulties, but this study attempted to overcome the difficulties as far as possible. The moral and material support by the management of the school and its teachers may have been the reason for the success of the EBS method, as the EBS method was a new strategy for students and teacher.

In light of the above discussion, it can be said that the method of electronic brainstorming has proved its quality and effectiveness in the development of skills in Islamic Education lessons, by enhancing creative thinking, dialogue, informational enrichment, construction of knowledge and interaction in the classroom. The advantages of EBS and its pedagogical affordances arose from the features of the Forum, interactive whiteboard, electronic resources and the continuity of communication. This was supported by the quantitative data which showed a clear improvement in creative thinking skills. This is illustrated in Figure 11, below. The quantitative data only referred to creativity, not dialogue or knowledge.
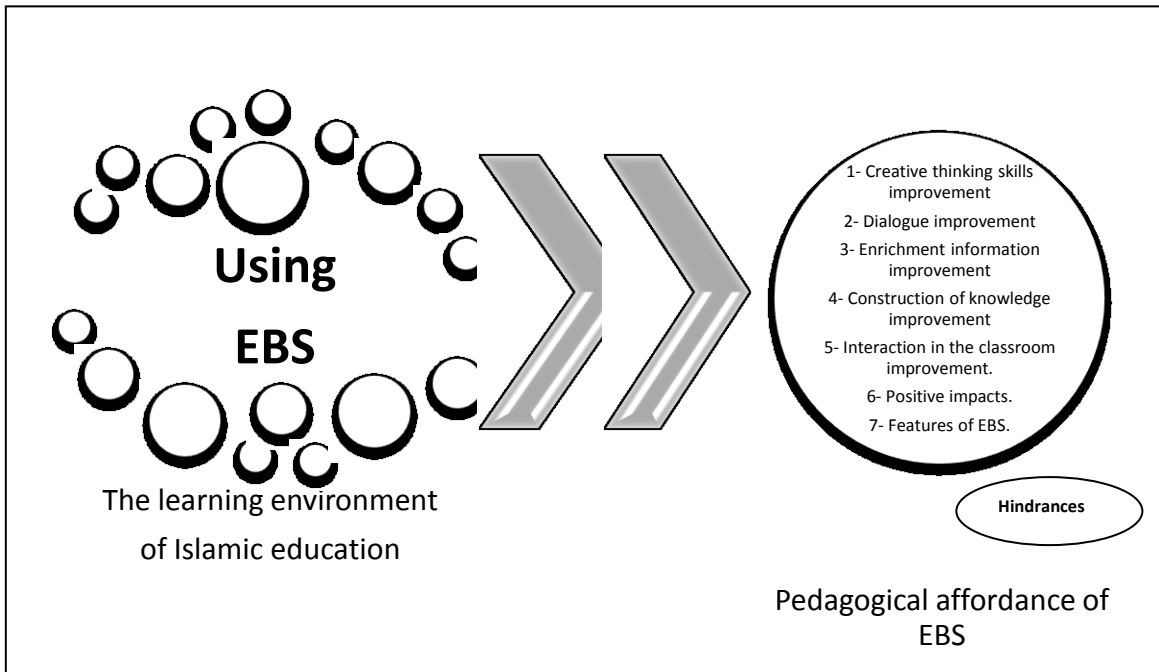
Figure 11: Summary of EBS findings

Through the discussion above, it can be inferred that this study has taken this reflection further with an attempt to examine how students cope with ICT in an Islamic educational setting in Saudi Arabia. What learning conditions does EBS bring into the study of Islamic Education in a small group? In EBS, ICT is primarily used to enable students to search, retrieve and exploit web-based information. This study focussed in depth on how EBS shaped interaction and action in small task-based groups, while ICT receded into the background.

The EBS method, as shown in this study, can facilitate access to different resources. It is argued that access to a variety of resources supports students' critical reflection in ICT-based learning environments. Therefore it seems relevant for students to develop some competence in education, so that they can participate and understand better. One of the most significant current discussions in EBS is whether ICT can play a central role in students' conversational exchanges and mediate their thinking to build and convey joint knowledge. Helping students to develop the same competence in Islamic Education would require shaping a learning environment that could stimulate

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students' social interaction and individual initiative in their learning. The socio-cultural setting in Saudi Arabia seems to offer this opportunity and even tends to encourage it through many learning development projects (Ministry of Education, 2002). Therefore, it could be said that students will be able to compete worldwide because, as Fullan (1993, p.46) states, "students must succeed if society is to succeed".

Michinov and Primois (2005) stated that the success of electronic brainstorming is as a technique where computerised software is used to generate ideas. Similarly, DeRosa et al. (2007) argued that use of EBS made students more creative and productive as compared with other groups. Accordingly, and drawing from the findings, there is an indication that EBS and Islamic Education can support each other and contribute to the construction of a community of discourse conducive to computer-assisted learning. For example, with EBS, students have access to educational web-based sources and have the means to communicate their own ideas with other students. With EBS, students would be able to discuss those sources critically and constructively in their particular socio-cultural and educational context by means of exploratory talk. Moreover, the findings show that EBS may be an asset in enhancing understanding and contextualising knowledge. These interpretations concur with previous studies underscoring that knowledge can be jointly achieved when students learn in an environment within which they can build mutuality and in which they are more likely to develop exploratory talk (Kennewell, 2001; Webb, 2005 and Morgan et al. 2007). This may be suitable in a situation where EBS is made an official method of instruction in Islamic Education. Finally, it can said that the electronic brainstorming method, with the facilities of ICT, was integrated with the activities of the new Islamic Education textbooks and in the socio-cultural situation prevailing in Saudi schools to afford an appropriate technique for teaching Islamic Education.

8.4 Summary of chapter

This chapter has explained and discussed the central importance of the findings. One of the more significant findings to emerge from this study is the affordances of electronic brainstorming as a teaching method in Islamic Education lessons compared with other methods, and the features that enable these affordances. This chapter has discussed several issues: pedagogical affordances of EBS, EBS' affordances for creativity skills, impacts of EBS on Islamic Education and its role in Saudi education, and hindrances to using EBS in Islamic Education in primary schools versus VBS and traditional methods. There has been a significant agreement between the empirical data, obtained through interviews and observations, and the wider research in this field represented by numerous studies analysed in Literature review. Therefore, it can be concluded that this study confirmed the general perception of EBS and found out some of the specific affordances that led to this positive effect on the quality of thinking and learning.

Chapter Nine: Conclusion and recommendations

This final chapter aims to draw together the threads of the study and comprises six sections. The first section summarises the study and focuses on its key findings, the second discusses the contributions to knowledge of the study, the section three illustrates the strengths and limitations of the study, and section four discusses its implications and makes recommendations for further research. The final section focuses on what I have learned as a researcher and draws the work to a conclusion.

9.1 Summary of study and main findings

The purpose of the study was to explore the effects of using electronic brainstorming on the development of Islamic Education lessons in order to gain a deeper understanding of the use of this method in primary schools in Saudi Arabia. In the course of this research, several aspects were investigated. Firstly, the effects of ICT, including EBS and its particular features, on students' interest in their Islamic Education lessons; secondly, the effects of ICT and the pedagogy of EBS in helping students to understand topics in Islamic Education; thirdly, the effects of ICT and EBS pedagogy on promoting creative thinking skills, student dialogue and other educational effects; fourthly, changes in the creative thinking ability of students. In order to achieve these aims, the following research questions were formulated, which the research addressed:

- What are the pedagogical affordances of EBS in the context of Islamic Education in Saudi Arabia from teachers' and students' perspectives in primary school?

- What are the key features of EBS that have pedagogical affordances in comparison with VBS and traditional methods?

- What are the affordances of EBS for creativity skills?

- What are the impacts of EBS on Islamic Education and its role in Saudi education?

- What are the hindrances in using EBS in Islamic Education in primary school?

To achieve the research aims and answer the research questions, a mixed method approach was designed, to include appropriate qualitative and quantitative methods. The qualitative methods were semi-structured interview and classroom observation of three Islamic Education teachers and their students (61 in all). The quantitative method consisted of TTCT tests administered before and after the intervention.

The qualitative data analysis used some principles of grounded theory, and the emerging organising ideas were used to design the data collection tools for the research. In addition, the main interview and observation data were analysed thematically. Quantitative data analysis was performed using SPSS to compare creativity before and after the intervention.

The study findings managed to answer the research questions and achieve the aims of the research. The most obvious finding to emerge from this study is the improvement in learning skills in the EBS method compared with the VBS and traditional methods. Clearly this method has benefits in teaching Islamic Education in Saudi primary schools. Additionally, this research attempts to provide a contribution towards

changing the learning environment in Islamic Education in primary schools in Saudi Arabia.

Through examination of the observation and interview data, the findings of this investigation revealed significant differences between electronic brainstorming (EBS) and verbal brainstorming (VBS) or traditional (T) methods in Islamic Education lessons in primary schools in Saudi Arabia. The EBS method outperformed the VBS and T methods in enrichment and accessibility of information, in student dialogue and their construction of knowledge. The affordances of the EBS Forum were availability of electronic resources, continuation of communication among students and teacher and raised interaction in the EBS classroom (see Section 6.2 in Chapter 6). Furthermore, qualitative data indicated improvement of creativity skills in the EBS classroom through use of the EBS Forum and other classroom activities in comparison with other methods. In addition, the quantitative findings clearly support the qualitative findings here, in that creativity skills improved in the EBS group more than in the other groups. Fluency, flexibility, originality and total scores showed statistically greater improvements in the EBS group than in the Traditional group or VBS group. In addition, the EBS method had positive impacts which affected the learning environment of Islamic Education lessons, through the motivation of students and their comprehension of lessons. However, there were some barriers facing EBS, notably learning problems, technical problems and communication problems.

The next section examines the contributions to knowledge of the study.

9.2 Contributions to knowledge

In the view of the findings derived from this study and the conclusions arising from them, the following contributions for theory, practice and methodology are presented. Based on the findings of this study, these contributions could be implemented by teachers, schools and policy makers to ensure the development of effective learning and teaching of Islamic Education through incorporation of ICT methods such as EBS.

9.2.1 Contributions to theory

As discussed in Chapter 3 and 4, based on EBS and the pedagogical affordances of ICT and creativity skills, this study can provide valuable perspectives, and thus assists educators in understanding and establishing of an effective learning environment in the classroom. Some of the affordances of EBS are provided by Holubová (2010), namely, engaging students without fear of criticism from their peers, and enhancing their learning of course material and sharing of information through anonymous participation of each student. In this way, more ideas are being created and the emergence of a creative environment is further encouraged, whereby students can post their ideas and react immediately to the ideas of their peers. In addition, some of these affordances of new technology and ICT can change relationships within learning settings, and therefore have a special place in the framework for teaching and learning in classrooms (Kennewell, 2001). They can also support students' learning within a pedagogical framework (Webb, 2005).

These perspectives have been implemented mainly in Western education systems with the aim of developing learning; however, these perspectives may not be fully

applicable in the teaching of Islamic Education due to differences in culture, tradition, setting and educational system (see Chapter 2). This study may contribute to a revision of framework for teaching of Islamic Education in Saudi Arabia because its findings may be applied at a similar stage of development of learning as in Western education. This study can contribute to the field of instructional technology, pedagogy and the curriculum of Islamic Education. According to the results of this study, there are certain factors in the Saudi Arabian context regarding the pedagogical affordances of EBS, notably the provision of a wide space for students to participate, which give students freedom to generate new ideas, in contrast to the more traditional methods widely used in Islamic Education (see Chapter 2). This study also explored the compatibility of EBS with Islamic Education lessons. The findings of this study indicate that it is possible to use EBS in such lessons due to availability of suitable material on the Internet. In sum, this study may help to shift the prevailing view of the teaching of Islamic Education away from traditional methods to new and more effective methods such as EBS.

9.2.2 Contributions to practice

This study can contribute to developing of learning and teaching, particularly in relation to Islamic Education teachers, supervisors, administrators and developers of Islamic Education curricula and pedagogies in the Ministry of Education in Saudi Arabia.

To create an effective Islamic Education teaching environment in Saudi Arabia, there must be considerable effort exerted to further develop current teaching practices. In this study, I found the students' view of teaching methods in Islamic Education was influenced by their rather negative perception of the teacher being too much in control

of the lesson whilst not providing students with many opportunities to participate. Therefore, EBS should be applied with the aim of improving teaching and learning environments in the Islamic Education classroom in Saudi Arabia. In order for students to learn effectively and for teachers to teach effectively with new technologies, their roles need to be developed and broadened. Teachers must relinquish at least some of their traditional authority, adjust the way they manage their classes, and increase their awareness of the potential of great range of new applications. In Saudi Arabia, there is evidence of a need for improving Islamic Education by the use of new teaching methods, as shown by Esmail (2005) and Almofada (2008). These studies are in line with research conducted in Western setting by Loveless (2002) and Conole and Dyke (2004), who recommended the use of ICT in the classroom. According to the findings of this study, the strategies of integrating ICT in the classroom were not used often in Islamic Education lessons in Saudi primary schools. Hence, the MoE should encourage Islamic Education teachers to implement these new strategies in their teaching. The Ministry should also facilitate integration of ICT in the case of Islamic Education supervisors, administrators and curriculum developers. The foregoing should take place in the context of developing teachers' practice within effective learning and teaching environments. Importantly, Islamic education teachers need to be aware of the fact that as much as the use of new technology is beneficial, it has to be accompanied by development of new pedagogy as well. They will, however, need help in employing new teaching practices. This study may provide a step towards ensuring the integration of ICT together with EBS in Islamic Education lessons, thus helping teachers, supervisors, administrators and curriculum developers to use new technologies as a means of supporting effective learning environments for teaching Islamic Education in Saudi Arabia.

9.2.3 Contributions to methodology

Most studies of social science research conducted in Saudi Arabia rely on the scientific approach based on questionnaire data collection (Almofada, 2000; Alassem, 2001; Al-Shafi'I, 2004; Esmail, 2005 and Almofada, 2008). In contrast, this study was conducted mainly with the interpretive approach as it attempted to understand the reflections of teachers and students on different teaching methods, to understand the influence of these methods on the behaviour of students and to explore teachers' and students' perceptions (Walsham, 1993 and Crotty, 2003). To deliver best results, this research used mixed methods, both qualitative and quantitative, thereby diminishing the risk of missing relevant data, as it could have been the case if solely a quantitative or a qualitative approach had been used. Thus, the application of both methods improved findings of this study, enriched the researcher's understanding of the pertinent topic, and provided him with in-depth data.

In addition, mixed methods is desirable and feasible because it offers a more complete view of a given issue, and because the requirements during the different phases of the intervention (or research project) make very specific demands on a general methodology. In this research used mixed methods which provided me a more complete view such as in creativity skills. Thus, even though using mixed method was more demanding, it has proved to be an appropriate tool for the very type of research this study conducted.

It can be said that use of this approach may contribute to methodology in social science research in Saudi Arabia by challenging the dominance of quantitative approach, not least because this study demonstrated that the qualitative approach usually provides more in-depth data about a studied subject (Johnson and Christensen,

2004) and offers a rich description of participants' insights (Janesick, 2003). In conclusion, using mixed research method enabled the research to combine numerical data with data of qualitative character which not only helped to put the numbers into context, but they themselves proved to be source of valuable information about the nature and essence of the studied matter.

The next section examines the strengths and limitations of the study.

9.3 Strengths and limitations of the study

9.3.1 Study strengths

A number of strengths may be noted regarding the present study. Firstly, to the knowledge of the researcher, there have been no previous studies using the electronic brainstorming method in public education in the Kingdom of Saudi Arabia. This study is therefore a pioneer in the field and may contribute to improving the educational process at the primary stage, especially in Islamic Education. Secondly, the study attempts to change the current teaching approach to Islamic Education, away from the traditional patterns to use of a new method. The findings provide evidence that this new approach is feasible in Saudi primary schools. Thirdly, the study has exploited new sources of learning in schools, such as computer laboratory and interactive whiteboard that have rarely been used by teachers of Islamic Education. In doing so, it has identified useful features and advantages of this method compared with other methods, while identifying barriers which could be avoided through concerted efforts of the Ministry of Education, school management and teachers. Moreover, it has provided a picture of the reality of schools, by observing classrooms and gleaning the perspectives of students and teachers, within my insider's knowledge of Saudi

schools' contexts. It has focused on important aspects of teaching, such as the availability of additional resources from ICT, dialogue and creative thinking skills.

In addition, one of the most obvious strengths of this study is the use of the e-brainstorming approach, which combines the benefits of online learning with non-technological methods. The website is designed to allow students to develop their learning skills through the online Forum and EBS, so some of the activities take place over the Internet or through Forum classroom activities. This design supports the learning process through a set of activities during the lesson. As a result, students may be able to participate in building their knowledge and learning experiences in a social context of co-operative interaction through the application of online activities and discussion. Another advantage is that it allows students to debate and exchange experiences through the online discussions, which supports the development of their expertise. Furthermore, this can ignite students' sense of belonging to a learning community and help them to acquire higher-order thinking skills, including critical thinking and creativity. Also, the Forum can be used in this lesson together with the e-library with its photo galleries, videos and stories, and this can help students in the review process.

Finally, this study has been able to combine the basics of Western educational theories and studies and the Saudi educational context based on Islamic views. This information and findings will inform education planners in Saudi Arabia of the current perceptions of primary school teachers, has several implications for the professional development of teachers, and reveals several control factors that need to be asserted to encourage teachers to use EBS in their teaching.

9.3.2 Study limitations

There are some limitations to this study. Because it used mainly the interpretive paradigm, its findings cannot be generalised, as this paradigm does not claim to discover 'universal laws' but to enhance understanding of a particular situation as well as the reality of the educational issue. In addition, there is a limitation to be faced with the use of observation which is one of the methods in this study. This was difficult to control in the classroom because of differences in participant responses and behaviour. Furthermore, there was an ethical limitation in using audio recording in this study. To avoid any problem with confidentiality, the data were archived and kept in a safe place.

The limited sample provided further limitations. Firstly, the study focused only on Islamic Education classes and not on the whole range of the school curriculum. Secondly, it was limited to primary school students, so was not representative of all school age groups. There was a third limitation with the sample because the educational system and culture in Saudi Arabia separates schools by gender. The researcher was unable to extend this study to girls' schools. The study took place in Al Qassim in Saudi Arabia, so the findings cannot be generalised to schools in other areas of the country.

In addition, the most important limitation lies in the fact that this study was applied by a postgraduate student who had limited time and resources compared to those of a full time researcher. Therefore, the data collection for this study focused on just one school. If there had been time and resources available to extend the study to other schools it would have been possible to obtain a wider spread of data to augment the

current results. With a small sample size, caution must be applied as the findings may not be transferable, but given the constraints of time and resources available for the study, it was considered essential to select only one school instead of drawing a sample from other schools and other cities, because such a strategy would have necessitated a lot more travel and greater costs in terms of time and money, which were not available for a small study such as this one.

The final limitation is in the nature of the case study itself. The main limitation of a case study is its potential lack of generalisability, so that the application of the findings of this research to other institutions needs to be undertaken with caution. However, this is compensated for by the fact that case studies provide in-depth understanding through the analysis of rich qualitative data. Case studies acknowledge the complexities of social truths while being capable of offering support to alternative viewpoints. Generalisability can also be attained to some extent through the conduct of further multi-site case studies and/or complementary surveys.

The next section illustrates the Implications and recommendations for further research.

9.4 Implications and recommendations for further research

9.4.1 Implications

The implications of this study for the schools, teachers and students will be presented in this section.

Improvement of the learning environment of Islamic Education

Based on the findings of this study, this research can contribute to developing learning

and teaching in Islamic Education. In this study, I found that teaching generally seemed to be teacher-centered with the teacher in control. Teachers appeared to be lecturers and information givers, while students reportedly were receivers and consumers. Electronic brainstorming can be used for improving teaching and learning environments in the Islamic Education classroom in Saudi Arabia, but it will be most effective if the principles of effective teaching and learning are understood, practised and applied.

Providing support for pedagogy and curriculum

Electronic brainstorming, used with appropriate information technology knowledge and skill, can be supplied to schools to help teachers in Islamic Education develop pedagogy and curriculum through use of online discussions, electronic resources and IWB. As well as this, EBS may help teachers fulfill their responsibilities for planning and implementing use of IT in schools to provide support for pedagogy and the curriculum.

Changing teaching methods in Islamic Education through use of EBS and ICT in the classroom.

Certain Saudi studies (Almofada, 2000; Alassem, 2001; Al-Shafi'i, 2004) which are interested in developing the teaching of Islamic Education have shown that most Islamic Education teachers use traditional methods and rarely use modern methods. In this study, I have broken that barrier and may have proved to Islamic Education teachers that the topics of their subject are in harmony with, and appropriate for, use of ICT and electronic brainstorming. Therefore this study has provided a model for how to use modern methods within Saudi Islamic Education.

9.4.2 Recommendations

In order for students to learn, and teachers to teach, with new technologies, their roles need to be developed and broadened. Teachers must relinquish at least some of their authority of the traditional classroom, relinquish some of their management of learning, and gain some familiarity with the potential of a greater range of new applications. At the same time, students need to assume some of the teachers' authority to determine their learning goals, play a role in selecting learning activities and a role in assessing themselves. This strategy was not used successfully in Saudi primary schools, according to the findings of this study. Hence, the Ministry of Education should encourage Saudi teachers to practise this strategy in their teaching. The integration of EBS should take place in the context of developing teachers' practice for effective learning and teaching environments. Importantly, Islamic Education teachers should be aware of the fact that new pedagogy is needed, not just the use of new technology. They will, however, need help in developing new teaching practices. In addition, some of results of this study indicate that lack of time was seen as a barrier by the teachers. Teachers should be provided with sufficient time by reducing the number of lessons per week and reducing the student-supervision tasks (or student monitoring) during the school day. Currently the maximum number of lessons per teacher is 24, thus it may be appropriate to reduce lesson numbers to 20 per week. This could help teachers to implement new approaches and integrate new technologies in the classroom for designing and developing lessons effectively.

The findings of this research also have thrown up many questions in need of further investigation and they have a number of important implications for future practice. So, these findings provide insights upon which future research could be based. It is

therefore recommended that further research be undertaken in the following areas. The first recommendation relates to the research design; research could be conducted in a wider range of schools in Saudi Arabia. Use of EBS could be investigated along similar lines to the present study but with reference to students' differing socio-economic status and levels of school attainment, and within different geographical contexts, such research would bring more depth and variety to the study. Therefore, this study could be considered to be a stimulus for further studies of primary education in Saudi Arabia.

Another important extension of this research could be to other school subjects, broadening the scope from this study's focus on Islamic Education. It could also be extended to a wider age range and to include girls' education as well. These may confirm the findings of the present study and provide a fuller picture of teachers' current use, perceptions and views on EBS.

This research could also be expanded to include the views of Islamic Education supervisors in the Ministry of Education, interviewing them to investigate their perspectives on new methods such as EBS, and how they might implement procedures to promote supporting factors and reduce the effect of hindrances.

Several recommendations can be made as a result of the findings of this study. The Ministry of Education should increase awareness among teachers of the use of technology in their teaching. Also, the Ministry of Education should provide teachers with e-resources, e-references and software related to the topics and objectives of the school curriculum in order to facilitate choice for teachers. In addition, they should

establish training courses for students and teachers in how to use technology in education as well as provide training in new teaching methods. They should also distribute questionnaires periodically to teachers to indicate their views on the curriculum, pedagogy and obstacles faced during their teaching.

9.5 Conclusion

This section contains what I have learnt as a researcher from undertaking this research and concludes this study. There have been three phases in this study: before conducting the research, during the research and after the research. In each phase, as a researcher, I have learnt various things about my role, the research field and the research phenomena. Before conducting the research, literature about the field prepared me in terms of the concepts and the field of the research. However, the actual research field and concepts were very much different from my initial perceptions. First of all, the formalised research procedures did not fit into the actual research context. In particular, participants' various demands were not considered before conducting the research. After analysing the research, I have learnt that there is no single fact about a social phenomenon. Each participant has a different understanding of teaching and learning and, therefore, whatever I thought that I knew about teaching was not particularly relevant to my participants' understandings of the phenomena. I could only try to perceive my participants' meaning-making procedures rather than classifying them as truths. In addition, this relative truth of phenomena is changeable according to the realities of one's construction of the object. However, this does not mean that my study's findings are not valuable; on the contrary, my reported experiences may expand and stimulate readers' construction of the phenomena.

Also, the researcher has benefited greatly both personally and professionally from researching and writing this thesis. Personally it has been a challenging experience to pursue further study and continue with a busy professional role. It has had positive benefits for his professional role. He has grown intellectually through the researching, reading and writing that has been required. The researcher has submitted two papers; one to an international conference and one to a national conference. Both papers were accepted by these conferences which gave me positive experiences and promoted my studying.

It is necessary here to conclude that ICT applications in education, such as EBS, are an integral part of present-day education but are comparatively new to Saudi Arabia. Consequently, teachers lack confidence and skill in using them. This situation must be remedied if the Ministry of Education's ambitions that all levels of the education system should benefit from the new technology and new teaching methods are to be realised. Teachers have generally positive attitudes towards new teaching methods using ICT, and a number of them have a basis of technological experience in a personal context which could be built upon. However, a long term government commitment to the provision of appropriate resources and training is needed. It is hoped that this study has gone some way in raising awareness of the current needs and issues in relation to the use of EBS amongst primary teachers and their students, drawing attention to the directions that future plans and polices should take. Based on the information provided by this study, more informed planning and implementation of in-service EBS training for primary teachers can be carried out, which will ultimately increase their ability to exploit e-resources for the benefit of their students.

In addition, it can be said that using this method of electronic brainstorming to reach pedagogical goals is an obligation for researchers. However, success in this venture is not a point but a process. Learners, teachers, and researchers together must engage in practice, reflect on theory, redevelop systems, and redesign pedagogy to chart the continuing course of educational technology. Research that ignores these participants or eschews these processes may founder in self-absorbed criticism or stray from its underlying learning goals. Research that embraces these participants and these processes will create both the future of educational technology and the future of pedagogy in Saudi Arabia.

Finally, further work is needed on identifying efficient, as well as effective, ways of intervening to promote thinking skills and raise attainment. There is a clear need for more comparative studies between different types of intervention and between thinking skills approaches and other strategies designed to change patterns of Islamic Education in the classroom.

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Appendices

Appendix 1: Quantitative data analysis tables

Skill	Pre-test mean	Pre-test SD	Post-test mean	Post-test SD	Difference between pre-test and post-test means
Fluency	7.87	2.655	16.66	8.552	8.79
Flexibility	11.18	2.907	14.89	6.159	3.70
Originality	3.98	3.112	6.08	5.751	2.10
Total	23.03	7.167	37.62	18.833	14.59

1.1. Normality Tests

Kolmogorov-Smirnov Test:

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Pre-test	.088	61	.200[*]	.985	61	.676

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Post-test	.129	61	.013	.953	61	.020

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Pre-test Fluency	.110	61	.065	.972	61	.184

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Pre-test Flexibility	.098	61	.200[*]	.980	61	.404

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Pre-test Originality	.121	61	.027	.930	61	.002

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Post-test Fluency	.163	61	.000	.944	61	.008

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Post-test Flexibility	.131	61	.011	.968	61	.115

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Post-test Originality	.194	61	.000	.825	61	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Change in Total Score	.180	61	.000	.906	61	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Change in Total Fluency	.148	61	.002	.933	61	.002

    a.   Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Change in Total Flexibility	.142	61	.004	.954	61	.022

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Change in Total Originality	.171	61	.000	.850	61	.000

a. Lilliefors Significance Correction

1.2 ANOVA Test for total pre-test, total pre-test fluency and total pre-test flexibility by teaching group:

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Total Pre-test	Between Groups	387.782	2	193.891	4.174	.020
	Within Groups	2694.152	58	46.451		
	Total	3081.934	60			
Total Pre-test Fluency	Between Groups	73.563	2	36.781	6.106	.004
	Within Groups	349.388	58	6.024		
	Total	422.951	60			
Total Pre-test Flexibility	Between Groups	32.031	2	16.015	1.956	.151
	Within Groups	474.986	58	8.189		
	Total	507.016	60			

1.3. Tukey Test for total pre-test, total pre-test fluency and total pre-test flexibility by teaching group:

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Teaching method	(J) Teaching method	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Total Pre-test	Traditional	Electronic brainstorming	-3.200	2.155	.306	-8.38	1.98
		Verbal brainstorming	2.952	2.129	.355	-2.17	8.07
	Electronic brainstorming	Traditional	3.200	2.155	.306	-1.98	8.38
		Verbal brainstorming	6.152*	2.129	.015	1.03	11.27
	Verbal brainstorming	Traditional	-2.952	2.129	.355	-8.07	2.17
		Electronic brainstorming	-6.152*	2.129	.015	-11.27	-1.03
Total Pre-test Fluency	Traditional	Electronic brainstorming	-1.250	.776	.249	-3.12	.62
		Verbal brainstorming	1.426	.767	.160	-.42	3.27
	Electronic brainstorming	Traditional	1.250	.776	.249	-.62	3.12
		Verbal brainstorming	2.676*	.767	.003	.83	4.52
	Verbal brainstorming	Traditional	-1.426	.767	.160	-3.27	.42
		Electronic brainstorming	-2.676*	.767	.003	-4.52	-.83
Total Pre-test Flexibility	Traditional	Electronic brainstorming	-.800	.905	.652	-2.98	1.38
		Verbal brainstorming	.964	.894	.531	-1.19	3.11
	Electronic brainstorming	Traditional	.800	.905	.652	-1.38	2.98
		Verbal brainstorming	1.764	.894	.128	-.39	3.91
	Verbal brainstorming	Traditional	-.964	.894	.531	-3.11	1.19
		Electronic brainstorming	-1.764	.894	.128	-3.91	.39

*. The mean difference is significant at the 0.05 level.

1.4 Non-parametric test for comparison between teaching groups:

1.4.1 Kruskal-Wallis Test:

Ranks

	Teaching method	N	Mean Rank
Total Pre-test Originality	Traditional	20	29.10
	Electronic brainstorming	20	37.02
	Verbal brainstorming	21	27.07
	Total	61	

Ranks

	Teaching method	N	Mean Rank
Total Pre-test Originality	Traditional	20	29.10
	Electronic brainstorming	20	37.02
	Verbal brainstorming	21	27.07
	Total	61	
Total Post-test	Traditional	20	22.72
	Electronic brainstorming	20	51.18
	Verbal brainstorming	21	19.67
	Total	61	
Total Post-test Fluency	Traditional	20	24.60
	Electronic brainstorming	20	51.22
	Verbal brainstorming	21	17.83
	Total	61	
Total Post-test Flexibility	Traditional	20	21.00
	Electronic brainstorming	20	50.82
	Verbal brainstorming	21	21.64
	Total	61	
Total Post-test Originality	Traditional	20	24.10
	Electronic brainstorming	20	45.15
	Verbal brainstorming	21	24.10
	Total	61	

Test Statistics[a,b]

	Total Pre-test Originality	Total Post-test	Total Post-test Fluency	Total Post-test Flexibility	Total Post-test Originality
Chi-Square	3.609	38.763	40.289	37.317	19.081
df	2	2	2	2	2
Asymp. Sig.	.165	.000	.000	.000	.000

a. Kruskal Wallis Test

b. Grouping Variable: Teaching method

1.4.2 Mann-Whitney Test:

EBS & VBS in Mann-Whitney Test

Ranks

	Teaching method	N	Mean Rank	Sum of Ranks
Total Post-test	Electronic brainstorming	20	31.32	626.50
	Verbal brainstorming	21	11.17	234.50
	Total	41		
Total Post-test Fluency	Electronic brainstorming	20	31.50	630.00
	Verbal brainstorming	21	11.00	231.00
	Total	41		
Total Post-test Flexibility	Electronic brainstorming	20	31.02	620.50
	Verbal brainstorming	21	11.45	240.50
	Total	41		
Total Post-test Originality	Electronic brainstorming	20	27.98	559.50
	Verbal brainstorming	21	14.36	301.50
	Total	41		

Test Statistics[a]

	Total Post-test	Total Post-test Fluency	Total Post-test Flexibility	Total Post-test Originality
Mann-Whitney U	3.500	.000	9.500	70.500
Wilcoxon W	234.500	231.000	240.500	301.500
Z	-5.388	-5.488	-5.245	-3.651
Asymp. Sig. (2-tailed)	.000	.000	.000	.000

a. Grouping Variable: Teaching method

Ranks

	Teaching method	N	Mean Rank	Sum of Ranks
Change in Total Score	Electronic brainstorming	20	31.45	629.00
	Verbal brainstorming	21	11.05	232.00
	Total	41		
Change in Total Fluency	Electronic brainstorming	20	31.42	628.50
	Verbal brainstorming	21	11.07	232.50
	Total	41		
Change in Total Flexibility	Electronic brainstorming	20	31.20	624.00
	Verbal brainstorming	21	11.29	237.00
	Total	41		
Change in Total Originality	Electronic brainstorming	20	25.62	512.50
	Verbal brainstorming	21	16.60	348.50
	Total	41		

Test Statistics[a]

	Change in Total Score	Change in Total Fluency	Change in Total Flexibility	Change in Total Originality
Mann-Whitney U	1.000	1.500	6.000	117.500
Wilcoxon W	232.000	232.500	237.000	348.500
Z	-5.456	-5.446	-5.340	-2.426
Asymp. Sig. (2-tailed)	.000	.000	.000	.015

a. Grouping Variable: Teaching method

VBS & T in Mann-Whitney Test:

Ranks

	Teaching method	N	Mean Rank	Sum of Ranks
Total Post-test	Traditional	20	22.58	451.50
	Verbal brainstorming	21	19.50	409.50
	Total	41		
Total Post-test Fluency	Traditional	20	24.32	486.50
	Verbal brainstorming	21	17.83	374.50
	Total	41		
Total Post-test Flexibility	Traditional	20	20.80	416.00
	Verbal brainstorming	21	21.19	445.00
	Total	41		
Total Post-test Originality	Traditional	20	21.28	425.50
	Verbal brainstorming	21	20.74	435.50
	Total	41		

Test Statistics[a]

	Total Post-test	Total Post-test Fluency	Total Post-test Flexibility	Total Post-test Originality
Mann-Whitney U	178.500	143.500	206.000	204.500
Wilcoxon W	409.500	374.500	416.000	435.500
Z	-.822	-1.746	-.105	-.145
Asymp. Sig. (2-tailed)	.411	.081	.916	.885

a. Grouping Variable: Teaching method

Ranks

	Teaching method	N	Mean Rank	Sum of Ranks
Change in Total Score	Traditional	20	18.92	378.50
	Verbal brainstorming	21	22.98	482.50
	Total	41		
Change in Total Fluency	Traditional	20	22.00	440.00
	Verbal brainstorming	21	20.05	421.00
	Total	41		
Change in Total Flexibility	Traditional	20	19.28	385.50
	Verbal brainstorming	21	22.64	475.50

	Total	41		
Change in Total Originality	Traditional	20	20.32	406.50
	Verbal brainstorming	21	21.64	454.50
	Total	41		

Test Statistics[a]

	Change in Total Score	Change in Total Fluency	Change in Total Flexibility	Change in Total Originality
Mann-Whitney U	168.500	190.000	175.500	196.500
Wilcoxon W	378.500	421.000	385.500	406.500
Z	-1.086	-.524	-.906	-.355
Asymp. Sig. (2-tailed)	.278	.600	.365	.723

a. Grouping Variable: Teaching method

EBS & T in Mann-Whitney Test:

Ranks

Teaching method		N	Mean Rank	Sum of Ranks
Total Post-test	Traditional	20	10.65	213.00
	Electronic brainstorming	20	30.35	607.00
	Total	40		

Test Statistics

	Total Post-test
Mann-Whitney U	3.000
Wilcoxon W	213.000
Z	-5.331
Asymp. Sig. (2-tailed)	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[a]

a. Not corrected for ties.

b. Grouping Variable: Teaching method

Ranks

	Teaching method	N	Mean Rank	Sum of Ranks
Total Post-test	Traditional	20	10.65	213.00
	Electronic brainstorming	20	30.35	607.00
	Total	40		
Total Post-test Fluency	Traditional	20	10.78	215.50
	Electronic brainstorming	20	30.22	604.50
	Total	40		
Total Post-test Flexibility	Traditional	20	10.70	214.00
	Electronic brainstorming	20	30.30	606.00
	Total	40		
Total Post-test Originality	Traditional	20	13.32	266.50
	Electronic brainstorming	20	27.68	553.50
	Total	40		

Test Statistics[b]

	Total Post-test	Total Post-test Fluency	Total Post-test Flexibility	Total Post-test Originality
Mann-Whitney U	3.000	5.500	4.000	56.500
Wilcoxon W	213.000	215.500	214.000	266.500
Z	-5.331	-5.270	-5.322	-3.908
Asymp. Sig. (2-tailed)	.000	.000	.000	.000
Exact Sig. [2*(1-tailed Sig.)]	.000[a]	.000[a]	.000[a]	.000[a]

a. Not corrected for ties.

b. Grouping Variable: Teaching
method

Ranks

	Teaching method	N	Mean Rank	Sum of Ranks
Change in Total Score	Traditional	20	10.80	216.00
	Electronic brainstorming	20	30.20	604.00
	Total	40		
Change in Total Fluency	Traditional	20	11.12	222.50
	Electronic brainstorming	20	29.88	597.50
	Total	40		

Change in Total Flexibility	Traditional	20	10.82	216.50
	Electronic brainstorming	20	30.18	603.50
	Total	40		
Change in Total Originality	Traditional	20	15.80	316.00
	Electronic brainstorming	20	25.20	504.00
	Total	40		

Test Statistics[b]

	Change in Total Score	Change in Total Fluency	Change in Total Flexibility	Change in Total Originality
Mann-Whitney U	6.000	12.500	6.500	106.000
Wilcoxon W	216.000	222.500	216.500	316.000
Z	-5.251	-5.078	-5.248	-2.549
Asymp. Sig. (2-tailed)	.000	.000	.000	.011
Exact Sig. [2*(1-tailed Sig.)]	.000[a]	.000[a]	.000[a]	.010[a]

a. Not corrected for ties.

b. Grouping Variable: Teaching method

1.5. Comparison of change in test scores between teaching groups:

Ranks

	Teaching method	N	Mean Rank
Change in Total Fluency	Traditional	20	22.62
	Electronic brainstorming	20	50.80
	Verbal brainstorming	21	20.12
	Total	61	
Change in Total Flexibility	Traditional	20	19.60
	Electronic brainstorming	20	50.88
	Verbal brainstorming	21	22.93
	Total	61	
Change in Total Originality	Traditional	20	25.62
	Electronic brainstorming	20	40.32
	Verbal brainstorming	21	27.24
	Total	61	
Change in Total Score	Traditional	20	19.22

	Electronic brainstorming	20	51.15
	Verbal brainstorming	21	23.02
	Total	61	

Test Statistics[a,b]

	Change in Total Fluency	Change in Total Flexibility	Change in Total Originality	Change in Total Score
Chi-Square	37.340	37.865	8.362	38.880
df	2	2	2	2
Asymp. Sig.	.000	.000	.015	.000

a. Kruskal Wallis Test

b. Grouping Variable: Teaching method

Ranks

	Teaching method	N	Mean Rank	Sum of Ranks
Change in Total Score	Electronic brainstorming	20	31.45	629.00
	Verbal brainstorming	21	11.05	232.00
	Total	41		
Change in Total Fluency	Electronic brainstorming	20	31.42	628.50
	Verbal brainstorming	21	11.07	232.50
	Total	41		
Change in Total Flexibility	Electronic brainstorming	20	31.20	624.00
	Verbal brainstorming	21	11.29	237.00
	Total	41		
Change in Total Originality	Electronic brainstorming	20	25.62	512.50
	Verbal brainstorming	21	16.60	348.50
	Total	41		

Test Statistics[a]

	Change in Total Score	Change in Total Fluency	Change in Total Flexibility	Change in Total Originality
Mann-Whitney U	1.000	1.500	6.000	117.500
Wilcoxon W	232.000	232.500	237.000	348.500

Z	-5.456	-5.446	-5.340	-2.426
Asymp. Sig. (2-tailed)	.000	.000	.000	.015

a. Grouping Variable: Teaching method

Ranks

	Teaching method	N	Mean Rank	Sum of Ranks
Change in Total Score	Traditional	20	18.92	378.50
	Verbal brainstorming	21	22.98	482.50
	Total	41		
Change in Total Fluency	Traditional	20	22.00	440.00
	Verbal brainstorming	21	20.05	421.00
	Total	41		
Change in Total Flexibility	Traditional	20	19.28	385.50
	Verbal brainstorming	21	22.64	475.50
	Total	41		
Change in Total Originality	Traditional	20	20.32	406.50
	Verbal brainstorming	21	21.64	454.50
	Total	41		

Test Statistics[a]

	Change in Total Score	Change in Total Fluency	Change in Total Flexibility	Change in Total Originality
Mann-Whitney U	168.500	190.000	175.500	196.500
Wilcoxon W	378.500	421.000	385.500	406.500
Z	-1.086	-.524	-.906	-.355
Asymp. Sig. (2-tailed)	.278	.600	.365	.723

a. Grouping Variable: Teaching method

Ranks

	Teaching method	N	Mean Rank	Sum of Ranks
Change in Total Score	Traditional	20	10.80	216.00
	Electronic brainstorming	20	30.20	604.00
	Total	40		
Change in Total Fluency	Traditional	20	11.12	222.50
	Electronic brainstorming	20	29.88	597.50

	Total	40		
Change in Total Flexibility	Traditional	20	10.82	216.50
	Electronic brainstorming	20	30.18	603.50
	Total	40		
Change in Total Originality	Traditional	20	15.80	316.00
	Electronic brainstorming	20	25.20	504.00
	Total	40		

Test Statistics[b]

	Change in Total Score	Change in Total Fluency	Change in Total Flexibility	Change in Total Originality
Mann-Whitney U	6.000	12.500	6.500	106.000
Wilcoxon W	216.000	222.500	216.500	316.000
Z	-5.251	-5.078	-5.248	-2.549
Asymp. Sig. (2-tailed)	.000	.000	.000	.011
Exact Sig. [2*(1-tailed Sig.)]	.000[a]	.000[a]	.000[a]	.010[a]

a. Not corrected for ties.

b. Grouping Variable: Teaching method

1.6 Shapiro-Wilkes tests for normality of distribution of scores for each teaching group:

1.6.1   Traditional group in Shapiro-Wilkes Tests:

Tests of Normality[b]

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Pre-test Fluency	.157	20	.200[*]	.948	20	.337
Total Pre-test Flexibility	.107	20	.200[*]	.934	20	.182
Total Pre-test Originality	.194	20	.047	.889	20	.026
Total Post-test Fluency	.121	20	.200[*]	.974	20	.829
Total Post-test Flexibility	.185	20	.070	.844	20	.004
Total Post-test Originality	.177	20	.099	.904	20	.049
Total Pre-test	.144	20	.200[*]	.882	20	.020
Total Post-test	.145	20	.200[*]	.938	20	.218
Change in Total Fluency	.099	20	.200[*]	.979	20	.922
Change in Total Flexibility	.094	20	.200[*]	.965	20	.638

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Change in Total Originality	.128	20	.200[*]	.943	20	.272
Change in Total Score	.171	20	.130	.908	20	.059

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

b. Teaching method = Traditional

1.6.2   EBS group in Shapiro-Wilkes Tests:

Tests of Normality[b]

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Pre-test Fluency	.167	20	.145	.935	20	.191
Total Pre-test Flexibility	.129	20	.200[*]	.966	20	.660
Total Pre-test Originality	.286	20	.000	.820	20	.002
Total Post-test Fluency	.171	20	.130	.919	20	.094
Total Post-test Flexibility	.194	20	.048	.918	20	.091
Total Post-test Originality	.190	20	.056	.804	20	.001
Total Pre-test	.138	20	.200[*]	.956	20	.466
Total Post-test	.174	20	.115	.860	20	.008
Change in Total Fluency	.177	20	.101	.941	20	.245
Change in Total Flexibility	.200	20	.035	.879	20	.017
Change in Total Originality	.182	20	.081	.885	20	.022
Change in Total Score	.162	20	.180	.907	20	.056

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

b. Teaching method = Electronic brainstorming

1.6.3 VBS group in Shapiro-Wilkes Tests:

Tests of Normality[b]

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Pre-test Fluency	.145	21	.200[*]	.951	21	.358
Total Pre-test Flexibility	.102	21	.200[*]	.969	21	.711
Total Pre-test Originality	.207	21	.019	.901	21	.036
Total Post-test Fluency	.154	21	.200[*]	.943	21	.252
Total Post-test Flexibility	.178	21	.081	.937	21	.187

Total Post-test Originality	.156	21	.200*	.907	21	.049
Total Pre-test	.121	21	.200*	.972	21	.768
Total Post-test	.114	21	.200*	.972	21	.766
Change in Total Fluency	.140	21	.200*	.978	21	.886
Change in Total Flexibility	.201	21	.027	.905	21	.044
Change in Total Originality	.199	21	.030	.917	21	.074
Change in Total Score	.173	21	.103	.942	21	.243

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

b. Teaching method = Verbal brainstorming

1.7 Wilcoxon Signed-Rank Tests:

1.7.1 Traditional group in Wilcoxon Signed-Rank Tests:

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test Fluency - Total Pre-test Fluency	Negative Ranks	2[a]	6.25	12.50
	Positive Ranks	17[b]	10.44	177.50
	Ties	1[c]		
	Total	20		

a. Total Post-test Fluency < Total Pre-test Fluency

b. Total Post-test Fluency > Total Pre-test Fluency

c. Total Post-test Fluency = Total Pre-test Fluency

Test Statistics[b]

	Total Post-test Fluency - Total Pre-test Fluency
Z	-3.324[a]
Asymp. Sig. (2-tailed)	.001

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test Flexibility - Total Pre-test Flexibility	Negative Ranks	9[a]	9.44	85.00
	Positive Ranks	10[b]	10.50	105.00
	Ties	1[c]		
	Total	20		

a. Total Post-test Flexibility < Total Pre-test Flexibility

b. Total Post-test Flexibility > Total Pre-test Flexibility

c. Total Post-test Flexibility = Total Pre-test Flexibility

Test Statistics[b]

	Total Post-test Flexibility - Total Pre-test Flexibility
Z	-.405[a]
Asymp. Sig. (2-tailed)	.686

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test Originality - Total Pre-test Originality	Negative Ranks	8[a]	8.62	69.00
	Positive Ranks	9[b]	9.33	84.00
	Ties	3[c]		
	Total	20		

a. Total Post-test Originality < Total Pre-test Originality

b. Total Post-test Originality > Total Pre-test Originality

c. Total Post-test Originality = Total Pre-test Originality

Test Statistics[b]

	Total Post-test Originality - Total Pre-test Originality
Z	-.356[a]
Asymp. Sig. (2-tailed)	.722

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test - Total Pre-test	Negative Ranks	3[a]	7.50	22.50
	Positive Ranks	16[b]	10.47	167.50
	Ties	1[c]		
	Total	20		

a. Total Post-test < Total Pre-test

b. Total Post-test > Total Pre-test

c. Total Post-test = Total Pre-test

Test Statistics[b]

	Total Post-test - Total Pre-test
Z	-2.922[a]
Asymp. Sig. (2-tailed)	.003

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

1.7.2   EBS group in Wilcoxon Signed-Rank Tests:

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test Fluency - Total Pre-test Fluency	Negative Ranks	0[a]	.00	.00
	Positive Ranks	20[b]	10.50	210.00
	Ties	0[c]		
	Total	20		

a. Total Post-test Fluency < Total Pre-test Fluency

b. Total Post-test Fluency > Total Pre-test Fluency

c. Total Post-test Fluency = Total Pre-test Fluency

Test Statistics[b]

	Total Post-test Fluency - Total Pre-test Fluency
Z	-3.923[a]
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test Flexibility - Total Pre-test Flexibility	Negative Ranks	0[a]	.00	.00
	Positive Ranks	20[b]	10.50	210.00
	Ties	0[c]		
	Total	20		

a. Total Post-test Flexibility < Total Pre-test Flexibility

b. Total Post-test Flexibility > Total Pre-test Flexibility

c. Total Post-test Flexibility = Total Pre-test Flexibility

Test Statistics[b]

	Total Post-test Flexibility - Total Pre-test Flexibility
Z	-3.932[a]
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test Originality - Total Pre-test Originality	Negative Ranks	3[a]	7.00	21.00
	Positive Ranks	17[b]	11.12	189.00

Ties	0[c]		
Total	20		

a. Total Post-test Originality < Total Pre-test Originality

b. Total Post-test Originality > Total Pre-test Originality

c. Total Post-test Originality = Total Pre-test Originality

Test Statistics[b]

	Total Post-test Originality - Total Pre-test Originality
Z	-3.141[a]
Asymp. Sig. (2-tailed)	.002

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test - Total Pre-test	Negative Ranks	0[a]	.00	.00
	Positive Ranks	20[b]	10.50	210.00
	Ties	0[c]		
	Total	20		

a. Total Post-test < Total Pre-test

b. Total Post-test > Total Pre-test

c. Total Post-test = Total Pre-test

Test Statistics[b]

	Total Post-test - Total Pre-test
Z	-3.921[a]
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

1.7.3 VBS group in Wilcoxon Signed-Rank Tests:

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test Fluency - Total Pre-test Fluency	Negative Ranks	1[a]	4.00	4.00
	Positive Ranks	20[b]	11.35	227.00
	Ties	0[c]		
	Total	21		

a. Total Post-test Fluency < Total Pre-test Fluency

b. Total Post-test Fluency > Total Pre-test Fluency

c. Total Post-test Fluency = Total Pre-test Fluency

Test Statistics[b]

	Total Post-test Fluency - Total Pre-test Fluency
Z	-3.884[a]
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test Flexibility - Total Pre-test Flexibility	Negative Ranks	3[a]	15.33	46.00
	Positive Ranks	15[b]	8.33	125.00
	Ties	3[c]		
	Total	21		

a. Total Post-test Flexibility < Total Pre-test Flexibility

b. Total Post-test Flexibility > Total Pre-test Flexibility

c. Total Post-test Flexibility = Total Pre-test Flexibility

Test Statistics[b]

	Total Post-test Flexibility - Total Pre-test Flexibility
Z	-1.729[a]
Asymp. Sig. (2-tailed)	.084

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test Originality - Total Pre-test Originality	Negative Ranks	5[a]	10.60	53.00
	Positive Ranks	12[b]	8.33	100.00
	Ties	4[c]		
	Total	21		

a. Total Post-test Originality < Total Pre-test Originality

b. Total Post-test Originality > Total Pre-test Originality

c. Total Post-test Originality = Total Pre-test Originality

Test Statistics[b]

	Total Post-test Originality - Total Pre-test Originality
Z	-1.122[a]
Asymp. Sig. (2-tailed)	.262

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Total Post-test - Total Pre-test	Negative Ranks	2[a]	9.25	18.50
	Positive Ranks	19[b]	11.18	212.50

Ties	0[c]			
Total	21			

a. Total Post-test < Total Pre-test

b. Total Post-test > Total Pre-test

c. Total Post-test = Total Pre-test

Test Statistics[b]

	Total Post-test - Total Pre-test
Z	-3.378[a]
Asymp. Sig. (2-tailed)	.001

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

1.8 ANCOVA Test

Tests of Between-Subjects Effects

Dependent Variable: Total Post-test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	16485.017[a]	3	5495.006	65.317	.000	.775
Intercept	1251.081	1	1251.081	14.871	.000	.207
Totpre	2326.242	1	2326.242	27.651	.000	.327
Tmethod	9557.106	2	4778.553	56.801	.000	.666
Error	4795.311	57	84.128			
Total	107625.000	61				
Corrected Total	21280.328	60				

a. R Squared = .775 (Adjusted R Squared = .763)

1.9 KAPPA Test:

Pre-test Fluency A1 * Pre-test Fluency A1 Cross tabulation

Count

		Pre-test Fluency A1			
		0	1	2	Total
Pre-test Fluency A1	0	29	0	0	29
	1	8	21	0	29
	2	0	1	2	3
Total		37	22	2	61

Symmetric Measures

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Measure of Agreement Kappa	.726	.082	6.528	.000
N of Valid Cases	61			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

1.10 EBS in Pilot study of Normality Test:

Normality test of the total pre-test and post-test for the pilot study sample

Test	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
Total Pre-test Total Post-test			

a. Lilliefors Significance Correction

Tests of Normality[b]

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Pre-test Fluency	.167	20	.145	.935	20	.191
Total Pre-test Flexiblity	.129	20	.200[*]	.966	20	.660
Total Pre-test Originality	.286	20	.000	.820	20	.002
Total Post-test Fluency	.171	20	.130	.919	20	.094

Total Post-test Flexiblity	.194	20	.048	.918	20	.091
Total Post-test Originality	.190	20	.056	.804	20	.001
Total Pre-test	.138	20	.200[*]	.956	20	.466
Total Post-test	.174	20	.115	.860	20	.008
Change in Total Fluency	.177	20	.101	.941	20	.245
Change in Total Flexiblity	.200	20	.035	.879	20	.017
Change in Total Originality	.182	20	.081	.885	20	.022
Change in Total Score	.162	20	.180	.907	20	.056

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

b. Teaching method = Electronic brainstorming

Appendix 2: EBS Forum
(English version)

EBS Forum (Arabic version)

Appendix 3: Teachers' and students' interviews

1. Teachers' interview before teaching

Islamic Education teachers' interviews

BACKGROUND INFORMATION

Teacher Code:
Date of interview:
Start Time _____ End Time _____
Date:
Level:
Class:
Group:
Subject: ·

_____

➢ **Initial questions:**

- What is your qualification?
- How many years have you taught Islamic Education?
- Have you attended any educational courses or workshops?
- What teaching method do you usually use in your lessons?
- To what extent do your students like Islamic Education lessons?
- To what extent do your students think the lessons are interesting?
- To what extent do your students understand the topics and concepts in your lessons?
- What, and to what extent, do you think is the most difficult point to learn or understand in your lessons?

➢ **Creativity skills:**

- What do you know about creativity skills?
- Have you taken any courses or training about students' learning of creativity skills?
- Do you consider that learning of 'creativity skills' is useful in your lessons?
- Do you use any activities or questions to promote creativity skills for your students?

➢ **ICT:**
- What do you know about using ICT in the classroom?
- Do you consider ICT to be useful in your lessons?
- To what extent are your students able to use ICT?
- To what extent do you believe that ICT could help to stimulate students' interest in learning Islamic Education?
- To what extent does ICT facilitate your lessons?

- Have you ever used ICT in the classroom?
- Have you ever heard about the method of EBS and what do think about it?

➢ **Teaching methods:**
- To what extent do you believe that using different teaching methods can stimulate students' interest in learning Islamic Education?
- To what extent do you believe that using activities would engage your students in Islamic Education?
- To what extent do you believe that students' contribution is necessary to the success of the classroom?
- To what extent do you think pre-planning for the lesson helps the teacher to achieve the lesson's aims?
- When you want to develop the dialogue skills of your students, what methods do you normally use?
- When you want to improve the creativity skills of your students, what methods do you normally use?
- From your point of view, do Islamic Education curricula need to adopt more modern teaching methods, produced by educational research?
- What are your expectations of the method which is proposed by the researcher, and what do you know about it?
- Any other impact and comments?

2. Teachers' interview after teaching

Islamic Education teachers' interviews

BACKGROUND INFORMATION

Teacher Code:
Date of interview:
Start Time _____ End Time _____
Date:
Level:
Class:
Group:
Subject: ·

➤ **Affordances of teaching method (EBS, VBS or T):**
- What do you think about this method?
- To what extent are students interested in the lesson when you use this method?
- To what extent do you believe the main teaching points have been learnt by students when you use this method?
  - What are the barriers to learning encountered by the students during the learning process when you use your method?
  - To what extent do you know about the teaching methods for promoting creativity skills when you use your method?
  - To what extent do you believe that Islamic Education, supported by ICT learning in EBS, enables students to gain a wide range of creativity skills and continue their life-long learning? (This question is only for EBS.)
  - What are the changes in ICT which supported your method (EBS) compared with VBS or traditional methods? (This question is only for EBS.)
  - To what extent do you believe that there is availability of resources for this method? (This question is only for EBS.)
  - To what extent do you believe that there a difference between the three methods?

  - To what extent do you know about this method?

  - To what extent do you believe that EBS can promote construction of knowledge for students and provide students with extra information?

  - What is the difficulty in teaching when you use this method?

- To what extent do you believe that students are interactive with your method?

- To what extent do you believe that this method helps students to engage in dialogue?

- To what extent do you believe that this method fits with Islamic Education topics?

- What are the advantages and disadvantages of this method?

- Did you gain anything from using this method in the classroom?

- Any other impact and comments?

---

3. Students' interview

BACKGROUND INFORMATION

Student Code:
Date of Observation:
Start Time _____ End Time _____
Date:
Level:
Class:
Group:
Subject: ·

_____

➢ **Initial questions:**

- To what extent do you like Islamic Education lessons?
- To what extent do you think the lessons are interesting?
- To what extent do you understand the lesson topics and concepts?
- What, and to what extent, do you think is the most difficult point to learn or understand?

➢ **Creativity skills:**

- To what extent do you think the lesson helps you learn creativity skills?
- To what extent do you think that learning creativity skills makes for an interactive learning environment?
- To what extent do you think that learning creativity skills will help you to face life's difficulties?

➢ **ICT:**
- To what extent do you prefer/not prefer using ICT in lessons?
- To what extent do you think that using ICT helps you to understand your lessons?
- What is your level of computer skills?

➢ **Teaching methods (EBS, VBS or T):**

- To what extent do you agree that using this method can help you to visualise abstract concepts?
- To what extent do you know this method?
- Did you enjoy using the knowledge Forum in this method? (This question is only for EBS.)

- Did the EBS knowledge Forum make you enjoy your learning more in EBS? (This question is only for EBS.)
- To what extent do you prefer/not prefer this teaching method?
- To what extent do you feel that, with this method, your teacher interacts with you in your lessons?
- To what extent do you feel that, with this method, your teacher helps you understand the lessons?
- To what extent do you think that, with this method, your teacher helps you to understand creativity skills?
- To what extent do you think that, with this method, your teacher helps you to develop creativity skills?
- To what extent do you think that, with this method, your teacher gives you more chance for dialogue than before?
- To what extent do you think that, with this method, your teacher gives you more chance for constructing your own knowledge than before?
- What new skills have you gained with this method?
- What difficulties have you faced with this method?
- Would you like to add any other comments?

Appendix 4: classroom and Forum Observation and field notes

BACKGROUND INFORMATION

Teacher Code:
Date of Observation:
Start Time _____ End Time _____
Date:
Level:
Class:
Group:
Subject: ·

- **Questions before observation:**

✓ What has this class been doing in Islamic Education recently?
✓ What unit are you working on?
✓ What instructional materials are you using?
✓ What do you anticipate doing in your Islamic Education class on the day I will be observing?
✓ What do you hope students will learn as a result of the work you have planned?
✓ What creativity skills will be learned in this lesson?
✓ What is the next step for this class?
✓ Is there anything in particular that I should know about the group of students that I will be observing?

Section one: CLASSROOM DESCRIPTION:

Section two: LESSON CHARACTERISTICS:
  1- **Lesson Purpose:**

  2- **Instructional Materials:**

Section three:
DESCRIPTION OF OBSERVATIONAL NOTES RELATED TO THE AIMS OF THE STUDY AND EVENTS IN THE CLASSROOM:
- **Did this lesson encourage students to use creativity skills for investigation or problem solving?**

- **Did the teacher encourage students to be reflective about their learning and their dialogue?**
- **Did interactions reflect the teaching method (EBS, VBS or Traditional), working relationships and productive discourse among students and between teacher and students?**

- **Did the instructional strategy (EBS, VBS, or Traditional) and activities probe students' existing knowledge and preconceptions to promoting their learning?**
- **Did students interact with the teaching method (EBS, VBS, or Traditional)?**

Section four: Other impacts:

Section five: Barriers and difficulties:

Section six: OTHER INFORMATION:

Appendix 5: Example of a teacher interview

(English version)

- **EBS Teacher:**

The first section: Islamic Education curricula:

- **How do you usually teach the Islamic topics?**

At present, the electronic brainstorming method, but usually the traditional method - and it is the lecturing method and sometimes verbal brainstorming.

- **To what extent do you think students like the Islamic Education lessons?**

It is the religion and the Muslim society's instinct. The child loves religion from his beginnings because of his breeding, and we are a faithful people and we bring up our children on faith.

(Interruption of the researcher: But the pupil may hate the subject because of the teacher or the methods)

I think the ways are different and changing ways is an attractive means. The oratorical way is a boring way to pupils but if the teacher uses many ways in the same lesson, pupils will be attracted. Also, using technology is a factor and we notice that everyone participates.

- **To what extent do you think students are interested in Islamic topics?**

Many students are interested in Islamic topics and this is because of family caring. Also the teacher plays an important role when he encourages pupils to love him and his subject. The family must encourage sons to be interested in Islamic topics.

- **To what extent do you think students understand the terms and concepts of Islamic Education?**

The teacher must know the mental levels of pupils because he must explain those terms. Pupils know a few things and don't know many things, so new concepts and terms must be explained for them.

- **What Islamic topics do you think students have difficulty understanding?**

Because the child learns from his beginning, so there are no difficulties, but the telling way still stays as a block for pupils' understanding.

The second section: Creative thinking skills:

- **What do you know about creative thinking skills?**

I read about it and from teaching experience and attendance at model lessons; also from exchanging experiences with teachers.

- **Have you ever taken courses about teaching creative thinking skills to students?**

This question has been answered above

- **Do you think that teaching creative thinking skills in Islamic Education is useful to students?**

Sure, for every subject.

The third section: ICT:

- **What do you know about education technology in class?**

Technology needs possibilities like using computers and projectors in teaching and also training.

- **Do you think that using education technologies in Islamic Education is useful for students?**

It is changing the traditional way and it is attracting pupils because pupils are fond of technology and pupils must take courses in using technology.

- **To what extent do you think that students can use computers in class?**

Some know and others don't know. As I said, they must take courses.

- **To what extent do you think using educational technology in Islamic subjects helps pupils to learn?**

Certainly.

The fourth section: Teaching method (Electronic brainstorming):

- **What do you know about this method of teaching?**

With sorrow, using technology is very low in schools and also this method of teaching is not good with the big numbers in the classes.

- **To what extent do you think students are interested in this method during lessons?**

Yes, students' interest in the subject is increasing but there is not enough time.

- **Has the main goal of this method been achieved?**

Yes and No…

Pupils participated and the interaction was achieved, even the shame-faced pupil who is hit by dullness participated with his classmates because of the computer, but all these had a bad effect on the exercises.

- **What problems did you meet during teaching by this method?**

Time, the time isn't enough; also pupils' lack of ability in dealing with the computer.

- **What is it, from your knowledge of teaching methods, which encourages creative thinking skills?**

There is a good way for pupils by using the Power Point program and pupils do their best in preparing lessons. This helps them in growing their thinking skills, because it gives pupils information quickly. Also, the manner of preparing questions and answers is useful for the pupil.

- **Do you think that using technology in teaching Islamic Education by using the brainstorming method gives us a clear idea about creative thinking skills and helps pupils to learn continuously?**

Yes, sure.

- **What do you notice when you use this method compared with the other methods (verbal brainstorming and traditional)?**

All pupils interact when we use this way; also competing is stronger than with the other ways.

- **To what extent do you think there are differences among the three ways?**

Yes, with technology the pupils may be interested, even in house he may enter on the site.

- **What do you know about this method?**

This method is a new one for me.

- **How does this method encourage students' thinking skills?**

Yes, this encourages learning and competing among groups.

- **What difficulties do you face with using this method?**

It was mentioned above.

- **What is your opinion about pupils' interaction with this method?**

It was mentioned above.

- **Do you think this method helps students in discussion?**

Yes, it helps in discussion more than other ways. Sometimes the shy pupil gains this skill with his mates.

- **Do you gain any other things by using this method?**

The information reaches pupils with less effort and more quickly.

- **Do you want to add any other comments?**

We need more time, and pupils must take a course in computer skills before applying this method.

- **Do you feel that students use this method to apply thinking skills?**

The pupil doesn't know much about these skills, but he knows it through teaching and experience; he may apply it without being aware of it, even though he knew it.

- **After having applied this method, what is your opinion of it?**

This method has many advantages, like interaction and the growing abilities of thinking and conceiving. On the other hand, it has disadvantages, as the lack of knowledge of some pupils about using the computer. If there isn't a computer in the house, the pupil won't be in contact with his other mates. Also, the narrow time slot is an important factor.

- **If we compare this way with the traditional way, which of the two ways is more useful for students?**

I wish we could merge the two ways, because the teacher can't use only the telling way; also for modernising and changing, because following one way is a boring thing.

- **When you use the Forum, do you feel that this improves creative thinking skills more than by the other methods?**

Sure, the pupil will be creative if he has the chance to write freely.

Also, he compares his answers with other answers; then the answers are merged together.

- **What will you do if the Ministry of Education adopts this method as suitable and it is possible to solve the difficulties and problems?**

Yes, I'll apply it, but there must be enough time for this method. The curriculum must be formed in another way to give wide usage for this method. But the continuous use of computers causes dullness, so we must give enough time for discussion and face-to-face dialogue with pupils without using devices; and this is the best.

- **Do you want to add any other comments?**

It's a good try and, although it has advantages and enthusiasm, there are some factors that will hold up this method.

<u>معلم طريقة العصف الذهني الالكتروني</u>

المحور الأول:محتوى المادة المشروحة:

- **ما الأسلوب الذي تتبعه عادة في شرح مواد التربية الإسلامية؟**

طريقة العصف الذهني الالكتروني في الوقت الحالي لكن عادة الطريقة التقليدية وهي طريقة المحاضرة.

- **إلى أي مدى تعتقد محبة أو رغبة الطلاب للحصص التربية الإسلامية؟**

هي فطرة الدين و المجتمع مسلم و الطفل يحب الدين من بدايته بسبب التربية في البيت و نحن شعب متدين و نشأ الأطفال على ذلك. **(مقاطعة من قبل الباحث/ لكن قد يكره الطالب المادة بسبب المعلم أو بسبب الطريقة)** أعتقد الطرق تختلف و تغيير الطرق تعتبر وسيلة جذب و الطريقة الإلقائية تصيب الطالب بالملل حتى لو يغير المعلم من طريقة إلى طريقة في درس واحد يشد انتباه التلاميذ. كذلك استخدام التقنيات فيها عامل مساعد و جذب و نلاحظ مشاركة الجميع.

- **إلى أي مدى تعتقد اهتمام الطلاب بمواد التربية الإسلامية؟**

نسبة كبيرة من الطلاب يهتمون و هذا يرجع إلى اهتمام الأسرة, و المعلم له دور كبير إذا كان قريب من الطلاب و مشجع لهم لكي يحبونه الطلاب و يحبون مادته, و ينبغي على الأسرة أن تحث أبنائها على الاهتمام.

- **إلى أي مدى تعتقد فهم الطلاب لمفاهيم و مصطلحات مواد التربية الإسلامية؟**

لابد المعلم أن يكون مدرك لمستوى عقول الطلاب, فالمعلم لابد أن يشرح تلك المصطلحات. الطلاب يخفى عليهم الشيء الكثير و لابد من توضيح المفاهيم و المصطلحات الجديدة.

- **ما الأشياء والنقاط التي تعتقد أنها تصعب على الطلاب فهمها وتدريسها في مواد التربية الإسلامية؟**

ليس هناك صعوبة لأن الطفل منذ الصغر يتعلم هذه الأمور لكن يبقى أسلوب السرد عائقا لفهم الطلاب.

المحور الثاني: مهارات التفكير الإبداعي:

- **ماذا تعرف عن مهارات التفكير الإبداعي؟**

قرأت عنها و كذلك من خلال الخبرة في التدريس و حضور الدروس النموذجية التي أقيمت من أجل ذلك وكذلك تبادل الزيارات و من خلال خبرات متبادلة من الزملاء المعلمين.

- **هل سبق وأن أخذت دورات عن كيفية تدريس مهارات التفكير الإبداعي للطلاب؟**

أجيب عن هذا السؤال في الأعلى.

- **هل تعتقد بأن تدريس مهارات التفكير الإبداعي في مواد التربية الإسلامية مفيد للطلاب؟**

مؤكد لكل مادة.

المحور الثالث: تقنيات التعليم:

- **ماذا تعرف عن تقنيات التعليم التي تستخدم داخل الصف؟**

التقنيات تحتاج إلى إمكانات و إذا توافرت تحتاج إلى تدريب و لابد من توفرها في كل قاعة تدريس وهي استخدام الحاسب و أجهزة العرض في التدريس.

- **هل تعتقد بأن استخدام تقنيات التعليم في مواد التربية الإسلامية مفيد للطلاب؟**

نجد فيها تغيير عن الأسلوب التقليدي و جذب للطلاب, لأن الطلاب مولعون بالتقنية ولابد من إقامة دورات للطلاب في كيفية استخدام التقنية.

- **إلى أي مدى تعتقد قدرة الطلاب على استخدام الحاسب الآلي داخل الصف؟**

هناك من عنده القدرة و المهارات اللازمة و البعض لا، و كما قلت سابقا لابد من إقامة دورات لهم.

- **إلى أي مدى تعتقد استخدام تقنيات التعليم في مواد التربية الإسلامية تساعد الطلاب و تحفزهم على التعلم؟**

أكيد هذا شيء مؤكد.

المحور الرابع: طرق التدريس:

❖ أسلوب العصف الذهني الالكتروني:

- **ماذا تعرف عن هذا الأسلوب؟**

للأسف استخدام التقنيات قليل جدا في المدارس و كذلك هذه الطريقة لا تصلح في ظل الأعداد الكبيرة داخل الفصل.

- **إلى أي مدى تعتقد اهتمام الطلاب خلال الدروس عند استخدام هذا الأسلوب؟**

نعم زاد اهتمام الطلاب بالمادة لكن المشكلة الوقت لا يكفي و لا يفي بما نريده.

- **إلى أي مدى تعتقد بأن الهدف الرئيسي تحقق خلال استخدام هذا الأسلوب؟**

من جهة نعم ومن جهة لا... لقد تحقق التفاعل و المشاركة من قبل الطالب حتى الطالب الخجول والذي يصيبه الملل قد شارك و تفاعل مع زملائه بسبب وجود الحاسب لكن هذا على حساب التدريبات.

- **ما العوائق والعقبات التي تصادفك أثناء التدريس عند استخدام هذا الأسلوب؟**

الوقت فوقت الحصة لا يكفي و كذلك عدم تمكن الطلاب من كيفية التعامل مع الحاسب بجدارة.

- **إلى أي مدى تعتقد معرفتك في طرق و أساليب التدريس التي تحفز مهارات التفكير الإبداعي؟**

هناك طريقة الإعداد الجيد التي يقوم بها الطلاب للدرس عن طريق برنامج البوربوينت و يتفنن الطلاب بطريقة الإعداد للدرس فهذا يساعدهم على تنمية مهارات التفكير و لذلك فهو يكسب الطلاب المعلومة بشكل أسرع و أرسخ. أيضا طريقة إعداد الأسئلة و الأجوبة للدرس من قبل الطلاب قد يستفيد الطالب بشكل أكبر.

- **إلى أي مدى تعتقد بأن تدريس مواد التربية الإسلامية المدعوم بتقنيات التعليم من خلال استخدام أسلوب العصف الذهني يعطي الطلاب تصور واضح عن مهارات التفكير الإبداعي و يساعدهم على التعلم المستمر؟**

نعم أكيد

- **ما التغير الذي تلحظه عند استخدام هذا الأسلوب مقارنة بالطرق الأخرى (أسلوب العصف الذهني اللفظي و الطرق التقليدية)؟**

تفاعل الطلاب جميعا عند استخدام هذا الأسلوب أيضا التنافس يكون أقوى من الطرق الأخرى بين الطلاب.

- **إلى أي مدى تعتقد بأن هناك اختلاف بين الطرق الثلاثة؟**

نعم مع التقنية قد يهتم الطالب حتى في المنزل قد يقوم الطالب بالدخول على الموقع.

- **إلى أي مدى تعتقد معرفتك بهذا الأسلوب؟**

الحقيقة هذا الأسلوب جديد ولم يسبق لي تطبيقه.

- **إلى أي مدى تعتقد بأن هذا الأسلوب يحفز مهارات التفكير ويطورها لدى الطلاب؟**

نعم يحفز على التعلم و التنافس بين المجموعات.

- **ما الصعوبات التي تواجهها عند استخدام هذا الأسلوب؟**

سبق ذكره.

- **إلى أي مدى تعتقد تفاعل الطلاب مع هذا الأسلوب؟**

سبق ذكره

- **إلى أي مدى تعتقد بأن هذا الأسلوب يساعد الطلاب على الحوار و النقاش؟**

نعم تساعد على الحوار و النقاش أكثر من غيرها. أحيانا الطالب الذي عنده حياء و خجل قد يكتسب هذا المهارة مع زملائه.

- **هل هناك أشياء أخرى اكتسبتها من خلال استخدام هذا الأسلوب؟**

وصول المعلومة للطالب بأقل جهد و أسرع.

- **هل هناك أي تعليقات أضافية أخرى ترغب في ذكرها؟**

الوقت يحتاج إلى زيادة و كذلك الطالب لابد يأخذ دورة في الحاسب قبل تطبيق هذا الأسلوب.

- **هل تشعر أن الطلاب يطبقون مهارات التفكير من خلال هذا الأسلوب؟**

الطلاب عندهم بعض الشيء عن هذه المهارات لكن قد يعرفها من خلال التدريس و الخبرة بغض النظر عن معرفتها مسبقا فقد يطبقها الطالب من حيث لا يشعر.

- **بعد تطبيقك لهذا الأسلوب و التجربة ما رأيك به؟**

هذا الأسلوب له إيجابيات و سلبيات كثيرة , من الايجابيات التفاعل و ذهاب الملل و ينمي القدرات أكثر من حيث التفكير و الإدراك. من سلبياته, بعض الطلاب لعدم إجادته لمهارات الحاسب و كذلك عدم توفر الجهاز في البيت قد يعيق التواصل مع زملائه الآخرين. كذلك ضيق الوقت عامل كبير.

- **هل تشعر بان الطلاب استفادوا أكثر من هذا الأسلوب مقارنة بالطرق التقليدية؟**

أتمنى دمج الطريقتين لأن المعلم لا يستغني عن طريقة السرد و الطرح و كذلك من باب التجديد و التغيير لأن الاستمرار على طريقة واحدة تجلب الملل لدى الطلاب.

- **عند استخدام المنتدى هل تشعر بأن مهارات التفكير الإبداعي تتطور من خلال هذا الأسلوب أكثر من غيره؟**

من المؤكد بأنك إذا أعطيت الطالب فرصة و حرية في الكتابة يبدع أكثر و كذلك يشاهد إجابة غيره و كذلك اختلاف التفكير عن بعضهم البعض فيتم دمج الأفكار فيما بينها.

- **لو تبنت وزارة التربية هذا الأسلوب مع وضع الإمكانات الجيدة و المناسبة و حل بعض المشكلات و الصعوبات، هل ستبادر؟**

نعم سأبادر في تطبيقها لكن لابد من وجود الوقت المناسب لتلك الطريقة, فيجب أن يصاغ المنهج بطريقة أخرى ليتسع المجال لهذا الأسلوب. لكن استخدام الحاسب بشكل كبير يسبب الملل لابد من وضع وقت للحوار و النقاش بعيدا عن الأجهزة وجها لوجه مع الطلاب و ذلك أنسب.

- **هل هناك أي تعليقات إضافية أخرى ترغب في ذكرها؟**

تجربة جيدة و فيها ايجابيات و فيها حماس لكن هناك بعض العوامل التي تعيق هذه الطريقة.

Appendix 6: An example of a student's letter to rich people in the 'charity' topic (Zakkat):

Dear 'rich' people,

I know you are rich because this is how I registered you on my letter. Just because you are rich you do not have to go all high and mighty towards the people around you. There are many ways to spend your money but we want you to spend your money for good or for the sake of people who are less fortunate than you! Charities, for example, are one way between you and poor people. But how do you give the money without going to charities foundation or making an effort yourself? Well, these are ways we came up with which you can develop:

- Transferring money using banks.

- Putting a fund box in your house which you can empty monthly.

- It is not only money that a charity needs! Every season you can see what clothes you need and, what you don't need, give to charity.

Sometimes shops will give small coins for change. You may say: "What would a penny do?" Well it does do something! If you keep a small purse in your car and keep putting the pennies in until, after 5 months or less has passed, see what those pennies actually make.

Kind Regards

Group No….

Appendix 7: Torrance Test of Creative Thinking

(English version)

THINKING CREATIVELY WITH WORDS
By E. Paul Torrance
VERBAL RESPONSE BOOKLET A

NAME _____
AGE _____ GENDER _____
SCHOOL _____
GRADE _____
CITY _____
DATE _____

SCHOLASTIC TESTING SERVICE, INC.
480 Meyer Road
Bensenville, Illinois 60106–1617

Activities 1–3: ASK-AND-GUESS

The first three activities will be based on the drawing below. These activities will give you a chance to see how good you are at asking questions to find out things that you don't know and in making guesses about possible causes and consequences of happenings. Look at the picture. What is happening? What can you tell for sure? What do you need to know to understand what is happening, what caused it to happen and what will be the result?

2

Activity 1. ASKING: On this page, write out all of the questions you can think of about the picture on the page opposite this one. Ask all of the questions you would need to ask to know for sure what is happening. Do not ask questions which can be answered just by looking at the drawing. You can continue to look back at the drawing as much as you want to.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
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11. _____
12. _____
13. _____
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21. _____
22. _____
23. _____
24. _____
25. _____

3

Activity 2. GUESSING CAUSES: In the spaces below, list as many *possible* causes as you can of the action shown in the picture on page 2. You may use things that might have happened just before the things that are happening in the picture, or something that happened a long time ago that made these things happen. Make as many guesses as you can. Don't be afraid to guess.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
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8. _____
9. _____
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11. _____
12. _____
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22. _____
23. _____
24. _____
25. _____

4

Activity 3. GUESSING CONSEQUENCES: In the spaces below, list as many possibilities as you can of what might happen as a result of what is taking place in the picture on page 2. You may use things that might happen right afterwards or things that might happen as a result long afterwards in the future. Make as many guesses as you can. Don't be afraid to guess.

1. _____
2. _____
3. _____
4. _____
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6. _____
7. _____
8. _____
9. _____
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11. _____
12. _____
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21. _____
22. _____
23. _____
24. _____
25. _____

Activity 4: PRODUCT IMPROVEMENT

In the middle of this page is a sketch of a stuffed toy elephant of the kind you can buy in most novelty stores for about five to six dollars. It is about six inches tall and weighs about a half pound. In the spaces on this page and the next one, list the cleverest, most interesting and unusual ways you can think of for changing this toy elephant so that children will have more fun playing with it. Do not worry about how much the change would cost. Think only about what would make it more fun to play with as a toy.

1. _____

2. _____

3. _____

4. _____

5. _____

Activity 5: UNUSUAL USES (Cardboard Boxes)

Most people throw their empty cardboard boxes away, but they have thousands of interesting and unusual uses. In the spaces below and on the next page, list as many of these interesting and unusual uses as you can think of. Do not limit yourself to any one size of box. You may use as many boxes as you like. Do not limit yourself to the uses you have seen or heard about; think about as many possible new uses as you can.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____

- *Torrance Test (Arabic version):*

التفكير الابتكاري باستخدام الكلمات

الاسم .... الجنس : ولد .... بنت ....
تاريخ الميلاد .... العمر ....
المدرسة .... الفرقة الدراسية ....
المدينة ....

الصورة أ

وضع : إ . بول تورنس (د . ف)
ترجمة : عبدالله . م . سليمان (د . ف)
وإعداد : وفؤاد أبو حطب (د . ف)
الناشر : مكتبة الأنجلو المصرية بالقاهرة ١٩٧١

النشاط من ١ إلى ٣ : خمن وأسأل

تعتمد أوجه النشاط الثلاث الأولى في هذه الكراسة على الرسم الموجود في أسفل هذه الصفحة . هذه النشاطات ستعطيك فرصة لتبين قدرتك على أن تفكر وتسأل أسئلة تؤدى إجاباتها إلى معرفة الأشياء التى لا تعرفها ، وإلى أن تضع افتراضات عن الأسباب والنتائج الممكنة لما يحدث في الصورة . أنظر إلى الصورة . ماذا يحدث ؟ ما الذى تستطيع أنت أن تقوله بكل تأكيد ؟ ما الذى تحتاج أن تعرفه لكى تفهم ما يحدث ؟ ما الذى سبب الحدث ؟ وماذا ستكون النتيجة ؟
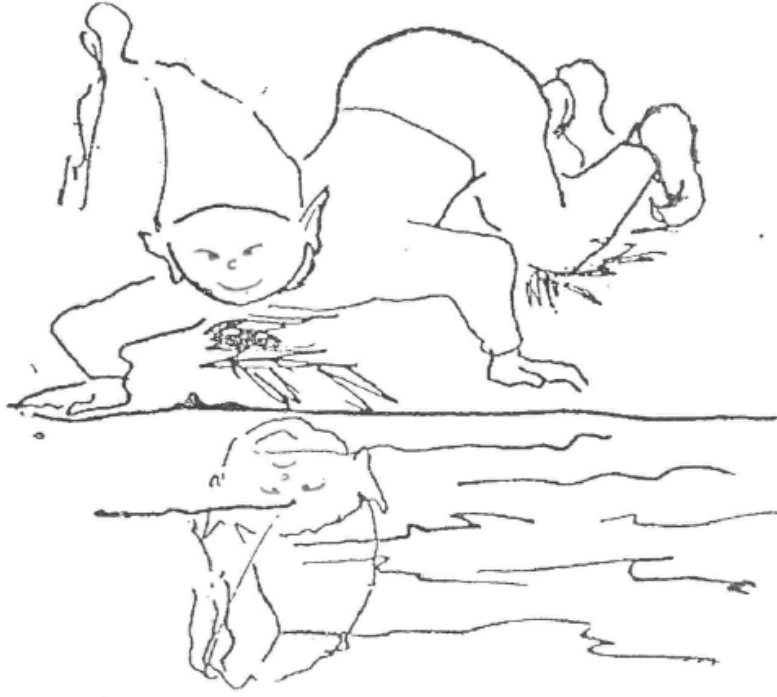
النشاط الأول : توجيه الأسئلة

أكتب على هذه الصفحة كل الأسئلة التي يمكنك أن تفكر فيها عن الصورة الموجودة في الصفحة السابقة . اسأل كل الأسئلة التي تحتاج إلى أن تسألها لكى تعرف ما هو حادث .. لا تسأل أسئلة يمكن أن يجاب عليها بمجرد النظر إلى الصورة . يمكنك أن تنظر ثانية إلى الصورة كلما أردت .

النشاط الثاني : تخمين الأسباب

اكتب فيما يلي كل ما تستطيع أن تفكر فيه من أسباب ممكنة للحادث الموجود في الصورة في صفحة ٢ من هذه الكراسة . يمكنك أن تفكر فيما قد يكون وقع قبل الحادث مباشرة أو وقع قبل ذلك بوقت طويل وأدى إلى ذلك الحادث الموضح في الصورة . اكتب كل ما تستطيع . لا تخف من مجرد التخمين .

النشاط الثالث : تخمين النتائج

أكتب فيما يلي كل ما تستطيع أن تفكر فيه مما يمكن أن يحدث نتيجة للحادث الموجود في الصورة في صفحة ٣ من هذه الكراسة . يمكنك أن تفكر فيما يمكن أن يقع بعد الحادث مباشرة أو ما سيأتي بعد الحادث بوقت طويل . أكتب أكثر ما تستطيع من التخمينات . لا تخف من مجرد التخمين .

النشاط الرابع : تحسين الانتاج

يوجد على هذه الصفحة صورة مرسومة لاحدى لعب الاطفال ، وهى عبارة عن فيل صغير محشو بالقش طوله ١٦ سنتمترا ووزنه حوالى ربع كيلو جرام . والمطلوب منك أن تكتب على هذه الصفحة والصفحة التالية الوسائل التي يمكنك أن تفكر فيها بحيث تصبح هذه اللعبة بعد تعديلها مصدراً لمزيد من السرور والفرح لمن يلعب بها من الاطفال . تحدث عن أكثر وسائل تعديل هذه اللعبة ذكاء وغرابة وإثارة للاهتمام . لا تهتم بتكاليف هذه التعديلات . فكر فقط فيما يمكن أن يجعل هذه اللعبة مصدراً لمزيد من السرور والفرح .

<div dir="rtl">

_____ ١

_____ ٢

_____ ٣

_____ ٤

_____ ٥

النشاط الخامس : الاستعمالات غير الشائعة (علب الكرتون)

يلقى معظم الناس بعلب الكرتون الفارغة (مثل علب ~~الكبير~~ ،
وصناديق الكبريت ، وصناديق الصابون .. الخ) رغم أن لها كثيرا من
الاستعمالات اللطيفة وغير الشائعة . أكتب على هذه الصفحة وعلى الصفحة
التالية كل ما تستطيع أن تفكر فيه من هذه الاستعمالات اللطيفة وغير الشائعة
ولا تحدد تفكيرك بحجم معين من هذه العلب . يمكنك أن تستخدم أى عدد من
هذه العلب كما تشاء . لا تقصر تفكيرك على الاستعمالات التى رأيتها أو سمعت
عنها من قبل ، وإنما فكر قدر المستطاع في الاستعمالات الجديدة الممكنة .

</div>

النشاط السادس : الأسئلة غير الشائعة

المطلوب منك في هذا النشاط هو أن تفكر في أكبر عدد من الأسئلة التى يمكنك أن تسألها عن علب الكرتون بشرط أن تؤدى هذه الأسئلة إلى إجابات عديدة ومتنوعة ، وأن تثير لدى الأشخاص الآخرين الإهتمام وحب الاستطلاع فيما يتصل بهذه العلب . حاول أن تجعل أسئلتك تدور حول بعض النواحى الخاصة بهذه العلب والتى عادة لا يفكر فيها الناس .

النشاط السابع : أفترض أن

فيما يلى موقف غير ممكن الحدوث ـ موقف قد لا يحدث أبداً . وعليك أن تفترض أنه قد حدث بالفعل ، وسوف يعطيك هذا الإفتراض الفرصة لاستخدام خيالك لتفكر في كل الأمور الأخرى المثيرة التى يمكن أن تحدث إذا تحقق هذا الموقف غير الممكن الحدوث .

افترض في خيالك أن الموقف الذى سنصفه لك فيما بعد قد حدث . ثم فكر في كل الأمور الأخرى التى قد تحدث بسببه ، وبمعنى آخر ما هى النتائج المترتبة على ذلك ؟ أكتب كل ما يمكنك كتابته من تخمينات .

الموقف غير الممكن : أفترض أن للسحب خيوطا تتدلى منها وتربطها بالأرض . ما الذى قد يحدث ؟ أكتب كل أفكارك وتخميناتك على الصفحة التالية .

439
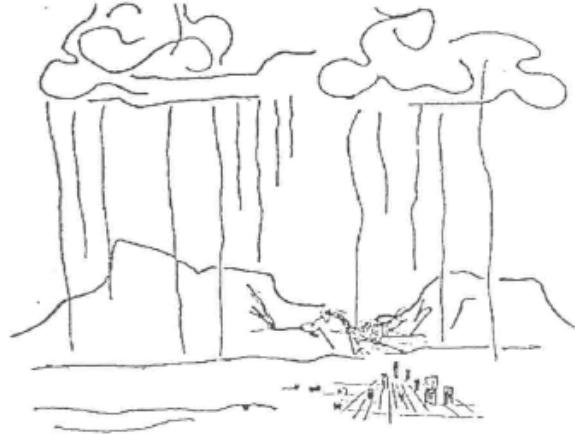
Appendix 8: An example in the "Prayer" topic for electronic resources after translation to English language
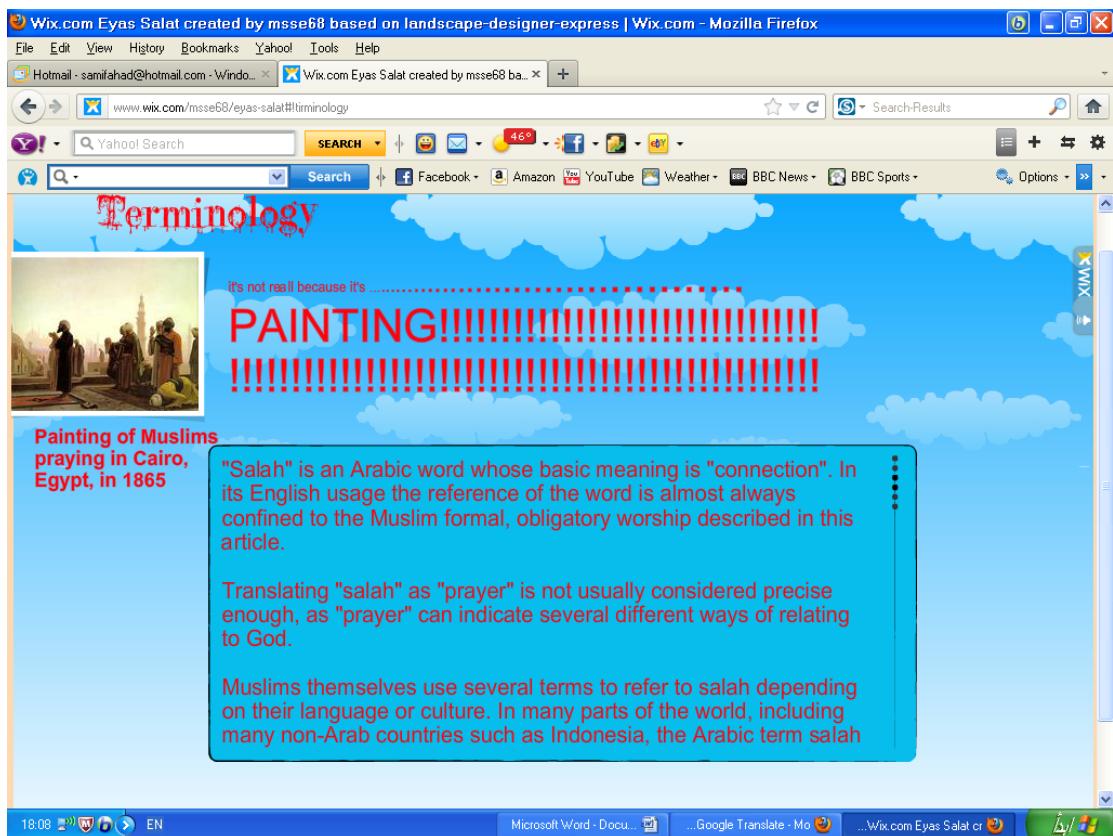
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Purpose and importance

Bosnian Muslims praying, ca. 1906

SALAAH IS VRY IMPORTANT, NOBODY IN ISLAM SAY IT'S NOT IMPORTANT

The chief purpose of Salah in Islam is to act as a person's communication with and remembrance of God. By reciting "The Opening", the first chapter of the Qur'an, as required in all daily worship, the worshipper can stand before God, thank and praise Him, and to ask for guidance along the Straight Path.

In addition, daily worship remind Muslims to give thanks for God's blessings and that submission to God takes precedence over all other concerns, thereby revolving their life around God and submitting to His will. Worship also serves as a formal method of remembering Allah, or dhikr

In the Qur'an, it is written that: "The true believers are those who feel fear in their hearts when God is mentioned. And when His Revelations are recited to them, they find their faith strengthened. They do their best and then put their trust in their Lord."

"To those whose hearts, when God is mentioned, are filled with fear, who show patient perseverance over their afflictions, keep up regular prayer, and spend (in charity) out of what we have bestowed upon them."

Salah is also cited as a means of restraining a believer from social wrongs and moral deviancy. According to a hadith in the collection Sahih Bukhari, Muhammad considered salah "the best

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Differences in practice

THE FIRST THREE WORDS ARE ANOTHER WORD FOR SALAAH

The Islamic worship (salat) practiced by one Muslim may differ from another's in minor details, which can affect the precise actions and words involved. Differences arise because of different interpretations of the Islamic legal sources by the different schools of law (madhhabs) in Sunni Islam, and by different legal traditions within Shi'ism. In the case of ritual worship these differences are generally minor, and do not necessarily cause dispute. It is important to note the reason why Sunni Muslims have a basic agreement on the necessary part of the Salah. Muslims believe that the Prophet Muhammad practiced, taught, and disseminated the worship ritual in the whole community of Muslims and made it

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Conditions

THERE ARE THREE CONDITIONS, NO MORE!!!

View of the worship hall of the Great Mosque of Kairouan (also called the Mosque of Uqba) considered as the oldest mosque in the Western Islamic World.[8] At the bottom of the central nave of the prayer hall there is a niche (the mihrab) indicating the qibla. The Great Mosque of Kairouan is located in the city of Kairouan in Tunisia.

This compulsory act of worship is obligatory for those who meet these three conditions:

are Muslim
are of sound mind
have reached the age of 10 (beginning at age seven is recommended).
There are five elements that make Salah valid:

Confidence of the time of worship. Being unsure invalidates even if the time turns out correct.[citation needed]
Facing the qibla, with the chest facing the direction of the Ka'ba. The ill and the old are allowed leniency with posture.
Covering the awrah
Clean clothes, body, place of prostration.
Ritual purity (wudu, tayammum, ghusl)
Praying in front of a sutrah.
The place of worship should be clean. In a few cases where blood is leaving

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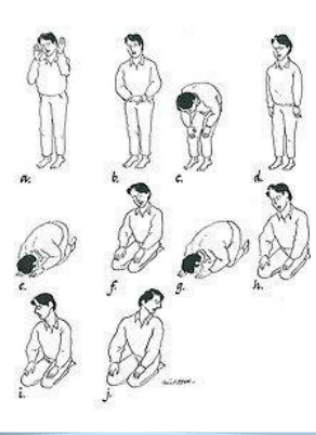File Edit View History Bookmarks Yahoo! Tools Help

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www.wix.com/msse68/eyas-salat#!preparation

Yahoo! Search   SEARCH   Facebook   Amazon   YouTube   Weather   BBC News   BBC Sports   Options

Preparation

Cleanliness and dress
Islam advises that Salah be performed in a ritually clean environment . When worshipping, the clothes that are worn and the place of prayer must be clean. Both men and women are required to cover their bodies (awrah) in reasonably loose-fitting garments. The well-known adage or hadith by al-Nawawi that "purity is half the faith" illustrates how Islam has incorporated and modified existing rules of purity in its religious system.

Ritual ablution
Main articles: Wudu, Tayammum, and Ghusl
Before conducting Salah, a Muslim has to perform a ritual ablution.

The minor ablution is performed using water (wudhu), or sand (tayammum) when water is unavailable or not advisable to use for reasons such as illness.

Wudhu is performed by Muslims according to the instructions of God given in the Qur'an

"O you who believe! when you rise up to prayer, wash your faces and your hands as far as the elbows, and wipe your heads and your feet to the ankles; and if you are under an obligation to perform a total ablution, then wash (yourselves) and if you are sick or on a journey, or one of you come from the privy, or you have touched the women, and you cannot find water, betake yourselves to pure earth and wipe your faces and your hands therewith, Allah does not desire to put on you any difficulty, but He wishes to purify you and that He may complete His favor on you, so that you may be grateful."

More specifically wudhu is performed by Muslims by washing the hands, mouth, nose, arms, face, hair, ears,(often washing the hair is merely drawing the already wet hands from the fringe to the nape of the neck) and feet three times each in that order. (It is not obligatory to wash the hair three times, once is sufficient, and men must also wash their beards and mustaches when washing the face).

Intention
Main article: Niyyah
The person should be conscious and aware of the particular Salah that is being offered, whether it is obligatory, if it is a

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Appendix 9: An example of colour coding from some pieces of the original interview.

(Interruption of the researcher: But the pupil may hate the subject because of the teacher or the methods)

I think the ways are different and changing ways is an attractive means. The oratorical way is a boring way to pupils but if the teacher uses many ways in the same lesson, pupils will be attracted. Also, using technology is a factor and we notice that everyone participates.

AFF Tech ←

There is a good way for pupils by using the Power Point program and pupils do their best in preparing lessons. This helps them in growing their thinking skills, because it gives pupils information quickly. Also, the manner of preparing questions and answers is useful for the pupil.

Thinking ←

- Do you think that using technology in teaching Islamic Education by using the brainstorming method gives us a clear idea about creative thinking skills and helps pupils to learn continuously?

Yes, sure.

- What do you notice when you use this method compared with the other methods (verbal brainstorming and traditional)?

AFF intraction ←

All pupils interact when we use this way; also competing is stronger than with the other ways.

The fourth section: Teaching method (Electronic brainstorming):

- What do you know about this method of teaching?

Hindranc ←

With sorrow, using technology is very low in schools and also this method of teaching is not good with the big numbers in the classes.

- After having applied this method, what is your opinion of it?

AFF intraction ←

This method has many advantages, like interaction and the growing abilities of thinking and conceiving. On the other hand, it has disadvantages, as the lack of knowledge of some pupils about using the computer. If there isn't a computer in the house, the pupil won't be in contact with his other mates. Also, the narrow time slot is an important factor.

Thinking ↗

Hindrances ↘

444

Appendix 10: Certificate of ethical research approval

UNIVERSITY OF
EXETER

Graduate School of Education

Certificate of ethical research approval

STUDENT RESEARCH/FIELDWORK/CASEWORK AND DISSERTATION/THESIS
You will need to complete this certificate when you undertake a piece of higher-level research (e.g. Masters, PhD, EdD level).

To activate this certificate you need to first sign it yourself, and then have it signed by your supervisor and finally by the Chair of the School's Ethics Committee.

For further information on ethical educational research access the guidelines on the BERA web site: http://www.bera.ac.uk/blog/category/publications/guidelines/ and view the School's statement on the 'Student Documents' web site.

READ THIS FORM CAREFULLY AND THEN COMPLETE IT ON YOUR COMPUTER (the form will expand to contain the text you enter). **DO NOT COMPLETE BY HAND**

Your name: Sami Alsenaidi

Your student no: 570006715

Return address for this certificate: 58 Constantine House, New north Road, Exeter, EX4 4JH

Degree/Programme of Study: 4 Years PhD

Project Supervisor(s): Professor Rupert Wegerif

Your email address: sa294@ex.ac.uk and samifahad@hotmail.com

Tel: 07889778535

I hereby certify that I will abide by the details given overleaf and that I undertake in my **dissertation / thesis** (delete whichever is inappropriate) **to respect the dignity and privacy of those participating in this research.**

I confirm that if my research should change radically, I will complete a further form.

Signed:..date:......01/02/10..............

*NB For Masters dissertations, which are marked blind, this first page must **not be included** in your work. It can be kept for your records.*

Chair of the School's Ethics Committee
last updated: August 2009

Certificate of ethical research approval

Your student no: 5700067l5

Title of your project:

Electronic brainstorming in Saudi primary Education

Brief description of your research project:

This study explores the use of electronic brainstorming in classrooms in primary schools in Saudi Arabia. It will involve students in primary school who used computers in their Islamic education lessons.
The main aim of my study explores the students' interest in Primary school in Saudi Arabia and to improve their creativity skills through electronic brainstorming and to investigate the influence of the electronic brainstorming method in classroom activity. The data collections to be used in this study will be mainly pre-test and post-test (to measure creativity skills for students); lesson observations as well as the students' social interaction and contribution to their lessons which will be conducted during the study. Teachers and the students will also be interviewed. The sample will consist of 25 to 30 primary school students whose are age between 11 and 12 years old and Islamic education teachers. The study will to take place in a classroom within the students' primary school around three months in Buraydah city in Al Qassim County in Saudi Arabia.

Give details of the participants in this research (giving ages of any children and/or young people involved):

participants:

- School students pre-test and post-test (to measure creativity skills for students for Torrance Test): A number of students in the Primary School will be between 80 and 90 students in three classrooms offered the opportunity to partake in this part of the research by parents and local Ministry of Education in Al Qassim County.

- Semi-structured interviews: I will have been identified for primary school pupils in year six will be asked to join a focus group for a semi-structured interview. These will be randomly sampled and both their own and parental consent will be obtained prior to involvement in the interview. In addition, I will be interviewed Islamic education teachers about what happened in classroom and their consent will be obtained prior to involvement in the interview.

- Classroom Observations: I will take place into classroom for observing and I will report what happened in classroom and do research aims have been achieved. and both their own and parental consent will be obtained prior to involvement in the observation. In addition, I will observe teaching methods for teachers whose are application the aims method and achieve the research aims. Their consent will be obtained prior to involvement in the interview.

Chair of the School's Ethics Committee
last updated: August 2009

Give details regarding the ethical issues of informed consent, anonymity and confidentiality (with special reference to any children or those with special needs) a blank consent form can be downloaded from the SELL student access on-line documents:

I will be following the Code of Ethics and Conduct set out by the British Educational Research Association (BERA, 2004) Issues regarding respect, confidentiality, informed consent, safe guarding will be carefully considered as detailed below.

The following procedures will be applied to satisfy ethical concerns. First, approval from school authorities will be obtained before carrying out the research. Second, all personal data of persons involved in the research will be kept a secret and will not be exposed to the public. Third, no real names of persons involved in the research will appear in the research report. Fourth, all data collected will be for educational purposes only and will not be used to earn any benefit. Fifth, oral approval from the school authority, teachers, parents and students will be obtained before doing the observations, video recording and interviews. Sixth, the researcher will be inform teachers, school authorities, the children and their parents with aims and procedures of the research as well as after the research, copies of the draft research report will be distributed to the school authority, teachers, parents and students. Lastly, any necessary modifications to the report will be making, if there are any objections from them, before letting the public have the chance of looking at the report.

Give details of the methods to be used for data collection and analysis and how you would ensure they do not cause any harm, detriment or unreasonable stress:

Data collection:

- Quantitative: A quantitative measure using a Pre-test and Post-test for Torrance measurements of creativity thinking will be used to sample the views of school students. This tests will involve six activities for measure their creativity skills. The students will response these activities.

- Qualitative: Information to determine the current views, perceptions and improve creativity skills on classroom as well as influence electronic brainstorming will be obtained through semi-structured interviews and classroom observation. This will involve primary pupils in six years and Islamic education teachers. With the consent of participants, interviews will be recorded and transcribed. This will then be coded thematically.

Data Analysis:

- Quantitative data: Questions in the creativity thinking test will be grouped according to the sub-skills of creativity thinking. The average score for each sub-skill will be calculated to find out the ability of students in various aspects of creativity thinking. The greater the score, the more able will the students be in that specific sub-skill. The average scores of sub-skills will add up to form an overall creativity thinking index. The scores students will get from the pre-test and the post-test will be compared to see if there is any difference in their creativity thinking ability before and after the implementation of the electronic brainstorming program. In this study, I will use scientific approach for showing the results between pre-test and post-test. Then, I will compare between the results and I know what method is best for promotion creativity skills. I will use SPSS scientific approach for showing the results between pre-test and post-test.

- Qualitative information will be transcribed and uploaded to NVivo 5 for thematic coding and further analysis. Differences among views of participants will be explored and cross comparisons made with regard influence and reflect in teaching methods. In addition, Data will write during observation classroom and reporting after pre lessons. Evidence of students feeling excited, bored, interested, concentrated, discussing subject content with classmates.

In addition, I will look at the notes taken during the classroom observations and will listen to audio recorded to get an overview of each lesson and each teachers with their students, and I will go through the students reflections with teaching methods. Then I will formulate questions for follow-up interviews with the teachers and students.

Give details of any other ethical issues which may arise from this project (e.g. secure storage of videos/recorded interviews/photos/completed questionnaires or special arrangements made for participants with special needs etc.):

During the data collection, data analysis and write up, data (questionnaires, audio recordings, consultation meeting records, observation records, interview data and individual data) will be securely stored in a locked cabinet in a secure building. As previously mentioned, electronic information will only be accessed by the researcher with their username and password. Electronic information will also be stored on a secure system, within a locked building with recognised virus protection. It will be destroyed when it is no longer required.

Give details of any exceptional factors, which may raise ethical issues (e.g. potential political or ideological conflicts which may pose danger or harm to participants):

This is a particularly sensitive area of research and therefore informed consent and right to withdraw must be strictly adhered to. It is also the responsibility of all those involved in the research to raise concerns about any of the participants. Parents of this cohort must be fully informed and be offered clear channels of communication to the researcher throughout the case study period.
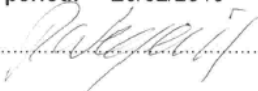
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*This form should now be printed out, signed by you on the first page and sent to your supervisor to sign. Your supervisor will forward this document to the School's **Research Support Office** for the Chair of the School's Ethics Committee to countersign. A unique approval reference will be added and this certificate will be returned to you to be included at the back of your dissertation/thesis.*

N.B. You should not start the fieldwork part of the project until you have the signature of your supervisor

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This project has been approved for the period: 20/02/2010   **until:**   20/05/2010

By (above mentioned supervisor's signature): ....date: 2/02/10

N.B. To Supervisor: Please ensure that ethical issues are addressed annually in your report and if any changes in the research occurs a further form is completed.

SELL unique approval reference:..................D.09.13.44.......

Signed:...........Salah.....................................date: 6/02/2010
Chair of the School's Ethics Committee

This form is available from   http://education.exeter.ac.uk/students/

Chair of the School's Ethics Committee
last updated: August 2009