Seek, Read, Present, Question (SRPQ): A feasibility study of an integrated strategy to teach history and critical thinking in a high school in Saudi Arabia

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Seek, Read, Present, Question (SRPQ): A feasibility study of an integrated strategy to teach history and critical thinking in a high school in Saudi Arabia

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Abstract

The growth of technology in the twenty-first century drives school education to use digital resources and communication tools for teaching and learning. Students need to be able to retrieve, select and collate useful information from a wealth of digital sources; to judge the suitability and reliability of the retrieved information; and to decide whether to process the selected information. They, therefore, need to master information literacy and critical thinking skills for their success in learning advancement. The key reason for this feasibility study is to propose a new strategy (Seek, Read, Present, Question: SRPQ) for education in Saudi Arabia that relies on technology in a collaborative learning situation to teach 'History' with critical thinking in Saudi girls' schools. It also seeks to figure out the extent to which this new strategy is applicable and acceptable for both teachers and students so that students can successfully learn the curriculum whilst develop their critical capabilities.

This study employed mixed methods to address the central questions where collaborative action research was the key approach, alongside interviews, unstructured observations and participants' reflective perspectives at the end of the study. Each data source has been analysed separately. The data was gathered from interviews with teachers and students who participated in this study; tests of achievement; students' and teachers' perspectives who transferred the strategy proposed in this study into their classroom; and the feedback that came from the schools' inspector who attended some lessons. The data was obtained over the course of twelve weeks, when the study was conducted, to answer the main research questions.

The study concludes that the SRPQ strategy is likely to be a practical and usable strategy to teach students their history curriculum in classroom, as the students made progress in their achievement tests. It may also be feasible to teach aspects of critical thinking. Both teachers

and students found it acceptable in the classrooms. Further research about this strategy is recommended.

Keywords: Teaching strategies, SRPQ strategy, Digital technology, Internet use, Collaborative learning, History, Critical thinking, Saudi Arabia

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DEDICATION

I had been blessed with an inspiring great mother, Fatima, whom this work is dedicated to honour her loving memory.

Also, this thesis is dedicated to my late father, Yahya, who shared with me the beginning of the road but did not see its end.

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I miss you both, and I always do.

Declaration

I declare that the work contained in this thesis is my own work and has not been submitted for any other awards or degree.

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Chapter One: Introduction

1.0. Introduction

Learning in the Islamic tradition is commonly believed to have been deeply rooted in the early revelations of the Holy Qur'an. This is largely associated with the time when the first verse of the Qur'an was revealed to the Prophet Muhammad (peace be upon him) was in the form of a divine command: 'read' (أقرأ). Since that time, the interest in teaching and learning has been an essential part of any Muslim's life. With the focus of this study on the teaching and learning of critical thinking by using technology to keep up with the pressing needs of the modern time in the Saudi context, it is of paramount interest to provide an historical overview of the structure of the education system in this part of the world, from the early period till present. Here, we raise a set of essential question: how was the situation of teaching and learning in the past and how is it now? We will have a close look at the teaching methods that are currently employed in Saudi schools.

There will also be a section on critical thinking in the Holy Qur'an. The reason for approaching this issue is that Saudi Arabia is an Islamic country and the Islamic Shari'ah (Islamic Law based on the teachings of the Qur'an and Sunnah) serves as the foundation of its constitution and legal framework. The aim is to thoroughly investigate how the Qur'an values thinking in general and critical thinking in particular, and to see whether critical thinking is encouraged or inhibited there. This chapter presents the researcher's motivation to examining this topic and the rationale behind this study. Finally, a brief summary of how this thesis is organised is provided as well. In general, this chapter is divided into four sections.

- Section One: An overview of the Education system structure in Saudi Arabia
- Section Two: Critical thinking in the Holy Qur'an
- Section Three: The Rationale of the present study
- Section Four: Study overview

1.1. Section One: The Education system in Saudi Arabia

The underlying principles of the Saudi education system are to create outputs that are supportive of and concordant with an Islamic, Arab and national identity, which is open to and interactive with other nations and civilisations, stemming from the springboard of the determinants and characteristics of the Arab-Islamic culture (Education, 2017). It is commonly agreed that until the late 19th century, the education structure in Saudi Arabia was generally rudimentary; the official formal education in the Kingdom had only begun in 1925. It has gone through many stages: traditional education in primary schools, in the mosques and in the houses of scholars. That stage usually lasted from five to six years, and that form of informal education was widely spread in Hijaz, Najd and the northern and southern regions (Al-Romi and Al-Swedani, 2013). From the primary school level, up to institutions of higher learning, religious studies, such as recitation and intonation of the Holy Qur'an, were taught alongside the study of Arabic language. Teachings of the Qur'an were given in the *Kuttab* (كُتّاب), a privately-run class where young children used to frequent to receive an elementary form of education. There was also a form of home-schooling that was carried out in other areas of Saudi Arabia. Modern natural subjects, such as arithmetic, were first introduced to the Saudi setting around 1920s, and they were generally taught at private schools (Sedgwick, 2001).

Under the Ottoman statute, the ten recitations of the Holy Qur'an were taught alongside learning foreign languages. The beginning was in Al-Ahsa' and Hijaz regions, then it rapidly spread to other areas in the Arabian Peninsula. Students who wished to pursue their studies beyond the elementary level had to join informal schools called *Halaqat* (حَلَقَات) or study circles, which focused on subjects such as Arabic language, history, arithmetic, Arabic literature and Qur'an Exegesis (Al-Romi and Al-Swedani, 2013). The Saudi authority of education established in 1951 gave the education sector in the Kingdom the essential impetus. In the beginning, it was called the 'ministry of knowledge', and education then was exclusive to boys. Nine years later, with the widespread awareness of the importance of and fundamental need to women's learning, women were allowed to join formal education in 1960. This was established under a different authority (The General Presidency for Girls' Education), while teaching the same curricula as those of men. In 2002, the two sectors of

men and women education merged under one authority “Ministry of Education” (Education, 2017). Since that time, the students’ number rose highly. According to Sayigh, in 1971 “Education still touches only a small proportion of the children of school age in all parts of the regions”. This number rose to six million students, of both genders, according to the latest statistics revealed by the Ministry of Education in 2016 (Education, 2017). Public education involves kindergarten, primary schooling for six years, three years in middle school and three years in high school (Education, 2017). The ministry of education has laid down and developed a set of policies and curriculum developments over the years in an attempt to meet any challenges (Education, 2017).

Recently, the Ministry of Education in Saudi Arabia has worked on developing a number of advanced policies that aim to address some emerging challenges, such as technological advancement, in order to keep up with global transformations. It has also developed some social and economic studies to help locals gain specific skills in order to run the national economy, which for years had been dominated by foreign workers. The use of technology has remarkably revolutionized learning in Saudi Arabia and introduced a variety of learning strategies, such as e-learning and collaborative learning, which have been viable to implement and to benefit thousands of learners in the country. Effective networking between students and faculty as well as amongst students has also been encouraged (Duiker and Spielvogel, 2007).

Prokop (2009) postulates that each wave of educational reform in Saudi Arabia came in the aftermath of either national incidents, such as the 1979 and the 2002 incidents in Makkah city, or international events, such as the terrorist attacks of September 11$^{th.}$ These incidents, he claimed, had spurred educational reforms and raised a public debate about the outputs of the education system in Saudi Arabia. However, these changes should not be viewed from a negative perspective; each change that occurred within the education system raises more deliberation that, I believe, will enhance the system and improve the conditions of learning and teaching in Saudi Arabia as a whole. However, there is still a gap between the outputs of learning in schools and the labour market demands, due to the lack of skilled workforce. At the same time, Saudi education system is creating a workforce that the national economy is not able to absorb (Doumato,1999). No doubt, the development of the education system has enhanced the economic capabilities to adopt and boost

the available technology (Roy, 1992). However, the big challenge for any reform attempt within the education system, as evidenced in relevant researches, lies not only in the contribution to boosting the economy but in human development as well (Maroun, Samman, Moujaes and Abouchakra, 2014).

Further, the employment of untrained teachers in schools in order to meet the rising demand or to create more job opportunities often came at the expense of the teacher's competence and qualification, which is clearly reflected in the quality of education itself (Cross, 2003). Unfortunately, teacher's preparation programs in most Saudi universities can be described as non-systematic and insufficient; students (pre-service teachers) are graduated with a bachelor degree and an associate subject, such as history, physics, math, English and so on (Al-Hazmi,2003). The influence of teachers on students' outcome is widely known to be complex. Mostly, it is a reflection of their academic skills, their experiences and their professional development. However, in recent years, the Ministry of Education has organized an in-service teachers' education programme that aimed to modernize teaching methods and identify the obstacles to effective teaching (Education, 2017). However, Courington and Zuabi (2011) believe that education reform in Saudi Arabia has not gone far enough and still needs a lot of effort to be made.

Richmond (2007) points out that in the developing countries, the teaching methods commonly used make students passive recipients of knowledge. This is mostly due to the unsuccessful training of professionals, which stifles their critical and creative thinking skills and hamper the development their nation. The essential problem of the education system in Saudi Arabia is its focus on the skill of memorizing information that can be recalled later in exams. Nevertheless, there is an emphasis nowadays on practical skills (Courington and Zuabi, 2011). It is observed that teaching in Saudi Arabia has slowly been transformed from teacher-centred pedagogy to a learner-centred one that involves the utilization of technology in classrooms, collaborative learning, as well as other strategies that inspire students to reflect on their learning and be self-directed. However, it still demands a lot of effort, time and collaborative work to make an actual and effective transformation of both teaching and learning, especially when half of the Saudi population is under the age of twenty-five according to the General Authority for Statistics in Saudi Arabia (2016).

1.2. Section Two: The critical thinking in the Holy Qur'an

1.2.0. Introduction

The Holy Qur'an is the fundamental source that inspired Muslims to build one of the greatest civilizations ever in the world. It constituted the biggest drive that led Muslims to excel other nations in science and knowledge in the middle ages and to lay the foundation of a great intellectual ravine that still has an impact on scientific research until present. Two distinctive elements played a pivotal role in the Islamic intellectual history during the early Islamic period: 1) the Qur'an and the Sunnah (sayings, acts and consents of the Prophet Muhammad 'peace be upon him'), and, 2) a growing interest in Greek philosophy and sciences, beside the study of classical philosophy of India, Persia and China. In that period, Muslims reached the zenith of intellectual thought, especially in the Arab region. They were gifted in literary arts and exhibited eloquence and beauty in their ability to write and memorize thousands of verses and poems. Therefore, part of the miracle of the Holy Qur'an is to challenge the people of Makkah to produce a text that could challenge the magnificence of the Qur'anic verses. In many verses, the Holy Qur'an invited the Makkah's non-believers to challenge, to ponder over their creation, to reflect on the means they are provided with food as well as to be critical about their beliefs and thoughts.

1.2.1 What is the Qur'an?

The most common definition of the Holy Qur'an in Islamic literature is that it is "Allah's word sent down to Muhammad (peace be upon him) for guidance and worship" (Deraz, 1957). This definition is echoed in many verses (Ayat) of the Qur'an itself. Sometime the Qur'an is called "Aayat" which means verses or simply "The Book" or "Allah's Book", as Deraz mentioned that the association between 'Book' and 'Allah' is to distinguish Allah's word from other words, such as words by people or angels (1957). For instance, in Surah Al-Hadeed, verse 9, Allah says,

(It is He who sends down upon His Servant [Muhammad] verses of clear evidence that He may bring you out from darkness into the light. And indeed, Allah is to you Kind and Merciful)

(هُوَ الَّذِي يُنَزِّلُ عَلَىٰ عَبْدِهِ آيَاتٍ بَيِّنَاتٍ لِّيُخْرِجَكُم مِّنَ الظُّلُمَاتِ إِلَى النُّورِ ۚ وَإِنَّ اللَّـهَ بِكُمْ لَرَءُوفٌ رَّحِيمٌ (9)

Furthermore, in surah An-Naml, verse 6, Allah the Almighty says:

(And indeed, [O Muhammad], you receive the Qur'an from one Wise and Knowing)

(وَإِنَّكَ لَتُلَقَّى الْقُرْآنَ مِن لَّدُنْ حَكِيمٍ عَلِيمٍ (6)

Muslims believe that the Holy Qur'an is the last revealed word of Allah. It is the primary source of every Muslim's faith and practice. The Qur'an is most commonly seen in a written form, yet most Muslims learn it by heart. Some memorize all of it, and others memorize only some verses. It was revealed to Muhammad (peace be upon him) in Arabic, which means any Qura'nic translation, either into English or any other language, is neither a Qur'an nor a version of the Qur'an, but rather a translation of its meaning. So, it only exists in Arabic version, which has not changed since communication to the Prophet (peace be upon him).

1.2.2. How are 'thinking' and 'mind' represented in the Holy Qur'an?

The word think *'Fakkar'* (فكّر) in the Qur'an appears in many phrases that express the process of thinking or thinking skills. It is always mentioned in the course of a compliment or an urge to use reason in different situations. Moreover, the Holy Qur'an uses subordinate clauses, such as "*Oly Alnouha*" or "*Oly Al-Albab*" (ألي النُّهى or أُلي الألباب) which means those who have intelligence or understanding, as a tribute to people who use their mind or thinking to realize the truth, the purpose of something, or the rationale behind their beliefs, actions or sayings. These phrases are repeated eighteen times in the Holy Qur'an. For example, Allah said in Surah Al-Ma'ida; verse 100:

(قُل لَّا يَسْتَوِي الْخَبِيثُ وَالطَّيِّبُ وَلَوْ أَعْجَبَكَ كَثْرَةُ الْخَبِيثِ فاتقوا اللَّـهَ يَا أُولِي الْأَلْبَابِ لَعَلَّكُمْ تُفْلِحُونَ)

Say, (Not equal are the evil and the good, although the abundance of evil might impress you." So, fear Allah, O you of understanding, that you may be successful)

This verse indicates that some people give priority to quantity over quality, even though when the preponderance represents the evil side. But people who have a good understanding and reasoning favour quality, even though it is supported by the minority (al-Qaradawi,1996). El-Akkad (2013) stated in his book "Al-Tafkeer Fareedah Islamiyah" that all religions mentioned thinking and mind

only implicitly, but Islam explicitly emphasized and commended it as a great activity that should be used in every matter. Ibn Taymiyyah (1984) defined the meaning of 'Amani' (أَمَاني) in Surah Al-Baqarah, verse 78.

(وَمِنْهُمْ أُمِّيُّونَ لَا يَعْلَمُونَ الْكِتَابَ إِلَّا أَمَانِيَّ وَإِنْ هُمْ إِلَّا يَظُنُّونَ)

(And among them are unlettered ones who do not know the Scripture except in wishful thinking, but they are only assuming)

Ibn Taymiyyah said: They did not grasp the meaning of the book so they could not understand it, even though they knew how to read and memorize it. Vygotsky in his book 'Thinking and Speech' agreed with this meaning emphasizing that learning words and their connections with objects does not lead to the formation of concepts, but rather there is a need for a task or a goal. However, Vygotsky (1934) thought it is not the only effective factor to formulate concepts.

The word ‘Aql’ (عقل) which means “sense, sentience, reason, understanding, comprehension, discernment, insight, rationality, mind, intellect, intelligence” appears 49 times as a verb, either in association with a plural noun (most of the time) or with single noun. All of these occasions come in present tense, except one case that places emphasis on the importance of the thinking skills process not just on the mind solo. Most of the time this occurs to express or cover three meanings: understanding, distinction between good and evil matters or prevention of the occurrence of evil things. In Surah Al-Baqarah, verse 75 Allah said about a party of the Jews who adapted their Scripture:

أَفَتَطْمَعُونَ أَن يُؤْمِنُوا لَكُمْ وَقَدْ كَانَ فَرِيقٌ مِّنْهُمْ يَسْمَعُونَ كَلَامَ اللَّـهِ ثُمَّ يُحَرِّفُونَهُ مِن بَعْدِ مَا عَقَلُوهُ وَهُمْ يَعْلَمُونَ

(Do you covet [the hope, O believers], that they would believe for you while a party of them used to hear the words of Allah and then distort the Torah after they had understood it while they were knowing?)

Here the verb (Aqelouh) (عَقَلُوه) associated with the pronoun “they”, i.e. non-believers, comes in the meaning of 'understand'. In other words, they understood what Allah says to them, yet they did not follow it.

In Surah Al-Mulk, verse 10, Allah the Almighty says:

وَقَالُوا لَوْ كُنَّا نَسْمَعُ أَوْ نَعْقِلُ مَا كُنَّا فِي أَصْحَابِ السَّعِيرِ

And they will say, "If only we had been listening or reasoning, we would not be among the companions of the Blaze."

Here the verb (Na'qel) (نَعْقِل), again associated with non-believers, expresses the meaning of ability of distinguishing between good and evil. This future dialog between angels and nonbelievers about why they end up in Hell, puts out the reason for their deviation from the right path as 'we didn't have mind or intelligence that would help us to distinguish between good and evil.

(وَإِذَا قِيلَ لَهُمُ اتَّبِعُوا مَا أَنزَلَ اللَّـهُ قَالُوا بَلْ نَتَّبِعُ مَا أَلْفَيْنَا عَلَيْهِ آبَاءَنَا ۗ أَوَلَوْ كَانَ آبَاؤُهُمْ لَا يَعْقِلُونَ شَيْئًا وَلَا يَهْتَدُونَ)

(and when it is said to them, "Follow what Allah has revealed," they say, "Rather, we will follow that which we found our fathers doing." Even though their fathers understood nothing, nor were they guided?)

Surah Al-Baqarah, verse 175, used the present tense with the negative form of the verb as "لا يعقلون" (they don't think wisely) or in an invective form (do you not understand?) to those who do not use their minds to contemplate things and unquestionably follow the traditions of their ancestors. In addition, the Holy Qur'an employed a number of synonyms to express the meaning of thinking, such as '*Tafakkur'* (تَفَكّر), *Tathekar* (تّذكر) that come to urge people to question or critique the way they think in order to enhance their thinking capabilities. *Tabassur* (تَبْصّر) and *E'atebar* (اعْتِبَار) are also used to promote deep thinking and reasoning. *Nazer* (نَظر), *Tafaqquh* (تَفقّه), <u>*Tadabbur*</u> (تدّبر) and *Edikar* (إدِكّار) are words that are used in the same vein. The following Table (1) lists all relevant words associated with the sense "عقل" in the holy Qur'an and the places of their mentioning. See table 1.1.

Words	Arabic sound	The meaning in English	Repetition in Al-Quran	How many Aya	How many Sura
آلتَفْكِير	Tafakkur	Thinking	18	16	13
التّعقّل	Aqel	Mind	49	50	30
التّذكر	Tathekar	Remembering	292	279	71
التّبصُر	Tabasuer	Considering	184	142	62
النّظر	Nazar	Deep understanding or awareness	129	113	48
التّدبر	Tadebuer	Thinking of thinking	4	4	4
التفقه	Tafaqquh	Awareness	20	20	12
الإعتبار	E'atebar	Considering	1	1	1
الإدكار	Edikar	Remembering	7	8	2

Table 1.1: words that come in the Holy Quran as the meaning of thinking

1.2.3. What are the instruments of thinking in the Qur'an?

The Holy Qur'an shows clearly in many verses that the heart is an important instrument whose task is to process information and knowledge that come to man via his senses, such as hearing and sight. Without it, learning, thinking, understanding and other intellectual acts would not occur. Abu Hamid al-Ghazālī (2005) said: the heart is the means of realizing the world of human knowledge. It is the part of the body that addresses, puts blame or make demands. Thus, there is an association between the faculties of hearing and sight on the one hand and the heart on the other hand in the Holy Qur'an that allows learning and thinking skills to be exercised, which was repeated in several verses. For instance, in Surah An-Nahl, verse 78, Allah says:

(وَاللَّـهُ أَخْرَجَكُم مِّن بُطُونِ أُمَّهَاتِكُمْ لَا تَعْلَمُونَ شَيْئًا وَجَعَلَ لَكُمُ السَّمْعَ وَالْأَبْصَارَ وَالْأَفْئِدَةَ ۙ لَعَلَّكُمْ تَشْكُرُونَ)

(And Allah has brought you forth from the wombs of your mothers not knowing a thing, and He made for you hearing and vision and intellect that perhaps you would be grateful)

In this verse, it is clearly stated that the processes of learning and knowing occur as a result of the activities of the human senses, such as hearing, sight and consideration by heart. The Holy Qur'an employs two phrases to express *'Aql'*. These are *'Qalb'* (قَلْب) and *'Fuo'ad'* (فُؤاد), which mean heart in

English, to express mind or intellectual. Ibn Kathir commented on this verse by saying that after Allah mentioned how He created man, He blessed him with the faculties of hearing to be aware of sounds, sight to see things and heart that is used symbolically to stand for the mind, which is the centre of human reasoning and realization (1357).

Another example in Surah Al-A'raf verses 179 Allah said:

(لَهُمْ قُلُوبٌ لَّا يَفْقَهُونَ بِهَا وَلَهُمْ أَعْيُنٌ لَّا يُبْصِرُونَ بِهَا وَلَهُمْ آذَانٌ لَّا يَسْمَعُونَ بِهَا ۚ أُولَٰئِكَ كَالْأَنْعَامِ بَلْ هُمْ أَضَلُّ ۚ أُولَٰئِكَ هُمُ الْغَافِلُونَ)

(They have hearts with which they do not understand, they have eyes with which they do not see, and they have ears with which they do not hear. Those are like livestock; rather, they are more astray. It is they who are the heedless)

This verse talks about three parts of human body: eyes, ears and hearts. Each one is assigned particular tasks; the eye to see, the ear to hear and the heart to reflect. This comes in the context of reproaching non-believers who adamantly rejected to recognize the truth about Allah despite that they have the mental faculties to do so.

1.2.4. What is the purpose of thinking in the Qur'an?

Thinking in the Holy Qur'an has a number of purposes, among which are:

To realize the existence of a Creator and act according to the principles of the faith He ordained. For example, Surah Al-Imran, verses 191, says:

(الَّذِينَ يَذْكُرُونَ اللَّـهَ قِيَامًا وَقُعُودًا وَعَلَىٰ جُنُوبِهِمْ وَيَتَفَكَّرُونَ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ رَبَّنَا مَا خَلَقْتَ هَٰذَا بَاطِلًا سُبْحَانَكَ فَقِنَا عَذَابَ النَّارِ)

(Who remember Allah while standing or sitting or [lying] on their sides and give thought to the creation of the heavens and the earth, [saying], "Our Lord, you did not create this aimlessly; exalted are You [above such a thing]; then protect us from the punishment of the Fire)

To explore the universe and how it works. In Surah Al-Imran, verses 190, Allah says:

(إِنَّ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ وَاخْتِلَافِ اللَّيْلِ وَالنَّهَارِ لَآيَاتٍ لِّأُولِي الْأَلْبَابِ)

(Indeed, in the creation of the heavens and the earth and the alternation of the night and the day are signs for those of understanding)

To reveal the divine in human life and how societies and civilizations have built. Surah Al-Imran verse 137, exhorts men to travel through the land and reflect on the creation of other nations. It says,

(قَدْ خَلَتْ مِن قَبْلِكُمْ سُنَنٌ فَسِيرُوا فِي الْأَرْضِ فَانظُرُوا كَيْفَ كَانَ عَاقِبَةُ الْمُكَذِّبِينَ)

(Similar situations [as yours] have passed on before you, so proceed throughout the earth and observe how was the end of those who denied)

To explore Human mental qualities, characteristics and patterns of behaviour. In Surah Ar-Rum, verse 8, Allay says,

(أَوَلَمْ يَتَفَكَّرُوا فِي أَنفُسِهِم)

(Do they not contemplate within themselves?)

To analyse the corroboration of ideas, principles and beliefs. For instance, Surah Al-Imran verse 65, reads,

(يَا أَهْلَ الْكِتَابِ لِمَ تُحَاجُّونَ فِي إِبْرَاهِيمَ وَمَا أُنزِلَتِ التَّوْرَاةُ وَالْإِنجِيلُ إِلَّا مِن بَعْدِهِ ۚ أَفَلَا تَعْقِلُونَ)

(O People of the Scripture, why do you argue about Abraham while the Torah and the Gospel were not revealed until after him? Then will you not reason?)

1.2.5. Types of thinking in the Qur'an

Reflective thinking. It is the ability to analyse and understand the relationship between cause and effect and to leverage one's understanding and experience to contemplate things through a series of events. The Holy Qur'an states that everything in our life works according to a specific system that one should recognize and construe in the right way. For instance. Surah Al-Ahzab, verse 62, states:

(سُنَّةَ اللَّـهِ فِي الَّذِينَ خَلَوْا مِن قَبْلُ ۖ وَلَن تَجِدَ لِسُنَّةِ اللَّـهِ تَبْدِيلًا)

([This is] the established way of Allah with those who passed on before; and you will not find in the way of Allah any change)

Holistic thinking. This is the ability to look at things as a whole including the many diverse types of relationships between the different factors in a complex system. This is emphasized in the Holy Qur'an in order to urge men to grasp the whole picture before judging a situation or expressing a particular point of view. Surah Al-Ahzab, verse 62, declares:

(بَلْ كَذَّبُوا بِمَا لَمْ يُحِيطُوا بِعِلْمِهِ وَلَمَّا يَأْتِهِمْ تَأْوِيلُهُ ۚ كَذَٰلِكَ كَذَّبَ الَّذِينَ مِن قَبْلِهِمْ ۖ فَانظُرْ كَيْفَ كَانَ عَاقِبَةُ الظَّالِمِينَ)

(Rather, they have denied that which they encompass not in knowledge and whose interpretation has not yet come to them. Thus, did those before them deny. Then observe how was the end of the wrongdoers)

Logical thinking. This is the process of thinking and evaluation based on provided knowledge or information. It involves scrutinizing information one knows, picking up uncertainties, and verifying conclusions. The notable narrative of Prophet Ibrahim's encounter with "An-namroud" illustrates this kind of thinking in Surah Al-Baqarah, verse 256. It says:

(مَا اتَّخَذَ اللَّـهُ مِن وَلَدٍ وَمَا كَانَ مَعَهُ مِنْ إِلَـٰهٍ ۚ إِذًا لَّذَهَبَ كُلُّ إِلَـٰهٍ بِمَا خَلَقَ وَلَعَلَا بَعْضُهُمْ عَلَىٰ بَعْضٍ ۚ سُبْحَانَ اللَّـهِ عَمَّا يَصِفُونَ ۝)

(Allah has not taken any son, nor has there ever been with Him any deity. [If there had been], then each deity would have taken what it created, and some of them would have sought to overcome others. Exalted is Allah above what they describe [concerning Him])

Divergent thinking. This involves breaking down a topic in order to explore its elements and generate new ideas by piecing together the details. Surah Al-Ankabut, verse 20 feeds into this vein. It says:

(قُلْ سِيرُوا فِي الْأَرْضِ فَانظُرُوا كَيْفَ بَدَأَ الْخَلْقَ ۚ ثُمَّ اللَّـهُ يُنشِئُ النَّشْأَةَ الْآخِرَةَ ۚ إِنَّ اللَّـهَ عَلَىٰ كُلِّ شَيْءٍ قَدِيرٌ)

(Say, [O Muhammad], "Travel through the land and observe how He began creation. Then Allah will produce the final creation. Indeed Allah, over all things, is competent)

Creative thinking. This expresses the ability to generate a new idea and look at things from different perspectives.

(إِنَّ اللَّـهَ فَالِقُ الْحَبِّ وَالنَّوَىٰ ۖ يُخْرِجُ الْحَيَّ مِنَ الْمَيِّتِ وَمُخْرِجُ الْمَيِّتِ مِنَ الْحَيِّ ۚ ذَٰلِكُمُ اللَّـهُ ۖ فَأَنَّىٰ تُؤْفَكُونَ)

(Indeed, Allah is the cleaver of grain and date seeds. He brings the living out of the dead and brings the dead out of the living. That is Allah; so how are you deluded?)

Critical thinking. This involves the ability to reason, reflect on, and consider an account, making a conclusion or resolving a problem. This type of thinking has a range of criteria that can be drawn through a variety of Qur'anic verses, which are explained below.

1.2.6. Criteria of critical thinking in the Qur'an?

Ideas or claims based on evidence. This is established in many phrases in the Holy Qur'an, such as 1) *'Elm'* (عِلْم) which means trace of knowledge, or *'Ketab'* (كِتَاب), which stands for a scripture. Surah Al-Ahqaf, verse 4, states:

(ائْتُونِي بِكِتَابٍ مِّن قَبْلِ هَٰذَا أَوْ أَثَارَةٍ مِّنْ عِلْمٍ إِن كُنتُمْ صَادِقِينَ)

(Bring me a scripture [revealed] before this or a [remaining] trace of knowledge, if you should be truthful)

Surah Al-Kahf, verse 15, puts out another term *'Sultan'* (سُلطَان) that expresses the meaning of authority. It states:

(لَّوْلَا يَأْتُونَ عَلَيْهِم بِسُلْطَانٍ بَيِّنٍ ۖ فَمَنْ أَظْلَمُ مِمَّنِ افْتَرَىٰ عَلَى اللَّـهِ كَذِبًا)

(Why do they not bring for [worship of] them a clear authority? And who is more unjust than one who invents about Allah a lie?")

Surah An-Naml, verse 64, establishes the significance of providing a *'Burhan'*(بُرْهَان), which means a proof or evidence, in the course of advancing an argument. It says:

(قُلْ هَاتُوا بُرْهَانَكُمْ إِن كُنتُمْ صَادِقِينَ)

Say, "Produce your proof, if you should be truthful."

Evaluation of the credibility of sources. This involves acquiring knowledge from its reliable sources. Surah Al-Anbiya, verse 7, reads:

(وَمَا أَرْسَلْنَا قَبْلَكَ إِلَّا رِجَالًا نُّوحِي إِلَيْهِمْ ۖ فَاسْأَلُوا أَهْلَ الذِّكْرِ إِن كُنتُمْ لَا تَعْلَمُونَ)

(And We sent not before you, [O Muhammad], except men to whom We revealed [the message], so ask the people of the message if you do not know)

Examination of proposed evidence. This criterion is established in Surah Al-Hujurat, verse 6. It says:

(يَا أَيُّهَا الَّذِينَ آمَنُوا إِن جَاءَكُمْ فَاسِقٌ بِنَبَإٍ فَتَبَيَّنُوا أَن تُصِيبُوا قَوْمًا بِجَهَالَةٍ فَتُصْبِحُوا عَلَىٰ مَا فَعَلْتُمْ نَادِمِينَ)

(O you who have believed, if there comes to you a disobedient one with information, investigate, lest you harm a people out of ignorance and become, over what you have done, regretful)

No generalization. In_Surah Fatir, verse 18, the Holy Qur'an lays down a pivotal principle that generalization is not commended:

(وَلَا تَزِرُ وَازِرَةٌ وِزْرَ أُخْرَىٰ)

(And no bearer of burdens will bear the burden of another)

Objectivity. This criterion ranks high in the Qur'anic discourse. It aims to establish justice and fairness in passing judgements, no matter the situation of the parties associated with them. Surah Al-Ma'idah, verse 8, says:

(يَا أَيُّهَا الَّذِينَ آمَنُوا كُونُوا قَوَّامِينَ لِلَّـهِ شُهَدَاءَ بِالْقِسْطِ ۖ وَلَا يَجْرِمَنَّكُمْ شَنَآنُ قَوْمٍ عَلَىٰ أَلَّا تَعْدِلُوا ۚ اعْدِلُوا هُوَ أَقْرَبُ لِلتَّقْوَىٰ ۖ وَاتَّقُوا اللَّـهَ ۚ إِنَّ اللَّـهَ خَبِيرٌ بِمَا تَعْمَلُونَ)

(O you who have believed, be persistently standing firm for Allah, witnesses in justice, and do not let the hatred of a people prevent you from being just. Be just; that is nearer to righteousness. And fear Allah; indeed, Allah is Acquainted with what you do)

1.2.7. What are the obstacles that hinder critical thinking?

Ignorance. This is one of the major obstacles that stifle critical thinking. In general, it stands for a lack of knowledge. It describes the state of being unaware and can be used to describe individuals who deliberately ignore or disregard important information or facts. Surah Hud, verse 46, says:

(قَالَ يَا نُوحُ إِنَّهُ لَيْسَ مِنْ أَهْلِكَ ۖ إِنَّهُ عَمَلٌ غَيْرُ صَالِحٍ ۖ فَلَا تَسْأَلْنِ مَا لَيْسَ لَكَ بِهِ عِلْمٌ ۖ إِنِّي أَعِظُكَ أَن تَكُونَ مِنَ الْجَاهِلِينَ)

(He said, "O Noah, indeed he is not of your family; indeed, he is [one whose] work was other than righteous, so ask Me not for that about which you have no knowledge. Indeed, I advise you, lest you be among the ignorant)

Imitation. Mainly speaking, it involves the conscious incontestable embracing of and identification with a certain belief, behavior or a tradition. Surah Az-Zukhruf, verse 22, declares:

(بَلْ قَالُوا إِنَّا وَجَدْنَا آبَاءَنَا عَلَىٰ أُمَّةٍ وَإِنَّا عَلَىٰ آثَارِهِم مُّهْتَدُونَ)

(Rather, they say, "Indeed, we found our fathers upon a religion, and we are in their footsteps [rightly] guided")

Follow whims. The Holy Qur'an presents an expression that refers to the situation where an individual becomes subject to his personal whims *Al-Hawa* (الهَوَى). The Qur'an expresses that sense in Surah Ar-Ra'd, verse 37, which says:

(وَلَئِنِ اتَّبَعْتَ أَهْوَاءَهُم بَعْدَ مَا جَاءَكَ مِنَ الْعِلْمِ مَا لَكَ مِنَ اللَّـهِ مِن وَلِيٍّ وَلَا وَاقٍ)

(And if you should follow their inclinations after what has come to you of knowledge, you would not have against Allah any ally or any protector)

Bigotry. According to Merriam Webster Dictionary, bigotry refers to obstinate or intolerant devotion to one's own opinions and prejudices**.** Surah Al-Baqarah, verse 145, says:

(وَلَئِنْ أَتَيْتَ الَّذِينَ أُوتُوا الْكِتَابَ بِكُلِّ آيَةٍ مَّا تَبِعُوا قِبْلَتَكَ ۚ وَمَا أَنتَ بِتَابِعٍ قِبْلَتَهُمْ ۚ وَمَا بَعْضُهُم بِتَابِعٍ قِبْلَةَ بَعْضٍ ۚ)

(And if you brought to those who were given the Scripture every sign, they would not follow your qiblah. Nor will you be a follower of their qiblah. Nor would they be followers of one another's qiblah)

Following one's conjecture. The word conjecture expresses an inference formed without proof or sufficient evidence. It is a process wherein a conclusion is reached by surmise or guesswork. Surah Yunus, verse 36, announces:

(وَمَا يَتَّبِعُ أَكْثَرُهُمْ إِلَّا ظَنًّا ۚ إِنَّ الظَّنَّ لَا يُغْنِي مِنَ الْحَقِّ شَيْئًا ۚ إِنَّ اللَّـهَ عَلِيمٌ بِمَا يَفْعَلُونَ)

(And most of them follow not except assumption. Indeed, assumption avails not against the truth at all. Indeed, Allah is Knowing of what they do)

Arrogance. Arrogance is an attitude of superiority manifested in an overbearing manner or in presumptuous claims or assumptions. Surah Ghafir, verse 56, states:

(إِنَّ الَّذِينَ يُجَادِلُونَ فِي آيَاتِ اللَّـهِ بِغَيْرِ سُلْطَانٍ أَتَاهُمْ ۙ إِن فِي صُدُورِهِمْ إِلَّا كِبْرٌ مَّا هُم بِبَالِغِيهِ)

(Indeed, those who dispute concerning the signs of Allah without [any] authority having come to them - there is not within their breasts except pride, [the extent of] which they cannot reach)

Public pressure. Surah Ar-Rum verses 60, encourages the Prophet to be patient and steadfast in the face of those who belied him and rejected his message, despite their domination of power in his time. It says,

(فَاصْبِرْ إِنَّ وَعْدَ اللَّـهِ حَقٌّ ۖ وَلَا يَسْتَخِفَّنَّكَ الَّذِينَ لَا يُوقِنُونَ)

(So be patient. Indeed, the promise of Allah is truth. And let them not disquiet you who are not certain [in faith])

1.2.8. How does the Qur'an promote thinking?

The Holy Qur'an used a variety of strategies to promote reasoning and thinking. Here are two examples.

Challenging, where counter-proofs are invited from opponents to substantiate their claims. In Surah Yunus, verse 38, Allah Almighty says,

(أَمْ يَقُولُونَ افْتَرَاهُ ۖ قُلْ فَأْتُوا بِسُورَةٍ مِّثْلِهِ وَادْعُوا مَنِ اسْتَطَعْتُم مِّن دُونِ اللَّـهِ إِن كُنتُمْ صَادِقِينَ)

(Or do they say [about the Prophet], "He invented it?" Say, "Then bring forth a surah like it and call upon [for assistance] whomever you can besides Allah, if you should be truthful)

Dialog. In general, a dialog involves an exchange of ideas and opinions organized. In debates, it signifies a discussion between two parties to a controversy with the aim to reach a resolution. The Holy Qur'an says in Surah Ash-shura, verses 69-77,

((قَالَ هَلْ يَسْمَعُونَكُمْ إِذْ تَدْعُونَ (٧٢) قَالُوا بَلْ وَجَدْنَا آبَاءَنَا كَذَٰلِكَ يَفْعَلُونَ (٧٤) قَالَ أَفَرَأَيْتُم مَّا كُنتُمْ تَعْبُدُونَ (٧٥) أَنتُمْ وَآبَاؤُكُمُ الْأَقْدَمُونَ (٧٦) فَإِنَّهُمْ عَدُوٌّ لِّي إِلَّا رَبَّ الْعَالَمِينَ (٧٧) وَاتْلُ عَلَيْهِمْ نَبَأَ إِبْرَاهِيمَ (٦٩) قَالُوا نَعْبُدُ أَصْنَامًا فَنَظَلُّ لَهَا عَاكِفِينَ (٧١) إِذْ قَالَ لِأَبِيهِ وَقَوْمِهِ مَا تَعْبُدُونَ(٧٠) أَوْ يَنفَعُونَكُمْ أَوْ يَضُرُّونَ (٧٣)))

(And recite to them the news of Abraham, When he said to his father and his people, "What do you worship? They said, We worship idols and remain to them devoted. He said, "Do they hear you when you supplicate? Or do they benefit you, or do they harm? They said, But we found our fathers doing thus. He said, Then do you see what you have been worshipping. You and your ancient forefathers? Indeed, they are enemies to me, except the Lord of the worlds)

Summary

The Holy Quran encourages people in general and Muslims in particular to think and to be critical in judging what they see, hear, do and believe. Further, it criticizes those who do not use critical thinking to seek the truth about the Creator Himself, his Prophets (peace be upon them), the universe, as well as the resurrection. Of course, there are some factors, some of which were underlined in the Holy Qur'an, that hinder people from being critical. Endut and Abdullah (2009) argued that the difference between modern civilization and Islam in terms of critical thinking is not in the operational level, but rather deeply in its conception, mainly in relation to the issues of certainty (*al-Yaqin*), the absolute truth (*al-Haqq*) and religious consciousness and values.

The recognition of Allah as the Sole Creator of the universe and all creatures therein will always remain the ultimate goal of thinking and contemplation in Islam. *Tafakkur* 'تفكر' is the reflexive form of the root "فكر" (*Fakkar*), which means to reflect, meditate و cogitate, ponder, contemplate, and consider.

However, sometime, Muslims tend to abandon the activity of thinking assuming that it may lead to disbelief or heresy. However, utilisation of critical thinking helps to strengthen one's beliefs and reach a profound understanding of faith. So, the Holy Qur'an exhorts both believers and non-believers to search for convincing proofs (*burhān*), which are derived from reliable and certain (*yaqini*) premises. Critical thinking does not open the door for the denial of one's beliefs, but it will generate deep understanding of beliefs and boost people's insight into and certainty of the tenets of their religion and the wisdom behind them. However, that does not mean one must not construct his faith unless he finds logical reasons behind what he is doing. Sometimes, one has to trust what Allah said if he believed in Him in the first place, which is called in Islamic terminology as "*Al-Iman*" (absolute faith in Allah).

1.3. Section Three: The rationale for the study

1.3.1. Research focus

The need for transformation

The model of learning and teaching proposed and tested in this study shifts the focus from one that is guided by the teacher (or school) and which is based on the student's textbook as the sole source of knowledge, into a learner-driven model that basically relies on a variety of sources of information and technology facilities. It seems that educators generally agree on the pressing need for this transformation. However, the debate and disagreements remain focused on how schools should respond to this transformation (Al-Saleh, 2002). Most of the views on educational reform focus on the investment of technology to transform the educational model. In fact, this is a positive and an encouraging trend, but it is not surprising; it is a recurring event with each new technology (Zanker,

2006). The fault is not in the establishment of modern educational reform based on new technology; it is rather in the misconception that technology alone can bring about the desired change (Coe, Aloisi, Higgins, & Major, 2014). The key determinant of our success will not be the number of computers purchased or software installed, but rather the definition of our educational visions, preparation and support of teachers, designing of curricula, addressing issues of equity, and responding to the rapidly changing world (Kleiman, 2004).

It is well known that technology is a tool which enables students to learn, produce, and construct knowledge. However, a fundamental transformation cannot occur in schools unless there are profound changes in pedagogy that includes and creates a new culture for learning (Pearlman, 2009). The continuation of teachers' learning and the development of new methods and strategies that have a valuable impact on student's learning and educational outcomes could create a school culture that empowers teachers to promote critical questioning, innovative approaches and sharing ideas, which are essential for an effective pedagogical transformation (Coe et al., 2014). It is important that this attitude goes beyond addressing what students "need" to know in terms of the school curriculum, but also engages with what students "believe" they need to know (Pearlman, 2009). It is this transition from curriculum ownership by teachers and educators to including what students believe they really need, think and are able to do. This does not mean abdicating responsibility for the curriculum in terms of what we as educators believe is important, but providing a voice for students so that they can be engaged in this process.

There has been considerable debate about the kinds of skills which students are likely to need in the future (Jerald, 2009), though this is not a new debate (Higgins, 2014). However, there is a general consensus among educators, business leaders, academics, and government agencies in different countries that new skills will be needed and an emphasis should be made on some of the existing skills (Dede 2010). This is reflected in the growing international movement to identify the skills needed by students to succeed in a rapidly changing, digital world (Larson & Miller, 2011). A number of these skills are linked to deeper

or more complex methods of thinking and learning, analytic and creative reasoning, complex problem solving, and effective teamwork and interaction (Duncan & Duncan 2009). These skills differ from the more traditional academic curriculum, since the focus on content knowledge is reduced. This debate is not straightforward, and these issues will be addressed in more depth in Chapter 2.

The children are not a blank slate

A child does not come to school with an empty mind; rather, he/she comes with pre-gained experiences that can be built on, which the core of the constructivism theory represents (Fosnot, 2013). According to this perception, we learn from our experiences. We interpret these experiences by relying on what we already know, by giving logical reasons to things around us, and by commenting on the experiences and justifications. Accordingly, knowledge is built up not repeated, and it is accumulated from our activities in life. Learning occurs in a given context, the meaning of which is in the learner's mind; therefore, there are various worldviews. Building of knowledge involves the learner’s input and reflection on what he/she has learned. It is a process of continuous evolution in social context (Bodner, 1986).

Also, students outside of school premises gain a vast amount of information from many sources, as well as having access to people through the internet and social media networks. In our modern age, it became easy to talk to people from different backgrounds, each having their own ideas and perspectives on the world. Now, it is important for the student to be able to distinguish between facts and opinions; between correct information and false claims that are not supported by any evidence. Developing this ability can help students to build a base of knowledge that would protect them from rushing into unfounded judgements and provide them with tools to use when they read and hear information outside of the school context.

It seems clear that the traditional model of education where the school's role is to take responsibility for everything the students learn is no longer possible. Today, students must acquire knowledge, develop abilities and take attitudes that prepare them to be productive members of a contemporary workforce in a global economy powered by technology, which will evolve during their lifetimes. They must be prepared to continually learn new skills throughout their lives for a future we cannot predict.

The changing role of the schools

Schools should therefore provide an environment in which technology can be used to support meaningful learning by encouraging students to build up -and not simply reproduce- knowledge, to rely on dialogue and discussion rather than on just receiving information, to explain what they have learned and not simply repeat it, and to comment on and critique what they have learned and not just describe what they were told. But, technology alone is not enough to bring about a fundamental change in teaching and learning. To do so, teachers need to be well equipped with strategies and methods that help them to employ technology effectively in teaching students to be problem-solvers, creative, critical thinkers and communicative with others efficiently.

As a teacher, I have always been interested in identifying the potential technology that would enable students to evaluate information and knowledge they come across in their daily life as well as in schools. I also have an interest in empowering teachers to use this technology in an efficient way. It can be said that many Saudi' students had difficulty in repressing their opinions or effectively evaluating others' opinions. This may due to education model that focuses on teachers role rather than students' activities in the classroom.

From this perspective, this study is attempting to propose and test a new strategy called: Seek, Read, Present, and Question (SRPQ) in the teaching of critical thinking that heavily relies on technology in the history curriculum. It is an exploratory study to investigate to what extent such a strategy is usable and realistic in the Saudi context. I believe this strategy would be a helpful to

encourage students to think critically and to reflect on their own thinking and on others as well. It is based on literature and related learning theories. Look at figure 1.1

There is a wide range of studies in Saudi Arabia that deal with the methods of teaching critical thinking. Other studies investigated the potential of using technology, either to promote thinking skills via using specific programmes and software or to improve students' achievement. However, as far as the present researcher knows, no study in Saudi Arabia has used an Internet-based strategy to teach critical thinking in History in schools. Thus, this study, I believe, is significant to highlight the feasibility of using technology (Internet-based) in teaching critical thinking. More details about similar studies in terms of the aim (teaching critical thinking) or strategies (utilization of "Internet" technology, and collaborative learning) or critical thinking test (an Arabic adaptation of The Watson–Glaser Critical Thinking), can be found in Appendix A.

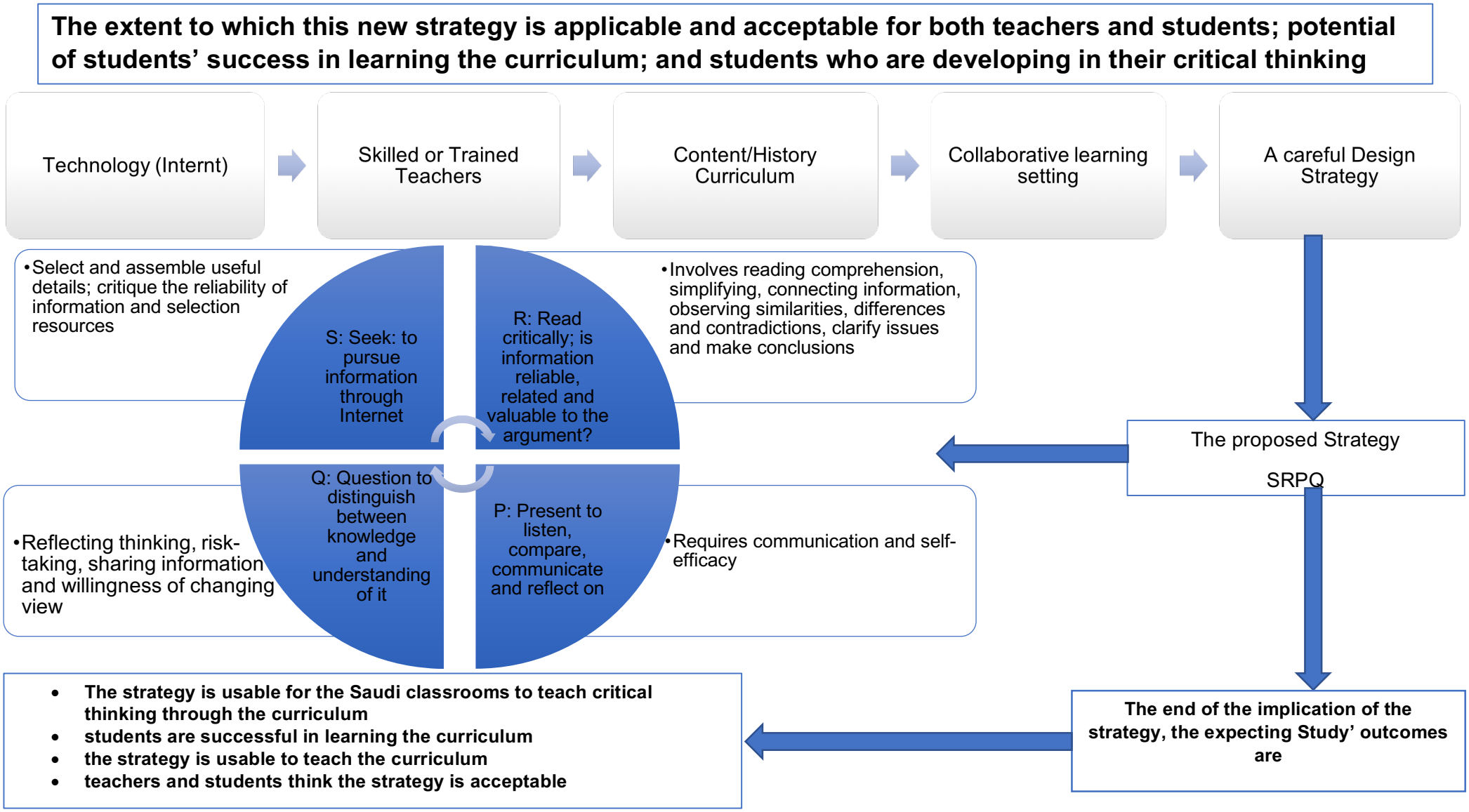

Figure 1.1. The study framework

1.3.2. Research questions

The principal aim of this study is to propose and test the feasibility of a new strategy in education that relies on technology in a collaborative learning situation to teach history with critical thinking in Saudi schools. It seeks to identify the extent to which this new strategy is viable and acceptable for both teachers and students. A further aim is to find out whether students are successful in learning the curriculum whilst developing their critical thinking. Therefore, this study is looking at a range of interventions and strategies that might work together to enhance students' thinking in general and critical thinking in particular, e.g. collaborative learning, technology, content and critical thinking teaching strategies. The study raises the following questions:

1. Is the SRPQ strategy feasible to use in classroom settings in Saudi Arabia?

    • Is the strategy practical to use in Saudi classrooms?

    • Do teachers and students consider it as acceptable?

2. Are students successful in learning the curriculum when these strategies are employed?

3. What are the challenges with using technology in teaching the curriculum through critical thinking in Saudi classrooms?

1.4. Section Four: a brief summary of the thesis's chapters

The first chapter of this study is an introduction. It presents an overview of the education system in Saudi Arabia and a brief history of its development and progression. The focus here will be on the teaching methods that are applied in Saudi schools. Then, there is a section on critical thinking in the Holy Qur'an, since the education system in Saudi Arabia is highly based on and influenced by the teachings and vision of Islam. The intended aim is to understand the Qur'anic perception of and attitude to critical thinking. This chapter also explains the rationale and motivation of the study and presents the research questions. Next, it gives an overview of this thesis.

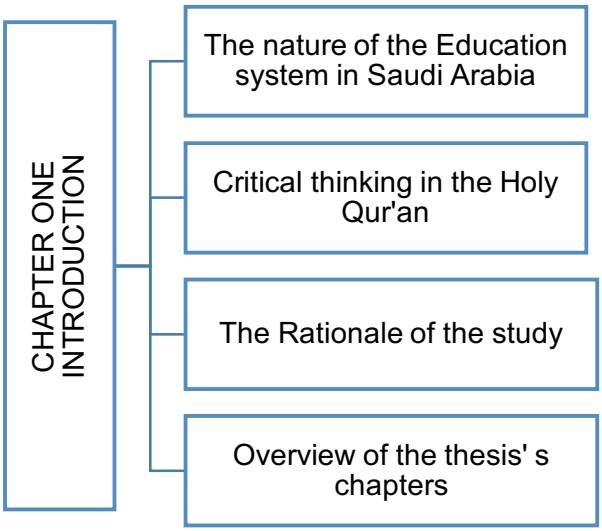

Figure 1.2. Chapter One

The second chapter reviews the literature that are related to this study, such as 21st century skills, critical thinking and thinking skills, and pedagogy, which are all concerned with technology. The goal is to establish how these areas of interest are affected by technology and vice versa. The chapter is divided into four essential sections. The first section focuses on some salient issues related to critical thinking, and the second section is concerned with technology. The third section covers some points about collaborative learning. The reason behind this is to identify critical thinking skills; how we should teach them in schools; what role technology can play to support teaching and learning; and how collaborative learning can boost students' knowledge and skills. The last section of this chapter identifies other studies pertinent to critical thinking or the use of technology in teaching and learning and the theoretical framework of the study.

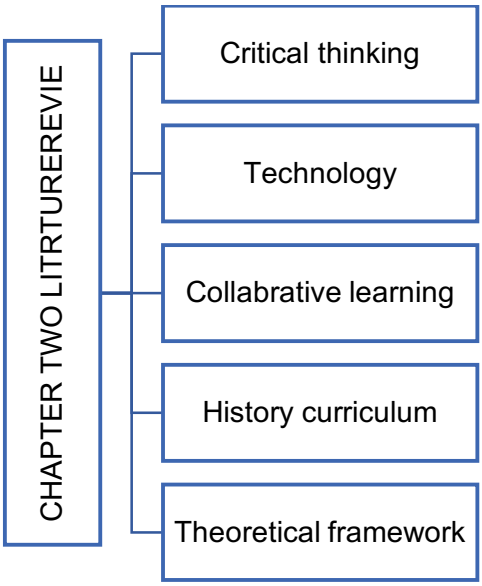

Figure 1.3. Chapter Two

The third chapter presents SRPQ strategy. It explains this new strategy and how we could apply it into classroom within the history curriculum. It also gives some examples of those lessons that have been applied within this study.

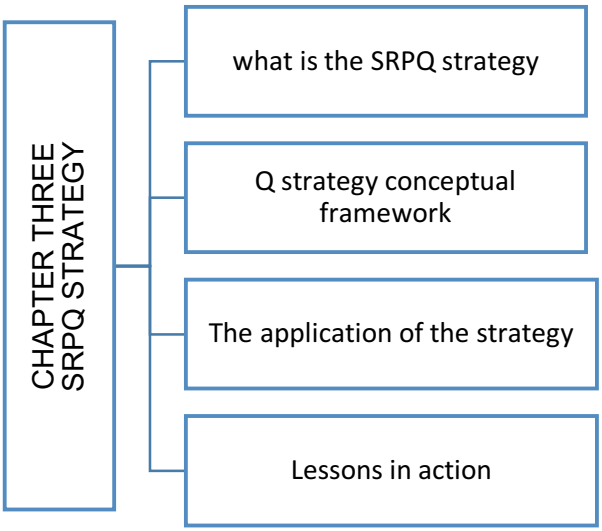

Figure 1.4. Chapter Three

The fourth chapter present the methodology that the study is adopting. It describes how and why the research methods were chosen in order to answer the research questions. This study used mixed methods: interviews, observations and collaborative action research with the teachers. Each method adds significant value to the research and greatly contributes to the overall success of the research in order to answer the research questions.

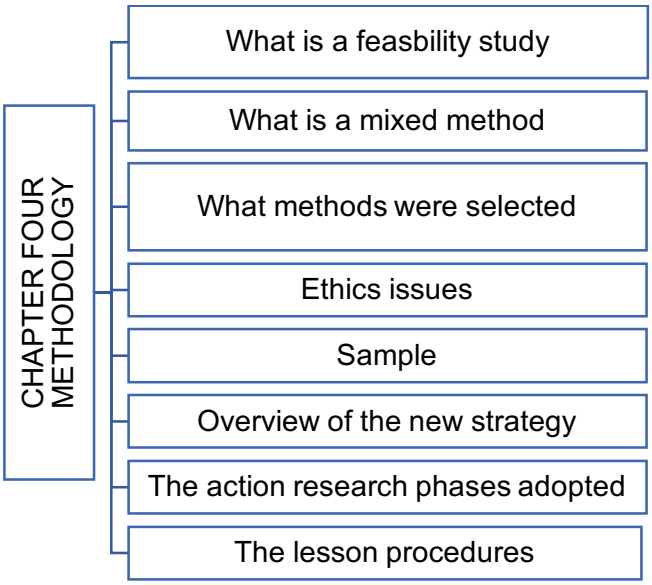

Figure 1.5. Chapter Four

The fifth chapter presents the results of the research. It discussed how the data that was collected through different methods and used in this study is analysed.

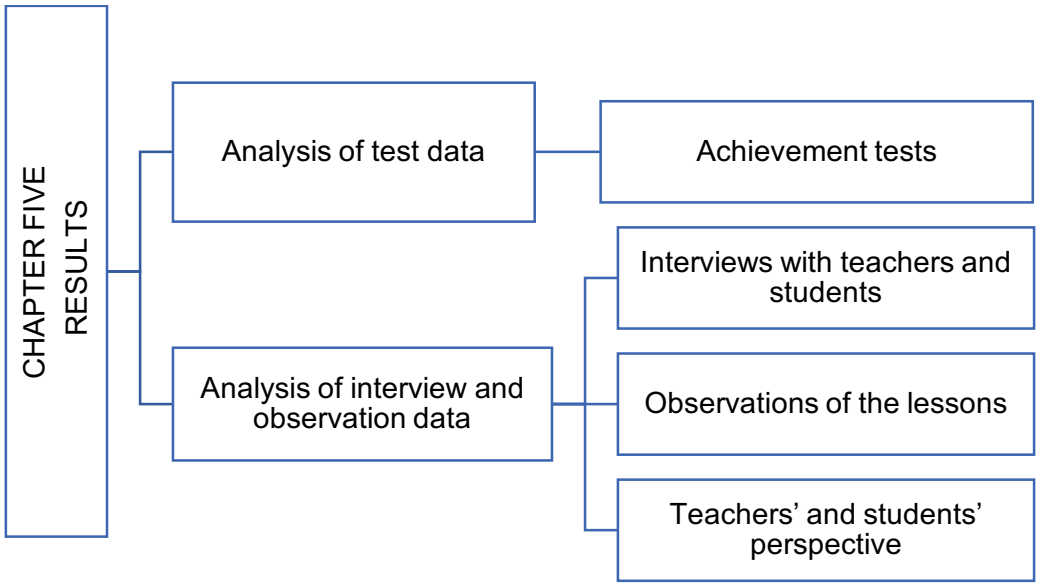

Figure 1.6. Chapter Five

Chapter six discusses the main findings of the research. It analyses the study findings in more detail and relates them to the existing literature relevant to the area of the research. It also highlights the limitations of the study and suggests some recommendations for further research.

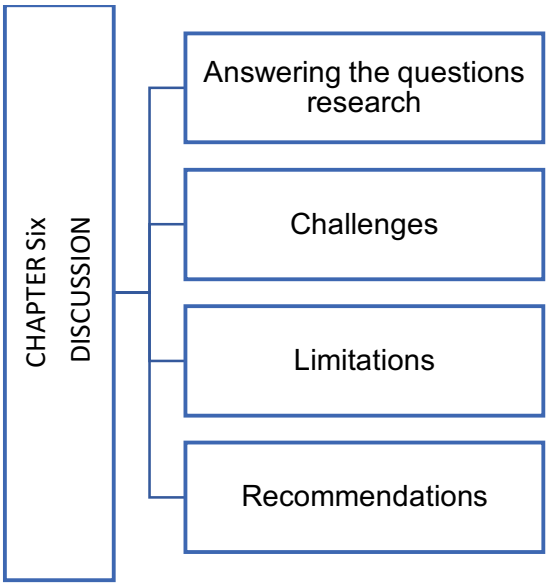

Figure 1.7. Chapter six

Summary

This first chapter has situated this study into the context of education in Saudi Arabia and the background of existing scholarship relating to the use of technology in teaching critical engagement with the curriculum. It presented the case for further research in this area. The chapter has outlined the main aims of the present study and explained its context and rationale, including understanding the concept of critical thinking in the Holy Qur'an, and how this relates to the history curriculum in Saudi Arabia. It further gives an overview of the structure and organisation of this thesis.

The next chapter will review in depth the current literature on 21st century skills, critical thinking, collaborative learning, and pedagogy, in consideration of technology in order to identify the background issues for the study.

CHAPTER TWO: LITERATURE REVIEW

2.0. Introduction

The key reason for this feasibility study is to explore a new strategy for education that relies on technology in a collaborative learning situation to teach history with critical thinking in a Saudi school setting. It also seeks to identify the extent to which this new strategy is applicable and acceptable for both teachers and students and whether students are successful in learning the curriculum and meeting the challenges of using technology. Therefore, this chapter is looking at a range of interventions and strategies that can work together to enhance students' thinking in general and critical thinking in particular, e.g. collaborative learning, technology, content and critical thinking teaching strategies.

The present chapter will review three areas of literature: (a) 21st century skills, (b) critical thinking and thinking skills, and (c) teaching as supported by technology. The aim is to explore how these elements are affected by technology and the relationship between them. The chapter also aims to suggests some ideas on how to help educators focus on useful technology that can be used to improve the processes of learning and teaching and provide the learners with the effective tools for acquiring knowledge and applying it in everyday life. There is a common theme in literature that children's use of technology in their homes is more frequent and sophisticated, even more varied and powerful than using it in schools (Dodge et al., 2008, Somekh et al., 2002). Researchers argue that valuable insights into how to teach or educate students for life can be known by how students learn in their homes (Lee and Finger, 2010).

This chapter is divided into four key sections. The first section focuses on critical thinking. The second section is concerned with technology. The third one discusses collaborative learning and the relevant theories of learning. The last section presents the study's theoretical framework and reviews other studies concerned with critical thinking or the use of technology in teaching and learning. The reason behind this structure is to look in depth at what critical thinking skills are and how we should

teach them in schools; the role that technology plays in support of teaching and learning; and how collaborative learning can deepen students' knowledge and skills.

This section is organised as follows:

- Section One: critical thinking skills, which involves:
    - What 21st century skills are,
    - What thinking is,
    - What creative thinking is,
    - What critical thinking skills are,
    - and, how critical thinking skills are taught,
    - The challenges of assessing critical thinking
- Section Two: The role of technology in teaching and learning
- Section Three: Collaborative learning and related theories of learning
- Section Four: The history curriculum
- Section Five: The theoretical framework

2.1. Section one: Critical thinking

2.1.1. 21st century skills

The 21st century seems to mark a significant change in terms of the essential skills we need in our world today. These skills are associated with the emergence of technology, which has created a set of complex challenges in education. Technology has changed both how we can learn, and what we need to learn. It has also affected the way we identify the final goals of learning, and how we can support a student in realizing these goals. There is a consensus among educators that we must establish certain core skills that should be taught in schools and incorporated in the curricula. In this section, we will try to respond to the following questions: what are these skills? What skills are appropriate for the 21st century? And how should we teach them?

The term '21st skills' is widely used, but there is no clear-cut consensus about what is included in this phrase. What is essential for some organizations may not be so important for others. There are many accounts of what these skills are, with emphasis on what skills are most important for students to learn. Duncan and Duncan (2009) define 21st century skills as 'skills that increasingly demand creativity, perseverance, and problem solving, combined with preforming well as part of a team'.

Dede's analysis provides a comparison of current organisations' frameworks about what students should learn in order to become fully prepared to live in 21st century. This study adopts the 'Partnership for 21st Century Skills' framework as baseline. It concluded that within the overall skill-set there is a different area of emphasis required for each group (Dede, 2010). Overall, there is some agreement on how students might apply their learning authentically in various situations and contexts (Larson & Miller, 2011).

Dede categorises these skills into two groups: 'perennial' skills, which were retained from the previous century, but still have value in this century. These include areas such as communication, though, which now has an increased emphasis. He also identifies the importance of 'contextual' skills that are unique to this century, such as decision making, due to the availability of enormous amounts of information which requires processing, evaluating and taking decisions, dependent on such quantities of information. In contrast, Silva (2009) states that these 21st century skills are not new, but they only represent a shift in emphasis. It could be said that, for example, when people started to interact with other cultures they needed to translate knowledge into their own languages and contexts. As a result, there was a massive body of knowledge, which needed to be written, analysed and used in their lives (e.g. the early encounter between Islamic and Greek civilisations at the beginning of the Islamic civilisation awakening; then the interaction between Islamic civilisation and Western civilization in Al-Andalus, presently 'Spain'). They had to use skills that we call today 'higher order' thinking skills (Bloom, 1956) or 'productive thinking (Moseley et al. 2005. In other words, 21st skills were used in previous centuries but in a different framework and context, (e.g. communication and collaboration are taking a new dimension in this era of technology as we can practice or apply them virtually; the time and space can be bridged by technology).

Silva points out that many of today's teachers are familiar with these skills as they were trained to use Bloom's taxonomy, which has organized the objectives of learning according to the level of cognitive demand or complexity (Jerald, 2009). Paul Resta, director of the Learning Technology Center at the University of Texas at Austin points out that delivering of 21st century skills is more important than focusing on skills of the last century (Salpeter, 2003).

2.1.1.1. So, what is new?

Aspects of the workplace have become more demanding as machines have replaced some of human roles. This increased the need for people who have the ability to analyse, evaluate information, and make decisions, which cannot –yet - be made routinely by technology. There are a number of major trends, which have shaped the demand for specific complex skills in this century, particularly the influence of the personal computer and increasing globalization (Jerald, 2009).

Computers and technology have replaced many jobs that could be broken down into a set of rules or simple processes. Technology is rapidly changing and advancing in ways that put many jobs at risk, though it is sometimes hard to predict which jobs will be affected by computerization (Jerald, 2009). One of the major implications of this is that schools should offer students an efficient education that will not lose its value in the future for employment and an increased flexibility for adapting to new working patterns.

2.1.1.2. What are these skills?

As noted above, there is no consensus on what these skills are. There are many frameworks of '21st century skills' that were presented by researchers and different organizations. International Society for Technology in Education (ISTE) has established six essential skills vital for students in this digital world (NETS, 2007). These are:

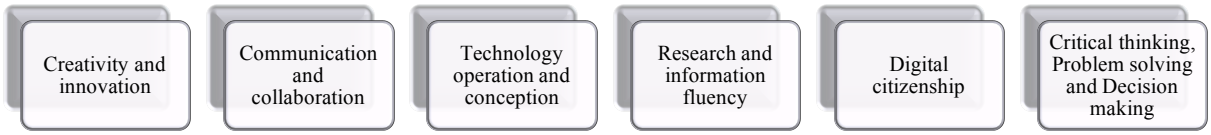

Figure 2.1 The six essential skills according to ISTE

Binkley and his colleagues (2011) suggested ten skills in four categories, which are:

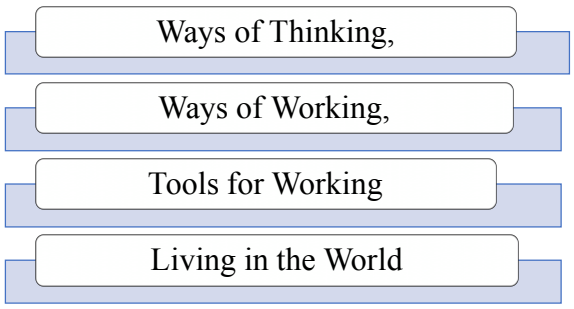

Figure 2.2 The four categories according to Binkley and his colleagues

A report from a new public-private coalition known as the Partnership for 21st Century Skills ("21st Century Skills Minnesota: Student outcomes and support systems partnership with STEM initiative", 2017) has developed a framework for 21st century learning, which views that skills must be part of students' learning. These are not to be taught instead of core subjects, but they are embedded into them. They are:

Figure 2.3 The framework for 21st century learning developed by the Partnership for 21st Century Skills

Moreover, an identification of 21st Century Skills Framework was suggested by The North Central Regional Education Laboratory (NCREL) and the Metiri Group ("Literacy in the Digital Age", 2003).

It consists of four groups:

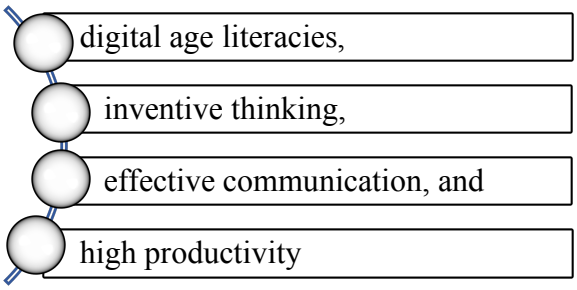

Figure 2.4 The 21st Century Skills framework was suggested by (NCREL) and Metiri Group

It is observed that in most of the 21st Century skills frameworks presented by organizations and researchers, there is a concern with two aspects. First, they concentrate on *knowledge*, i.e. what students should know (facts about themselves, the surrounding environment, their relationships with others and with the universe, and so on). Second, they focus on the *skills* that enable them to use this knowledge in different circumstances, create new ideas, encounter challenges and seize opportunities (e.g. problem-solving, decision-making and assessing the consequences of actions), to communicate and collaborate with same/different culture and to be critical toward their work, information and resources. There is a need for new societies that value the interaction and communications as the fundamental skills (Binkley et al., 2011).

All of these skills, how to think critically, to solve a problem, to evaluate an evidence, and to analyse information, are acknowledged as essential for our children' survival today (Wagner, 2010). Wagner further identifies a skill-set named 'the seven survival skills'. These are critical thinking and problem solving; collaboration across networks and leading by influences; agility and adaptability; initiative and entrepreneurialism; effective oral and written communications; accessing and analysing information; and curiosity and imagination (2010).

The ability to ask a good question that leads to identify information, enhance understanding, carry out an exploration or initiate an inquiry, is a fundamental skill that workplaces demand (Wagner, 2010). Tony (2010) believes that children should also know how to find and make sense of the

information about other cultures as a result of globalisation. This would help individuals to fit into a context and culture of the schools and in real world.

In what follows, I will classify essential skills that our students should be equipped with into three categories:

- Creative thinking skills that enable students to think outside the box, from the usual to the unusual; to be critical about things, news, and information not just take them at face value; to evaluate and make sense of them; and to be willing to take risks, make decisions based on reasoning and evidence, and take responsibility for those decisions.
- Communication skills that enable students to recognize the similarities and differences among realities, opinions and other cultures; engage in disputes in which they will be able to collaborate and share ideas, information with members of same/different cultures without losing their identity.
- Digital literacy that provides students with tools that enable them to use technology efficiently, represent their culture, idea, and interact with others in different settings.

However, Moseley and colleagues (2005) point out that the simple categorization of different skills into frameworks and taxonomies does not mean we have to teach them separately. In other words, they can be taught in parallel or in combination, depending on the skills as enabled and supported by particular knowledge. This suggests that the integration and purposeful use of different kinds of thinking for specific purposes is a feature of an effective education.

2.1.1.3. What is more important? Knowledge or skills?

21st century skills must focus on what students do with their knowledge, not just its acquisition, and on their ability to apply information to different situations. This does not mean that skills are more important than knowledge, but they may develop from a base of knowledge (Higgins, 2014). Rotherham and Willingham (2009) state, "you need something to think about" and argue that knowledge assists us in identifying the underlying structure of a problem. They argue that the degree to which knowledge has depth is the degree to which the skills will be mastered. This means we

cannot distinguish between knowledge and skills by asking which is more important than the other. However, teachers should focus on how to acquire information (the process of learning), which needs skills (practising and modelling) to gain this information. Then, this new knowledge can be applied into unique situations.

2.1.1.4. Challenges to 21st Century skills:

One important question that arises here is that: to what extent can these skills be clearly identifiable and measurable? For example, some 21st century frameworks provide certain skills, such as "risk-taking", "self-direction", "the desired" or even "creativity", that cannot be easily measured or are hard to apply in classroom. Rotherham and Willingham (2009) view that educators should be aware of what can be taught and provide the valid and reliable methods to teaching and assessing these skills in schools. The natural pattern of students' learning can be thought of as having three aspects: knowledge, skills, and attitudes. Each one should receive adequate attention. However, student's attitudes are harder to measure and may need time to be effectively evaluated. Teachers tend to weight what they value most. Therefore, some skills may sometimes be ignored on account that they could not be easily measured or assessed. It takes time and commitment to develop assessment measures that evaluate certain complex skills, such as creativity or synthesis (Duckor, 2011). Therefore, setting tests, measurements, and assessment methods that motivate students' thinking and reasoning rather than memorizing is fundamentally important today.

In preparation for the research, I reviewed some Arabic studies (see Appendix A) concerned with how critical thinking should be taught. Some involved technology and others focused more on critical thinking, which might be seen as relating to 21st Century skills. Further, there is an exploration of the similarities and differences between those studies and the present one. The purpose of this step is to identify the gap the current study seeks to fill in the literature in terms of how it might relate to their findings.

There are two groups of studies: the first group is Arabic studies which are put in a chronological order, from the newest to the oldest. The second one is non-Arabic studies that have some relevance

to this research. They are also organised from the newest to the oldest, and they are related to teaching critical thinking or improving it. Then, I classified them into three categories: the first one is what kind of CT tests they used, the second one is how they apply their study and the third one is what strategies they used.

Some studies are more helpful than others in terms of their approach or their results. However, each one helps to some extent to shed light on the current study.

- The primary focus of these studies was on how to improve students' critical thinking or high order thinking.
- They used different critical thinking tests; some used an Arabic adoption of California critical thinking test (CCTST), some used an Arabic adaptation of The Watson–Glaser Critical Thinking, while others developed their own tests (see table 2.1).

Arabic adoption of California critical thinking test (CCTST) (or the original)	Hailat et al. study (2009), Nawal's study (2005), Al-Khadhra's study (2005), Amal's Study (2005), Bartlett and Cox's research (2002)
An Arabic adaptation of The Watson–Glaser Critical Thinking (or the original)	Ashraf's study (2014), Al-Hamazani's study (2013), Al-Harrbi's study (2013), Al-Dhafiri's study (2013), Al-Maqdami's study (2012), Nabeel Barahmeh and Haytham Barahmeh's study (2013), Mervat Araam's study (2012), Ali's study (2009), Ameen's Study (2008), Al-Jaff's study (2005), Erickson's study (1999)
Developed their own tests (or other)	Al-Otaibi's study (2007), Al-Shebel's Study (2006), Mazen's Study (2005), Sabri's study (2001), Abdel Fattah's Study (2001), Khairy's study (2000), Al-Mahsen's study (2000), Al-Mahsen's study (2000), Khadijah's study (2000), Lafi's study (2000), Bakhit's study (2000).

Table2.1: Thinking skills assessments

- Some studies suggested teaching critical thinking within the curricula, but others developed specific units (see table 2.2).

Within the curriculum	Al-Hamazani's study (2013), Al-Dhafiri's study (2013), Ali's study (2009), Al-sharfy's study (2009)
Developed specific CT units	Mervat Araam's study (2012), Al-Otaibi's study (2007), Nawal's study (2005), Al-Khadhra's study (2005), Amal's Study (2005), Mazen's Study (2005), Sabri's study (2001), Abdel Karim's study (2000), Khairy's study (2000), Khadijah's study (2000), Lafi's study (2000), Bakhit's study (2000), Carr, Kathryn's study (1990).

Table 2.2: How to teach critical thinking

- Most studies and researchers have focused on teaching and developing critical thinking skills using different teaching strategies (see table 2.3).

Problem solving, brainstorming, concept maps, dialogue and discussion and thinking aloud	Ashraf's study (2014)
Employ technology (multimedia, computer, the World Wide Web (Internet)	Al-Harrbi's study (2013), Nabeel Barahmeh and Haytham Barahmeh's study (2013), Khawaldeh and Tamemy's study (2012), Al-Shebel's Study (2006), Erickson's study (1999)
Dialogue and discovery	Al-Dhafiri's study (2013)
Cognitive contradiction	Al-Maqdami's study (2012)
K.W.L. strategy	Mervat Araam's study (2012)
Using historical documents	Hailat et al. study (2009)
The role-sharing strategy (Kagan's strategy)	Ameen's Study (2008)
CoRT thinking program	Al-Otaibi's study (2007)
Short reports with current events	Al-Jaff's study (2005)
Exploring strategy	Nawal's study (2005)
Scientific approach	Mazen's Study (2005)
Collaborative learning strategy	Abdel Fattah's Study (2001)
Brainstorming, the mating and production of ideas, learning innovation, rewarding innovative ideas, encouraging adventure, allowing mistakes and taking responsibility.	Abdel Karim's Study (2000)
Contemporary issues strategy	Lafi's study (2000)
A negotiation strategy	David's study (1995)

Table 2.3: Teaching strategies

- Most studies have confirmed the possibility of teaching thinking skills at all levels of education and through all subjects of research. They also stressed that thinking skills could be taught to all students.
- Most studies have emphasized that technology is an important factor that helps students' learning. Therefore, it should be taking into account in the process of curriculum planning.

To sum up, there is emphasis on certain skills, which have now been called 'the 21st century skills', that may not be entirely new but they result from an emphasis on essential components of the curriculum and are demanded by workplaces, particularly where physical presence is less important. Jobs today demand certain skills, such as high order thinking, judgment and communication (Jeraled, 2009). This means schools have the responsibility to prepare students for an uncertain future for possibly unconventional jobs. However, this does not mean that students should abandon methods of memorization of information or learn to follow directions. These latter skills may still be necessary, but they will not be sufficient for employment beyond their lifetime.

2.1.2. What is thinking?

It is hard to find out how people think. However, we can have some understanding of this by focusing on people's behaviour or looking for patterns and regularities between situations (Moseley et al., 2005). Thinking can be defined as a mental process that is enhanced by receiving external stimuli, through your senses, that you analyse in mind in order to make sense or decision or judgements (Beyer, 1988; Presseisen, 1988). Piaget looked at thinking as an active process that develops in consequence of children's interaction with the world around them. Vygotsky (1943) considered the development of thinking in a social context, while Dewey (1910) described thinking as everything that comes to mind in trying to resolve a problem or a situation of uncertainty. Both Vygotsky and Dewey connected thoughts with language. They claimed that our thoughts are shaped by what we say or write. In other words, the language turns our thoughts into actions (McGregor, 2007) and our actions into thoughts. In terms of an educational definition, the Department for Education and Skills DfES (2002) stated that thinking is 'a cognitive activity trigged by challenging tasks and problems'.

The above definitions of thinking suggests that thinking is an internal process, with controlled and uncontrolled thoughts. It can be complex, conscious and verbal, particularly when it is affected by surroundings and social setting. It can be directed by the thinker, in most situations, or by external stimuli that trigger it, particularly in learning situations. Thinking is something that takes time to develop. Piaget (1950, 1973) believed that development precedes learning when children's learning is motivated through interaction with their environment and their response to it. It starts with self-centre then moves into social world, by adjusting two processes: assimilation and accommodation. The former means that the digestion of new information and fitting it into cognitive structures that already exist. The latter means the restructuring of the cognitive patterns in some way in order to comprehend the new information. Vygotsky believed that developmental learning leads by socialization and language acquisition. He believed that learning is neither an internal procedure nor a passive behaviour formation (Vygotsky, 1978).

Some patterns of thinking may be more effective than others in certain situations (Moseley et al, 2005). Therefore, to improve students' learning we have to establish a learning environment that enables students to realize their thoughts, monitor them and make judgments (meta-cognition). More complex patterns of thinking that could be defined as a good thinking in particular situations include creative thinking, critical thinking and other aspects of thinking skills that Moseley and his colleagues described as 'productive thinking'. However, the nature of human ability is that thinking can also be used for less positive purposes, where 'good' thinking is not just effective or efficient, but also it has a moral or ethical dimension (Kaufman, 2009; Cropley, Kaufman and Cropley, 2008; Runco, 2004; McLaren, 1993; Nebel, 1988; Sternberg, in press). Therefore, schools should assist students in considering the value of what they have achieved or decided and in reflecting on the significance of any creative action or outcome of complex thinking (QCA, 2005). Ashman and Conway (1997) concluded that thinking skills programmes naturally include six related types of thinking:

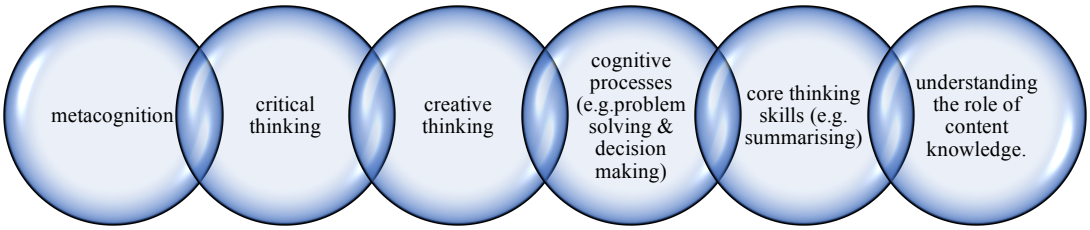

Figure 2.5 Types of thinking according to Ashman and Conway

2.1.3. Creativity and creative thinking

Recognizing creativity or creative thinking becomes easier when you see it rather than describe or justify it in advance (Wegerif, 2010). The term 'creativity', to some extent, is vague and ambiguous (Kampylis & Valtanen, 2010). Sternberg and Lubart in their book 'The Concept of Creativity' (1996) defined creativity as 'the ability to produce work is both novel and valuable', while Runco (2008) described it as 'thinking or problem solving that involves the construction of new meaning'. Creativity, in this way, is more concerned with the product rather than the process. Lin (2011) argued that the emphasis on product is Eastern- orientated, while Kimbell (2000) suggested that the Western perspective of creativity focuses on the process. Newton and Newton (2014) stated that this is a reminder to be open to other views and cultures when thinking about creativity. Also, the process of thinking consists of reasoning, inventing or generating ideas and problem solving (Csikszentmihalyi, 1996; Prentice, Matthews and Taylor, 2003; Ruggiero, 2004). In education, thinking is defined as the ability "to generate and extend ideas, to suggest hypotheses, to inspire imagination, and to look for alternative innovative outcomes" (DfES/QCA, 2004, p. 22). However, Newton and Newton (2014) argued that the priority of originality or novelty appears to be different between contrasted cultures. In the Western settings, priorities are given to novelty, while in the Eastern contexts suitability is most valued. The environment and individual's psychological state is also a significant element that affects creativity (O'Quin and Derks, 1997).

Creativity can therefore be seen as a combination of components, both intrinsic and extrinsic. This multi-component process includes not only cognitive features and abilities but also affective, motivational, and personal individualities as facilitated through cultural and social interactions (Daskolia, Dimos and Kampylis, 2012). Creative thinking is innovative and investigative; it provides

new solutions for problems, while allowing original ideas to emerge (Rhodes, 1961). Creativity includes a number of cognitive processes, such as perception, awareness, compassion, novelty, flexibility, fluency, intuition, comprehension and creation (Tegano, Moran and Sawyers, 1991; Russ, 1996; Sternberg and Lubart, 1996; Lubart, 2000-2001; Prentice, Matthews and Taylor, 2003; Lubart and Guignard, 2004). Although creativity is considered an innate ability that all people are capable of, researchers have found out that its development requires a number of stimuli in a favourable environment (Hewett, 2005; Yamamoto and Nakakoji, 2005). Creativity should include an emphasis on individual creativity and on social and environmental circumstances that may hinder or promote creativity (Johnson and Carruthers, 2006). Innate creativity relies on some factors, such as the capability of producing many ideas, and expresses both divergent and convergent thoughts. Weisberg (1986) describes how creativity basically results from a person's conscious work on a problem that does not solve simply. Candy (1990) states that a number of factors, both inside and outside our control, influence the nature of creativity. These include aspects such as inherited personality, geographical position, economic resources, health, education, and formative and lifelong experiences. They collaboratively impart the possibility for creativity to an individual. The current academic approach to human creativity highlights its "ethical elements" (Cropley, 1999: 513) or 'moral underpinning' (Craft, Gardner and Claxton, 2008: 169). However, some acts of creativity could be seriously damaging. This means, not all patterns of creativity are deemed good or can be combined by awareness of their impact on societies (Craft, Gardner and Claxton, 2008; Cropley, Kaufman, Cropley and Runco, 2010; Sternberg, 2010).

Nakakoji et al. (1998) considered creativity in relation to the assessment of the creative products. Therefore, if the product is not apparently useful, it cannot be regarded as creative. In this sense, creativity is not about developing a new idea that is neither valuable nor suitable (Johnson and Carruthers, 2006). Creative thinking is inherent on many grounds and aspects of life; it is established and perceived in different modes with respect to its domain of orientation. Creative thinking can therefore be thought of as a "situated" activity in the sense that it can be well-observed in relation to the socio-cultural context and/or the disciplinary area in which it occurs (Amabile, 1983; Csikszentmihalyi, 1996). It occurs after acquiring deep and rich knowledge structures, in which

students are enabled to utilise their current knowledge, add to it and reorganize or restructure their conceptual knowledge as a consequence (Johnson and Carruthers, 2006). Creative thinking is a dynamic mental process that alternates between divergent and convergent thinking. Perkins (1985) and Weisberg (1993, 1999) asserted that creativity utilises or involves ordinary mental processes in extraordinary ways in order to produce extraordinary results. Thus, creative teaching or creative learning, which involves structured lessons that inspire students to think creatively, is more effective than teaching creativity in a classroom setting (Newton and Newton, 2014). Providing students with opportunities that enable them to become problem solvers and foster creative thoughts is more feasible than giving them the answers (Fryer,1996; Newton and Newton, 2014).

2.1.4. What is critical thinking?

The literature on critical thinking is extensive. However, according to van Gelder (2005), it is a neglected topic. The term 'creative thinking' is broad. It has been used in different ways that developed over time (Moseley et al, 2005). Critical thinking is a cognitive activity, associated with using the faculties of the mind. Learning to think in critical, analytical and evaluative ways means using mental capabilities, such as concentration, classification, collection, and judgment. However, many people who are likely to be critical thinkers in a more effective way can be hindered from doing so for a variety of reasons other than the lack of ability or potential. In particular, personal and affective reasons can form hindrances to creativity. In this section, I will explore the idea and some of the challenges associated with the term.

Critical thinking is a complicated process underpinned by other skills, which are simpler and, perhaps, easier to acquire. Therefore, students have to possess the less complex thinking skills in order to carry out critical thinking, which demands time, effort and deliberate practice (van Gelder, 2005). It involves certain processes that comprise self-awareness as well as other characteristics that enable a person to analyse, interpret and evaluate any inferences made. The individual must possess and use certain dispositional characteristics that constitute the foundation of critical thinking (Walker, 2003). However, possession of knowledge does not simply mean the ability to think critically; the individual's desire and motivation must be present (Dewey, 1933). Bloom's Taxonomy

was created in 1956 in order to promote 'higher' or more complex forms of thinking in education, such as analysing and evaluating, rather than just remembering facts (Bloom, 1956). It also argued that students cannot attain the higher order thinking without acquisition of essential lower order skills.

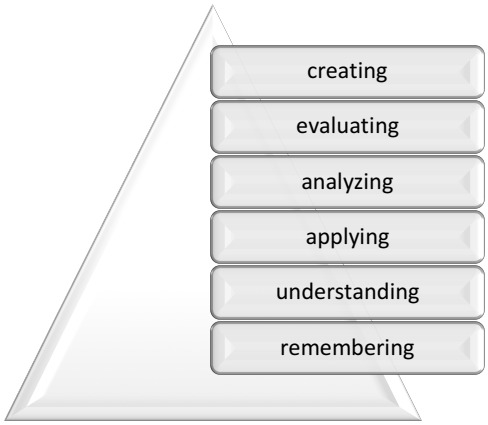

Figure 2.6 Bloom's Taxonomy

Critical thinking is such a broad phrase that can apply in a wide range of domains and contexts (van Gelder, 2005). To be useful, it needs to be defined more precisely. Halpern defines critical thinking as 'the use of those cognitive skills or strategies that increase the probability of a desirable outcome'. Bloom (1956) claimed that 'higher order' thinking (since it is complex, requires judgment, analysis, and synthesis and cannot be applied in a rote or mechanical manner (Halpern, 1998). Dewey defined 'reflective thinking' as a kind of thinking that consists of turning a subject over in the mind and giving it serious and consecutive consideration, which can be used to evaluate the quality of judgments made (Walker, 2003). 'Critical thinking is skilled and active interpretation and evaluation of observations and communication, information and argument' (Fisher and Scriven, 1997: 21). It is 'a reasonable and reflective thinking focused on deciding what to believe or do' (Ennis, 2011).

Thinking skills are seen by some as mental capabilities that enable one to review and evaluate information in order to draw conclusions or meaning in a rational manner (McGregor, 2007). It can be said that critical thinking is the ability to see beyond the surface level of information or knowledge and to find relations between the parts of the given information. This includes analysis, evaluation and synthesis in order to reach a new perspective or draw a conclusion.

Critical thinking is purposeful, reasoned, and goal-directed, usually with conscious intent and applied in a variety of settings. Thinking critically is used in evaluating either the outcomes (e.g. the effectiveness of a decision or the solution to a problem) or the process of thinking (e.g. the reasoning behind the conclusion or the factors considered in making a decision).

Dispositions are crucial to critical thinking; without them critical thinking does not take place and may be substandard (McGrath, 2003). The critical thinker exhibits the following dispositions: willingness to engagement; habitual use of plans and suppression of impulsive activity; flexibility; willingness to abandoning non-productive strategies to self-correction; and the awareness of social realities (Halpern, 1998). Ennis (2011) asserts that critical thinker cares to get things right (seeks for alternative possibilities, explains, and considers other views); cares to understand and present honestly and clearly; and cares about others.

2.1.4.1. Is thinking critically a skill?

Before I begin to discuss the methods of teaching critical thinking skills in schools as the literature suggests, it will be useful to raise this question: are they skills that can actually be taught? The benefit of focusing on skills that are teachable and generalizable is that it helps reduce the gap between thinking on one hand and the skills that can be taught and those that can be used in real world on the other hand (Halpern, 1998). This is a complex issue that has been argued about from philosophical, psychological and educational perspectives (Moseley et al. 2005)

A skill is conceptualised as linked to the ‘knowing how’ (Ryle, 2009) understanding of knowledge. In the educational setting, Dewey described it in the sense that ‘thought denotes belief’ (1910). That means what we believe reflects on our thoughts and actions. Some, however, suggest that the distinction between ‘knowing how’ and ‘knowing what’ cannot be useful in relation to education, whereas Higgins and Baumfield (1998) argue that such distinctions are important in coming to know, or in the process of teaching and learning. Similar to skills, thinking relies on practice and experience for better performance. It can be extended in many ways (Smith, 2002); it is carried out by choice (Johnson and Gardner, 1999); it can be schematized or sequenced (Smith, 1984); it can be

repeatable and transferable (Smith, 1984); and it follows a strategy, a method and techniques (Smith, 2002). Therefore, like any other skill, thinking can certainly be learned and taught.

Can critical thinking be extended? Yes, most people have the ability to think at some level, but most of them do not have the aptitude of critical thinking, since critical thinking tends to be a 'special capacity' (Smith, 2010). Most people are not good at reasoning; humans are not naturally critical because critical thinking is a deliberate reflective activity. Shermer (2002) describes human as 'a pattern seeking, a story telling'. We like to make sense of things that we grasp simply or quickly, and critical thinking means slowing down or questioning this process. Most people tend to be comfortable with the first explanation that appears right (van Gelder, 2005). This means critical thinking is a learned skill that must be developed deliberately (Resnick, 1987). Dewey argues that it is only when belief is problematic that we begin to think (Dewey 1916).

2.1.4.2. Is critical thinking a generic or specific skill?

This question lies at the heart of critical thinking skills debate because the answer will affect how we teach thinking in schools. Some educators are sceptic about the existence of a general thinking skill that applies to any content. This means critical thinking is a self-sufficient skill that could apply successfully in any situation, regardless of the domain. However, being critical about something means it has to have a knowledge value worthy to apply thinking skills. McPeck (1984) said 'think' is always thinking about something specific; therefore, there is no thinking about everything in general. Smith (2010) argues that a general thinking skill is 'procedural knowledge' that applies to many situations, irrespective of the content. He believes the thinking skill has some degree of generality because it involves some 'context-sensitive activities' such as understanding, judgment and so on. It is a matter of degree in terms of general thinking skills. However, some are more general than others (Baron, 1985; Higgins and Baumfield, 1998).

Many researchers contradict this conception with regard to transferability. Halpern (1998) supposed that what is remembered depends on what was accrued during learning. So, these skills will be recalled whenever the type of arguments had been learnt, regardless of the subject matter. It is

certainly true that thinking is specific and context dependent. However, this does not mean that there is no thinking skill that can be remembered or employed across a variety of contexts. In addition, the idea of transferability should consider the required knowledge that allows for transferring those skills; the deeper the knowledge you have about a subject, the more critical you are likely to be about that subject as you seek to resolve inconsistencies in what you know or develop an understanding by connecting information.

Being critical about Critical Thinking itself

In promoting critical thinking, we must not forget that critical thinking is something that itself needs to be thought about critically. If we advocate for and organise activities in school where we want students to do activities like check facts, look for assumptions, identify opinions, prejudice and vested interests, then we must ensure that critical thinking is itself open to critique. The idea of critical thinking implies that it is a universal method and can be taught as a skill (as discussed above). To think more critically about critical thinking, we have to think carefully about what we choose to be critical about. Is everything capable of being subject to this critique or only what we as teachers decide? What is it that we should be critical about?

If students are effectively taught to be critical, this will include developing their understanding of what it is important to be critical about and how to make choices about this critique. This will enable subsequent generations to shape the world they inherit or reconstruct their world critically (Dewey, 1916). A critical understanding of critical thinking has to allow both teachers and students to be able to question the context in which they find themselves. This is challenging for schools to grapple with and leads critical thinking towards critical theory which involves reflective assessment and critique of society and culture by applying knowledge from the social sciences and the humanities or as Max Horkheimer described it as an approach which seeks "to liberate human beings from the circumstances that enslave them” (Horkheimer 1982).

2.1.4.3. What are the barriers to Critical Thinking?

Critical thinking is the formation of a self-regulated judgment for a specific purpose, whose result in terms of interpretation, analysis, evaluation and inference can be explained according to the evidence, concepts, methods, criteria and context that were taken into consideration to establish it (Cornell, Riordan, Townsend-Gervis and Mobley, 2011). In this definition, mention is made of a number of terms, such as interpretation, analysis, evaluation and inference. These terms, together with explanation and self-regulation, are considered cognitive skills that can be developed with critical thinking, which Facione (2011) defines, according to the aforementioned consensus, as interpretation, understanding and expression of the meaning of a wide variety of events, data, situations, experiences, standards, criteria or procedures and judgments. However, developing critical thinking in a contemporary learning context can be a very complex and difficult process. The main barriers to learning and utilization of critical thinking are discussed below:

I. Ignorance

As Shiraev and Levy (2017) imply, this barrier to critical thinking occurs when there is a lack of essential background knowledge or information on a subject when a value judgment is made. For instance, a learner can be convinced that a "wizard" has the power to levitate objects, but he does not see or know of the thin rope that is tied to them. The effective method of overcoming this critical thinking barrier is to carry out the appropriate investigations in the multiple existing points of view on the subject in order to obtain all the pertinent evidences before making a value judgment or launching conclusions.

II. Lack of support

According to Loes and Pascarella (2017), human knowledge and intellectual capacity, are essential for critical thinking. Their lack or limitation hampers critical thinking. For instance, a scholar when writing a critical account cannot produce a comprehensive work while using other scholarly evidence. However, in the absence of such supporting material, the critical thinking process will be stopped at some stage. To break through this critical thinking barrier, it is important to use collaborative mode of thinking and learning.

III. Personal biases and prejudices

Cottrell (2017) suggests that this barrier to critical thinking occurs when one is unconvinced or unaware that each of us has his own biases and prejudices. This comes as a result of our own unique experiences and world's point of view, which sometimes makes it difficult to remain objective and think critically. For example, some people or students usually attribute their success to circumstances or subjective factors, while blaming and attributing their failure to external conditions. When a student is doing well in a test, he\she usually attribute his\her success to internal factors – such as seriousness, diligence, intelligence, and other personal factors. But on the other hand, when the student fails in the exam we usually see that he blames his failure on external factors – such as "questions were complicated" instead of assessing the situation critically.

IV. Physical and emotional barriers

According to Burbules and Berk (1999), this barrier to critical thinking occurs when one is unprepared or unaware that having stress, fatigue, drugs and limitations of this type can influence and severely affect our ability to think clearly and critically. Usually those people have a different point of view for the same situation depending on their emotional; he\she cannot see beyond what he feels, which prevents them to be rational or logical.

V. Selective Perception

As Bullen (2007) views, this barrier to critical thinking occurs when one is unprepared or is unaware that our own limitations of perception can lead to delusion or disorientation about the reality. For instance, one may look at the stars at night and perceive that they are as close as the moon and the planets. The effective method of overcoming this critical thinking barrier is to recognise that "looking" is not always "believing", since our senses and the perception or interpretation by the brain have limitations of optical illusions. So, one should know when and how to verify his observations with other sources.

VI. Evasive language

According to Loes and Pascarella (2017), language is one of the main barriers to critical thinking. The use of language seems to take us to a particular point of view or a sense. But, due to its words, it allows us to deny that intention and to withdraw. The effective method of overcoming this critical thinking barrier is to be aware of detours or unclear evasive words that eliminate the details that clearly show or determine the facts of an argument.

VII. Value judgments

According to Bullen (2007), this barrier to critical thinking is about individual opinions or value judgments as if one thinks that facts are so that the other does not have to worry about making their own judgment. For instance, the president showed a proud motive when signing the peace treaty. The effective method of overcoming this critical thinking barrier is to distinguish between what is a fact and what is an opinion in each argument. In this example, one fact may have been that the president was proud of the signature, but the tagline with motive comes from a personal opinion that has not been argued.

VIII. Meaningless or absurd comparisons

It is about making a comparison that implies that something is superior but at the same time denying it. For instance, an affirmation of an announcement about a battery only says: "Up to 30% longer duration". However, it does not say "it will last" 30% extra, since the word 'up' allows a whole journey and does not say about how often the 30% increase occurs. The effective method of overcoming this critical thinking barrier is to avoid making premature judgments without rational evidence (Bullen, 2007).

IX. Ad-hoc thinking

According to Abdul Hamid (2016) this type of barrier to critical thinking arises when dealing with a new hypothesis or patch, which cannot be independently tested. It is used to explain the facts that refute an assertion or theory, making it non-falsifiable. For instance, some researchers reject the "hostile comments" of the opponent and claim that they modify the measuring instruments or damage

the evidence. The effective method of overcoming this critical thinking barrier is to put little confidence or reserve value judgments about claims that cannot be independently tested by anyone.

X. Circular reasoning

It is a fallacious form of reasoning in which one assumes as true something that at the same time he is seeking to prove. For instance, one can argue that a paranormal activity or object exists since it is personally experienced by that individual, and if it is not experienced personally, it cannot exist. This restrictive mode of thinking hampers incorporating various other aspects in thinking. The effective method of overcoming this critical thinking barrier is to recognise when an argument assumes a motto as truth without having argued it, and at the same time to try to prove that same motto. If this happens, look for alternative explanations (McWhorter, 2016).

XI. Fallacy

According to McWhorter (2016), this critical thinking barrier is based on the belief that the fixed probabilities of an event, such as the tossing of a coin, can be increased or decreased based on the most recent results. That is, to think that some systems have memory when they do not have it. For instance, one may have a wrong concept of taking lottery numbers that have not yet been winners, since this will increase his chances of winning. The effective method of overcoming this critical thinking barrier is to recognise and distinguish between events that have a fixed probability and a variable probability to parameters.

XII. Irrelevant comparison

This type of barrier to critical thinking is encountered by learners when they make a comparison that is irrelevant, inappropriate or between objects of different levels or classes. For instance, one makes the statement: "For an office, printer A is better because it makes better copies than printer B, when an important fact is ignored, such as printer B also allows faxing, copying and scanning. The barrier usually comes from not having clear or well-defined purpose of the comparison (McWhorter, 2016).

XIII. Pareidolia (apophenia)

According to Soep (2016), this critical thinking barrier is a type of confusion error in perception due to the natural association and the social instinct of recognition of facial expressions and common

objects that occur when introducing a vague stimulus is perceived as something clear, distinctive or highly significant. This can be caused by memory biases, by confirmation biases, or by natural association biases.

The effective method of overcoming this critical thinking barrier is to recognise that a vague perception of a strange event can have multiple explanations and not only the first natural association. Overcoming this barrier also requires looking for alternative explanations that are more likely than exciting (Soep, 2016).

XIV. Pragmatic fallacy

This fallacy occurs when it is stated that something is true because it "works", even though the causality between its occurrence and a result is not proven. In engineering, this fallacy is used a lot for the effort or energy that allows saving "If it works, do not touch it". The effective method of overcoming this critical thinking barrier is to identify the reason or the possible mechanisms that cause the observed effects, starting with the most likely and not with the most emotionally attractive (Hitchcock, 2017).

XV. Regressive fallacy

It occurs when ignoring the natural and inevitable probabilistic fluctuation due to unknown variables of things when it comes to finding the cause and effect. For instance, people tend to invest in the stock market only when the profits are high. However, when they return to normal, they attribute it to their bad luck and not to the lack of enough information or extensive statistics. The effective method of overcoming this critical thinking barrier is to identify and understand the behaviour patterns or prepare correct statistics before making judgments of the observed events (Hitchcock, 2017).

XVI. Fallacy of the domino effect or sliding slope

This occurs when an argument assumes that a cascade of adverse or propitious elements will happen with the first movement, without offering proof of it, because the inspectors have regulated and controlled where to smoke in public. In the end, it will end up in a closed control of all things of our private life. The problem is not having enough information or extensive statistics. The effective

method of overcoming this critical thinking barrier is to evaluate the logic or arguments that sustain that the cascade of events will happen (Hitchcock, 2017).

There are other standard strategies with which most of the critical thinking barriers can be overcome, such as Problem Based Learning and collaboration (Hitchcock, 2017).

2.1.4.4. How can critical thinking be taught?

The ability to critique a piece of information or a fact and identify whether the conclusions are supported by evidence is crucial, not just in learning situations in schools but in everyday life (Holmes, Wieman and Bonn, 2015). Thus, one of the purposes of education is to help learners to transfer knowledge and skills from the teaching context, so they can be re-applied to new situations (Celuch and Slama, 1999; Daiz-lefebvre, 2004; Kang and Howren, 2004). So, as Dianne (1998) states, we must teach for transfer. Educators divide the goals or objectives of education into three distinct types: (1) knowledge, (2) skills or abilities and (3) attitudes or values. From this perspective, critical thinking is categorized as a set of skills that need deliberate practice to improve. However, this is not as simple as it appears.

A good learning environment provides a favorable context for learning activity. The learning tasks should require thoughtful analysis and synthesis. One strategy that could help transfer knowledge is the repeated use of authentic materials or materials that are similar to real-world situations (Derry, Levin and Schauble, 1995). An effective curriculum must be designed in different ways and sequences, presenting different activities and different ways of putting things together in order to meet the various needs of different children with “many tracks leading to the same goals" (Bruner, 1971).

Schools have to focus on providing the learner with the tools necessary to acquire knowledge and skills, then that knowledge and skills are transferred to everyday tasks. Thinking skills are mental processes. That means we cannot teach students to be critical thinkers in every foreseeable situation, but we can set up conditions that orientate them or encourage them to be good thinkers.

According to some psychological theories, it is possible to create conditions that will improve the possibility of creative results, even if only by avoiding conditions that are known to be disruptive or to work against creativity. White (1967) indicates that appropriate schooling or practice can put us in a "condition to notice what we used to miss; people cannot be taught nor can they learn how to notice".

Teachers should therefore use various methods and techniques to promote thinking skills because not all students are innately critical thinkers. This could happen by providing a body of knowledge in sequences then asking them to present this information critically by giving various answers to one problem (Walker, 2003). Habits are acquired and changed slowly. The effects of a change, for example, from traditional to responsive methods of teaching, cannot be assessed without allowing for a period of transition from earlier approaches and the continuation of the new approaches over time (Buchanan et al., 2005).

Teachers and educators should think of 'thinking' as not just the use of a specific skill in a suitable context but the recognition of when it is needed and the readiness to applying it. In addition, there is a distinction between the willingness to think critically and the ability to think critically. This is the distinction between what people can do and what they actually do in real-world contexts. Therefore, students must learn how to practice and not just learn the skills of critical thinking (Halpern, 1998). The following paragraph presents some techniques that can offer students a learning environment that enables them to think critically. Besides, when students receive appropriate instruction, they could become better thinkers (Halpern, 1998). These techniques however, would apply in two standard strategies. The first one is an indirect strategy, where students just achieve critical thinking skills in the subject of their studies (van Gelder, 2001). According to Pascarella (2006), this strategy will work but slowly. The second strategy is direct, where critical thinking skills are either taught in a separate curriculum or infused into students' curricula (van Gelder, 2001). In my view, the latter strategy is more preferable, as I believe students cannot pick up those skills (to some extent) unless they are taught deliberately how to do so and practice them repeatedly. Theoretical presentation of

the critical thinking skills is inadequate for students to use them on their own; they need to engage in the critical thinking process by deliberate and repeated practicing with direct feedback (Baron, 1993; Kuhn and Pease, 2008). For, repetition is the key component of learning (Howe, 1991).

A good question should go beyond the surface level of provided information or knowledge. Such question should be 'reachable', in Bloom's (1956) terminology, through a high-level thinking, starting with understanding why, then giving explanations, comparing and contrasting. Another technique is 'Socratic questioning' that explores the meaning, justification or logical value of a claim. In these types of questions, there are not always clear-cut answers, since they generate from individual student's experience and the kind of arguments they develop to particular questions. To use these questioning techniques effectively, it would also be good to give students time to think and encourage deliberation, perhaps by giving them 5 to 10 seconds to think (Walker, 2003). Questions provoke children' curiosity, make their thinking explicit (Coles and Robinson, 1989), and spur them to reflect on their thinking as well as on others' thinking. That means teachers should encourage students to raise questions. Sometimes, these questions will be simplistic, but over time their questions will improve and gain depth. Students should be encouraged to be inquisitive, ask questions and not accept things at face value (Walker, 2003). However, to be skeptical about everything can lead to a situation where no conclusion can be reached.

Discussion and debates promote and enhance critical thinking among students. Vygotsky (1978) believed that children's interactions with others promote intellectual and personal development. This technique should include both sides of an argument and weigh the cons and pros in order to make deliberate decisions, which are conducive to convincing performance (Mercier and Sperber, 2011). Reasoned observation allows students to realize other points of view and analyze them in terms of strength and weakness in order to reach a conclusion (Walker, 2003). It also enables students to go beyond simple perception and basic information (Mercier and Sperber, 2011). These models of teaching make students more prepared for encountering real life situations.

Written assignments are another technique or strategy to promote critical thinking. They enable students to reflect on their own thinking and enrich their thinking processes. Critical thinking can also be achieved through critical discussions that encourage students to share their points of views and advocate their arguments (Walker, 2003). Yet, students' reading, writing and engagement that motivate them to advocate their arguments are not an easy task (Newell, Beach, Smith and VanDerHeide, 2011). Critical thinking is beyond just writing a persuasive essay; it involves high literacy and a deep knowledge in which reading, writing, language and content work together (Langer, 2001).

A core part of critical thinking is developing an argument that constitutes a body of evidence in relation to some proposition. Argument refers to a connected series of statements that establish a definite proposition or resolve a conflict between different views. It goes beyond the setting of a proposition that involves comparison or evaluation on a goal-directed basis and in a normative dialogue (Walton, 1990). The importance of mapping the argument or making it explicit can enhance students' critical thinking and allow the teacher to pay attention to the details of the students' argument and give them feedback. A wide range of researches pointed out that mapping arguments has helped students to improve their critical thinking and assist them in comprehending advance topic (Kunsch, Schnarr and Tyle, 2014; Dwyer, Hogan, and Stewart, 2012, 2013; Carrington, Chen, Davies, Kaur, & Neville, 2011; Harrell, 2011; Renton and Macintosh, 2007; van Gelder, 2005). This step is challenging to manage in a large class. However, technology could assist in this strategy by using software that allow students graphically to represent, edit and evaluate their arguments, either by themselves or by their peers (Kunsch, Schnarr and Tyle, 2014). Teachers also can use this strategy by asking students to provide their reasoning or argument mapping in writing (Gelder, 2005).

Further, the key point of teaching is the teachers themselves; they need to build up their skills so that they can teach efficiently (Baumfield et al., 2005). When support is made available to teachers, they become able to expand their knowledge, build up habits and dispositions that improve their performance, and improve students' learning (Lewis, Perry, Friedkin and Roth, 2012a). Teachers

need to improve three areas: high-quality instructional resources, structures for learning within practice, and collegial learning (Lewis, Perry, Friedkin and Roth, 2012b).

2.1.4.5 The challenges of assessing critical thinking

Due to the different definitions of critical thinking and the specific skills that should be included, there is some difficulty in identifying one 'ideal' critical thinking test that could be accepted (for more details see Chapter Three, section 3.5.2, p.123). Each definition exposes multiple approaches to assessing critical thinking that has to simulate the messy real world of unstructured problem-solving (Bers, 2005). However, to assess students' critical thinking in their subject, it often needs more than one element to do the job, and more importantly a skilled teacher to do so. It seems there is quite often a gap between what students is learning in the classroom and what they are able to do, and what it is that teachers are really assessing. There are many challenges associated with developing assessments of these types of skills.

Assessment is a process of gathering evidences to draw conclusion on what students know and can do (Pellegrino, Chudowsky, & Glaser, 2001). It moves from a process or a product to an indicator of value of specific aspects of learning (Graf & Harris, 2016). Most teachers focus in their assessment on students' outcomes or 'value added' which meanly include how much progress students make in their tests. Curriculum and knowledge-based assessments therefore tend to exclude essential skills, such as critical thinking skills, from those tests. Ryoo and Linn (2015) state that the typical assessment is often a measure of an isolated idea rather than reasoned understanding. Hence, it needs to be explicit about the knowledge and skills that are recognized for both teachers and students. In other words, they both need to conceptualize those skills accurately (Afflerbach, Cho, & Kim, 2015). For a teacher, it is important to identify what kinds of knowledge and skills they are targeting and how these targets align with the instruction students have participated in during their lessons. Students then need to draw on this knowledge and these skills (Lee & Goldman, 2015). This might mean, for example, that students are able to show in their assessment that they have the ability to analyse, to reason, to interpret and to draw a conclusion.

Another challenge in assessing critical thinking is that critical thinking is a process that takes time to develop, which means it is hard to assess in the short term. Because of the integrated nature of the skills and processes, it is difficult to assess automatically. You need to assess the whole, not just separate parts.

The structure of any assessment is also challenging. It needs a profound understanding of the sequence of content and its association with specific critical thinking skills. The complexity of it needs to move from basic to deep, from simple to more complex (Hillocks and Ludlow, 1984). This is also challenging in a subject context where different areas of the curriculum may need different aspects of critical thinking skills to be assessed. For example, critical thinking skills for science are different from those for history or for reading or writing. Although evaluating cause and effect is common to both subjects, cause in science is different from cause in history. As history is the subject for this study, it needs a coherent understanding of events in relation to the present that is built through the use of complex analytical, constructive, interpretive, and evaluative skills (McLaughlin & McGill, 2017). This requires assessments that draw on these skills or "can evoke them" (Pellegrino et al., 2001).

Summary

This section of the literature review has covered three aspects: (a) 21st century skills, (b) creativity and creative thinking, and (c) critical thinking. Although there is no consensus on what 21st century skills should include in students' learning, there is agreement that skills such as digital literacy, communication, creativity, and critical thinking are significant for students. This is, of course, alongside with the core subjects, e.g. reading, writing and math. It is fundamental to create opportunities and environments that encourage students to be creative, critical, problem solver and reflective on their thoughts and behaviour. Critical thinking is not just the ability to draw a logical conclusion from observed facts but also the ability to establish truth beyond direct perception.

Educators have a substantial responsibility to identify skills that should be present in a curriculum

and should be taught effectively in order to prepare students for the world after school. These skills are varied, but they include making students more critical and creative thinkers. However, it does not necessarily follow that we value skills more than knowledge, but they should be considered as important as knowledge in curriculum design and planning. Students cannot master skills without prior knowledge. Meanwhile, knowledge in itself will not stand in an uncertain future.

Also, there is almost consensus that students should be taught to transfer what they have learned. This will not occur by simple presentation of critical thinking skills, but by a deliberate, repeated instructional design with guided feedback.

2.2. Section Two: Technology

2.2.0. Introduction

Teaching students in the twenty-first century is not anymore about providing them with information in a passive form; it is about preparing them for life, which means equipping them with thinking skills and capabilities, teaching them to communicate effectively, and providing them with opportunities that make them creative and so on. McCoog (2008) argued that to obtain 21st century skills, creation of new ideas, evaluation and analysis of the presented material, and application of that knowledge to previous academic experiences should be encouraged.

Students who grow up in a digital era are expected to learn in a digital environment that involves accessing multiple sources to glean information, sharing a resource with peers, discussing content, exchanging views and so an (Voogt, Erstad, Dede and Mishra, 2013). This has posed challenges for educators in relation to what to learn and how this learning can happen (Voogt et al., 2013).

Educators recognised the importance of technology and its implementation in schools. Selwyn (2012) proposed that more in-depth understanding of how technologies are used across social settings is vital to move educational research beyond an endless focus on how technology should be used to improve learning. In fact, there is much debate on the influence of technology on teaching

and learning (Cuban, 2001; Higgins, 2003), with the majority of researchers showing that technology has a positive impact not just on students' achievement but also on their thinking patterns.

The following part will seek to investigate two essential elements: impacts of technology on teaching and learning and methods of its employment in teaching practice.

2.2.1. Impacts of technology on teaching and learning:

There is little doubt that technology has become a universal tool for teaching and learning. Technology has offered students and teachers two massive possibilities; first, the ability to access enormous information and societies regardless of time or place; second, the ability to create activities that may not be imaginable in real life (Dede, 2010a). Blurton (1999) identified four fundamental features that make technology the most important tool for education: flexibility of use, connectivity, multimedia integration, and interactivity.

2.2.1.1. What technology do we mean?

The Department of Education in Victoria State in Australia defined technology as "electronic tools, systems, devices and resources that generate, store or process data. These include social media, online games and applications, multimedia, productivity applications, cloud computing, interoperable systems and mobile devices" ("Teaching with Digital Technologies", 2017).

There is a variety of technology types that can be employed in education settings, despite that most of them were not mainly developed for educational purposes, such as interactive whiteboards (IWBs) which are considered the second revolution in education (Betcher and Lee, 2009). Most technology is multimedia, which presents pictures, sounds, and words together. Mayer (2001) believes that human mind has two separate channels; each one has a limit of its ability. Thus, the combination of word and picture would result in deep understanding. Given the importance of integrating different styles of teaching to suit different learners, multimedia may support a variety of learner styles (the styles of acquiring knowledge in different ways). Beard, Clegg and Smith's study (2007) concluded

that there is a profound positive impact on pupils' learning when there is a combination of texts and videos included in the teaching materials. Below is an illustration of some examples of these technologies that have been employed in education.

- Interactive Whiteboards (IWBs):

Interactive Whiteboard (IWB) is an electronic teaching tool that can replace a conventional blackboard in classes. According to research by the British Educational Communications and Technology Agency (Becta, 2003), it is a large, touch-sensitive board. It is reachable and allows children to stand in front of it. In addition, it is connected to a computer, a digital projector and many digital devices such as printers, scanners, webcams and school pads. Being touch sensitive, it enables pupils to use it from any part of the class (Kershner et al., 2010; Serow and Callingham, 2011). The computer can be controlled directly by touching the board or using a special pen. It has a variety of capabilities, such as using unlimited webs to share with the whole class, screening videos, creating digital flip charts, and saving notes (Becta, 2003). These broader functions of the IWB make it accessible and usable, either individually by the teacher or collaboratively by pupils in the class. It facilitates direct interaction and use of texts, images, or access to stored materials (Kershner, Mercer, Warwick and Kleine Staarman, 2010).

- The computer and its applications:

A computer is an electronic device that displays information. It has the capability of storing, retrieving, and processing data. It can be used to type documents, send emails, play games, browse the internet, and edit or create spreadsheets, presentations, and even video or audio files. Each computer has two components: hardware and software. The software is any set of programmes that dictate the functions of the hardware. These include web browsers, games, and word processors, e.g. Microsoft PowerPoint, and Excel ("Computer Basics: What is a Computer? - Full Page", 2017).

A computer can be used by teachers and students in the classroom to improve learning outcome, engage students to be more active learners. Teachers use computers in diverse ways, such as structuring and presenting their lessons, while students can use computers to create web pages,

improve their pronunciation by using microphones and headphones, or simply to develop their reading and writing skills.

- Tablets:

A tablet is a personal computer that is smaller than a notebook computer and larger than a smartphone. It is a wireless, easy to carry anywhere, and has a sensitive touch facility. The idea of tablets was created by Alan Kay who believed that “when the real media of the future arrives, the smallest child will know it right way” (1974). This device would enrich teaching and learning environment in many ways, such as using the camera to record anything from field trip then play it back later, just record radio shows and podcasts, or simply start up a class blog ("Teacher Network | The Guardian", 2017). However, multi-tech tablets reduced the requirement of monitoring participations, offering a better setting (face-to-face) for interaction and support collaborative discussions (Dillenbourg and Evans, 2011; Higgins, Mercier, Burd and Hatch, 2011).

- Web2.0 and the Internet

A web browser, such as Explorer, Mozilla Firefox and Google Chrome, is a platform and software used to view web pages. A core component of the Web.2 is data management (Donelan, Kear and Ramage, 2010). The term itself was first introduced by Tim O’Reilly, and it became well known after the O’Reilly media Web.2 conference in 2004. It created a paradigm that delivers materials combined with other services in a completely new way (Bernal, 2009). The utilisation of this technology in the classroom marks a great era. For example, it would display lessons and tutorials, which could be used anywhere to enhance learning and teaching pedagogy. It enables people to share information, create material, collaborate and communicate.

In 2010, Khan Academy hit the headlines after getting the endorsement from Bill Gates, who said he regularly benefits from the website’s learning resources along with his children. The organisation was first established by Salman Khan, tutoring his relative who was living in another State in America. He began by giving one-on-one tutoring sessions over the internet. As more relatives wanted to benefit from his expertise, he started uploading his lectures on YouTube. Given the

widespread access of the public to this content, he soon received enthusiastic reviews from a vast number of students.

Seeing the potential of internet-based learning, Khan quit his job as a hedge fund analyst and began producing short videos on specific subjects, from mathematics to history and from finance to cosmology. His project received widespread recognition following the Gate's endorsement. It gained support from multiple corporate sponsors who appreciated the importance of online education, as technology helps provide unlimited educational access to everyone, everywhere who has access to a basic computer and internet (Kaplan, 2010)

2.2.1.2. How technology changes the way of teaching and learning?

Few decades ago, the orientation of education was teacher-centered; teachers would provide students with information and tell them how to deal with it. However, not anymore is this strategy valid in the era of technology. However, it needs a purposeful, careful and sufficient structure and plan that can make significant differences in students' learning (Kezia, Vinothini and Jananie, 2016). Transforming education requires rethinking how we teach and learn. Innovative educators, teachers and education leaders need to re-structure schools and classrooms to conform to digital age learning. It is not about using digital tools to support existing obsolete education strategies and models, but it is about tapping into technology's potential in order to amplify human capacity for collaboration, creativity and communication. Technology can be utilised to deliver meaningful, rich and purposeful content that enhance students' learning in which a thoughtful human is the guidance (Biancarosa and Griffiths, 2012). Technology permits both students and teachers to enrich their experiences by sharing information and communicating, irrespective of time, space, culture or even languages. Further, technology reshapes our daily lives, and our children are in the forefront of this transformation as we read, socialise, interact and play. According to OECD (2015), the Internet traffic as measured in bytes has increased more than three-fold just between 2008 and 2011. Most students have access to computers and Internet from as early as the age of 'six or may be younger'. However, there is still a gap between the existing technology on the one hand and teaching and

learning setting on the other hand. This situation requires a restructure of educational curricula and classroom facilities in order to fit effective technologies into existing environment and provide students with knowledge and skills of specific subject areas that are both meaningful and productive (Tomei, 2005).

This revolution will not just affect students' learning methods but also teachers' beliefs about learning and teaching. These beliefs may allow for or stifle a change to occur, contingent on the extent of change resistance (Fullan, 1982; Handal, 2003). Beliefs of teaching and learning are essential of the adoption of technology in classrooms (Hammond, 2011; Fogleman, McNeill, & Krajcik, 2011; Hoban, 2002; Pinto, 2005). They may be the last barrier to that adoption, as Ertmer (2005) sees. But, Hammond (2011) argues that this (teachers' beliefs as the last barrier) is an exaggeration, since there are other barriers that prevent the effective adoption of technology in schools, e.g. lack of training, classroom support, restricted access and the traditional nature of assessment. In other words, teaching' belief lies at the heart of any effectuation of change, but it does not represent the only hindrance to change. In fact, the association between pedagogical beliefs and practice is complex (Higgins and Moseley, 2001). Hammond (2011) states that beliefs help to understand and explain the framework of teaching and learning; they are not predictive of behaviour and they vary in nature and possibility.

Brown and McIntyre (1993) proposed that teachers have a sense of a 'normal desirable state' in their classroom; what students' activities should look like, and how students' progress will be. This notion was adopted in relation to teachers' use of ICT (Kennewell, 1997; Ruthven, 2009). It seems that implementation of technology is not the easy task, especially when teachers can see parallel situations in which they could gain what they plan to improve students' learning without technology. Hammond (2011) found that the espousing of technology in schools did not trigger a passion for technology transmission. However, researchers found that teachers who held constrictive beliefs are more likely to adopt technology in their classrooms (Becker and Riel, 2000; Gobbo and Girardi, 2001; Ertmer, 2005; Van Driel, Bulte and Verloop, 2007; Hermans, Tondeur, van Braak, and Valcke, 2008). The engagement with ICT has been seen as a consolidation belief in social constructivist pedagogy

(Windschitl and Sahl, 2002). Some may see it as a compound for a change in pedagogic belief (Dexter, Anderson, and Becker, 1999). Further, teachers need to be taught, trained and modelled to adapt to the use of technology in their classroom. They need to comprehend the benefits that students gain from this innovation in practice not just in theory.

Furthermore, technology has changed the presentation of education material. Schools' textbooks are not regarded the only resource that students rely on anymore. Mostly, textbooks have websites that offer assessment and additional material supported with audios or videos. In addition, e-books can now be downloaded to students' tablets or even smartphones ("TeachHUB | K-12 News, Lessons & Shared ResourcesBy Teachers, For Teachers," 2017).

2.2.1.3. Does technology benefit students' learning?

Many countries assign a massive budget to building schools fitted with technological facilities, e.g. computers, interactive whiteboard, etc. Yet, the result is not as satisfactory as it was expected. The OECD (2015) report 'Students, Computers and Learning: Making the Connection' has found that the use of computers in schools is not always aligned with students' learning improvement in some countries. Further, this report points out that despite the extensiveness of information and communication technologies (ICT) in our daily life, these technologies have not yet been extensively implemented in formal education. But, where they are used in the classroom, their impact on students' performance was varied, at the best. In fact, PISA results show no considerable improvements in students' achievement in reading, mathematics or science in the countries that had invested generously in ICT for education (OECD, 2015). Further, Sandhotz and Reillythe (2004) pointed out that despite the efforts to promote the utilisation of computers, the impact on teaching and learning in most classrooms has been minimal.

Despite the poor results linked to technology in the 'Programme for International Student Assessment' (PISA) that have been indicated on the OECD report, PISA suggests that the limited access to technology in schools may be better than nothing. OECD justifies the situation by saying that 'technology can amplify great teaching, but great technology cannot replace poor teaching'. This

means time, effort and collaboration are key components to using technology sufficiently in education.

However, the utilisation of technology can indeed benefit educational practice (Higgins, 2003; Condie, Munro, Seagraves and Kenesson, 2007; Balanskat, Blamire, and Kefala, 2006) or at the very least, generates modest increases in educational outcomes (Higgins, 2009). Several researches argued that the performance of students who learnt adequately in technology-integrated schools is likely to be higher than their peers who did not study in such environment. This means technology assists students in improving their academic performance (Hake, 1998; Beichner et al., 1999; Dori and Belcher, 2005; Shieh, Chang and Liu, 2011).

Besides, technology helps students clearly comprehend complex concepts. For instance, the use of software such as Grapes, Geometric Constructor in math can assist students to visualise mathematical functions in the form of graphs (Ruthven, Deaney and Hennessy, 2008). Some software assists students in correcting their spelling or grammar mistakes, such as Color Key. Digital cameras, for example, make it easier for students to take snapshots of their work and reflect on them later (Voogt et al., 2013). In fact, technology gives students the power to operate efficiently and adequately a complex that involves numerical, visual, audio and other tasks (Chai, Koh, Lim and Tsai, 2014).

Technology allows students to collaborate and interact with each other, with no restrictions of time or bounders, where a dialogue, different views, justification, reasoning and reflection can take place. This contributes to the development of students' achievement and enhancement of their thinking skills. According to Johnson and Johnson (1986), technology is a new tool to support collaboration. It also creates powerful learning environments (Oblinger and Oblinger, 2005). Durham University report by (Higgins, Xiao and Katsipataki, 2012) on 'The Impact of Digital Technology on Learning' suggested that collaborative use of technology, either in peers or small group, is more effective than the individual usage.

Technology supports student-centred learning where the students become more active, engaged and responsible for their education. They undertake some activities, such as organising, investigating, synthesising, and evaluating the content of the course (Means and Olson, 1994). This certainly promotes and boosts students' thinking skills, such as critical thinking and problem solving (Barab and Landa, 1997; Gallagher and Stepien, 1996; Savery and Duffy, 1995). Nevertheless, this does not marginalize teachers' role, as they assume another role as scaffolders, mentors, facilitators and instructors whenever students need.

Technology is an enthusing tool that entices students to engage in classroom activities more efficiently and earn them more self-steam. According to a report by the UNESCO, learning with technology provides powerful motivation to continue (How ICT Can Create New, Open Learning Environments, 2005). It offers immediate feedback for both the students and the teachers as well (Digital technologies in the classroom, 2015).

2.2.2. How technology is employed in teaching practice

It is established amongst researchers that the orientation of teachers toward technology will affect their implementation of technology in their classrooms. However, the adoption of technology is moderated by a range of features, apart from teachers' beliefs and attitudes, which are most essential, such as access to them, school support and the professional development (Ertmer, 2005; Miller and Glover, 2010; Teo, 2014; Burke, Schuck, Aubusson, Kearney and Frischknecht, 2017).

Tools of technology can be utilized in several ways, though teachers have to be careful regarding the selection of the tool, the reason behind its use and the goal it serves to achieve in teaching. A report by Cambridge International Examination suggests five examples on how to apply technology in education generally, which are:

- Bring your own device where students bring their own devices into the classroom to utilise them in learning activities. This approach, though reducing the cost for the schools with a variety of technology, may sometime pose a challenge to teachers in controlling student's

activities. In addition, it might cause embarrassment, should the teacher show lack of the knowledge on how to use them adequately.

- E-portfolios, where teachers and their students create catalogue of work to track students' learning, which provide a wide range of material in many formats.
- Flipped classroom, where students search for a piece of information or a term online at home then they apply the information they have gleaned in more depth in classrooms. This method would offer more time for activities and provide a deeper understanding.
- Personal Learning Network, where students interact with each other in order to facilitate sharing and exchanging ideas that support learning.
- Virtual Learning Environment (VLE), which provides access to courses, course content, assessments, homework, and links to external resources. It is a flexible approach, but it demands a high level of maintenance (Digital technologies in the classroom, 2015).

Another report conducted by Durham University asserted that what matters is not the use of technology that makes a difference in student's outcomes but rather it is how it has been used. However, the effective use of technology is more likely to occur by effective schools and teachers than other schools; also, technology is not a replacement of teachers but rather a scaffold of teaching (Higgins, Katsipataki & Xiao, 2012). Yet, the increase of technology use in schools is not likely to lead to a significant change in teaching methods (Sandhotz and Reilly, 2004).

The Apple Classrooms of Tomorrow (ACOT) project by Sandhotz and Reilly (2004) identifies five stages of teachers' attempt to integrate technology into their classroom: entry, where they are overwhelmed by technical and classroom management issues and showed little experience of using technology; adoption, when they are concerned about how technology can be integrated into daily plans; adaptation, when they integrated technology into traditional classroom practice more frequently and purposefully; appropriation, when they displayed a different attitude toward technology, understood it and used it smoothly as a classroom tool; and invention, when they revealed a new pattern related to other teachers, (e.g. sharing experiences) or to students, (e.g. creating diversity of learning situations that include collaboration, activeness and creativity). The

project concluded that the efficient integration of technology into classroom emphasizes the teachers' strengths-thinking attitude toward the curriculum and instruction rather than on technology itself. Teachers are not technicians. Hence, reducing technical expectations for teachers can improve their usage of technology (Sandhotz and Reilly, 2004). So, the crucial point is how technology works in educational setting not how technology itself works. Technology develops rapidly, which requires a constant sophisticated support. Therefore, schools need to provide technical, human, and organizational support to teachers (Voogt, Knezek, Cox, Knezek, & Ten Brummelhuis, 2011).Teachers need to be conscious of when and why the selection of technology would be educationally applicable and purposeful during lessons (Heikkilä, Vuopala and Leinonen, 2017).

A review study conducted by Buabeng-Andoh Charles (2012) identified some barriers that may stumble a sufficient integration of technology into schools. These barriers are categorized into three levels. First, teacher-level, which involves lack of teachers, ICT skills, confidence, pedagogical training, and follow-up of new and differentiated training programmes. Second, school-level, which includes old or poorly maintained hardware, inefficient educational software and limited access. Finally, system-level, which represents inflexible structural education system, traditional assessment; preventive curricula and restricted organizational structure. Investigating the extent to which these barriers affect individuals and institutions would help to tackle them (Becta, 2004).

Summary

No doubt, technology has changed the way we live, read, communicate, interact and learn. However, the implementation of technology into education was not as effective as most educators and researchers had expected or hoped due to a set of factors that work concurrently in dynamic situations such as schools. Students' learning would have been boosted greatly by the improvement of their academic achievement and their thinking skills, such as critical thinking, communication and creativity. Technology assists teachers as well to improve and boost their teaching methods, but it is not a magic stick or a replacement of teacher's role. Furthermore, teachers need support,

guidance, clear plans and instructions regarding the effective use of technology and its integration into their daily classroom (Orlando, 2009; Westberry, McNaughton, Billot and Gaeta, 2015; Heikkilä, Vuopala and Leinonen, 2017).

2.3. Section three: Collaborative learning

2.3.0. Introduction

Collaborative learning is a general term used among those concerned with education, and it describes the process of learners and their teachers' cooperation in looking for solutions or making efforts to understand concepts and create new ideas. Learners may work in small groups in classes, faculties, inter-faculty and even inter-schools. The model is a paradigm shift from the conventional setups where the teacher acts as the source of all knowledge, and the learner only functions as a recipient. This new module 'relatively' creates a platform for learners to explore and investigate information gleaned from different sources and, probably, try to analyse and understand its applicability. This method does not necessarily marginalize the role of the teacher, but it aims at incorporating the input of the learner into the learning process. Students take notes and listen to the tutor while following up the given instructions. The classroom is set up for stimulating discussions, interaction between learners and involving them actively rather than passively in the course work. According to Plutarch (1927) 'brain is not a vessel to be filled but a fire to be ignited'; this strategy places the teacher in a position of a coach, and the student is meant to become a player (Smith and MacGregor, 1992).

2.3.1. Is it collaboration or cooperation?

Collaborative learning is an array of approaches aimed at ensuring the learner's full participation in the learning process. The easiest description of this mode of learning is group work. This kind of work is interspersed with teacher-student class work, lecturing and note-taking. The time allocated for classwork and out of classwork is organized and balanced with an aim to ensure that the learner has adequate time to go through what he/she has learnt in class in group work with peers. This

allows them to digest the information, interpret and make inferences on the data they gathered. The targets of collaborative learning may differ from one setting to another. The study group may be set up to achieve a specific short-term goal as what happens in universities. The group may also collaborate to tackle and address a complex issue as directed by the tutor. Possibly, students may initiate a collaborative learning approach to pursue their interests and tackle problematic questions. The agenda of collaborative learning may be focused on producing results or simply taking part in a process or engaging in improving one another's academic progress (Barbara and Jean, 1992).

Collaborative learning is often confused with the cooperative one. However, there is a difference between the two methods. Collaborative learning requires combined efforts among learners or between learners and their teachers in education. McInnerney and Robert (2004) define collaborative learning as "a method that implies working in a group of two or more to achieve a common goal, while respecting each individual's contribution to the whole". In this model, group' members assume almost all the responsibilities in achieving the group's tasks. For instance, the group takes initiative to find sources to gain information. In such a case, a teacher may intervene only to assess the progress of the group and give advice. The aim is to ensure a comprehensive understanding and a strategy to solve arising problems. The learners may interact face-to-face or through computer-based models. The combined effort may be a joint project or specified delegation of duties and/or roles (Dillenbourg, 1999). This type of learning would lead to deep understanding and significant connections among participants (D.W. Johnson, Johnson, and Smith 1998; Smith 1995); bring alternative perspectives (Cunningham, 1992); develop a different product compared to a one produced individually (Ingram and Hathorn 2009); and synthesize information that are extracted from different views (Kaye, 1992).

In contrast, cooperative learning is "working together to accomplish shared goals" (Smith, 1995). It is a teaching strategy that brings together learners with different abilities and incorporates several learning and teaching activities to ensure that learners better understand their school work. The teacher, therefore, still has the full control of the class and only designates the roles to particular

groups to achieve various targets of the coursework. The teacher may even help the learners find sources of information and facilitate their presentation of concepts to the whole class. Groups are formed in such a way as the group members equally share responsibility. Each member of the group learns to understand the process and ensures that other members are aware of it too. This creates a sense of togetherness and joint achievement. The group is closely connected that any allocated homework is done thoroughly in order to ensure that each member of the group clearly understands it. In other words, the mutual benefit for all is the core value of the group because through recognizing that the group members are in the same boat, they see that any success or failure will affect the entire group (Rupert, Karen, Lyn, Neil and Denise, 2004).

The core difference between collaborative and cooperative learning is that the former lays emphasis on the participant and the process of knowledge formation, while the latter focuses on the creation of the ultimate product. Collaborative learning involves direct interaction between group's members, which includes negotiations, discussions, and accommodating others' perspectives. In contrast, each member in cooperative learning has to complete the part that is given to him/her separately so that the entire groups can achieve the assigned task (Dillenbourg, Traum and Schneider,1996; Roschelle and Teasley 1995; Kozar, 2010).

The present study will deal with these two terms without distinction, as the focus here is on students' learning attitudes in their interaction with each other as they learn (e.g. exchanging information, engaging in debates, checking different view) in order to produce the final product or bring about the solution. In other words, the focus is on how they get there (shared goal) and what they get (either right or wrong).

2.3.2. How does collaboration/cooperation support students' learning?

Working together to reach a final goal, find a solution or create a meaningful project would enhance cognitive learning as the interaction with peers take place (Zurita and Nussbaum, 2003). In addition, the responsibility for one another's learning as well as their own would help other students to be successful (Gokhale, 1995). In collaborative learning, Johnson and Johnson (1986) view that there

are five vital elements. These are positive interdependence, promotive interaction, individual accountability, group processing, and social skills. Besides, according to Johnson and Johnson (1986), there is convincing evidence that students who learn cooperatively can achieve higher levels of thought and retain information longer than their peers who work individually. Further, collaborative learning promotes students critical thinking through discussion, clarification of ideas, and evaluation of others' views (Gokhale, 1995). It provides students with an opportunity to engage in discussion (Totten, Sills, Digby and Russ, 1991). Accordingly, collaborative learning enriches students' knowledge and improves their high order thinking, especially critical thinking skills, where others' views are taken into account by weighing them and a conclusion can be reached.

2.3.3. For an affective collaboration/cooperation learning

Many researches put more emphasis on the importance of tasks' constriction in collaborative learning than the relation between group's members (Miller, Garnier, Hartnett and Couzin, 2013). However, Barron (2003) suggests that the focus should be on tasks' constriction as well as students' interaction within the group in order to understand learning outcome, which is relatively different from individual learning. Another view postulated by Mercier, Higgins and Da Costa, (2014) suggested that attention should be paid to how students are functioning within the group in order to ensure all students' participation intellectually and organizationally and enable them to solve the task's problem. However, it is likely that the high level of intellectual and organizational leadership is not related to students' outcomes within the group (Mercier, Higgins and Da Costa, 2014). Therefore, both tasks provide a clear goal that cannot be achieved individually (Mercier and Higgins, 2014; Johnson and Johnson, 1986). Students' behaviour within the group and with other groups involves, for instance, active participation, and consideration of others' views in order to understand the task or the problem and ensure that each member is able to explain the task, make evaluation and draw conclusions (Johnson and Johnson, 1986).

Students' engagement in productive collaboration processes is the only component that enhances their performance. More specifically, students need to actively reconstruct meaning by deliberating

divergent views and sharing information rather than splitting the work (Miyake and Kirschner, 2014). Yet, students often fail to engage spontaneously in productive collaboration (Lou, Abrami, and d'Apollonia, 2001).

Another element that may affect collaborative learning is teachers, who are the instructors in this situation. Their perception of teaching must be one that sees it as a procedure that develops and enhances students' ability to learn. They should realize that transition of information is not their role, but, rather, they create and manage meaningful learning experiences and motivate students' thinking through real world problems (Gokhale, 1995). Teachers need also to ensure that students' conversation is related to the task content. Rau, Bowman and Moore (2017) argue that the most effective learning collaboration is the one that provides students with collaboration scripts, which structure collaborative interactions by proposing orders of interactions, by posing questions for students to discuss or by prompting students to exhibit particular behaviours (Fischer, Kollar, Stegmann and Wecker, 2013; Kollar, Fischer and Hesse, 2006; Weinberger, Fischer and Stegmann, 2005).

Nonetheless, scripts that support collaboration may fail to improve learning of content knowledge for many reasons, such as they do not support students' needs in terms of the content that offers little or much help (Dillenbourg, 2002), or they provide support at the wrong time (Rummel, Walker and Aleven, 2016). Insufficient support can lead to negative effects if students perceive it as annoying or distracting (Rummel, Walker and Aleven, 2016).

In addition, the group size is essential in order to ensure that all students participate within their groups at the intellectual and organizational levels. Johnson and Johnson (1986) indicate that the small group of (2, 3, maybe 4) is better than the large group. In a small group, students will have more time to talk with each member and faster pace to finish the work. However, Rau and Heyl (1990) state that small groups, e.g. (of three) exhibit less diversity that would lack divergent thinking and exposition of different expertise that help to make collective decision-making. Equally, in larger groups, it is difficult to guarantee all members' contribution (Gokhale, 1995).

2.3.4. Collaboration/cooperation and technology

The implementation of technology in education has increased the capability to benefit from collaboration for students' learning and teachers' teaching. Mercier and Higgins (2014) indicate that technology, such as multi-touch, allows different forms of collaboration and could be utilised for complex collaborative learning activities with adequate support. This kind of technology shifts the focus from less process to more task discussion (Harris et al., 2009).

Further, technology can promote deep understanding as well as appreciable conversations (Pea, 1993). Rau, Bowman and Moore (2017) assert that technology would provide students with the proper support they need in order to understand a complex concept and reflect deeply on it and make sense of visual representation collaboratively (Schwartz, 1998), especially when their activities are provided with a script (Rau, Bowman and Moore, 2017). More, it can help students to explain a complex concept or achieve a task (White and Pea, 2011).

Technology would facilitate harmony building through group discussions and questioning (Cavalier and Klein, 1998). It also helps to manage information sources in terms of their interchangeability as well as the ability to search, tag and track versions. Further, it enables local and remote presentation and helps to store and save finished works and archiving them (Deal, 2009). Finholt and Teasley (1998) noted that groups that collaborate through technology association are more likely to generate better ideas than groups that collaborate face-to-face. However, face-to-face groups perform better when the task requires problem-solving or reaching agreement. Nevertheless, they are likely to be dominated by individual views.

2.3.5. Collaboration/cooperation and critical thinking

There is an increased emphasis on teamwork within the workforce in this era of technology. The need for people who are able to think creatively, solve problems, and make decisions as a team is increasing as well. Students in the real world are increasingly encountering complex multifaceted problems that have societal, regulatory, ethical and financial aspects. These problems also require specific solutions and may cover topics that need critical thinking and formulation of possible

solutions (Carrithers, Ling, and Bean, 2008; Kunsch, Schnarr and Tyle, 2014). Therefore, the main goal of using technology in education is to develop and to enhance critical-thinking skills and collaborative learning. Coles and Robinson (1989) in their book “teaching thinking” introduced collaborative learning as one of the methods that enhance high order thinking whilst students learn from each other and correct their own errors and others as well, (e.g. when students explain some concepts to each other, they express their thoughts loudly and make their thinking clear). This means there is a mutual benefit between collaborative learning and the use of technology.

According to Loes and Pascarella (2017), the concept of collaboration in this context implies that learners receive support or assistance to think critically on a given scenario, issue or task. This collaborative mode of learning facilitates critical thinking by bringing together various learners or people with different sets of understanding and ideas about a given scenario. This helps them to explore, discuss and analyse the issue from a range of aspects and perspective and come up with more comprehensive understanding and description of problems and more holistic and compatible answers, perspectives, solutions or ideas.

Beckmann and Weber (2016) suggest that collaborative strategies seek the construction of knowledge through groups. That is, the learning process is collaborative, where understanding is " a permanent work in a continuous and cumulative fabric of learning in which collective experiences are promoted". These group experiences make it possible to appropriate reality and consequently the production of knowledge is generated, which subsequently needs to be systematized.

For this reason, students are able to think innovatively and produce new knowledge in collaboration with others. Now, while the students do the academic work, they put into play the communication skills, since "the collaborative learning, is centred basically in the dialogue, in the negotiation, in the word, in learning by explanation". Collaboration in learning makes use of argumentative discourse that has the purpose of convincing with reasoned arguments, to accept the different thought or to counter-argue with a foundation, when one does not agree with a certain point of view (Loes and Pascarella, 2017).

Defining the role of collaboration in critical thinking, Barkley, Major and Cross, (2014) suggest that in modern day, online communities and forums are believed to be the best and highly accessible sources of collaborative learning in creative manner. The changes are immediately reflected, so that there is a preview of the work done. Team members can work on the same page without having to physically meet, although they must use some timely tool to coordinate the effort. The review of the work of the other can be done easily online and the various readings of the participants multiply the revisions to ensure the process of continuous improvement. This is very consistent with the modern philosophy of total quality, as each one can go evaluating individually what is missing of the total work that must be filled to perfect it.

Summary

Collaborative learning is an approach intended to ensure that learners participate fully in the learning process. It helps students to organize their thought, deepen their understanding, clarify concepts and make them open to different views. This strategy, in fact, has become increasingly important in the modern era, where collective action is essentially needed. Further, technology has added advantage to learning and made it outstrip time and space. Hence, the benefits between collaborative learning and technology are mutual.

2.4. Section Four: The History curriculum

2.4.1. What is history?

History education is not only about the study of the past, but it also shows how the past has helped in shaping the present and how it will probably contribute to shaping the future. The heart of history is evident. However, it seems that history education is struggling sometime over political interests, which most of the time lie outside of the proper education system that puts its own version as the best story (Segall,2006). It is not a reflection of the past; it is rather an interpretation of it. Jenkins (2000) states that the past and the history are not “stitched” together; the meanings given or added to the past are not fundamental or intrinsic to the past, but rather they are given by outsiders. Thus,

history is not about the past but how the meaning of it has been interpreted by diverse perspectives (Kellner, 1989).

Student's awareness of history education should be improved through three aims. The first aim is to develop students' knowledge of the past; to develop their knowledge of time eras, progressions of change, events and agents based on diverse interpretations and perspectives. The second aim is to be able to use historical approaches, which is reflected in the ability to use different historical theories and concepts to articulate, investigate, explain and draw conclusions about historical issues from different perspectives. The third aim is to comprehend how history is used by different groups and interests in the past and the present, which allows students to give viewpoints on the future and to assess the use of history in different contexts and time periods (Ledman, 2015).

2.4.2. How has it been taught?

There are different approaches to teaching history depending on the orientation of the history education: 'single narrative'/'collective memory', 'disciplinary' and 'postmodern'/'critical', as Seixas (2000) specifies. The first one is the most widespread teaching approach in schools all over the world, where students have to listen to one single story (the only version) as the best of the past (mostly written by those in power (Segall, 2006)). It involves dates, names, places and so on, and students have to memorise them. As Seixas (2000) argues, the history learning in this case is lost any way. The second orientation is teaching history with multiple versions of the past (varied stories or disciplinary) that allow students to use historical methods, reach conclusion through the better interpretation of documents and evident information, and questioning a historical account (Segall, 2006; Stearns, Seixas and Wineburg, 2000). The third approach is what Seixas called "postmodern", or what Segall (2006) described as "critical" approach, where students in the disciplinary orientation learn about history from diverse versions of the historical event, but in this approach students relate those historical stories to their social and political present. Seixas (2000) argues that it is not enough for students to simply arrive at the best version of the historical events grounded by evidences, but

they should recognise how different groups categorise the past into history to implicate and serve their political and social benefits. From this orientation's perspective, Ankersmit deliberates that studying history is not the reduction from unknown to known, but it disintegrations what appears familiar (as cited in Segall, 2006).

Thus, the best way to comprehend history and to relate and reflect on our present is to teach our students how to think critically. It seems that the saying "the past does not negotiate" is meaningless sometime, especially when the historical events are unclear, incomplete or fake. Students should be able to reach a meaningful conclusion, elaborate its social, religious, political and economic context, and indicate how that past reflects on what is happing in the present.

However, critical thinking skills cannot be taught in history at once, but they must be disseminated and distributed throughout the curriculum, highlighting or reinforcing a specific skill each time (Craver, 1999).

2.4.3. Could we teach critical thinking within history education?

Critical thinking involves a complex set of concepts and can be taught independently or by integration into numerous academic subjects, or as Robert Sternberg calls it a "mixed approach" (as cited in Ennis, 1997). In addition, it can be explicit or implicit (Ennis, 1997), and it has various well-constructed definitions depending on researchers' underpinning philosophy. For instance, Siegel describes a critical thinker as one who "appropriately moved by reasons" (Siegel, 1988, p. 23), whilst Ennis defines a critical thinker as one who has "rational reflective thinking concerned with what to do or believe" (Ennis, 1987, p.10). Also, Paul (1991) identifies critical thinking as a "systemic' way to form and shape thinking. According to ("How to teach critical thinking" 2015), critical thinking skills are a long-term improvement process. See Chapter Two, p.41, for more detail about critical thinking skills.

Hunter (1991) argues that teaching critical thinking separately would limit human thoughts. Thus, the need to expand critical and creative thoughts processes is essential in order to accommodate and benefit from the outcomes of those new disciplines. Ruggiero (as cited in Hunter,1991) suggests that the resistance to teaching critical thinking in classrooms comes from a series of misunderstanding points, such as thinking cannot be taught and is alien to the thrust of one's regular teaching accountability. Or, some students are obviously dull and the quality of their performance is decreasing.

There is a common misleading notion that anything is written or published is true. Therefore, questioning the certainty of facts, Peirce (1998) emphasizes that we cannot be certain about anything. Bronowski (1973) argues that the absence of critical thinking skills would be a misplaced sense of certainty that may lead to fascistic attitude. Our search for knowledge means engaging in thinking processes. Hence, to achieve this aim, students should be taught critical thinking within their curricula and be trained to use it. It might start with basic higher order thinking. Neimark (1987) considers that this training (to use higher order thinking skills) would lead to a deep insight into students' thought progression and an acquisition of powerful systematic processes for organizing and integrating knowledge in pursuit of proper understanding. This requires viewing students as thinkers, reflective, self-aware and systemic. According to Cameron and Richmond (2002), "critical thinking provides a superior approach to acquiring answers to difficult questions rather than believing uncritically what one hears on the evening newscast", and in history education those skills are more needed, where the absolute facts about event, people, etc., are less visible.

Learning critical thinking within any disciplines (history in our case) needs to be part of the learning processes rather than outside of it. It needs to be a well-planned action and evaluation, which involve four major stages according to Taylor (1987): disorientation, exploration, reorientation and equilibrium. Teaching critical thinking also could benefit teachers both in practice and in their daily life, such as managing a complex issue in their classroom (e.g. political issues), or spotting-on a dangerous or staple system of rules and procedures (Smith, 2011).

However, students who are adapted to explanatory teaching would misunderstand problem-solving, critical thinking or communication approaches. Consequently, they feel threatened when being asked to be critical or communitive, they may not see the value of those approaches, or they may not share the belief that thinking skills developed during their learning will be useful and more important than just gaining information (Pittendrigh and Patrick, 1984). Thus, teachers' responsibility in such case should focus on giving students a clear idea about their adoptive techniques and provide a persuasive clarification of the rationale of those approaches, (e.g. problem-solving or critical thinking or communication approaches and so forth) (Pittendrigh and Patrick, 1984).

2.4.4. What strategies could we use to teach critical thinking through history?

There is a wide range of strategies that enhance students' critical thinking which history teachers could select and integrate into her/his classroom according to the students' age, the nature of the lesson, as well as other criteria. In the following paragraphs, I will review some of them analytically.

- Beginning with a question that is not simply answered by 'yes' or 'no', but rather by provoking students' thinking to thrive the quest of knowledge or to solve the problem, such as how, why, when, or what if. For instance, how could/or could not the war be avoided? would be a suitable one. However, students cannot be critical thinkers without having the information they need. Therefore, any exercise should establish a foundation of related information by reviewing previous related lessons or information, or by showing them a short video, text or pictures ("12 Strong Strategies for Effectively Teaching Critical Thinking Skills," n.d.).
- Brainstorming, where there is not absolute correct answer. It begins by selecting a historical topic (e.g. human right movement in the USA), determining the purpose of the lesson, deciding how the students will work (group/ individual), and how much time will be given. The result from such strategy would be a great source for debate, discussion and challenging different views. This active learning strategy is a quick way to generate thoughts and measure the previous knowledge.

- Investigating images, where students use the analyses processes to investigate the historical aspect about the selection of something, e.g. photo, a piece of art, a poster or video clip. This strategy enhances students' critical thinking, observation and interpretive skills.
- Café conversation, where students are aware of different perspectives in order to understand the past events and how different background groups (socially, economy, age, gender, and occupation) represent different views on the same issue. This strategy can be employed by selecting a historical topic (e.g. give some information about the event or ask students to seek the background information by themselves via the Internet) and a contesting group (who hold a different view to enrich the discussion). After the conversation is wrapped up, students would write a journal to reflect on their experience. It would allow students to exercise independent judgment in gathering and assembling information and knowledge.
- Close viewing protocol, where a carefully and purposely film media is selected to focus on the massage that the filmmaker wants us to receive. This strategy would increase students' critical thinking by critiquing the film content and justifying their claims. It would be more effective if the teacher asks questions before students begin to watch the film in order to attract their attention and provoke their thinking (what does the film tell us? why does it tell us that? What are the most important points in the film 'in students' point view'?).

The above strategies were adopted from ("Teaching Strategies | Facing History and Ourselves," n.d.).

- Fairmindedness strategy, where students are able to consider the strengths and weaknesses of contrasting points of view. They put themselves (imaginably) in others' places to create an understanding of them. This allows students the chance to reflect on and consider evidences and reasons of positions (Binker, 1995.).

Binker (1995) provided thirty-five strategies that would apply in any discipline in school setting to teach critical thinking skills. They have been categorised into three groups: a) affective strategies, (e.g. think independently); b) cognitive strategies / macro-ability, (e.g. clarifying issues, conclusions, or beliefs); and c) cognitive strategies / micro-skills, (e.g. comparing and contrasting ideals with

actual practice. Binker (1995) believes the independent, exact, fair-minded thinker can be translated into classrooms discussions and activities.

2.4.5. How could technology be used with history?

Several years ago, students had to sit at the library and wade through documents and books looking for a public figure or historical event. Now, they can simply insert a keyword in a search engine and the database generates the precise passages (Craver, 1999). Also, the most obvious issue that faced teachers in teaching history is students' lack of previous knowledge in history, which is mostly related to difficulties with comprehending the meaning of abstract concepts and relationships, where technology would be helpful to grasping those things. However, Halpern (1998) argues that technology has made the ability to think critically more significant than ever before, yet many consistently engage in flawed thinking. Hence, the use of technology alone would not make students critical thinkers, but rather it depends on how teachers apply and employ this technology in their classroom.

Craver (1999) argues in his book that 'using Internet primary sources to teach critical thinking skills in history' is more useful than students' relying on their history textbook as the basic source, where they usually do not have to employ critical thinking skills because the book has made a conclusion for them. In contrast, using technology (the Internet) encourages them to make effort to create order, to make inferences, to examine, to judge and to make evaluation. Additionally, technology, especially the Internet, helps to challenge the one opinion presented by the textbook, which most of the time avoids the conflicting account of events and presents the solo perspective (usually of those who are in power).

Technology brings history up to life. Most of the time, students see history as a boring, dry and irrelevant subject to them. Technology offers students an opportunity to view and read- first hand- historical documents. There are many websites that provide historical videos that make history more interesting and meaningful for students (Tenkely, n.d.). Teachers should be encouraged to utilize

these technologies into their classes, such as the history channel ("HISTORY | Watch Full Episodes of Your Favourite Shows", n.d.), American History in Video ("American History in Video", n.d.), and Watch Know ("WatchKnowLearn / History," n.d.).

Summary

History education is not merely a reflection on the past, but rather it is an interpretation of it, which makes it one of the most applicable areas of curriculum to teach critical thinking. Judgement is often required to interpret the past and to balance different sources of evidence. Certainty about complex issues (most of the time) is hard to achieve. Students need to be taught to challenge the historical information and raise questions, which allow them to be reflective on the present. There are varied strategies that can be used to teach critical thinking skills, and with the assistance of technology, history would be more interesting for students.

2.5. Section Five: Theoretical framework

2.5.0. Introduction:

Learning is a process of continuous change. This change is manifested in the insight, behaviour, perception, and motivation or a combination of them. It is characterized by a systemic change in the behaviour or behavioural dispositions that reflects as a result of experiences in specific situation (Bigge and Shermis, 1999). Thus, it is important that students make sense of their learning and personalise it. Hence, teachers need to encourage students and provide opportunities for them to take responsibility and to explicitly emphasize the importance of doing so (Hammond, 2011). However, this is unlikely to happen unless they fully understand why they do that and how to do it accurately. Accordingly, teachers should know learning' theories that constitute the framework of their teaching and for the students' learning (Butterfield and Nelson, 1989). Understanding learning theories invests teachers with the ability to translate them into instructional methods and reflect on their teaching in order to create a better learning environment for students and to seek for adaptation or change. Lewin (1951) said 'there is nothing as practical as a good theory'.

As this study is seeking to effect change and propose a new education strategy to teach critical thinking using technology, it is useful to demonstrate some learning' theories that help to shape the study framework. I will begin by presenting some of these theories, explaining the main points of each one and the criticisms levelled against it. Then, I will advance the specific theories related to this study and rationale of their choice and applicability to this study.

2.5.1. Theories of Learning:

A learning theory, as Bigge and Shermis describe it, is "a systemic integrated outlook in regard to the nature of the process whereby people are related to their environments in such a way as to enhance their ability to use both themselves and their environments in a most effective way" (Bigge and Shermis,1999, p3). So, it is a deliberate process of formulating viewpoints to understand the behaviour of individuals in order to learn in a comprehensive way integrated in different environments so that it becomes more effective. It is described as an effort to explain how people learn and it provides a guidance to design practical learning experiences (Baumfield et al, 2005). It is a way to verify instructional design, strategies and select reasoned ones (Ertmer and Newby,1993). There are three major theories that have been determined in learning behaviour: objectivist theories that include both the behaviourist and cognitivist theories, constructivist theories and connectivism theory. Those theories overlap in many ways. Yet, each has its distinct characteristics in explaining and describing learning (Ertmer and Newby,1993).

2.5.1.1. Objectivist Theories:

The key assumption underlying these theories is that the real world is an external knowable place and includes both behaviourist and cognitivist approaches.

a. Behaviourist's theory

It believes that learning takes place if there is a change in the form or the frequency of observed performance, and an accomplished learning occurs if there is an appropriate response that followed the presentation of a specific environmental stimulus. It lays emphasis on environmental conditions, as well as the importance of the organisation of stimulus and consequences within that environment

(Ertmer and Newby,1993). The shape of learning can be decided by selection of reinforcements (Jonassen, 1991). Therefore, the use of repetition and reviewing help students to sustain their readiness to respond (Schunk, 1991). The transferring of knowledge takes place when students are able to reapply some common elements into a different situation (Ertmer and Newby,1993). Thus, the most useful teaching strategies are the ones that build and strengthen stimulus-response associations (Winn, 1990). However, behaviourist theory cannot sufficiently explain the acquisition of higher thinking skills or those ones that need more time and depth to address them, e.g. language development, problem solving, inference producing, and critical thinking (Schunk, 1991).

Thorndike is one of the psychologists who laid down the optimal principles of this theory such as the law of effect that provides the most important conceptions of learning (Jonassen, 1991). Thorndike (1927) believed that learning occurs by trying and making errors, as well as the habitual response structures according to the amount of satisfaction or annoyance that are connected to the effect. This connection strengthens by repetition and weakens by non-repetition. This theory helps educators to determine the elements of the best learning situation, or as Gropper (1987) states, displays the environmental conditions that allows students to be able to make the correct responses and formulate the materials so that they become important and meaningful for learners. Further, it helps students to recognise their needs, which lead to satisfaction.

This theory excludes the mind operation of learning outcome, as they cannot be observed. The famous psychologist Skinner believed that studying observable behaviour is more important than internal mental operations (Jonassen, 1991).

b. Cognitivist theory

The cognitive theory shifted the stress from the observable behaviour to more complex cognitive processes instated such as thinking, problem-solving, language development, concept creation and information processing (Snelbecker, 1974). It concerns with the process of acquiring knowledge, (e.g. how it is received, organised, stored and retrieved) and internal mental structures (e.g. mind functions during the learning process). Like the behaviourist's theory, the cognitivist theory stressed

the role of environment to facilitate learning, but the mental activities of the learner that lead to responses are more essential. It concerns with what students know and how they acquire that knowledge (Jonassen, 1991). Therefore, the learning process occurs when students become able to understand how to employ the knowledge (stored in their mind) into a different situation and understand the knowledge framework that involves the form of rules, concepts and distinctions (Ertmer and Newby,1993; Duffy and Jonassen, 1992).

Despite its emphasis on the cognitive aspects and its explanation of complex forms of learning, such as reasoning, problem-solving and information-processing, this theory still views the ultimate goal of teaching as the transfer of knowledge to the learner sufficiently and effectively by using two techniques: simplification, in which knowledge is analysed, decomposed and simplified into basic building blocks, and standardization, where the irrelevant information is removed (Ertmer and Newby,1993; Bednar et al., 1991). Thus, learning situations should be organised in a way that students are able to associate the new knowledge with the exciting one meaningfully; generate feedback that helps students to assimilate and/or accommodate this new information effectively; and understand that the experiences of different individuals bring diversity into the educational situation, which may affect the learning outputs (Ertmer and Newby,1993; Stepich and Newby, 1988). In SRPQ there is a repetition of the process of gaining knowledge and skills that allow students to build a profound understanding of what they are doing and how to use this knowledge in another situation and reviewing what they present (from seek for information to present them to the whole class).

2.5.1.2. Constructivist Theories

Several theorists were part of the constructivist movement, including John Dewey, Maria Montessori, Jean Piaget, and Jerome Bruner (Perkins, 1991). Basically, it is said that people construct their understanding and knowledge of the world around them on the basis of their experiences and their reflection on these experiences. When we encounter something new, we interpret it based on our past experience, which may lead to a confirmation of our current thinking or a change in our view of things and redirection. This means, people create their own personal knowledge in relation to their

own goals and aims. In the classroom setting, it means encouraging students to be active participants, creating their own understanding, but testing this by reflecting on what they are doing, or by talking about it and how their understanding has occurred through questioning themselves and their learning strategies. Students in the constructivist theory are learning how to learn as they learn (Ertmer and Newby,1993).

This theory overlaps with the cognitive theories in emphasizing the importance of mental performance of students, but it differs from them in that it sees the mind as a filter to what comes from the outside world that creates its own coherence, where the behaviourists consider the mind as the world's reference (Jonassen, 1991). Further, the mind is the source of all meanings, so our knowledge of the world stems from our interpretations based on our experiences. We create meanings not just acquire them (Ertmer and Newby,1993). Learner and environments are both important factors that influence each other and produce the knowledge that is essential to be embedded in the learning situation in which it is used (Brown, Collins, and Duguid,1989). Talk and interaction become important in constructivist learning environments as does engagement with a variety of sources of information.

The goal of teaching is not just the transfer of knowledge but rather the elaboration on and interpretation of information as well as the continuation of using the understanding in authentic situations. This means creating cognitive tools that reflect culture where they have been used, reflecting the insight and experiences of individuals (Ertmer and Newby,1993; Brown, Collins, and Duguid,1989).

The most important principle and basic idea of the constructivist theories is the emphasis on knowing how to make it, as Vico stated in his work (as cited in von Glasersfeld,1989). Another important idea that was established by Piaget is the social interaction that involves two crucial factors: assimilation and accommodation, which are used differently in modern language. Thus, it is important to understand them in the context of the constructivist theory of knowing (Von Glasersfeld,1989). In SRPQ student are encouraged to draw on their own knowledge and reflect on their own perspective

which may lead to change in their view of things or redirecting them (when they present their response to a task). Access to sources of information and collaborative interaction is also critical.

2.5.1.3. Connectivism Theory

The rapid increase of technology that has emerged in modern societies, (e.g. the Internet, particularly Web 2.0) has provided endless access to a wide range of points of view and offered opportunities for communication and knowledge in new forms inside and outside of formal educational institutions (Goldie, 2016). Therefore, the ability to access the related information and tackle the resources presented by various and varied views becomes an essential skill that is increasingly recognized by individuals, organizations and institutions (Cheston, Flickinger and Chisolm, 2013; Flynn, Jalali and Moreau 2015). Thus, adopting a new theory or building on an old one to explain learning in these new contexts is vital. Connectivism is the most important theory that is associated with learning in technology context (Goldie, 2016). Siemens (2005) believes that the previous theories, such as the constructivist, the behaviourist and the cognitivist theories, are not reflective of underlying the new social environments.

According to Siemens (2014), connectivism theory of learning highlights the importance of interaction among all those involved in the learning process, adding that the process does not occur in teacher-student hierarchies, but rather all participate as information nodes, such as an ecology. It also provides a great contribution to technology-assisted instruction, with the conception of learning networks and ecologies, where everything revolves around information connections with which learning is generated. Kop and Hill (2008) argued that unlike the theoretical contributions discussed above (behaviourism, cognitivism and constructivism), connectivism does not detail specific aspects for the instructional design. However, according to Anderson (2016), this approach highlights the importance of having an open structure, adequate to the flow of knowledge, where anyone can participate in this process and all can contribute without hierarchies, where the content is generated by the users themselves, by the massive participation, or by the co-construction of ideas and

knowledge. This context encourages the creation of open and free platforms where learners can create social networks (Google Groups, Facebook, Twitter, Flikr) and communication where you can share texts, audios and videos (e-mails, Skype, messenger), and blogs and podcasts are created and distance education is given via platforms such as Wikipedia and Moodle. The nature of the tasks in SRPQ encourages learners to make connections. This is not only in terms of the sources of information and evaluation of their relevance to a key question, but also in terms of hearing each other's perspectives through discussion, where everyone can participate new ideas and information and interact with each other in a successful collaborative setting.

2.5.1.4. Transactional distance theory

This theory of learning in the digital context was developed by Moore (1993), by articulating the notion that "distance education is not merely a geographic parting of teachers and learners, but, more critically, is a pedagogical issue. In order to develop this theory, Moore (1993) conducted a qualitative analysis process on more than a thousand educational programs of the time characterised by the student-teacher separation. The aim was to locate the pedagogical macro-factors, defined by the former as the distinctive pedagogical characteristics of this part of the teaching-learning universe in which the students were separated from their teachers. But, the simple geographical separation was not enough.

The aim was to find out if there were differences in the way in which the different educational programs were organised and offered that could help to understand them and thus investigate and develop them. The result of this process of qualitative analysis was the Theory of Transactional Distance, which states that different educational programs can be differentiated according to the existing degree of structure (or the amount of control exercised by the trainer or the educational institution) and dialogue (or the amount of control exercised by the student). These were the macro factors that defined the field, the greater the structure, the greater the distance, while the greater the dialogue, the smaller the distance. Therefore, distance education is not defined by the geographical

separation between teacher and student, but by the amount of existing dialogue and structure (Moore, 1993).

In other words, Wedemeyer (2010) views that the teacher and the group of students may be distant if there is no dialogue between them, even if they are under the same roof. Likewise, by having dialogue, the teacher and students can be united, even if physically separated by thousands of kilometres. This dynamic and systemic study of distance education has made distance irrelevant and has focused the attention on communication through different media and in the construction of knowledge.

Koslow and Piña (2015) argue that when there is significant communication between the student and the teacher the distance between them decreases, and when the significant communication decreases, the distance increases. According to Saba (2016), a researcher who follows Moore's line, the variation in the value of dialogue and structure determines the amount of transactional distance at each moment. This dynamic flow occurs throughout the development of an educational session. Thus, at different times, the distance varies for each student, if they consider the amount of structure and dialogue appropriate to their requirements to learn. This relationship is maintained both in the classroom and on-line. These ideas influenced the development of SRPQ in the way the tasks are designed and the teacher frames the question, but then the students engage collaboratively in identifying and discussing the relevance of the information.

2.5.1.5. Theory of learning by modification and generation of schema

Michelson and Knoblock (2006) who developed this learning theory affirm the existence of three types of learning: growth, restructuring and adjustment, while knowledge itself is stored in an organised way in mental schemes. The learning cycle would go according to the following stages: 1) Initially, there is the stage of growth in which the individual brings together knowledge without any structure; 2) When the amount of stored knowledge reaches a certain size, there is an adjustment of the schemes that the individual already had updated with the new information. In this step, no new

schemes are generated (Michelson and Knoblock, 2006); 3) Finally, the creation of new schemes and the coupling of existing ones takes place. As the name suggests, a restructuring is carried out in which new conceptual structures emerge or the way of interpreting old ones changes. This step is extremely important and is done through two mechanisms (Michelson and Knoblock, 2006): Generation of a new scheme from a similar scheme that is identified by analogy with the information it contains and the new one. This scheme is copied and updated with the new data. By induction of new schemes, it has as its origin the observation that certain structure occurs whenever certain patterns appear, when there is certain contiguity (Michelson and Knoblock, 2006). It is not anticipated that many of the activities in SRPQ will lead to schema change, however understanding the nature of the learners' thinking and the accommodation of new ideas is what underpins the constructivist approach.

2.5.1.6. Information Processing Theory of Gagné

Robert Gagné (1970;1972) developed the concept of information processing and identified various critical factors which facilitate or hamper learning. This theory of learning stems from the notation that information which the human brain receives is naturally processed, rather than responding merely to stimuli. The theory implies that to obtain results in learning, it is necessary to know: a) the internal conditions that intervene in the process b) the external conditions that can favour optimal learning (Gagne, 1970; 1972).

Although, this theory stems from cognitivism, it makes use of concepts from other learning theories. For instance, it utilises behaviourism model to develop task analysis and reinforcement framework for instruction purposes. From the theories of information processing, the basic explanatory scheme regarding internal conditions recognises the existence of different phases in the learning process: a) motivation b) comprehension c) acquisition d) retention e) recalling f) generalisation g) execution and h) feedback. Regarding the external conditions, they are considered as the environmental

influences on the subject that facilitate learning, and which are essential for optimising learning in various phases (Gagne, 1970; 1972).

According to Winne (2017), conventionally the application of this theory was restricted to instruction purpose in selective scenarios such as military settings. However, with the advent of information and communication technology (ICT), learners' capacity to process information has been greatly enhanced with the integration of technology and the increase in accessibility. This theory can facilitate quick and more critical information processing in general education setting and relates to the design of SRPQ in the information searching phase.

2.5.1.7. Theory of Mediation

Kozulin (2003) stated that the teacher is an organiser and mediator of the student's encounter with knowledge. His primary function is to guide the constructive mental activities of his students, and he will provide pedagogical assistance adjusted to their competences. The aforementioned view shows the need to assume mediation, as expressed by Warschauer (1997), in the learning experience where a mediating agent (parents, educators) acts as a support and stand between the learners and their environment to help organise and develop their thinking system and, thus, facilitate the application of new intellectual tools to the problems that are present.

For his part, Feuerstein (1985) argues that mediated learning is a construct developed to discover the special interaction between the student and the mediator (teacher, parents and / or person in charge of the child's education) that makes possible the intentional learning and significant mediation. In addition, it considers the experience of mediated learning as a decisive factor in the cognitive development of people, as it happens with children at home or with students at school.

Also, Feuerstein and Feuerstein and Falik (2015) recently pointed out that the mediator teacher favours learning, stimulates the development of potentialities and corrects deficient cognitive functions; that is, he moves the subject to learn in his potential area. Parents, friends and teachers

are also mediators. In addition, they consider that pedagogical mediation " is the key requirement of educational processes as the methodological style that will enable the development of the distinctive capacities of the human being: thinking to feel, create, innovate, discover, and transform.

Feuerstein, Feuerstein and Falik, (2015) stated that several factors precede and explain the construction of the learning acquisition process and that this occurs when the experience provokes a change in the knowledge or behaviours of the human being. In this same order of ideas, Orland-Barak and Maskit, (2017) have considered the forerunner of social constructivism, with historical-social emphasis. From it, various social conceptions about learning have been developed. The fundamental of this theory implies that learning knowledge is an interactive process between the environment and the learner, but the environment should be considered in its cultural and social context to understand and improve the learning.

Piaget (1964) in this context also agreed that the near development zone represents the possibility that the individual has to learn in the social environment in the interaction with others. The prior knowledge and experience of other peers is what makes learning possible; therefore, the richer and more frequent the interaction with others, the richer and broader the knowledge. The Near Distal Development Zone, according to Daniels (2016), is achieved through mediation, and it is understood as the process in which a mediator (the teacher) participates by leading the teaching and learning processes. At the same time, he establishes a relationship of help with the learner (student) to support him/her to organise, develop thought processes and facilitate their application of superior structures. In other words, the path that is determined from the next to the distal is the path of learning. Distal development is a goal to achieve. The development zone is represented by two dimensions: role of the teacher as mediator and the active learner. Vygotsky (1979) recognises that the child thinks to remember and the adolescent remembers to think. In this context, Orland-Barak and Maskit (2017) suggested that in contemporary world digital environment truly facilitates this form of interactive learning by providing a virtual zone of proximal development. This perspective emphasises the role of the teacher in SRPQ where the teacher is not the centre of what is happening in classroom but rather she or he is a facilitator who support students and redirect the learning

processes. The teacher's role shifts from instructing students in new knowledge to supporting students' understanding of the validity of that knowledge.

2.5.1.8. Theory of situated learning

Stoetzler and Yuval-Davis (2002) explaining this theory suggest that knowledge is an active association between the environment and an agent, and learning takes place with close and clear engagement of learner in a real and complex instructional setting. The situated learning concept emphasizes the cultural context in which the acquisition of intellectual skills takes place. This theory holds that the acquisition of skills and the sociocultural context cannot be separated. In turn, the activity is marked by the situation, a perspective that leads to a different view of the transfer. According to Lave and Wenger (1991), this learning theory considers that the transfer of knowledge occurs when new situation triggers or determines a response.

According to Bell, Maeng and Binns, (2013), this theory of situated learning in contemporary technology-led learning environment has major implication. Modern communication tools, on one hand, has immense capacity of storing of situation knowledge, and, on the other hand, new technologies also provide and facilitate reliable and fast exchanges between learners with similar interests, though with dissimilar contexts. Dawley and Dede (2014) show that in situated learning, the construction of knowledge has a high dependence on individual and social cognitive interaction. The transfer of knowledge takes place at the request of bringing the learning situation closer to the real context of application. Circumscribing learning to situations outside of reality, as often occurs in traditional education, does not allow the transfer because they are not lived. This learning approach depends on the teaching goals and the results of it. It is very useful in adult education because it allows the subject to conduct himself by making decisions in cooperative activities with their peers, increasing active learning. This relates to the design of curriculum tasks in SRPQ which students gain their knowledge from a dynamic content where they already have some familiarity but are encouraged to look more deeply.

2.5.2. Study theoretical framework reflection

As stated earlier in this chapter, this study proposes several important factors that might work together to enhance students' thinking in general and critical thinking in particular, with regard to collaborative learning, technology, content and teaching strategies. Therefore, it is difficult to draw on a particular theory, but each theory contributed a part in developing the theoretical framework of this study. See Figure 2.7 below

Daniels (2016) believes each theory sheds light on some important parts that assist the study in creating the best learning environment and recognising the learning behaviour as it occurs.

The most serious shift in education in the recent years is the moving from students as the recipient of the information to being the information generator; from what facts to what, how and why: from teachers delivering-information to varied teacher roles; and from lessons that contain low-level content and skills to high-level of them. In this sense, for learners, it is important to have a solid conceptual understanding and knowledge of how to utilise what they learn in new contexts in authentic manner. So, learning is an active process of engagement individually and socially, and learners' variances are incomes to be used, not obstacles to be challenged (Wilson and Peterson, 2006).

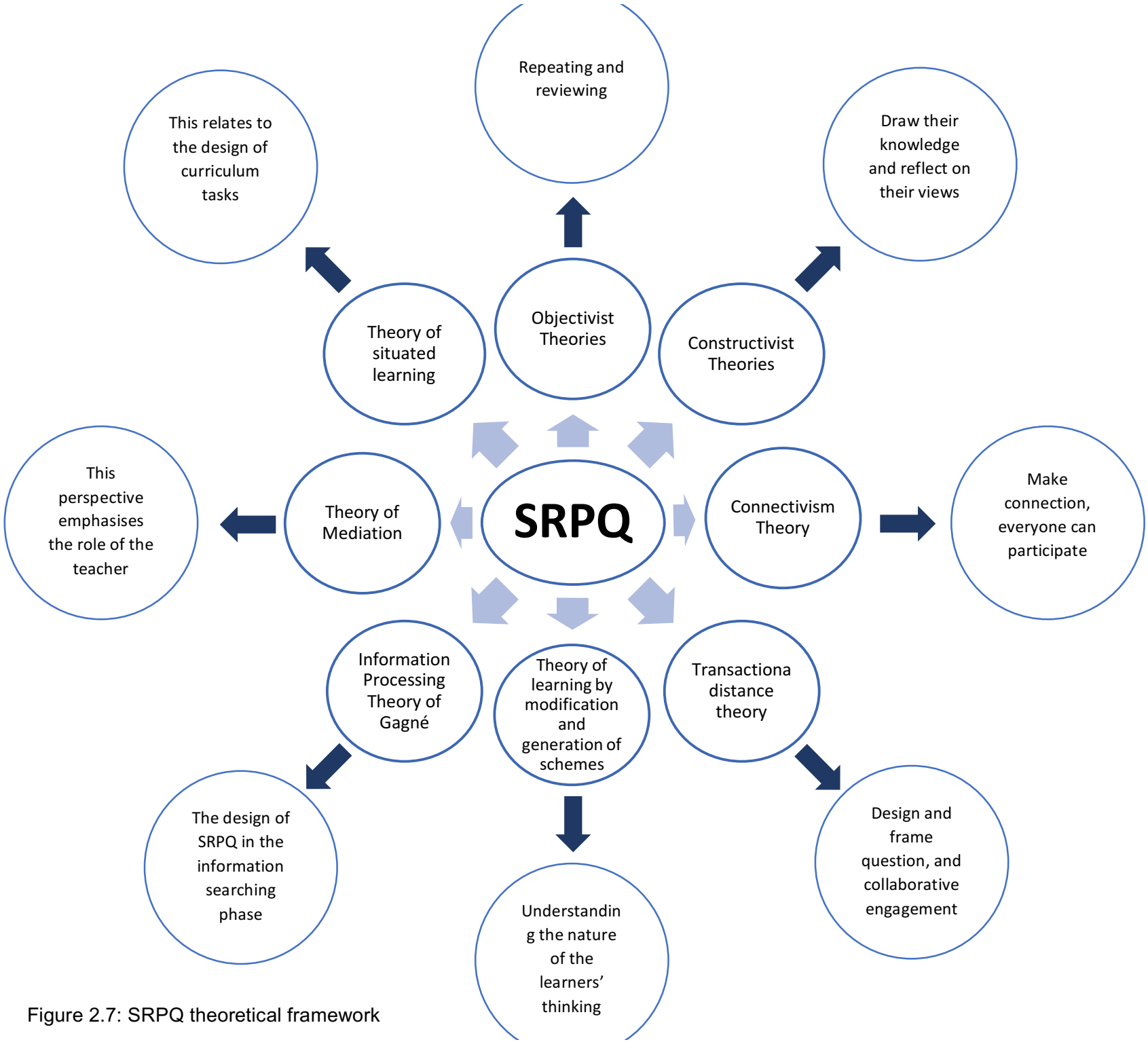

Figure 2.7: SRPQ theoretical framework

2.6. Conclusion

This chapter has investigated three areas of literature related to the present study: critical thinking skills that involve 21st century skills, creative thinking, critical thinking and its teachings methods; technology roles in teaching and learning; and finally, collaborative learning strategy and its impact on students to reflect on their thinking and be critical thinkers. Then, the theoretical underpinnings of the study have been explained.

The next chapter explains what the SRPQ strategy is and how the study applies it into the classroom in order to respond to the following questions:

1. Is the SRPQ strategy feasible to use in classroom settings in Saudi Arabia?
    - Is the strategy practical to use in Saudi classrooms?
    - Do teachers and students consider it as acceptable?
2. Are students successful in learning the curriculum when these strategies are employed?
3. What are the challenges in using technology to teach the curriculum through critical thinking in Saudi classrooms?

CHAPTER THREE: SRPQ STRATEGY

3.0. Introduction

This study aims to propose a new approach to teaching critical thinking within the curriculum subject of history using the technology facilities in a small number of schools in Saudi Arabia. The objective was to find out the feasibility of using these approaches in terms of the practicality and acceptability of this new strategy among teachers in the Saudi schools setting. This chapter explains this strategy and how it has developed from the research literature and learning theories; It also describes how it can be applied in the classroom setting. Finally, the chapter sets out some examples of what has been done in this study.

This chapter discusses:

- what the SRPQ strategy is;
- SRPQ strategy's conceptual framework;
- the application of the strategy;
- examples of some lessons in action

3.1. What is the SRPQ strategy?

This strategy is called "Seek>Read>Present>Question" (SRPQ). It is essentially a fusion of two associated methods: technology-learning and collaborative-learning. These two methods are usually 'discussed separately in the literature', as Deal (2009) described. I believe this strategy involves a number of skills at each stage and helps to promote students' thinking in order to become more critical, conscious, understanding, and reflective of what they do, which is the process of structured critical thinking. The use of technology helps to make the stages of the strategy apparent and practically accessible for both teachers and students.

- Seek: according to some studies, students prefer to glean information from the Internet rather than from printed papers or books (Gunn and Pitt, 2003). The reason behind this might be that

they spend less time and effort to find information online, or because it is more convenient to them. However, seeking information via the Internet can be a challenging task, not only because there is extensive information online but also because of the question of how extensive it has become (Bruce and Leander, 1997). This leads students' encounter with vast amount of information that may sometimes be irrelevant (McKenzie, 1998). In this stage, students are seeking information via Internet search engines to answer questions that are set or agreed. This would enable students to adopt and improve effective skills for searching information that they could use and rely on in their future life, such as awareness of information sources, including accessibility, quality, timeliness, and trustworthiness (Kerins, Madden and Fulton, 2004). These aspects are made explicit through the tasks.

- Read: the purpose of reading in this strategy is not to train students to memorise information. Rather, it helps them to be conscious of a goal that would guide them in their selection from extensive sources. Reading in this context is not an individual task carried out by single students, but it is done by students within their groups. This would certainly provide students with the opportunity to engage in helpful activities, such as ensuring understanding, debating, explaining and reasoning. In this way, students can sustain their vocabulary growth in the subject, build up their knowledge of the details and boost their comprehension through clarification and discussion (Klingner & Vaughn, 1998)
- Present: this stage of the SRPQ strategy is to encourage students to present their findings. They listen to each other's presentation, compare other groups' answers to theirs and reflect on their achievement. This helps to improve students' self-awareness and self-efficacy. Freudenberg, Brimble, Vyvyan and Corby (2008) argue that the key elements of improving a student's ability to be critical thinker are to be a confident communicator, to be a team player, to show initiative and to be a problem solver, which all require the development of students' self-efficacy.
- Question: in this stage students would be able to distinguish between opinion, knowledge and understanding of the status of that knowledge. This needs to be an important consequence of becoming aware of one's state when reading or listening (Baker, 1979; Markman, 1977, 1979;

Brown, 1982; Baker and Brown, 1984), which might lead to improving one's own critical awareness.

3.2. SRPQ strategy conceptual framework

As outlined earlier in previous chapter, it is hard to draw on one particular theory to develop a teaching strategy for the classroom. Rather, each theory contributed a part in developing the overall theoretical framework of this study (See Figure 2.7 p: 97). The current study suggests several important factors that might work together to enhance students' thinking in general and critical thinking in particular, with regard to collaborative learning, technology, curriculum content and teaching strategies.

This combined strategy provides a new perspective for the use of technology in teachers' classroom in relation to the teaching of history in Saudi classrooms. It is commonly agreed that a synthesis of effective strategies for teaching critical thinking is likely to be most useful for teachers (Abrami et al., 2014).

Technology has been used as a channel that carries information for students faster and provide access to content from the classroom more effectively. McGuinness (1999) believes that teaching thinking with technology, no matter the approach used, allows the interaction between the teacher, students and technologies that can be structured in certain pedagogical ways. Indeed, the operation of technology in the classroom changes the way teachers teach over time. Teachers are the key factor in inspiring and spurring students to reach their potential, not merely by reliance on technology. It has been found in a number of studies that there is a positive impact of networked classrooms on pupils' thinking and learning, such as Computer Supported Intentional Learning Environments (CSILE) and Technology Intentional Learning Environments (TILES) (Scardamalia, Bereiter, McLean, Swallow and Woodruff, 1989) even before the internet was available.

There are three broad classifications of the ways of delivering thinking skills in classrooms. This can be done directly by structuring programmes that are additional to the original curriculum. They can

also be done in subject-specific learning, such as science or mathematics, or by infusing them in the normal curriculum (McGuinness, 1999). Some added a fourth approach, which can be used to teach critical thinking across content but not explicitly, which is known as the 'immersion approach' (Abrami et al., 2014). This study has chosen to infuse its strategy of teaching critical thinking in the history curriculum by systematically recognizing opportunities within the normal history curriculum in the first and second year grade in high school.

The present study investigates the SRPQ strategy combined with the collaborative learning strategy in the classrooms. According to Smith and MacGregor (1992) in collaborative learning, "Students are working in groups of two or more, mutually searching for understanding, solutions, or meanings, or creating a product".

Collaboration may enhance students' individual learning experiences by encouraging them to obtain new understanding and gain perspectives (Liaw Chen and Huang, 2006). Essentially, collaborative learning can be described as a context wherein the computer, information, and network technology facilitate interaction among learners for acquisition or sharing of knowledge (Koschmann, 1996). The limitation of knowledge level fades in this kind of learning environment. Therefore, students' opportunity to interact with each other and with the information in the lesson is increased (Scardamalia and Bereiter, 1994)

3.3. The application of the strategy

As the researcher, I planned nine lessons for both schools, with collaborative contributions from the class teachers. The first time we met, I explained to them the aims, goals and tools of this research, what I expected them to do about the SRPQ strategy and how we could apply it within the curriculum and what technology would be used. As the application of the strategy was within a collaboration setting using technology as a tool for seeking information, and the normal classes do not support that kind of learning situation (even though, there was an IT lab where each student has his own desktop computer), we asked some students to bring their own laptops so that each group had at

least one laptop to share. Then, for each lesson, I sat with teachers and discussed which lesson we were going to apply the strategy (depending on the national curriculum) and what skills were more suitable for the lessons.

In addition, I also directly introduced the SRPQ to students in terms of what the strategy is, what their role would be and how they could apply the strategy, with some clarification of the teacher's role in these lessons. I also explained what we expected from this strategy in relation to their learning.

The series of lessons were divided into three stages (see figure 3.3); each one with three lessons. Every lesson had an introduction, main body, and a recap. The introductions varied from one lesson to another, usually containing a short video, pictures or introductory discussion about something that is well known in social media. The main lesson was framed in the form of a statement followed by a number of questions based on the students' national curriculum. Students were asked to use the SRPQ strategy that essentially places an emphasis on the idea that the more students have information about the subject, the more they can develop depth of understanding. At the same time, particular critical thinking skills, for instance, analysis, interpretation, inference, contrast and reasoning, were introduced and emphasized. These activities were done collectively. The recap was where teachers or the researcher had the chance to reflect on what students had learnt by asking questions that would transfer students' skills and knowledge into a similar situation.
Some examples were:

- Do you think Britain is historically responsible for what is happening today in Palestine? If yes, why? (Lesson 2 / school 2)
- Why does the Ottoman history have lots of contradictions? (Lesson 4/ school 1)
- Why did the Ottoman Empire fight Muhammad bin Abdulwahab? (Lesson 9/school 1)
- What would happen if Imam Muhammad bin Saud had not supported Sheikh bin Abdulwahab? (Lesson 9/ school 1)
- What would happen if the Taif's tribes had supported The Prophet Muhammad (peace be upon him) when he had approached them asking for support? (Lesson 4/ school 1)

- What is the difference between the Caliphate that started after the Prophet Muhammad (peace be upon him) died and Da'esh Caliphate? (Lesson 4/ school 1)

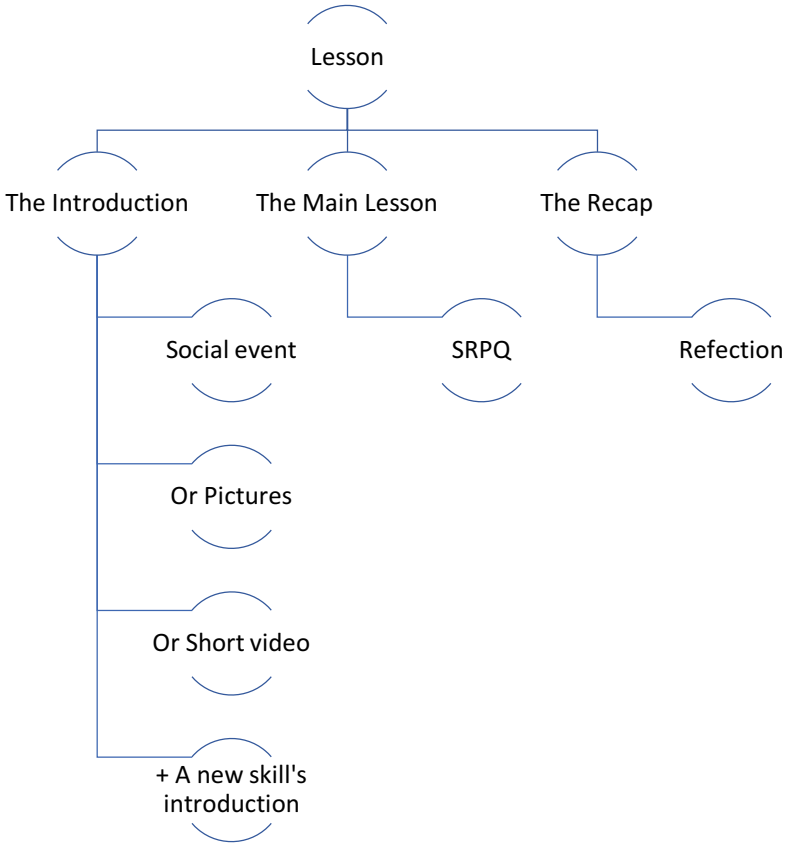

Figure 3.1: How lessons were divided

Each main part of lesson (the main body/ the application of SRPQ) was divided into four stages (see figure 3.4). The first stage was an introduction to the task itself and the skill that was going to be taught and focused on. This would often take about 10 minutes. The task formulated as a question is given to the students and they are asked to pursue an answer to it by looking for information on the Internet as a group. Each task focused on one specific skill such as reasoning, analysing, clarifying, evaluating and concluding. They had to work collaboratively. The second stage took approximately 10 minutes where students as a group discussed the information they collected and what they had to include or exclude. In the third stage, students presented their opinion or summary of what they had done to other groups, while the other groups were listening 'critically' as they allowed, in the next stage, to challenge the presented answer by raising questions such as 'what resource did they use? 'Is their answer reliable? And, how did they reach that assumption? This stage would usually take about 10 minutes. The fourth and last stage was the questioning of what

had been presented, which would often take 15 minutes. The lesson in aggregate would take about 55 minutes.

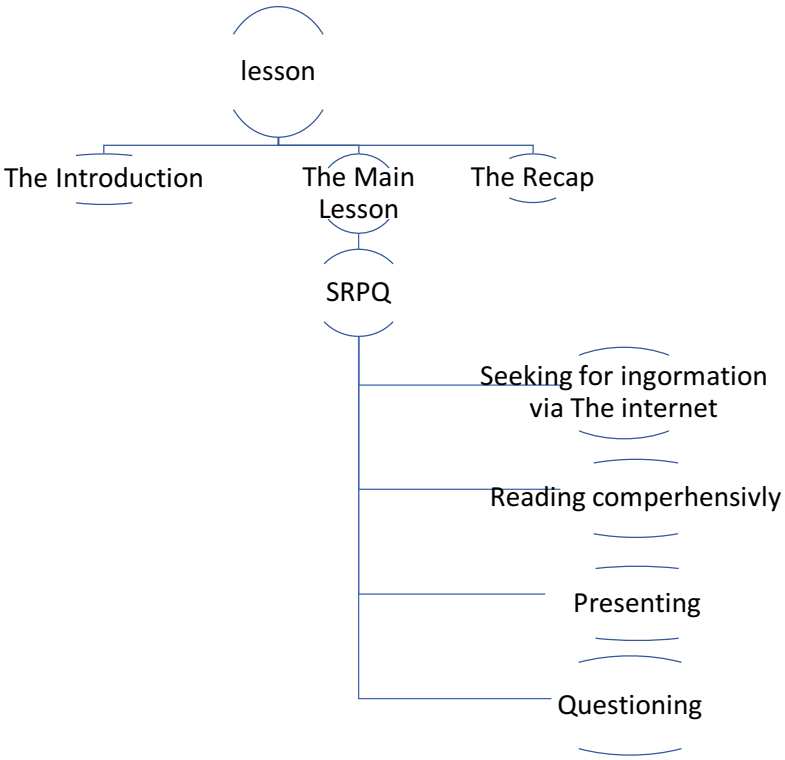

Figure 3.2: Where the SRPQ implemented

Each one of those four stages were planned so as to give students sufficient time allowing them to think and express their thoughts within the groups. Then, they would reflect on their strategies in order to gain more self-regulation.

The researcher, and the participating teachers had worked together to design learning tasks with a degree of open-endedness in order to encourage students to suggest meaning, make judgments and evaluate their conclusions. The classroom was planned to have an open-minded attitude, and to create a learning atmosphere that allowed for agreements and disagreements freely.

Students in this approach were enthusiastically active and motivated by curiosity to acquire the information that was needed to respond to the questions of their task. Additionally, the use of

network communication, such as databases, email and WWW, provided a unique opportunity for collaborative learning among students (McGuinness, 1999).

Teachers act as administrators and orchestrators of students' activities, as well as instructors. In the classroom, they observe students' activities and direct them to achieve the ultimate per-planned goal. The development of critical thinking skills has a positive impact not only on students thinking but on teachers' thinking as well (McGuinness, 1999).

In identifying with what Nosich (2012) has stated, the researcher believes that talking and listening are important to identify both the strong and the weak points of an argument and the kind of beliefs that drive people to do or say certain things. The study guided students' attention by asking questions that made their exploration more enjoyable and comfortable as possible as it could be. Disruption and confusion are the most common elements that mostly come with using technology. Further, we encouraged students to address their own questions, which is the hardest part of critical thinking, as students tend to jump to solve the problem or present their point of view without challenging it by asking questions (Nosich, 2012).

3.4. Lessons in action

To analyse students' activities, I considered three elements; first, if they reached reasoned answers that indicated whether they have understood the task and responded to it; second, they obtained their answers from reliable sources, which would illustrate the ability of students to judge the source and its reliability and trustworthiness; third, to what extent the students were critical about the information they selected.

Example One

The focus of this lesson was to teach research skills to the students. These skills were intended to help them to seek, identify and retrieve information to answer the questions that had been raised.

They also assessed the value of that information, evaluated the sources and organized it. The lesson also aimed to teach students the procedure of SRPQ strategy. They were therefore encouraged to ask themselves certain questions that guided them to the most appropriate sources. The key point here was to emphasize that if someone has experience or confidence about something, that does not mean what he or she says is necessarily true, but rather it does add to his/her argument being more credible. Reputation is one of the elements that make the person an expert in something or not. This is one of the methods for accepting or rejecting what one says. However, it is important to check if the source has a particular interest or bias. Alongside, questions about the circumstances of their statements were raised (Nosich, 2012).

Each class was given a statement depending on their lesson and a series of factual questions.

By using SRPQ strategy and investigation skills, answer the following questions as a group.

“The Battle of Ain Jalut took place in 658 A.H /1260 A.D between Muslim Mamluks and the Mongols”

Where did the battle take place?

Who was the Muslim commander of that battle?

How did that battle affect the future of both Mamluks and Mongols?

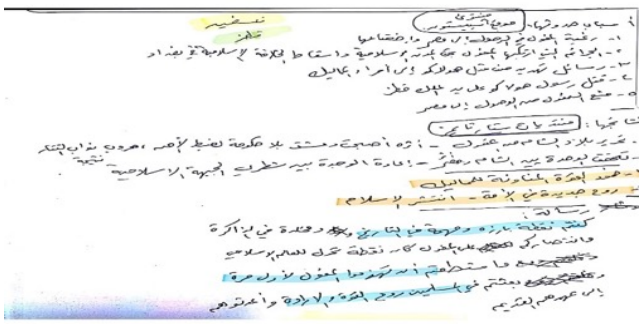

Figure 3.3: Group 1

In group one, students had answered all questions correctly (I highlighted each answer with a different colour); they wrote further information about causes and consequences of the battle and their point of view about its circumstances (blue highlighted). Their sources were two forums (Spacetoon and Startimes) and Wikipedia, which means students had read more than one source to get their answers, indicating some level of criticality.

The first two questions were easy to answer; however, they were not specific about where the battle took place; they answered briefly (Palestine); in contrast, their sources were too detailed in this part (a destination between Bisan and Nablus in Palestine in Wikipedia, and between Bisan and Nablus in the Jordan Valley of Palestine in Spacetoon forum).

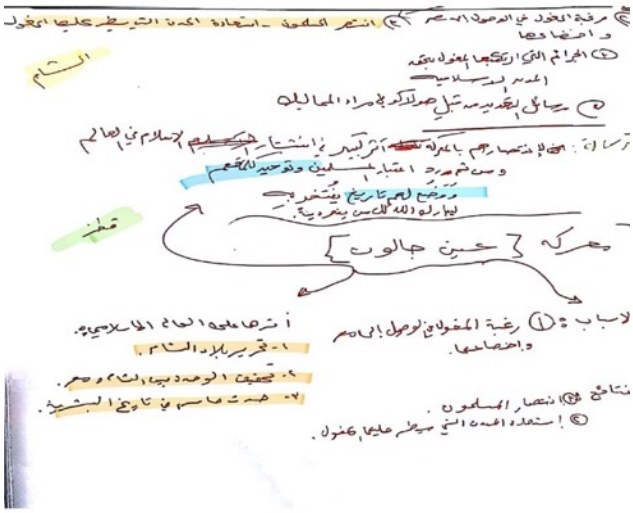

Figure 3.4: Group 2

In group two, students had answered all questions fully as well; they wrote further information about some causes and consequences of the battle (blue highlighted). Their sources were some online forums (they had not specified) and Wikipedia, which means students had read more than one source to get their answers, indicating some level of criticality.

Additionally, they were too broad about where the battle took place; they answered (Al-Sham); in contrast, their sources were more detailed in this part (a destination between Bisan and Nablus in Palestine in Wikipedia).

Figure 3.5: Group 3

In group three, students had answered all questions correctly as well, but they had not illustrated their answers. They added more information about why Mongols fought that battle (blue highlighted). Their source was Wikipedia, which means students had just read one source, indicating a lesser level of criticality.

Additionally, they were specific about where the battle took place; they answered (Bisan in Palestine) as stated in Wikipedia.

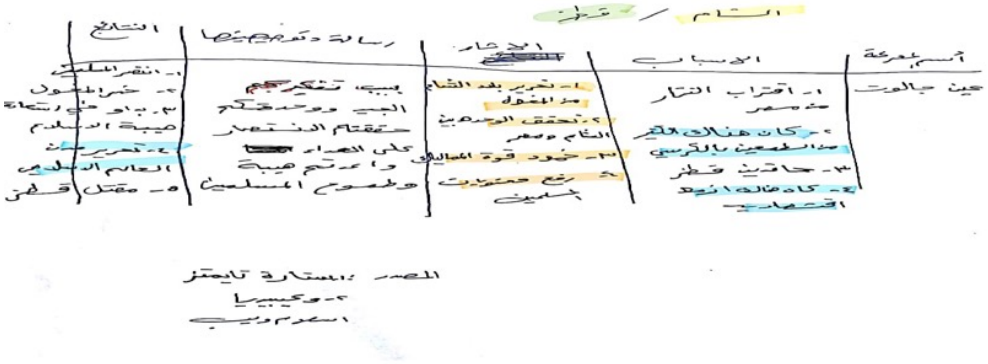

Figure 3.6: Group 4

In group four, students had answered all questions properly; they wrote further information about causes and consequences of the battle and their point of view of that battle (blue highlighted). Their sources were two forums (Islamweb and startimes) and Wikipedia, which means students had read more than one source to get their answers, indicating some level of choice and the possibility of criticality.

In this group, the students were too broad about where the battle took place; they answered (Al-Sham); in contrast, their sources were more detailed in this part (a destination between Bisan and Nablus in Palestine in Wikipedia and in Islamweb).

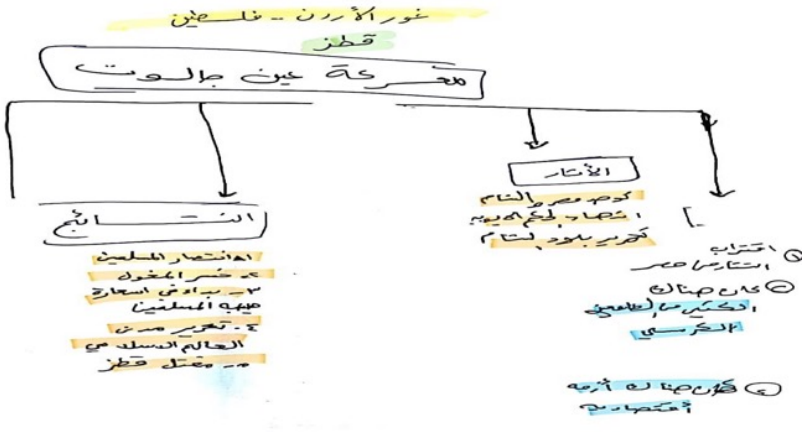

Figure 3.7: Group 5

In group five, students had answered all questions fully; they wrote further information about why they thought the Mamluks went to the battle. Their sources were Islamweb and Wikipedia, which means students had read more than one source to get their answers, indicating some level of criticality.

They were specific about where the battle took place; they answered, “In the Valley of Jordan”.

Reflection

- All groups responded accurately to their task.
- All of them had used Wikipedia as the primary source, but they had read from one or two sources beside it, apart from one group.
- All groups were selective about what information to include or exclude.

Example Two

The focus of this lesson, beside the SRPQ strategy, was on reasoning and interpretation. This type of thinking mostly has a common fault among students, where a student would consider only one

possible cause and accept it without consideration of other possibilities. Therefore, students had been encouraged to be open to other possibilities.

"The Ottomans were governed by different sets of laws during their epoch."

Read the above statement carefully and discuss it within your group. Then, by using the SRPQ strategy, find reasons that led the Ottomans to formulate their court system in that structure. Following that, tell other groups your interpretation and your perspective.

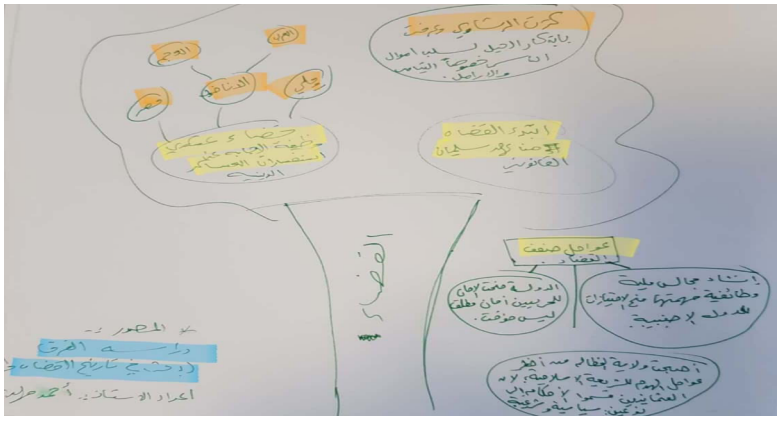

Figure 3.8: Group 1

The first group had focused on three elements of court system; when it started, court divisions, and the causes of vulnerability, which answered the question but without illustration. However, they thought the corruption in court system led to injustice and then the fall of the system itself. Their sources were academic article, which indicates improvement in source selection. Further, I believe students had selected some information from Wikipedia as it was not in their resource (which they mentioned) but in Wikipedia. Also, they had not selected important information such as state doctrine, which had the big influence on the Ottomans' laws (state in their resource).

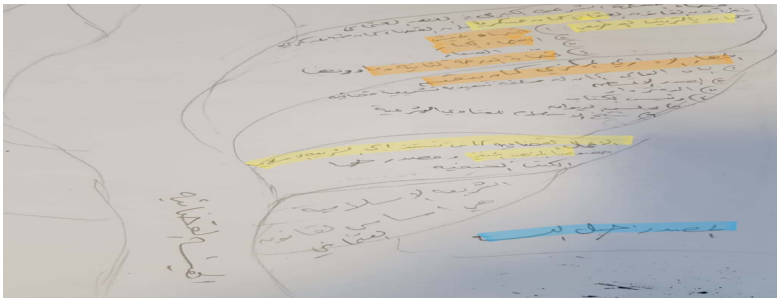

Figure 3.9: Group 2

The second group discussed also three elements; state doctrine, judicial work and court hierarchy, which responded to the task. They included lots of information that reasoned why court system had been formulated that way. However, they misunderstood one of the most terminology used on the Ottomans' judiciary (military judiciary; قضاء العسكر), which indicates the court or the court system in each state they ruled was not the military court. That leads to a false conception that the Ottomans' judiciary was formulated to serve the military, which was not true but it was superior in authority to them especially when the Ottoman empire was strong.

Their sources were academic articles, which indicates improvement in source selection as well. Also, I believe some information from Wikipedia was not in their source (which they mentioned) but in Wikipedia.

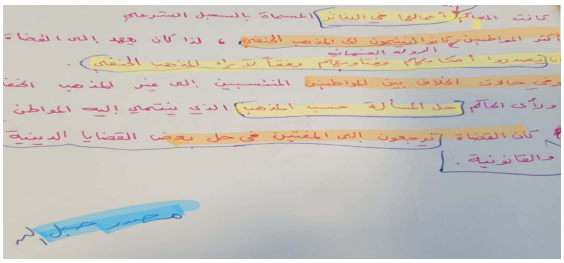

Figure 4.10: Group 3

The third group showed some important fact about the Ottoman court system, i.e. the state

doctrine. They explained that the Ottoman court adopted the Hanafi doctrine. But, the dispute was judged by the citizens' doctrines, which means they did not force anyone who ruled them to abide by their doctrine. Also, this group pointed out that the Ottoman court adopted the written law as well.

Their sources were academic articles, which indicates improvement in source selection as well. Also, they were too specific on the selection of the information and on their interpretation, which indicates some level of criticality.

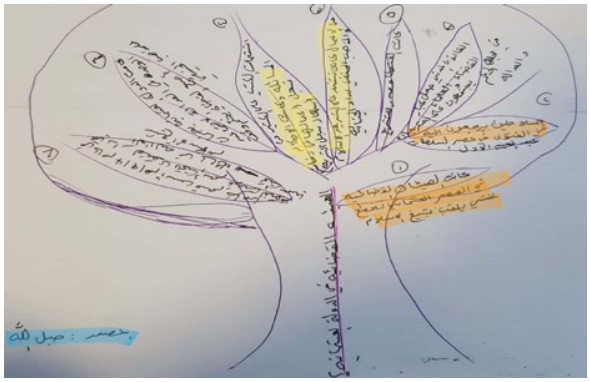

Figure 3.11: Group 4

This group presented the state doctrine that influenced the court system; the court maintained the written laws and the Fatwa contained judicial judgment, while the Ottoman Sultans worked accordingly.

There is an indication of improvement on source selection where the students gleaned their information from reliable academic article.

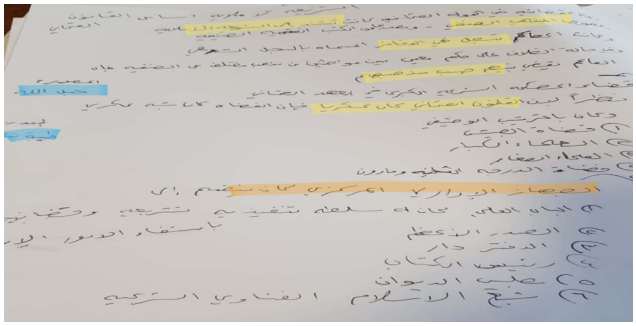

Figure 3.12: Group 5

This group discussed two essential features of the court system: the state doctrine, which is Hanafi, but they also use other doctrines if the citizen adopted a different view according to the judicial hierarchy.

The group used an academic article to present their information, as well as information from the forum site.

Reflection

Each group offered mostly different components of the Ottoman court system, though there were some similarities to some extent that allow diversity and understanding of the subject in several ways and identifying different views and interpretations.

There is some improvement on the selection of the information and the use of the resources. However, all groups, apart from group five, gave one reference (I believe two of them had used Wikipedia but they had not mentioned it. Maybe they thought it would make their information less reliable).

All groups apart from group one had used the same reference, which was the first one that came up on Google (look at the picture below), though their selection of information was different.

Figure 3.13: The result of students' research (Google)

Example Three

Descriptive analysis was the most important ability that was focused on in this lesson in terms of historical thinking. We showed students from both classes a number of pictures related to their lesson and requested that they describe what they were about. Then, they were asked to use the SRPQ strategy to discover more about them.

The students were showed pictures of The Süleymaniye Mosque.

Then, they were asked to find out:

Figure 3.14: The Süleymaniye Mosque (out and inside)

Where is it?

Who built it?

What is the most captivating feature of it?

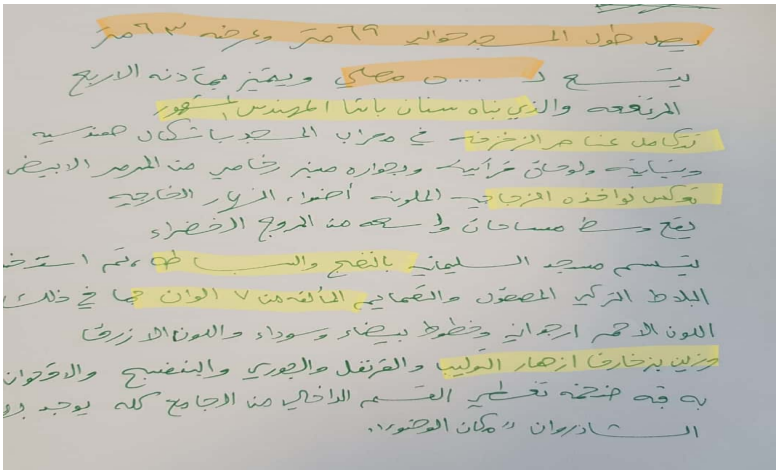

Figure 3.15: Group 1

Group one responded to the task as it was designed; they stated where and who had built that mosque, and the most fascinating feature from their perspective is the elegantly decorated interior. They described that in some details. Their source was a reliable one who is a specialist on Islamic history.

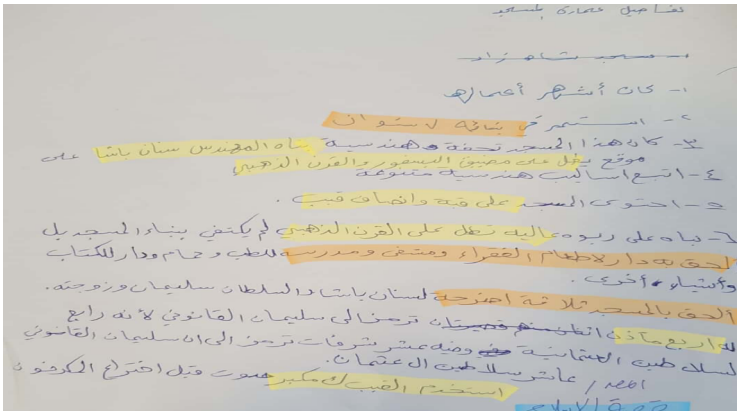

Figure 3.16: Group 2

Group two had responded to the task correctly as well; they stated where and who had built that mosque. The most distinctive feature from their perspective was not just the elegantly decorated interior but the unique architecture that ensured an equal distribution of sound for listeners to hear.

They described some elements in some details. Their source was similarly a reliable one, the specialist on Islamic history.

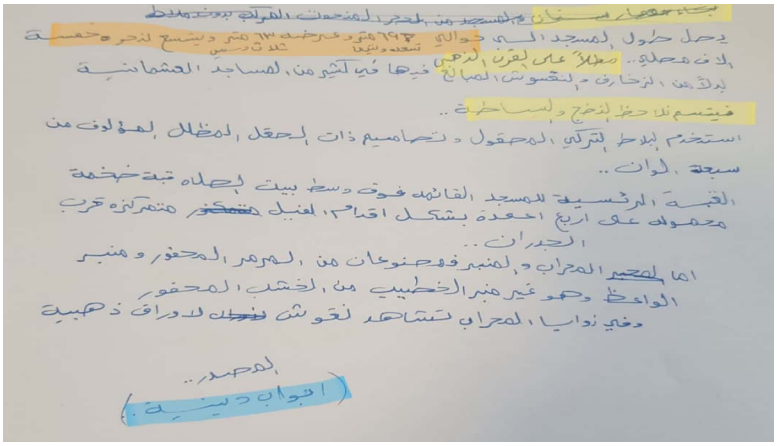

Figure 3.17: Group 3

Group three had also responded to the task correctly; they stated where that mosque is and who had built it. The most distinctive feature from their perspective was the elegantly decorated interior such as the central dome that they also described in some detail. Their reference was a forum website.

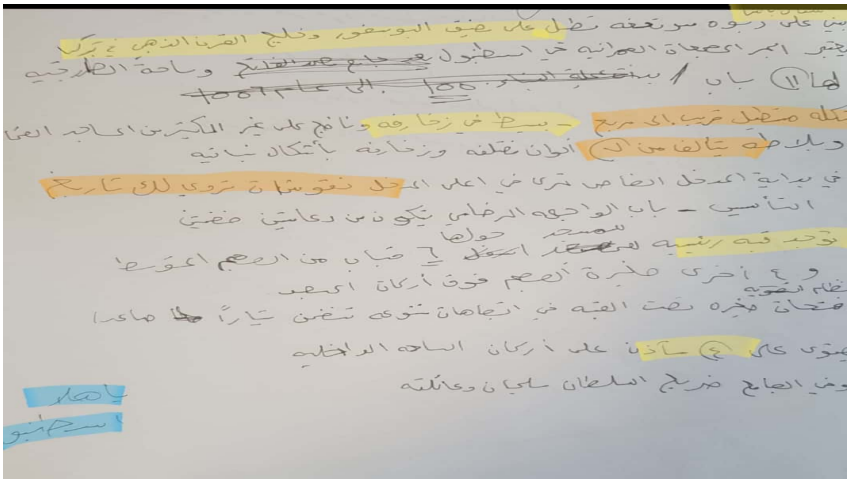

Figure 3.18: Group 4

Group four similarly responded to the task correctly too. They stated where that mosque is and who had built it. The most distinctive feature from their perspective was the elegantly decorated interior

such as mosque minarets and the eight domes, which they too described in some detail. Their resource was a forum site.

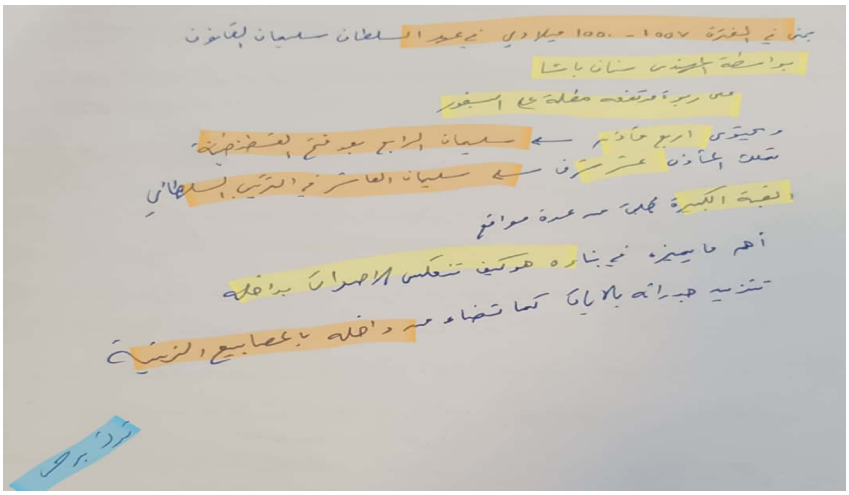

Figure 3.19: Group 5

Group five had responded to the task in a similar way; they stated where that mosque is and who had built it. The most distinctive feature from their perspective was the elegantly decorated interior such as the mosque minarets and the domes, which they described further, as well as the use of light throughout the mosque. Their source was also a forum site.

Reflection

All groups responded correctly and largely demonstrated their ability to undertake descriptive analysis. In addition, each group focused on one or two elements that allowed for various views besides their own opinions.

Most of the groups had taken their information from news forums except for groups one and two. Also, groups tended to use only one reference. This could be because they explained what they saw on the pictures then they just used the reference to clarify the reasons behind it.

3.5. Conclusion

This chapter outlined and exemplified the proposed strategy SRPQ for this study. This strategy is the reflection of the research literature and the learning theories that underpin the strategy and its design. It depends heavily on technology in teaching history with critical thinking. It was used over twelve weeks in two high schools, along with some achievement tests to identify its overall feasibility and practicality in the Saudi context. The study also explores whether there was evidence of students' progress in learning history as this might indicate that this strategy can successfully infuse critical thinking into history lessons. Next, the study turns to explore the views of teachers about this strategy and its acceptability to use and students' engagement effectively with it. .

The following chapter explains the data collection methodology applied in this study. It seeks to respond to the following specific questions:

1. Is the SRPQ strategy feasible to use in classroom settings in Saudi Arabia?

    • Is the strategy practical to use in Saudi classrooms?

    • Do teachers and students consider it as acceptable?

2. Are students successful in learning the history curriculum when these strategies are employed?

3. What are the challenges in using technology to teach the history curriculum through critical thinking in Saudi classrooms.

CHAPTER FOUR: THE EVALUATIVE METHODOLOGY

4.0. Introduction

The main purpose of this study is to propose a new strategy for a pedagogy that utilises technology in teaching history with critical thinking in schools in Saudi Arabia. It is therefore an exploratory feasibility study to investigate to what extent such an approach is practical and realistic in the Saudi context. This chapter describes how and why the method has been adopted to explore the research questions: whether the use of ICT requires a new approach to teach and learn history with critical thinking; what approaches have been used already in schools in Saudi Arabia to teach history with critical thinking; and how teachers use technology in their classroom. This study used a mixed-method approach: interviews, observations and collaborative action research with the teachers as the key approaches. Each approach adds value to the research and contributes to the overall goal to answering the research questions.

This chapter addresses:

- ❖What feasibility study is;
- ❖What a mixed-method approach is;
- ❖Why this approach was chosen for this study;
- ❖What methods were selected;
- ❖Ethics issues;
- ❖Sampling schools/ students;
- ❖An overview of the new teaching and learning strategy;
- ❖The action research phases adopted;
- ❖The lesson procedures;
- ❖And, a review of the research questions in relation to the design.

4.1. Feasibility study

A feasibility study usually aims to explore uncertainties, and whether the intervention is or is not acceptable, or practical (O'Cathain et al., 2015). It enables researchers to evaluate whether the ideas can be formed in such a way as to be applicable and sustainable (Bowen et al., 2009). This increases and improves the understanding of how the intervention or approach might work. It also suggests when and how is best to use or adapt these approaches in future studies (O'Cathain et al., 2015). According to the National Institute for Health Research (NIHR), "A feasibility study is undertaken to address the question 'can the planned evaluation be done?' In contrast, pilot studies are miniature versions of the main study" (O'Cathain et al. 2015). Although feasibility studies are less common in education, arguably they are even more important, otherwise testing the efficacy or effectiveness of an approach may be premature without establishing its feasibility.

The main purpose of this study is to propose a new strategy that relies on technology to teach critical thinking in Saudi's schools within the history curriculum. Thus, the researcher develops a strategy named Seek> Read> Present> Question (SRPQ) (more details about this strategy can be found in p.135-142 section 3.9 of this chapter). Therefore, this study is primarily designed to test the viability of this strategy as a practical approach in classrooms, within the content of the curriculum and to ascertain whether the strategy was acceptable to students and teachers.

A feasibility study can use either qualitative or mixed methods (O'Cathain et al. 2015). In this study, a mixed-method approach was adopted to explore the feasibility of an experimental design and to evaluate the appropriateness of a measure of critical thinking.

4.2. Mixed methods

Adopting mixed methods is a research approach that goes beyond the common distinctions of positivism, interpretivism or constructivism. It scaffolds the bridge between the quantitative

and qualitative researches and aims to utilize the strengths of each and avoid weaknesses of both in order to address the research questions. Research approaches can be 'mixed' to grasp valuable opportunities to clarify important aspects of the research questions (Johnson and Anthony, 2004). The utilization of a mixed method can be enhanced by the integration of data of different types (Bryman 2006; Meissner, Creswell, Klassen, Clark and Smith, 2011). The combination of data sources provides a better understanding of research problems and offers more comprehensive evidence to answer questions that cannot be addressed by a quantitative and qualitative method alone. It also encourages the researcher to consider multiple paradigms (Meissner, Creswell, Klassen, Clark and Smith, 2011).

There are different stances that affect researchers when they conduct their research: how they express their view toward the world, and how these views translate into practice. In mixed methods, the researcher could select a paradigm that fits her/his research depending on where the focus of the research is placed. According to Meissner, Creswell, Klassen, Clark and Smith (2011), the 'best' paradigm that is suitable for mixed methods is Pragmatism, which was articulated by a number of researchers, but it is often identified with historical figures such as John Dewey and William James. In this approach, the research questions determine the adequacy of the methods. The researchers could choose multiple paradigms as well, but they have to be explicit in this "dialectical" perspective (Greene and Caracelli, 1997), particularly in reconciling any differences in the data.

It is important to understand "what happened", which refers to quantitative data, and "why it happened", which refers to qualitative data. The present researcher is an experienced teacher who claims to understand the school dynamics in the Saudi context in practice (e.g. knowing what works), has the capability to investigate theories in that context (e.g. addressing the research's questions) and has the ability to analyse and interpret the data related to theories and practices in that context. From this stance, the researcher would be seen as pragmatism

paradigm who sought (as much as possible) to be objective in terms of analysing the date, but not neglecting providing illustration in different perspectives.

This study adopted a mixed-method approach to expand the capability of part of its action research design to investigate students' behaviour and thinking in some detail. As this research seeks to propose a new strategy for a pedagogy to teach critical thinking that utilizes technology, it seemed appropriate to collect quantitative data from the score tests in order to evaluate the sufficiency and feasibility of this new strategy for classroom. Moreover, participants' perspectives need to be collected so that a combination of qualitative and quantitative data from more open-ended information (e.g. how technology is being used in schools in Saudi Arabia; and how critical thinking is currently taught in Saudi Arabia) could be gathered from the interviews and classroom observations.

4.3. The research methods and approach

4.3.1. Action research

An overall action research approach was adopted, as this provided some flexibility in the fieldwork to work alongside the teachers involved and to address some of the problems and challenges in the research approach as they aroused. There is no agreement on one definition of action research. However, it was initially introduced by Kurt Lewin (1947) who coined this term through investigations in social problem settings when he combined the action and the research to modify the life circumstances of a group of disadvantaged people (Cohen, Manion and Morrison, 2011). Cohen, Manion and Morrison, (2011) define action research as 'a small-scale intervention in the functioning of the real world and a close examination of the effects of such intervention'. Kemmis and McTagger (1992) describe it as planning, acting, observing, and reflecting carefully, systemically and strictly. It concerns with a specific problem in a specific situation or context to foster a change or an improvement to the group. Therefore, at some point, action research project must be able to provide a measurable difference, which

has occurred in that project (Adey, 2004).

It provides teachers and other practitioners with data on which they could rely to transform individual behaviour (Dickens and Watkins, 1999). Checkland (1991) and Dickens and Watkins (1999) distinguish action research as a repeating cycle of problem association, analysis, planning intervention, and evaluation of the results in order to estimate what has been achieved and plan subsequent interventions. It is a methodology that recommends ways to collect and interpret data (Reason and Bradbury, 2001). The flexibility and adaptability make action research suitable for schools setting (Cohen, Manion and Morrison, 2011).

The action research process is dynamic, changing and self-reflecting. It enables the present researcher and the teachers who have participated in this study to investigate whether technology helps in making a student a good thinker; to find out how critical thinking has been taught; and to identify the necessary changes that can be undertaken to make technology more relevant to classroom, to teachers' methods and to students' learning. This study is attempting to identify and improve methods that teachers are likely to use by introducing a new approach that relies more on technology as a medium of teaching and learning critical thinking. As Adey (2004) said, "If you want to change what happens in schools, then you need to get into schools".

However, action research is an approach and a theoretical orientation rather than the presence or adoption of the theory itself (Van Manen, 1990). Schleiermacher stated that theory (in action research) does not tell the practice what to do; it comes later as a reflection of the practice (as cited in Van Manen, 1990). However, you cannot ask the teachers to change their practice without an explanation of the rationale or the theory that underlines the new method or new strategy (Adey, 2004).

This research operated using action research as the primary method over 12 weeks in two high schools for girls in Saudi Arabia (more details about the procedure of this will come later in section 3.7.2. of this chapter).

4.3.2. Interviews

Action research starts with a small cycle that involves planning, taking action, observing, and reflecting (Cohen, Manion and Morrison, 2011). To start this study, the researcher had conducted interviews with teachers who were involved in this research and with students who later participated as well. These interviews took place in the planning phase. The purpose of doing this was threefold: to evaluate teachers' strategies and methods they have previously used in their classrooms; to identify the teachers' (and students') perceptions of critical thinking; and to identify the extent of using technology in those classrooms.

The research interview has been defined as 'two-person conversation initiated by the interviewer for the specific purpose of obtaining research relevant information, and focused by him on content specified by research objectives of systemic description, prediction or explanation' (Cannell and Kahn, 1968: 527). Dyer (1995) believed that an interview is different from daily conversation; hence data that will be generated from interviews should be valuable and significant in relation to the research aims. The aim of the interview is to ask pre-designed questions in order to obtain specific information from the participants. Tuckman and Harper (2012) describes the interview as an access point to a person's mind in order to sound what he/she knows, what he/she thinks, what his/her attitudes or beliefs are, and what his/her values are.

Cohen, Manion and Morrison (2011) view that the purpose of an interview is to gather information that has direct bearing on the research objects, to identify variables and relations, or to conjoin with other methods that have been used in the research. Thus, this study has

used interviews to obtain students' and teachers' perspectives on the meaning of critical thinking and on technology usage in the classroom. This gives the researcher a baseline picture that the study is subsequently going to build on through the work in the classrooms.

There are of course disadvantages with interviews, which are mainly related to bias or subjectivity. Nevertheless, it allows for great depth of data collection than other methods (Cohen, Manion and Morrison, 2011).

The interview questions for both teachers and students were divided into two main categories. The first category was nine questions about critical thinking. The purpose of this category of questions was to get an insight into teachers' and students' perspectives on critical thinking and their beliefs and attitudes toward it. For example:

- What is critical thinking?
- Does the Holy Qur'an encourage this kind of thinking?
- Why should we learn how to think critically?
- What is the benefit of learning how to think critically?
- What is the negative side of teaching/learning critical thinking?
- Do you think we could teach/learn how to think critically?
- Do you teach/learn critical thinking in classroom? How?
- Are critical thinking strategies used in your class?

The second category comprises six questions about technology. These aimed to identify to what extent the schools are equipped with technology, and whether teachers used them in their classrooms. For example, the following questions were explored.

- Is technology available in your school?
- Is it easy for you to use it?

- What kind of technology do you have in your school?
- Is technology used in your classroom?
- What are the benefits of using technology in your classroom?
- What is the down side of using technology in your classroom?

The interviews took place in the beginning of the study - for holistic understanding - and in the resources' room that is used by both teachers (to demonstrate some lessons), and students (to seek information). As the researcher, I was aware of any ethical issues associated with this kind of situations. All interviewees were aware of the protocol used in the interviews. The length of the interviews varied between 30-40 minutes during the whole of the first week of the study.

Analysis procedure

To analyse the data generated from the interviews, the researcher followed two different procedures. Students' interviews were coded and categorised before being analysed statistically by using SPSS, as they were sufficient (about sixty-two students) to consider the frequency of responses. However, due to the small number of teachers (about six participants) being interviewed, the researcher went through them, interpreted them critically, using similar codes and categories, but also identifying themes and issues.

4.3.3. Observation

To facilitate the collection of the test data on students' learning and the perceptions of the teachers and students, a series of lesson observations were planned. Observation is not just watching; it is watching and noting people, behaviours and events systemically most of the time (Marshal and Rossman, 2016; Simpson and Tuson, 2003). It is an opportunity to gather live data (Cohen, Manion and Morrison,2011); to distinguish the reality where people may act differently from what they say or usually do (Robson and McCartan, 2016). What is counted

as evidence in an observational situation depends on when, where and for how long we are watching, how many observers there are, and, above all, *how* we are watching (Cohen, Manion and Morrison, 2011). Observation allows the researcher to see things that might be missed; to discover things that matter about which participants might not talk freely in an interview situation (Cohen, Manion and Morrison, 2011) and which might not be captured by assessment data.

There are many types of observation in education. Each one has its points of strength and weakness. One dimension is how explicit or implicit the criteria are for noticing and recording. At the explicit end of the spectrum is a structured observation where the researcher is controlling the place, time, participants, circumstances and things observed. The researcher classifies the behaviour that participants displayed into categories, coding them perhaps with letters or numbers to jot down date and analyse it afterwards. This type of observation is usually high in reliability but its validity can sometimes be at risk when the participants act differently as they know that they are being observed and recorded, or in terms of how rigorous the categories are. At the other end of the spectrum in observation is a naturalistic or unstructured observation where the researchers record what they see and notice as best as they can. This kind of observation is high in validity and would allow for new ideas to be generated, but it is usually carried out on a small scale and is less reliable, since what an individual notice is often related to what he considers important. Observation schedules can vary from highly structured to informal note-taking and sketches. Another type is a participant observation where the researcher becomes actively part of the group being observed. This could be covert or overt, though covert makes it difficult for the researcher to take contemporaneous notes and may lead to loss of objectivity if the researcher becomes too involved (Thomson and McLeod, 2015).

In this study, an unstructured observation is selected as part of its methodology to observe

students' and teacher's behaviour in classroom. The aim is to identify details in relation to the research questions that might not come from the interviews or any other approaches selected in this study. The lesson observations aimed to answer questions such as how students and teachers responded to the new approach of teaching and learning; how students interact with each other and with their teacher; and how technology is used in classrooms and in relation to critical thinking.

There are two types of systemic observation visits to schools in Saudi Arabia:

- External observation, which is made by the general inspection office, and usually takes place twice a year, once each term (the academic year in Saudi Arabia is divided into two terms).
- Internal observation, which is carried out by the school principal or her/his deputy.

Observation visits may sometimes be paid for other considerations, such as for drawing teachers or students' attention to certain issues. Thus, it was important from the very beginning of the research to create a positive and non-judgmental situation with both teachers and students who participated in this study. For example, teachers and students were free to make comments, to come up with suggestions and to interact at any stage of the project. Teachers' expertise and their perspectives were highly valued.

A note form was developed for the purpose of this study. The notes were recorded inside the classrooms. Then, a one-to-one discussion with the teacher is held outside the classroom. Those notes were added at this stage as well. The observation mainly focused on:

- The lesson's introduction:
    - How did the teacher start her lesson?
    - How did the students interact with her?
    - What kind of questions were raised?

- The main lesson:
    - Did the students appear to have fully understood what they have been given?
    - How did they interact either with each other or with their teacher in order to solve the task?
    - Did they appear to have understood the strategy and the skills associated with it?
- The dialogue that came with their presentation:
    - Were students able to identify the strengths and weaknesses of other groups?
    - Were students able to reflect on their own thinking and responses?

Analysis procedure

The notes gathered from the fieldwork were transcribed and included. These notes recorded the time span of each stage of the lesson activities, levels of distraction that occurred as a result of technical problems, and examples of questions that students asked in the classroom and the teachers' comments provided after the end of each lessen. When the researcher came back from the field trip, some further notes were added from memory.

As the researcher, I went over all of the collected notes and sought to analyse them critically. In general, these notes generated overall descriptions of the observation.

4.3.4. Participants' perspective

At the end of the study, I asked the participants: teachers, students and the inspector - who attended one of study's lessons - to provide their perspectives on the study as a whole and to

critique the strategy in terms of its usability and feasibility to employ it in their daily class. They wrote down what they thought on a piece of paper and passed it to the researcher.

Analysis procedure:

As the researcher, I went through those critique notes, read them carefully and took each point into consideration, which added more value to the data collection process.

4.3.5. Overview of data collection

Action research is the main overall approach that employed mixed methods to generate data that could answer the research questions. It was organized into three phases or cycles. The first one is the planning phase, where the interviews took place, then planning the first three lessons with consideration of teachers' input. See figure 3.1.

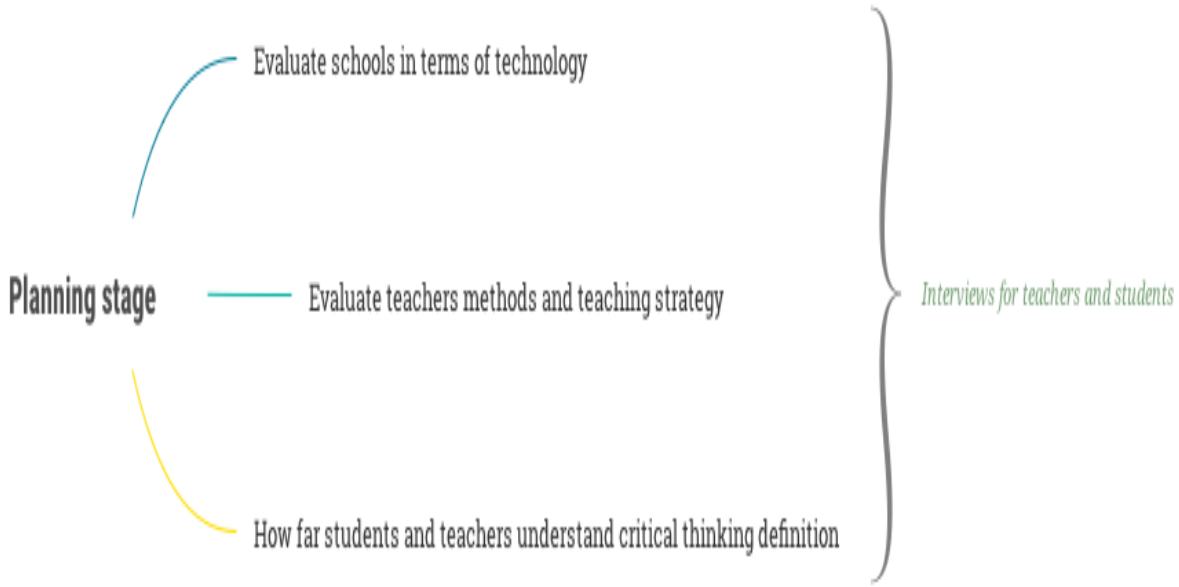

Figure 4.1 The first week in the schools (preparation)

The second stage is to review the teaching and learning procedures and to know to what

extent students and teachers had accepted the new strategy. After that, the necessary adjustments (if any) were made and then the proposed strategy was re-employed in three other lessons. In the last stage, the same procedure is followed in terms of revision and re-employment of the strategy in the last three lessons

4.4. Ethical issues

There are three main ethical issues related to this research.

- Consent,
- Ensuring participants' privacy, and
- Avoiding causing any kind of harm to the participants whether physical or emotional.

Researchers who are involved in researches that aim to make a change, to improve a group or a situation should obtain an explicit consent from the participants so that they become aware of what they are doing. They are also advised that they have the freedom to drop at any stage of the research (Baumfield, Hall and Wall, 2008). Thus, in terms of the classroom observations and interviews, all participants were informed about the methods that had been used in data collection (e.g. taking notes). However, using audio recording was not permitted by the schools (due to the culture's restriction in this matter). The consent forms were signed by each participant (teachers and students) before the study had been undertaken. All participants were made aware that their involvement in this study was voluntary and they had the right to withdraw at any time and at any stage. Moreover, the researcher avoided unnecessary contact with students during observation lessons. Privacy of participants was ensured by conducting interviews in a private room, which was the resources room.

All data was saved anonymously in order to protect the participants' privacy. The participants were not identified in any report or any other subsequent descriptions or publications.

In terms of data protection, all the data was saved to a secure drive on the researcher' own computer with a secure password and would not be revealed to or discussed with other individuals. Furthermore, any sensitive data will be destroyed after completing this study.

As researcher, I went through several stages before the research took place:

- Durham University ethics approval

The research had a full ethics review by Durham University's School of Education, and all ethical issues were first discussed with the study's supervisor (ethical approval provided in Appendix B).

- Ministry of Education in Saudi Arabia
    - As the researcher, I asked the Saudi Embassy in London to give me permission to conduct the study in Saudi Arabia.
    - Then I asked the Ministry of Education in Saudi Arabia to provide me with a permission to visit schools in Riyadh, where the study took place (See Appendix C).
    - Then I went to schools located in the west of Riyadh and approached some teachers to see if they are interested in participating in the research. A number of them were enthusiastic and were willing to participate in this study. The first one, I already had connections with its staff, and the second one was approached because of geographical convenience.

4.5. Measures

4.5.1. Achievement tests

A test of attainment is a suitable and effective strategy to collect quantitative data rather than qualitative data (Cohen, Manion and Morrison, 2011). The study used two types of tests in order to evaluate students' performance. The first one aimed to capture the starting point and is used as baseline assessment to measure students' level in terms of their knowledge of the subject, which is history in this case. The second one is to measure the value added to teaching and learning afterwards. Cohen, Manion and Morrison (2011) state that a value added to students can be assessed if only the starting point and starting abilities and achievements are known. As researcher, I had designed both tests; the pre-test and the achievement test. This latter test is divided into two sections: the first one is true or false, and the second one is multiple choice. This type of test may encourage students to guess, but it can also be used to evaluate aspects of higher order thinking skills and cover most of the content areas of the curriculum.

Figure 4.2: Tests used in the research

4.6. Validity and Reliability

Validity and reliability are two main issues a researcher has to take into account when designing, analysing, and evaluating a research study. Validity refers to the capability of an instrument to measure what is intended to be measured. To examine the validity of a research study, different procedures have been proposed including: content validity, internal validity, and external validity. Reliability, on the other hand, refers to the consistency of the study results, which is divided into internal and external reliability.

Nevertheless, to ensure validity and reliability, content validity and internal reliability were established for the quantitative part of the present study, while the qualitative part, on the other hand, was validated by using an alternative technique relevant to naturalistic inquiry, that is, trustworthiness.

4.6.1. Content Validity

In order to ascertain the validity of the achievement tests' questions and their ability to measure higher thinking skills, such as bloom's taxonomy. First, they were discussed with the teachers of the research participants (who were in some context able to judge the questions fairly from their experience that exceeded more than ten years of teaching). Second, after reaching a final formula, the questions were presented to a group of inspectors (supervisory centre), who have long experience (more than 20 years) in developing questions about higher thinking skills, to formulate them in the final stage.

4.6.2. Internal Reliability

In order to estimate the consistency of the two tests, the researcher applied a Cronbach alpha coefficient test. The internal reliability of any scale is considered high when the value of the

Alpha coefficient is high (values range from 0 to 1). In fact, the liability coefficient of a scale should exceed 0.60 to ensure that items of each dimension have high coherence.

4.6.3. Qualitative Data

Trustworthiness of this study

The concept of trustworthiness refers to the value of the research findings, which can be achieved by applying a set of methodological processes including: credibility, transferability, dependability and confirmability. In order for qualitative research study to be credible, the researcher has to ensure that the data obtained is true and accurate. Transferability is equivalent to external validity in quantitative studies, and it refers to the degree to which the results can be generalised to other contexts or populations. The technique used to assess the reliability of the qualitative data is dependability, which refers to the consistency of the findings. Confirmability, on the other hand, is associated with the neutrality of the findings. In other words, for research data to be confirmable, the researcher's personal interests and biases should not interfere with the conduct of the research.

4.7. School selection and sample of students

4.7.1. School type

The study was conducted in two girls' high schools in Saudi Arabia. These are called 'curriculum schools' and are indicated as School 1 and School 2. There are two types of high schools in Saudi Arabia. The first one is the traditional school, where students have no role to choose their timetable. Also, there are no optional subjects that they can select to study. However, in the second year they can choose a fast-track path to study for two years (high school is typically three years in total). There are three paths: literature, science and management. In the literature, they can study Arabic grammar and literature, English language, social studies, Islamic studies and so on. Typical subjects in the science path are

mathematics, physics, chemistry, biology, and English language. In the management path, they study subjects such as IT, leadership, and management.

The second type of schools is called ‘curriculum schools’, where students can finish their study in two years and a half. The first year in high school is similar in both categories: traditional or curriculum schools. In the first year in the curriculum schools, students must study a mix of both introductory literary and scientific subjects in order to have an idea of the nature of the subjects that they will study in the next two years in more details. It is still imperative that students choose one of the two paths, but they have the right to choose which subjects they want to study each term, including the summer term. Both schools use the same types of tests to measure students’ achievement and outcomes.

4.7.2. The selection of schools

The first criterion for selection was based on the type of school, which was a curriculum school. The reason for this choice was that the study took place in the second term of school year when the traditional schools were teaching geography. History had already been taught in first term as part of social studies curriculum. The second criterion was about the location of the schools. Riyadh is a large city. Schools there are divided in terms of supervision and inspection into five geographical sectors: north, south, west, east and centre. Therefore, I chose the west where I originally had taught as a primary school history teacher. The final phase was the selection of the two schools, one of them I already had connections with its staff, and the second one was approached because of its geographical convenience.

School 1 is located in a middle-class neighbourhood. School 2 is located in an upper middle-class neighbourhood. Like most of high schools currently in Riyadh, both schools are well-equipped with technology facilities. Each classroom in the schools is fitted with an interactive

white-board and a projector. It also has two computer laboratories and a resource room that is accessible to teachers and students. The resource room is equipped with a smart board, a digital camera attached to the white board, a projector, and computers connected to the internet. All lessons particularly presented for this study took place in resource rooms of the two schools.

In School 1, the study took place in a second-year class with students on the literary path during the history subject lessons. There were 28 students in the class. In School 2, the study took place in year-one class (where no path has been selected yet) in social studies lessons, history section, with 40 students attending the lessons.

4.7.3. The sample

Sampling is a process of selecting a representative group of individuals from a specific population. The random sampling proved to be better and more effective, as it eliminates biased selection that would have increased the possibility to estimate sampling error and make inferences to the population (Bryman, 2012; Encyclopædia Britannica, 2017). However, this study's sample was not random due to two main reasons. First, action research usually does not deal with random samples or manipulated variables (Zeni, 1998). Second, the selection depended on the willingness of participating schools and teachers. However, the researcher did not play any role of samples selection.

The sample size in School 1 was manageable. It included (28) students aged between 15-17 years old. This allowed dividing them into five groups: three groups had six members and the other two groups had five members. In School 2, the sample included 40 students from first-year high school. Apparently, this is a large number, and it was divided into six groups: four groups had seven members, and two groups had six members. Both classes were originally

divided into groups by their teachers. The allocation of students in the classes was initially fixed by the schools, as they allocated students from the beginning of the school year.

4.8. The study periods

This study trip took place over 12 weeks in both schools. The first week was a planning and evaluation week. For the schools, this concerned how far they were equipped with technology facilities. With regard to teachers, the researcher looked at how much they use technology in their classes, to what extent they understood the definition of critical thinking, and whether they teach these skills in their classrooms, and if so, how they do that. As to students, the key point of evaluation was to assess their achievement level (knowledge, information and thinking skills), and their attitudes towards technology and critical thinking in general. The second week was planned to introduce the new teaching strategy to teachers and students. The aim was to see how it could be applied in classroom as well as to provide students with some guidelines that would help them in using this strategy.

The next nine weeks were divided into three phases, each lasted for three weeks. Each phase included the elements of planning, observation, reviewing and reflection. The last week was dedicated to the evaluation of the students' attainment by testing them. Two tests were conducted: achievement test and critical thinking test. It also included an evaluation of the study itself from the teachers' and the students' points of view in terms of their likes and dislikes about the new strategy that has been used.

4.9. SRPQ Strategy

The study has developed a new strategy that could be effective in teaching critical thinking within curriculum (History in this study). This strategy is called SRPQ; Seek>Read>Present>Question. Then it has been applied to nine lessons that were planned

specifically for this study from student's usual history curriculum. This strategy has introduced some questions to teachers and students at the first week of this study; what is it; how we apply it and what role for each one to play. The application of the strategy was within a collaboration setting using technology as a tool for seeking information. More details about this strategy can be found in chapter three, p.99

4.10. Action research in the study itself

The need for action research is commonly used in the classroom, mainly if teachers want to reflect on what they do, such as introducing a new approach, modifying the current one, or explicating precisely why certain things (behaviour or skills) occur. Teachers are often problem solvers, even without realising that they have the experience that can tell them what, when and how to teach, and which is the best way to motivate students. However, sometime teachers' focus on what is going on in the classroom seems to be excessive. Thus, it becomes a good idea to have an outsider who could help refocus this situation a bit.

This research was conducted in the Saudi schools setting in order to offer a new strategy called SRPQ that in this case depends on the use of technology. According to Baumfield, Hall and Wall (2008), the best understanding of action research comes from the interrelations between three elements:

- The intention, which includes agency and impetus.
- The process, which includes tools and analysis.
- The audience, which includes voice and critical community.

However, each one of the abovementioned aspects is also an explicit part of the overall research process in this thesis, starting from the initial research questions and going through to the conclusion of this thesis.

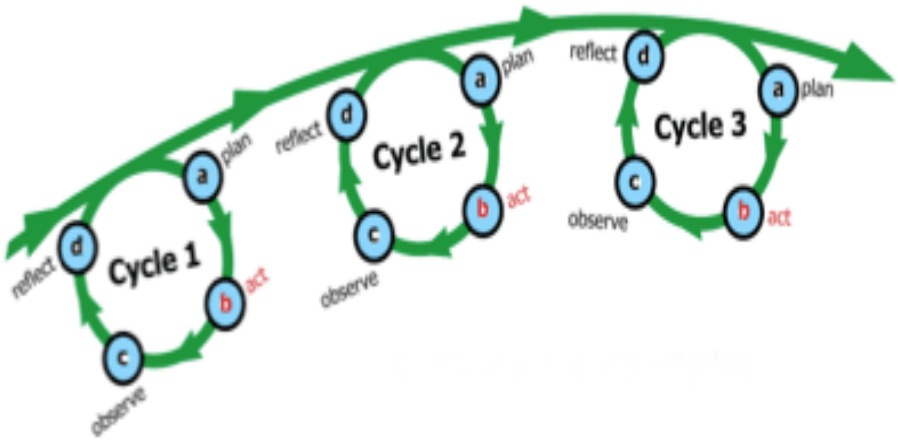

Figure 4.3: Action research cycles

4.10.1. Cycle 1: Formulation of Research Questions

- Intent:

The researcher intends to observe students' attitudes and activities in the classroom in order to discover whether the use of ICT might require a new approach to teach and learn critical thinking in Saudi's schools.

- Process:

- Read extensively about
  - Critical thinking. What is it? How has it been taught?
  - Technology. How has it been used in classrooms?
- From the first year of the time of this study, I attended a wide range of training workshops that would help me acquire necessary skills that are essential to conduct a PhD project sufficiently.

- Audience

The audience of this thesis is initially my supervisor, then academic readers and fellow researchers as well as interested teachers in Saudi Arabia.

After a while, the researcher produced the first draft of the chapter “Literature review”. This chapter concluded with setting the main research’s questions:

1. Is the SRPQ strategy feasible to use in classroom settings in Saudi Arabia?

    • Is the strategy practical to use in Saudi classrooms?

    • Do teachers and students consider it as acceptable?

2. Are students successful in learning the history curriculum when these strategies are employed?

3. What are the challenges in using technology to teach the history curriculum through critical thinking in Saudi classrooms?

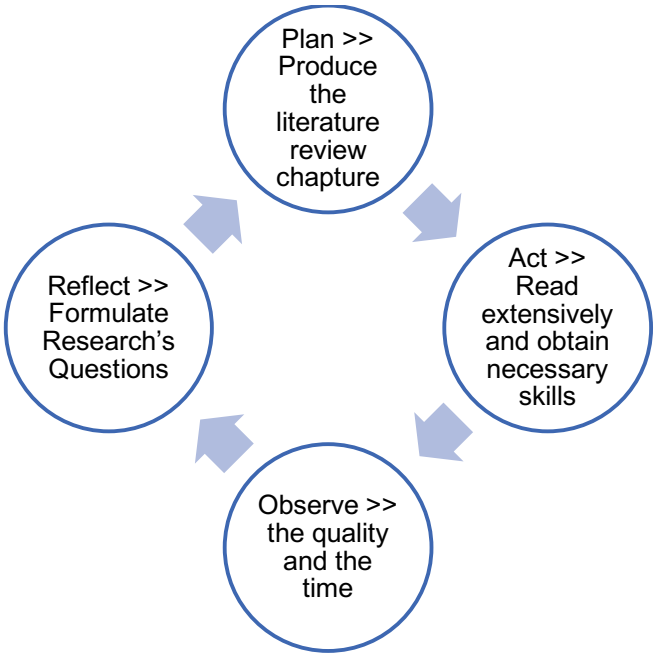

Figure 4.4: First cycle conclusion

4.10.2. Cycle 2: Design of the Action Research Methodology

- Intent:

The intent of this study is to propose a new strategy based on the use of technology that can be utilized successfully in classrooms in Saudi Arabia and to teach critical thinking to students.

- Process

- Plan and building up of the methodology chapter.
  - What are the best methods to carry out the research question?
- Read other studies of similar interests in order to have a perspective of their methods.

- Audience

- Initially, the supervisor is my major audience, then readers of the research.

The first draft of methodology was structured by formulating the interview questions (see p.114), clarifying the strategy that would be utilize in the classroom setting (see p.135), and identifying the samples (see p.133).

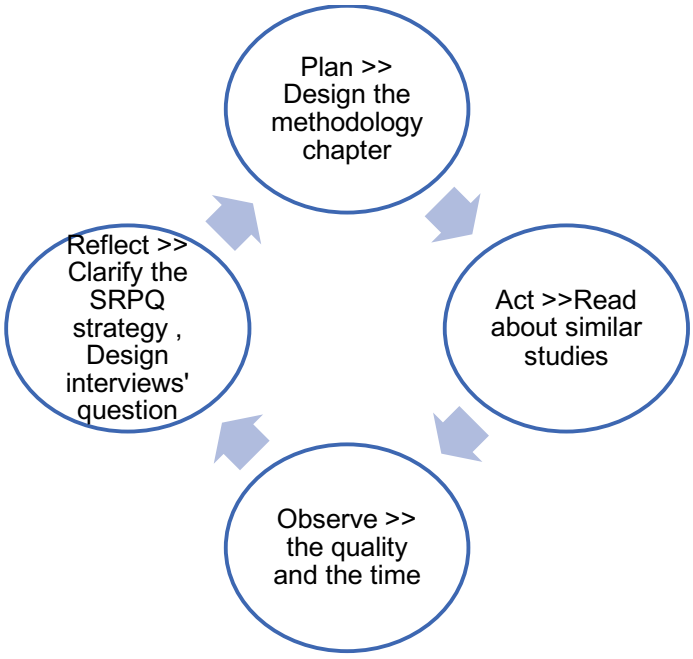

Figure 4.5: Second cycle conclusion

4.10.3. Cycle 3: Ready to Apply:

- Intent:

To obtain the necessary permissions that would allow the research to be conducted in schools in Saudi Arabia.

- Process:
  - Had the ethics approval from Durham University.
  - Had a permission from the Ministry of Education in Saudi Arabia
- Audience

The supervisor, Ministry of Education in Saudi Arabia, School of education at Durham University.

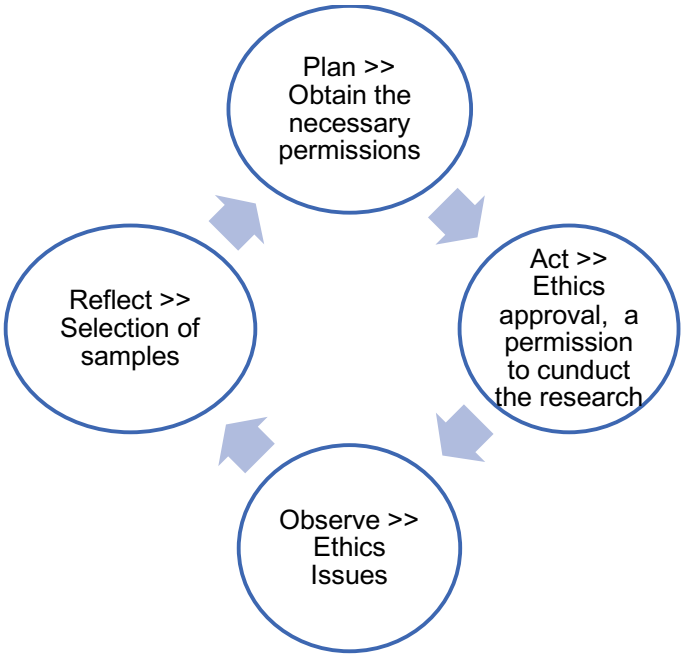

Figure 4.6: Third cycle conclusion

The end of these three cycles of action research is the reflection on my study itself. It became clear that the effective methodology to be selected here would be mixed methods (an action

research, framed with interviews, observations and tests) in order to obtain a range of data that will address the overall research questions. It is true that the researcher was not fully conversant with the process of the action research in the early stages of the study itself. But, as the study developed, action research became more apparent.

The three stages that follow are about the action research “in action” in classrooms in Saudi Arabia to demonstrate and apply the new strategy that the study has proposed.

4.10.4. Action research “in action” in classrooms

As the researcher, I have used the same procedure that had been used previously:

- Intent
- Process
- Audience

First cycle: The planning cycles

- Intent:

The intent was to establish an understanding of SRPQ strategy by teachers and students.

- Process

The first lesson started by introducing the strategy and providing some instructions that show students how to use the SRPQ strategy efficiently. Then, the students were asked to write down these instructions on a sheet of paper and put them in a table, so that they will be considered in each session (look at figure 3.5).

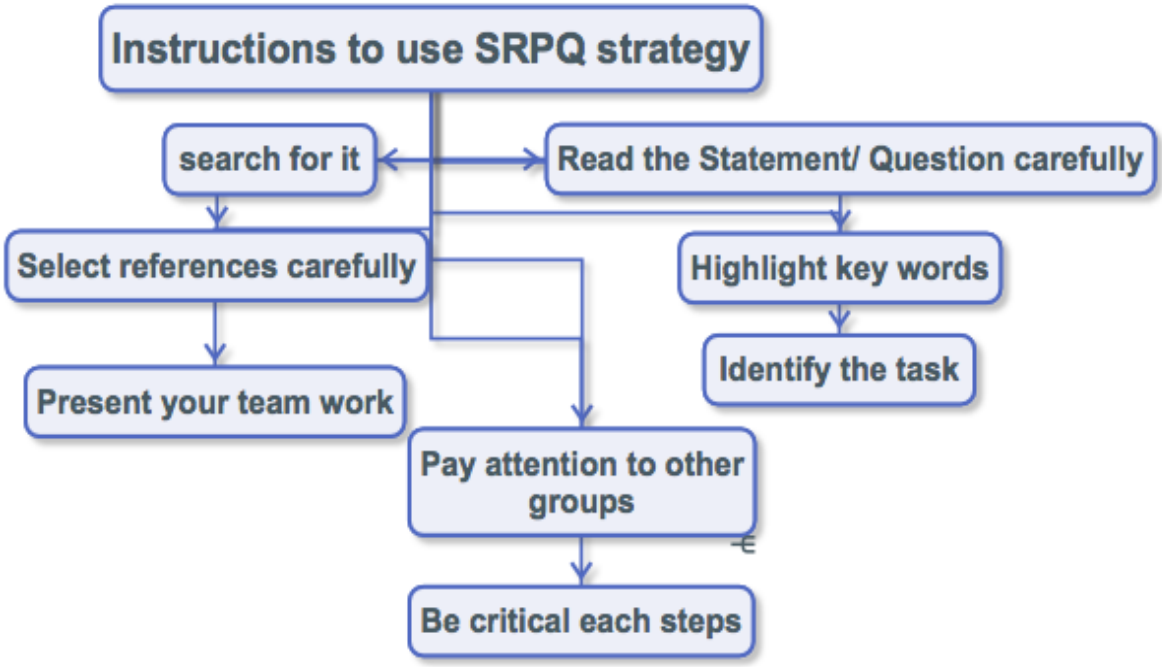

Figure 4.7: Instructions that show students how to use the SRPQ strategy

- Audience

Teachers, students

Reviewing and Observing

After each lesson, the teachers and the researcher reviewed and evaluated all the events that occurred in the classrooms, the type of questions that were asked, the engagement of the students, and the learning of critical thinking. At the end of the three sessions, we asked the students to undertake a simple test that would give us an idea about how far they managed to grasp the skills that they had learnt in these lessons. The students were anxious about the time they spent in the phase of seeking information, saying that it was too short to find and understand what was required.

Re-planning and Reflecting

The results of the above process showed a slight improvement in the students' learning as observed by the teacher. Furthermore, we decided to add extra five minutes to the main session so that the total time would be 60 minutes instead of 55. we also made sure that the teachers had already prepared a good range of questions that would be asked during the class, such as how, why, and what do you think, which are likely to prompt students to focus more on searching and reading.

Figure 4.8: First cycle conclusion

Second cycle

- Intent:

The intent was to emphasize critical thinking skills that were structured within the content of each lesson.

- Process:

Each lesson introduced a number of skills that would enhance students' critical thinking. These skills were distributed throughout the lessons. Each lesson had superficially stressed one skill, but this did not mean we neglected other necessary skills.

- Audience:

The audience here were the teachers and students.

The Reviewing/ Observing

The second set of three lessons went more smoothly than the first one. This was likely because students' understanding of the SRPQ strategy by that time had slightly improved and broadened. It was noted that the application procedure of the strategy in this phase was clearer for both teachers and students. In addition, the students' skills may have improved.

Re-planning and Reflecting

From the daily observation and teachers' point view, there was a noticeable improvement in students' thinking behaviour, not just during the classes where the study took place but also in other classes that students attended with their teachers. Therefore, the researcher continued with the same techniques, as were applied in the second set of three lessons.

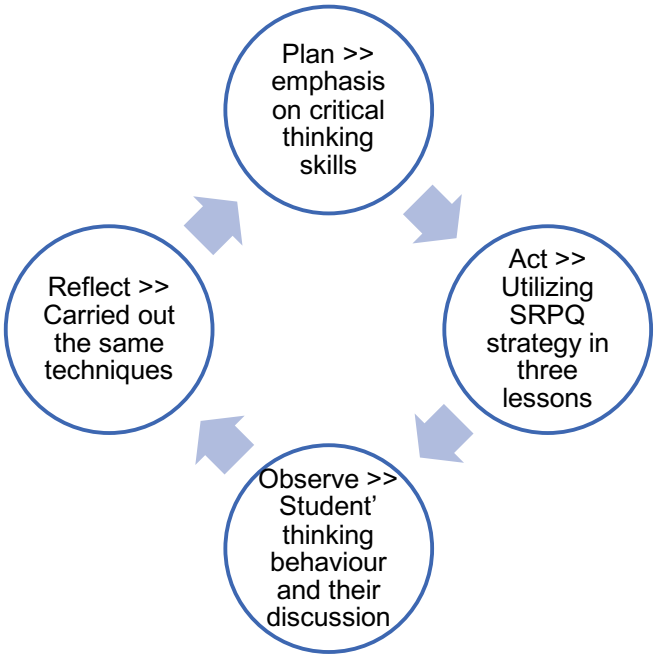

Figure 4.9: Second cycle conclusion

Then we repeated the cycle one more time.

4.11. Summary of the lesson procedure

As the researcher, I planned nine lessons in total for students in both schools, with a substantial contribution from the class teachers regarding the preparation and planning the detail of the tasks. The lessons were divided into three stages, and each stage had three lessons. Every lesson had an introduction, main body, and a recap. The introductions varied from one lesson to the other, containing a short video, pictures or introductory discussion about a subject commonly popular in social media in Saudi Arabia. The main lesson was framed in a statement form followed by questions, based on the students' national curriculum of history. Students were asked to use the SRPQ strategy that essentially emphasized that the more students have information about the subject, the more they will have a deeper understanding of it. Alongside this, one of the critical thinking skills, for instance, analysis,

interpretation, inference, contrast, and reasoning, was introduced and practiced. These activities were done collectively in the classroom. The recap was where students, as a group, had the chance to critique each other's arguments. Each group presented its work, while other groups were listening and ready to share their perspective on what they had listened to afterward.

4.11.1. Lesson One

The focus of this lesson was on teaching students research skills. These skills were intended to include, identify and find information to answer the questions that had been raised. They also assess the value of that information, evaluate its sources and organize it, and they will be used correctly in other contexts. Besides, the lesson aimed to teach students the procedure of SRPQ strategy. Therefore, they had been encouraged to ask themselves certain questions that guided them to the correct and reliable source. The key point here was to emphasize that if someone has experience in something, that doesn't mean what he or she says is the ultimate truth about that thing, but rather it makes his/her argument more credible. Reputation is one of elements that make the person an expert in something or not. It is one of the reliable methods for accepting or rejecting what one says. However, it is important to check if the source has a partial interest or bias. Alongside, questions about the circumstances of their statements were raised (Nosich, 2012).

Each class was given a statement depending on their lesson.

School 1:

By using SRPQ strategy and investigation's skills, answer the following questions as a group.

"The Battle of Ain Jalut took place in 658 A.H /1260 A.D between Muslim Mamluks and the Mongols"

Where did the battle take place?

Who was the Muslim commander of that battle?

How did that battle affect the future of both the Mamluks and the Mongols?

School 2:

Look at the picture in front of you (we used a smart board to show the students Al-Masjid al-Aqsa's picture). By using the SRPQ strategy and investigation skills, answer the following questions as a group.

Which Masjid is this one?

Where is it located?

Who built it?

How do Muslims connect to it?

4.11.2. Lesson two

Observing the relationship between events, causes and effects of the SRPQ strategy was one of the main skills that have been focused on in this lesson. The purpose of this session is to demonstrate how to find a link between the information students had gathered. They were directed to look at relevant evidences in determining what caused something, identify the possibilities in this case, and consider counter-arguments that could be posed against their evidences.

School 1

Read the statement below. Then by using the SRPQ strategy and cause and effect strategy, discuss the statement within your group to answer these questions.

"The Mamluks era had witnessed the establishment of many religious, civil, and commercial architecture"

What is the main feature of Mamluks' architecture?

Which elements had influenced the Mamluks' architecture? In which way?

School 2

Read the statement below. Then by using the SRPQ strategy and cause & effect strategy, discuss the following statement within your group to answer the questions.

"Theodor Herzl is considered the founder of the Zionist movement"

What is the Zionist movement?

Who was Theodor Herzl?

Was Palestine his only option? What does that mean?

4.11.3. Lesson three

In this lesson, using the SRPQ strategy with analysis and evaluation claims were the key skills that were taught in the classes. The students were requested to clarify the idea behind those claims and to judge the credibility and the acceptability of the claims.

School 1

"The relationship between the Ottomans and the Mamluks had been confrontational. Both states competed for control of the spice trade, and then the Ottomans aimed to eventually take control of the Holy Cities of Islam. This conflict, had led to a stalemate at the end."

What claims does the statement present?

What does the statement assume?

To what extent do you agree/disagree with it? Why?

School 2

Read this letter dated November 2nd 1917 (we gave each group a copy of Balfour's letter that was known historically as "Balfour Declaration") by using the SRPQ strategy. By relying on analysis and evaluation of the claims, answer the following questions:

Who was the writer?

To whom did he send it?

Why did he send it?

What was the letter's claim? What did he assume?

To what extent do you think Britain has the responsibility for what is happening now in Palestine?

4.11.4. Lesson four

This lesson focused on comparing and contrasting, using concepts' maps, beside the SRPQ strategy. The students were asked to use those skills to arrange information in such a way that it can be understood or presented more effectively.

School 1

Read the statement below. Then by using the SRPQ strategy and compare and contrast, answer the following questions. Use the concepts maps to organize your information.

"The Ottomans formed an Islamic State that ruled over enormous lands for almost six hundred years."

What was the importance of Ottomans' location?

Do you think it would have been a powerful advantage or not? Why?

Identify the most powerful Sultans and make a comparison between them in terms of how long they ruled and which land they conquered?

School 2

Read the statement below. Then by using the SRPQ strategy and compare and contrast, answer the following questions. Use the concepts maps to organize your information.

"Palestine was under the British Mandate in the period between 1920-1948"

Compare the population of Jews and Arabs before and after the mandate.

How did that affect the population of Palestine after the mandate ended?

4.11.5. Lesson five

The focus of this lesson, beside the SRPQ strategy, was on reasoning and interpretation. This type of thinking mostly has a common fault among students, where a student would consider only one possible cause and accept it without consideration of other possibilities. Therefore, students had been encouraged to be open to other possibilities.

School 1:

"The Ottoman State was governed by different sets of laws during its epoch."

Read the above statement carefully and discuss it within your group. Then, by using the SRPQ strategy, find reasons that led the Ottomans to formulate their court system in that structure. Following that, tell other groups your interpretation and your perspective.

School 2:

Read the following statement carefully and discuss it within your group. Then, by using the SRPQ strategy, answer the questions below:

"In 1948, the First Arab– "Israeli" War was fought between the "State of Israel" and a military coalition of Arab states."

What was the cause of this war? Who gained victory? Why?

To what extent do you agree/disagree with war? Why?

4.11.6. Lesson six

This lesson focused on students' ability to summarize information, alongside using the SRPQ strategy. This type of skills benefits students in spotting important information quickly from other information, which would be included in the summary. All that depends on the value of the information and the extent of its relevance to the argument they made.

School 1:

Read the following statement carefully and discuss it within your group. Then, by using the SRPQ strategy, answer the questions below:

"The Prophet Muhammad (peace be upon him) was full of praise for the army that would accomplish that conquest, and for the leader "Amīr" *who would command that army: "Verily you shall conquer Constantinople. What a wonderful leader will its leader be, and what a wonderful army will that army be" (Musnad, Imam Ahmad)*

Who was this leader that the prophecy tells us about?

Narratively, how did he conquer Constantinople?

School 2:

Read the following statement carefully and discuss it within your group. Then, by using the SRPQ strategy, answer the questions below:

"The Suez Crisis, also named the Tripartite Aggression was an invasion of Egypt in late 1956 by "Israel", followed by the United Kingdom and France."

What reasons were behind this aggression?

What is the story behind the Suez Canal?

Use the map to make your story more exciting.

4.11.7. Lesson seven

Descriptive analysis was the most important ability that was focused on in this lesson. We showed students from both classes a number of pictures related to their lesson and requested them to describe what they are about to see. Then, they were asked to use the SRPQ strategy to discover more about them.

School 1:

The students were shown pictures of The Süleymaniye Mosque. Then, they were asked to find out:

Where is it?

Who built it?

What is the most captivating feature of it?

School 2

The students were presented with some pictures of The First Palestinian Intifada.

Then, they were asked to find out:

Where did the Intifada start?

Against whom did it occur?

Who was the main fighter?

What did they use?

Describe how you feel and what you think about it?

4.11.8. Lesson eight

Utilizing the SRPQ strategy provides students with an access to massive information that needs to be simplified, organized and classified. Hence, those skills were the focus of this lesson.

School 1:

By using the SRPQ strategy, answer the questions below.

"It took the first Saudi state several decades to unite Najd area alone"

Who was the most famous enemy of the first Saudi state?

Clarify your answer by presenting the most significant battles between them.

School 2:

By using the SRPQ strategy, answer the questions below.

The Palestinian Intifada has gone through various stages that affected both Palestinians and "Israelis"

How did the Intifada make an impact on both Palestinians and "Israelis"?

Illustrate your answer by giving some examples of the first and the second *Intifadas.*

4.11.9. Lesson nine

In this last lesson, the study focused on the student's ability to reach a conclusion based on the information they had gathered by using the SRPQ strategy. Thus, there was an emphasis on the consideration of other alternative courses of action, the consequences of various alternatives and whether they are valuable or not.

School 1:

Read the statement below and answer the following questions:

"The first Saudi state was established in the year 1157 A.H (1744 A.D) when Muhammad bin Abdu al-Wahhab and Prince Muhammad bin Saud formed an alliance."

What were the elements of that movement?

How did the neighbouring states of that movement perceive it? How about now?

Why do you think the Ottoman state in that time resisted that movement?

School 2:

Read the statement below and answer the following questions:

"The Palestinian Issue is at the heart of the Arab Nation. It has received support from different Arab governments, including Saudi Arabia"

How has Saudi Arabia supported the Palestinian Issue?

Is that enough?

Who do you think have the right to dominate this land? Why?

4.12. Reviewing the Study Research Questions

This study is attempting to determine whether the use of ICT requires a new approach to teach and learn critical thinking in Saudi schools. To achieve this aim, the researcher has designed a new strategy that relies heavily on technology. This strategy was applied in two high schools in Saudi Arabia (girls) using mixed methods to collect both quantitative and qualitative data. Action research approach was seen as the suitable approach for this kind of study, which seek to effect a change in the school setting and offer a new strategy. Further, the action research has been combined with other methods in order to obtain the data that we were looking for.

Further, it explores this new strategy in education that relies on technology in a collaborative learning situation to teach critical thinking in a Saudi schools setting. It figures out the extent to which this new strategy is applicable and acceptable for both teachers and students and whether students are successful in learning the history curriculum, whilst they are developing their critical thinking.

Four main questions have been formulated.

1. Is the SRPQ strategy feasible to use in classroom settings in Saudi Arabia?

    • Is the strategy practical to use in Saudi classrooms?

    • Do teachers and students consider it as acceptable?

2. Are students successful in learning the curriculum when these strategies are employed?

3. What are the challenges in using technology to teach the curriculum through critical thinking in Saudi classrooms?

To answer these questions, the research has developed a new strategy to teach critical thinking that relies on the use of technology. This strategy has been integrated in nine lessons

in each school. At the end of the action research, we designed achievement test. If the results of the test indicated improvement in students' achievement, this will reflect the feasibility (both *acceptability and usability) of* the new strategy that relies on technology in teaching students to be good thinkers as well as they are successful in learning the history curriculum. That may indicate the SRPQ strategy could be used as an effective method to teach critical thinking.

Also, the research carried out interviews with both teachers and students at the beginning of the study. The data coming from the interviews were triangulated by using unstructured observation to find out to what extent this strategy is *acceptable.*

At the end of the strategy application, the third question will be answered based on the study's problems and challenges that may occur during the study' implication and teachers' perspective.

3) What are the problems of using technology to teach critical thinking in Saudi classrooms?

Summary

The study used mixed methods for data collection, which was a combination of different complementary approaches involving students' attainment, perceptions of teachers and students, and lesson observations, all were set in an overall action research frame. The aim of this approach was two-fold: to identify the current teaching and learning situation in girls' schools in Saudi Arabia in relation to using technology facilities in teaching critical thinking with history, and to evaluate the feasibility of a new approach integrating technology and critical thinking called SRPQ. This study took place in high schools for girls in Riyadh over a period of twelve consecutive weeks.

This chapter has provided details about the SRPQ strategy, which the present study has proposed for teaching critical thinking. Details about the study sample and participating schools have been provided as well.

The next chapter will discuss how the data that came from the different methods has been analysed and used in this study in relation to the main research questions:

1. Is the SRPQ strategy feasible to use in classroom settings in Saudi Arabia?

    • Is the strategy practical to use in Saudi classrooms?

    • Do teachers and students consider it as acceptable?

2. Are students successful in learning the history curriculum when these strategies are employed?

3. What are the challenges in using technology to teach the history curriculum through critical thinking in Saudi classrooms?

CHAPTER FIVE: RESULTS

5.0. Introduction

The current study involved different types of data collected through four sources. Each data type has been analysed separately. The data was gathered from interviews with teachers and students who participated in this study; tests of achievement; perspectives of teachers who transferred the strategy proposed in this study into their classroom; and the feedback that came from the schools' principals and inspectors who attended some lessons. All this data was put together so as to address the research questions of this study. The data was collected over the course of twelve weeks, when the study was conducted, to answer the following main research questions:

1. Is the SRPQ strategy feasible to use in classroom settings in Saudi Arabia?

    • Is the strategy practical to use in Saudi classrooms?

    • Do teachers and students consider it as acceptable?

2. Are students successful in learning the curriculum when these strategies are employed?

3. What are the challenges in using technology to teach the curriculum through critical thinking in Saudi classrooms?

The purpose of the above questions is manifold. They attempt to investigate the feasibility of the proposed strategy to see if it is feasible and realistic in the Saudi context. Further, it seeks to evaluate the current situation of teaching and learning methods in schools in Saudi Arabia and to grasp teachers' beliefs and conceptions of critical thinking: how they teach critical thinking, and how they use technology in classrooms to support their teaching.

This chapter addresses the following:

- Analysis of test data.
    - Achievement tests.

- Analysis of interviews and observation data
    - Interviews with teachers and students.
    - Observations of the lessons.
    - Teachers and students' perspectives.

5.1. Analysis of achievement's test data

Three tests were conducted at both schools: two high schools for girls in Saudi Arabia, as Table 1 below shows. The total number of students interviewed from both schools was 68 students.

Schools	All students	Present	Absent
No.1	28	26	2
No.2	40	39	1

Table 5.1: Participants

However, on the test day three students were absent, whereupon the researcher excluded them from this analysis as shown in Table 5.1.

For this part of the study, two types of tests were used. The first types included the achievement tests, which were administered on three occasions (1) a pre-test, (2) a post-test (these were both developed for the research) and (3) a final post-test, which the school normally administered in assessing students.

The outcomes from these tests are compared in order to locate any significant variation in students' achievements before and after the application of the SRPQ new teaching strategy, where technology is used as the main instrument in the classrooms.

The quantitative data was analysed using IBM SPSS Statistics version 20.0, and the significance level was decided by taking p-values into consideration where $p>0.01$ meant there is a meaningful difference in each school and all the study sample (both schools jointly).

The study hypothesized that teaching critical thinking with technology (Internet) in the history curriculum may put students at a disadvantage in terms of learning the history curriculum, which can be formalized as H0: “There will be no difference in students’ achievement during the course of the intervention”. On the other hand, the H1 hypothesis says, “There will be a difference in students’ achievement during the course of the intervention”.

A further follow-up test using the school’s usual assessment procedure at the end of the school year was also used to check that this progress was what would usually be expected.

The achievement tests developed for the research were scored out of the same total (50 of 50) where each one is equal to one score. The tests were designed to be of equal level of difficulty.They were divided into two sections, the first one is true-false questions, which are formed into twenty-five points; the second part is multiple choice questions which are formed into twenty-five points, each followed by four choices.

A. School Number 1

The tests’ results of the first school are shown below in table 5.2 and figure 5.1. In the table, S1/1 represents student one in school 1; Ach-Test (first post-test) is the achievement test that was developed by the researcher; F-Ach-Test is the second post-test that was set by schools at the end of the term, which is discussed below. The total number of students who completed the tests was 26.

Students	Pre-test	Post-test	Change between pre-and post-test	F-Ach-Test
S1/1	12	35	23	49
S1/2	13	36	23	47
S1/3	13	37	24	47
S1/4	12	36	24	21
S1/5	19	41	22	46
S1/6	15	39	24	48
S1/7	9	32	23	36
S1/8	18	40	22	30
S1/9	13	34	21	49
S1/10	10	32	22	43
S1/11	13	37	24	41
S1/12	9	32	23	34
S1/13	13	34	21	45
S1/14	14	36	22	47
S1/15	17	40	23	45
S1/16	15	38	23	45
S1/17	5	29	24	46
S1/18	15	39	24	48
S1/19	13	39	26	50
S1/20	10	33	23	25
S1/21	9	31	22	31
S1/22	12	34	22	46
S1/23	13	25	12	39
S1/24	10	33	23	40
S1/25	10	34	24	37
S1/26	15	37	22	46

Table 5.2: Tests' result in school 1

Table 5.2 demonstrates students' scores in all four tests. It shows clearly an improvement in students' academic results, as the improvement gained between pre-test and the post- test (both developed by the research) is high for each participant.

This indicates that the use of SRPQ strategy could be useful in teaching "history" curriculum and students were able to gain a high score in it.

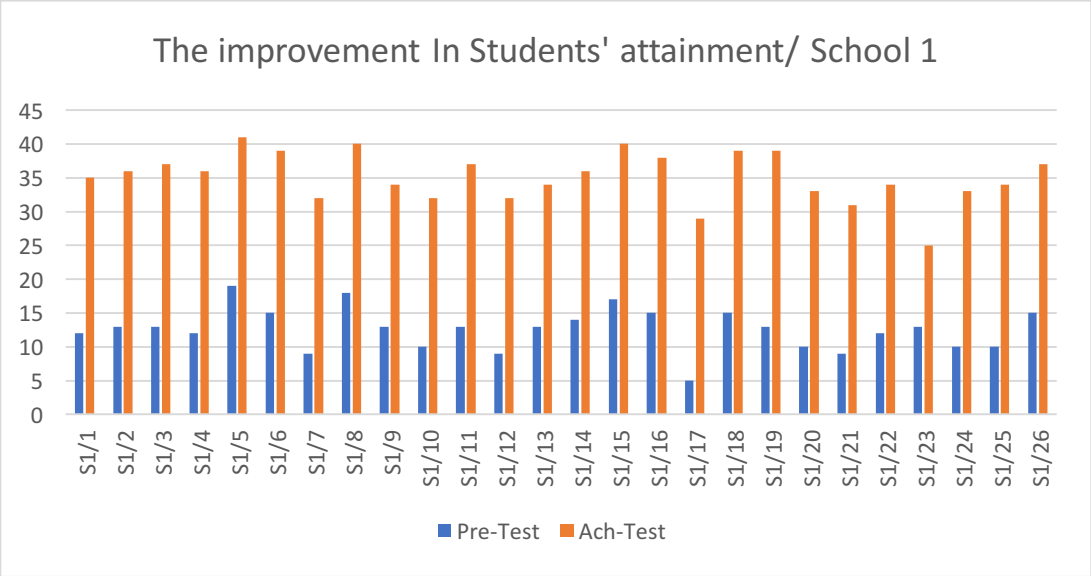

Figure 5.1: Tests result, pre- and post-test school 1

Figure 5.1 displays that there is a significant variation between pre-test and achievement test (designed by the researcher).

		Pre-Test	Ach-Test	F-Ach-Test
N	Valid	26	26	26
	Missing	0	0	0
Mean		12.58	35.12	41.58
Median		13.00	35.50	45.00
Mode		13	34	46
Std. Deviation		3.101	3.734	7.824

Table 5.3: Test results Mean, Std. Deviation school1

Table 5.3 shows that there is an increase between Pre-test and Ach-test in terms of their means. This suggests that students can learn the history curriculum while the SRPQ strategy is used. We cannot conclude that they learned better (or worse) due to the exploratory design. But, we can be sure they made some progress while they were being taught with SRPQ.

Furthermore, I did a paired-sample t test with each of the three tests; pre-test and the Ach-test (first post-test); the Ach-test and the F-Ach-test post-tests comparing means, standard deviations, and differences for each class separately and all classes combined, where the normality measured by skew and kurtosis were fairly normal (see Appendix G). See Table 5.4 below.

Pair	n	mean	Std. Deviation	t	df	Std. Deviation Difference	Mean Difference	Sig. (2-tailed)
Pre-Test	26	12.58	3.10	-47.48	25	2.42	-22.53	.000
Post-Test 1	26	35.12	3.73					
Post-Test 1	26	35.12	3.73	-4.26	25	7.73	-6.42	.000
F post-Test	26	41.58	7.82					

Table 5.4: *t*-test Pre-test and Post-Tests Means, Standard Deviations, and Differences for school 1

Table 5.4 displays the mean of correct responses for the pre-test and post-tests. The difference between means is statistically significant for each test. For the pre-test and the Ach-test, a two tail paired samples t-test revealed that students in school 1 have shown an improvement after the implementation of SRPQ strategy, where the post-test (*m*=35.12, *s*=*3.73*) compared to the pre-test (*m*=12.58, *s*=*3.10*), and *t* (25) = -47.48 that p<.01.

Further, tables 5.2 and 5.3 indicate also that students continued to improve academically when they scored slightly higher in their final exam, which has been revealed by paired samples t-test as well where the final post-test (m=41.58, s=7.82) compared to the first post-test (m=35.12, s=3.73), and t (25) = -6.42that p<.01. The continued improvement is likely to reflect other content taught after the study, but included in the school's final assessment.

This implies that the successful use of the SRPQ strategy might support students in their attainment as well as in their critical thinking, suggesting that the new strategy to teach critical thinking is feasible in classrooms in curriculum subjects.

Therefore, the result in School 1 in relation to the present study's hypothesis indicates that the study rejected the null hypothesis (H0) that "There will be no difference in students' achievement

during the course of the intervention". The students made progress, though we do not know whether they made more progress than they would have done without the strategy, as this is a feasibility study rather than an experimental study.

B. School Number 2

Students	Pre-test	Ach-test	The change between pre-and post-test	F-Ach-test
S2/1	15	37	22	40
S2/2	23	45	22	48
S2/3	25	47	22	46
S2/4	18	40	22	43
S2/5	22	44	22	41
S2/6	20	42	22	50
S2/7	18	40	22	38
S2/8	15	37	22	47
S2/9	17	39	22	40
S2/10	17	39	22	43
S2/11	22	44	22	48
S2/12	23	45	22	48
S2/13	23	45	22	44
S2/14	23	44	21	48
S2/15	21	43	22	39
S2/16	19	40	21	36
S2/17	22	44	22	49
S2/18	17	39	22	45
S2/19	15	37	22	29
S2/20	20	42	22	47
S2/21	15	37	22	46
S2/22	27	48	21	50
S2/23	17	39	22	40
S2/24	16	39	23	40
S2/25	22	44	22	47
S2/26	14	36	22	41
S2/27	19	41	22	48
S2/28	15	38	23	43
S2/29	14	36	22	31
S2/30	16	37	21	37
S2/31	19	41	22	40
S2/32	22	44	22	50
S2/33	21	42	21	49
S2/34	20	42	22	42
S2/35	14	36	22	41
S2/36	19	40	21	50
S2/37	16	38	22	37
S2/38	9	32	23	35
S2/39	19	42	23	44

Table 5.5: Tests result, school 2

The results from the second school is shown below in Table 5.5 and figure 5.2; where S is the standard to students who were coded in numbers; Ach-test is the first achievement test (post-test 1); F-Ach-Test is the second (post-test). The total number of students who completed the tests is 39.

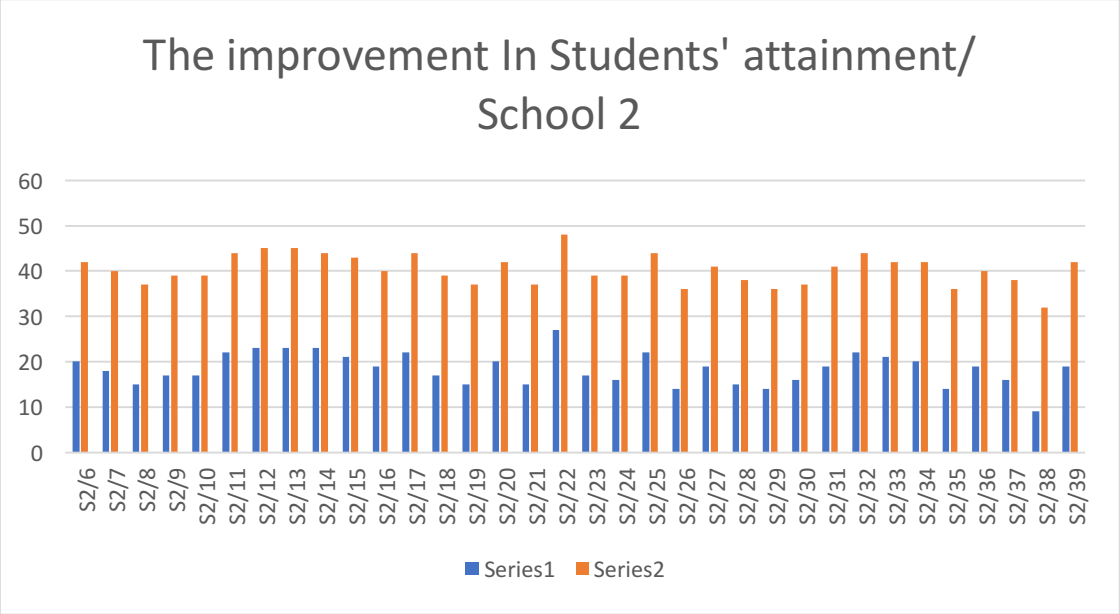

Figure 5.2: Tests result, pre- and post-test school 2

The result demonstrates similarity between the two schools. Both show that there are differences between pre-test and the two other achievement tests, which implies progression in students' outcomes after the applications of the SRPQ strategy.

		Pre-Test	Ach-Test	F-Ach-Test
N	Valid	39	39	39
	Missing	0	0	0
Mean		18.69	40.64	43.08
Median		19.00	40.00	43.00
Mode		15[a]	44	40[a]
Std. Deviation		3.686	3.513	5.353

Table 5.6: Test results Mean, Std. Deviation school2

Table 5.6 above displays that there is a large increase between Pre-test and Ach-test in terms of their means. This suggests that SRPQ strategy can be employed in classroom setting and affect students' outcomes in a positive way, which is not necessary but feasible.

As to School 1, I did a paired-sample *t* test to each of the three tests as was done in school 2; pre-test and the Ach-test (first post-test); the Ach-test and the F-Ach-test post-tests comparing means, standard deviations, and differences for each class separately and all classes combined, where the normality as measured by skew and kurtosis were fairly normal (see appendix G). See table 4.8 below.

Pair	n	mean	Std. Deviation	t	df	Std. Deviation Difference	Mean Difference	Sig. (2-tailed)
Pre-Test	39	18.69	3.68	-268.58	38	.51	-21.94	.000
Post-Test 1	39	40.64	3.51					
Post-Test 1	39	40.64	3.51	-3.65	38	4.17	-2.44	.000
F post-Test	39	43.08	5.35					

Table 5.7: *t*-test Pre-test and Post-Tests Means, Standard Deviations, and Differences for school 2

Table 5.7 displays the mean of correct responses for the pre-test and post-tests. The difference between the means is statistically significant for each test. For the pre-test and the Ach-test, a two tail paired samples t-test revealed that students in school 1 have shown an improvement after the implementation of the SRPQ strategy, where the post-test (m=40.64, s=3.51) was compared to the pre-test (m=18.69, s=3.68), and t (38) = -268.58 that p<.01.

Moreover, tables 5.6 and 5.8 also indicate that students continued to improve academically when they scored higher in their final exam, which has been revealed by paired samples t-test, where the final post-test (m=43.58, s=7.82) is compared to the first post-test (m=40.64, s=3.51) and t (38) = -2.44 that p< .01

Summary and reflection

The study evaluated the SRPQ strategy using the achievement tests, which were run on three occasions and two of them were developed for the research: (1) a pre-test, (2) a post-test and (3) a final post-test, the latter being normally administered by the school. Those tests in both schools showed improvement in students' learning outcomes. This indicates that the SRPQ strategy (Search, Read, Present and Questioning), where technology and collaborative learning are integrated, is feasible to use in the classroom in teaching history.

So, these tests reveal that students made progression academically in both schools separately, indicating that the SRPQ strategy is feasible for teaching history in classroom settings in Saudi Arabia.

5.2. Analysis of interview data

As the researcher, I conducted interviews with both students and teachers who participated in this study and posed a set of questions to them. These interviews took place at the beginning of the study. The purpose of posing these questions was to evaluate the current teaching and learning situation in schools in Saudi Arabia and to understand teachers and students' perception of the concept of critical thinking; how do teachers teach it? How do they use technology to support their teaching in the classrooms? and, what beliefs do they have towards critical thinking and technology?

The interviews carried fifteen questions in a written form, as recording was not permitted by the schools. Divided into two groups, the first group of the interviews comprised nine questions about critical thinking, and the second group comprised six questions about the use of technology in their school in general and in their classrooms in particular. The questions in the interviews were provided on sheets of paper, and each question was introduced and discussed. Each respondent then provided a written response to each question, whilst the researcher was taking notes. Six teachers in total were involved in the research: two of them undertook this study in their classrooms, and the

other four volunteered to give their views. A total of sixty-two students from both schools participated in the research.

With regard to the students' interviews, the researcher analyzed the interviews in steps to create quantitative categories for further analysis with SPSS. This approach was used just with students' interviews, as the size of data was large. But, there was no need to use this approach with teachers' interviews as there were only six of them. First, the researcher read through them in full, looking for patterns, differences and similarities. Second, for the students' interviews, the answers to each question were clustered in terms of similarity. Then, they were coded in categories for further analysis. In some questions, students' responses were listed under more than one categories, but those questions were analyzed separately. In addition, to be able to analyse them in SPSS, their responses were given a value, such as 1 for category 1, 2 for category 2, and so forth. Then, each category was given two values; 'Yes', if a student's response applied, or 'No', if a response did not apply (see table 4.15). Then, they were all brought together in one table (look at table 4.17). Thus, the total in these questions is greater than 100%. For example, in Q3: Why should we learn how to think critically?

The students' responses varied as follows:

1. *To have more information*
2. *To develop our ability to interact with each other and to be creative thinkers*
3. *To have good skills*
4. *Because it is a skill for this generation*
5. *To understand what is happening around us*
6. *To solve problems and identify the negative things*
7. *To learn how to think for ourselves*
8. *Because it is a skill for life*
9. *I don't think we should learn it*
10. *To improve our ability to judge, understand, and explain things*
11. *To correct our mistakes*

12. To identify our mistakes, critique them, and avoid them later

13. To help us understand others, access information and comprehend other views better

14. It is its time

15. It is the future

These responses were clustered into six main categories for this question:

1. Skills for life; as 3, 4, 7, 8, 14, 15
2. To understand things better as 1, 5, 7, 10, 13
3. To be able to judge and make conclusions by ourselves as 6, 7, 10, 12
4. To learn how to solve problems and deliberate over issues with others as 1, 2, 6,12
5. To correct our view as 11, 12,
6. We should not learn critical thinking as 9

Response	Frequency	Valid Percent
YES	23	37.1
NO	39	62.9
Total	62	100.0

Table 5.8: Skills for life

I explained previously how the interviews with teachers and students had been conducted, examined and coded. Here, I shall present the results of the interviews with teachers followed by students' interview.

5.2.1. Teachers' interviews

Teachers who undertook these interviews were six in total. All of them hold an academic degree and have more than ten years teaching experience. Their ages were over 35 years old.

GROUP 1: **Critical thinking questions**:

Q1: What is critical thinking?

Teachers who participated in this study apparently knew the definition of critical thinking, or at least their responses covered most of its aspects. However, knowing terminology does not mean one is able to handle it or use it comprehensibly. It should bring up the connection between words and concepts (Nosich, 2012).

'It is a deep analysis of information and ideas to either make a judgment or suggest a solution'

'It is the ability to weigh the information or views to reach the right decision'

'Look carefully for solutions'

'It is a set of skills required for deep understanding'

'It is that skill through which we reason all aspects of arguments'

Q2: Would you give an example from your experience?

All teachers gave spontaneous examples of how to cover this type of thinking in their classrooms, but they were not deliberately planned in advance.

'I asked students questions that required deep analyses'

'Usually, if the students reach answers, I will ask them how they got it'

'I use "why" a lot during the lessons'

Q3: Does the Holy Qur'an support this kind of thinking?

All stated that the Holy Qur'an promotes critical thinking, and they gave examples of that.

'The Qur'an always urges people to search for evidences'

'The Qur'an uses reasoning and dialogue for persuasion'

'The Qur'an exhorts us to think'

Q4: Can critical thinking be taught?

All teachers said, "Yes, we can teach critical thinking'. When they were asked "How"? they gave examples of "why" instead of "how", which is obviously irrelevant but related to the next question

(see Question 5 for examples). They realized the need for teaching critical thinking or thinking skills in general, but what they did not know was how to apply it. Some teachers thought they have to choose either to teach critical thinking or the content of the curriculum, in which case they could do both, since critical thinking and content are not overlapping or contradictory. However, each school has a student book that contains more than one hundred strategies to enhance thinking skills, of which teachers could choose, plan, practice and apply in their classroom.

Q5: Why should we teach critical thinking?

Most of the teachers mentioned that students should be prepared to face the challenges they would come across in everyday life. In this way, they will be able to distinguish facts from opinions.

'Teaching critical thinking helps a student to be a better person'

'Teaching critical thinking prepares students for the future'

'Teaching critical thinking assists students to face challenges they would come across in everyday life'

Q6: What is the benefit of learning how to think critically?

Most of the teachers mentioned some advantages to students in learning how to think critically.

'She would have her own view;

She will be able to differentiate between factual and fake news or information;

She will have the ability to make decisions'

Q7: What is the negative aspect of learning critical thinking?

Two teachers expressed their concerns about this type of thinking, fearing that this might lead students to be skeptical about everything in life, especially what they value most.

'It might lead to atheism'

'It could lead to scepticism'

Q8: Do you use critical thinking' strategy in your classrooms?

All teachers said yes to this question, but not all the time or in each class. However, they have not given any examples to illustrate their answers.

GROUP 2: Technology questions

Q9: Is technology available in your school?

The teachers said yes, technology facilities, such as Computers, Smart boards, and projectors, are already available in their schools. Most high schools in Saudi Arabia are well equipped with technology facilities, apart from the Internet that was mostly exclusive to the administration work.

Q10: Is it easy for you to use technology?

Teachers said yes, it is easy to use, though they regularly stumbled with some technical issues.

Q11: What kind of technology do you have in your school?

They gave examples of technology facilities available in their classrooms, such as Computers, Smart boards, and projectors. However, they did not mention the resources room that holds the richest resources of technology in the school, which indicates the lack of its use.

Q12: Do you get any support from the school when you encounter technical problems?

They said they often meet some technical problems, but they always get the technical support they need.

'I have all technology that I would use in my classroom'

'There is always an IT staff member to assist if I face any technical problems'

Q13: Do you use technology in your classroom?

They said yes, they use technology in their classes, but they did not clarify that. However, one of them mentioned that her use of technology depends on the subject she teaches and the strategy she selects.

'It depends on the subject and the strategy I picked'

Q14: What are the benefits of using technology in your classroom?

Most of the teachers thought that technology helps to save time and add elements of enjoyment and excitement to the class.

'Students are more interactive with the lessons'

'It saves my time'

'It makes lessons more enjoyable'

Q15: What challenges do you face when you use technology?

Technical problems and slowness of the Internet are the most highly challenges teachers face in daily school life.

'If I need to show something on the Internet, such as a video clip on YouTube, I have to bring my own router with me'

'Sometime, it just collapses'

'The Internet signal is too Weak'

5.2.2. Students' interviews

Analysis phases

As the researcher, I went through the responses and coded them in sentences so as to create quantitative categories and, thus, be able to analyze the data with SPSS for frequencies of responses. For example, when the researcher asked the students: "what is critical thinking?" the responses were varied. So, the researcher grouped them in terms of similarity to six types of responses, where each one has a unique number (see Table 5.9).

GROUP 1: Critical thinking questions

The purpose of these questions was to know the extent of students' perception of critical thinking. Questions included the following: do you think it is possible to learn critical thinking? and, is your school a good place to learn it?

Q1: What is critical thinking?

Table 5.9 shows that the students, at least to a reasonable extent, knew and could identify some aspects of critical thinking. The highest percentage of students (29%) indicates 'analyze information and make judgment', then 19% of them signified 'summarize and represent'. Yet, more than one-third of the students believed that critical thinking is a negative critique. Maybe that explains some student's behaviour during the lesson, as they were cautious to critique each other's work.

'Reflective and logical thinking'

'To be the odd one out'

'It is the kind of thinking that looks at the two sides of a thing'

Response	Frequency	Valid Percent
Negative Critique	15	24.2
Positive Critique	1	1.6
Positive and Negative Critique	13	21.0
Analysis information and make judgment	18	29.0
Give an opinion	3	4.8
Summarize and represent	12	19.4
Total	62	100.0

Table 5.9: What is critical thinking?

Q2: Does the Holy Qur'an support critical thinking?

Table 5.10 shows a high percentage of students who believe that the Holy Qur'an does support critical thinking. Only a few of them could give examples of relevant Qur'anic verses, e.g. (' *إِنَّ فِي ذَٰلِكَ لَآيَاتٍ لِّقَوْمٍ يَتَفَكَّرُونَ*") *'Indeed in that are signs for a people who give thought'*), while the rest of them said they 'don not remember'. Meanwhile, a few students thought the opposite view, and more than a third of them stated that they do not know. Most students who said 'No' or 'I do not know if the Qur'an encourages us to learn this kind of thinking' could not tell if they should or shouldn't learn how to think critically (look at Table 5.10).

Response	Frequency	Valid Percent
Yes	43	69.4
No	4	6.5
Do not know	15	24.2
Total	62	100.0

Table 5.10: Does the Qur'an support critical thinking?

Q3: Why should we learn how to think critically?

Most students thought they should learn how to think critically because it provides skills for life, to understand things better or to help them interact with others. However, over a quarter of them did not know why they should learn this kind of thinking (look at table 5.11).

'To improve the quality of our thinking'

'To help us understand and be aware of our mistakes'

Response	Frequency	Valid Percent
Skills for life	23	37.1
To understand things better	11	17.7
To be able to judge and make conclusion by ourselves	6	9.7
To learn how solve and deliberate issues with others	8	12.9
To correct our view	5	8.1
We should not learn critical thinking Don't Know	2 12	3.2 19.4
Total	67	108.1

Table 5.11: Why should we learn how to think critically?

Total is greater than 100% as some sentences included more than one reason.

Q4: What is the benefit of learning how to think critically?

Over half of the students associated deep understanding of information with the discussion of issues, as a benefit of critical thinking. (See table 5.12)

'We know our mistakes, and correct them'

'Self-development'

Response	Frequency	Valid Percent
To understand information in depth	16	35.8
To be able to evaluate resources	6	9.7
To be able to discuss issue that matter to us	12	19.4
To think for myself	6	9.7
To correct our view	6	9.7
To solve problems	4	6.5
Don't know	7	11.3
Total	67	101.9

Table 5.12: What is the benefit from learning how to think critically?

Q5: What are the negative aspects of learning critical thinking?

Table 5.13 below demonstrates that half of the students did not know if critical thinking has disadvantages or not, but more than a quarter of them thought it is challenging to society. '*You should have courage to be a critical thinker'*, one student specified.

'Maybe we hurt other's feelings if we become critical'

'Sometime, they misunderstood my critique'

'Become more personal'

Response	Frequency	Valid Percent
To be in doubt about everything	9	14.5
Challenging the society	10	16.1
Intolerance	5	8.1
Do not Know	32	51.6
None	6	9.6
Total	62	100.0

Table 5.13: What is the negative side of learning cortical thinking?

Q6: Do you think we could learn how to think critically?

Table 5.14 below shows that three quarters of the students believe they could learn how to think critically. Some said, '*if I practice it I could do it'*. However, most of them stated they need their teachers to guide them directly in this matter. The students who said 'no, we cannot learn how to think critically' explained that it is a state of mind, so it is matter of whether you have it or not.

'Our minds are able to improve and be trained'

'We have the ability to develop, but we need our teachers to help us find the right way'

Response	Frequency	Valid Percent
Yes	47	75.8
No	8	12.9
Do not Know	7	11.3
Total	62	100

Table 5.14: Do you think we could learn how to think critically?

Q7: Does your school teach you how to think critically?

Three quarters of students believe their school teaches them how to think critically, as shown in table 5.15 below. Nevertheless, some students consider that school is not the right place to teach or learn critical thinking and you should do it by yourself. Some said all what they had learnt in classes was just they had to memorize information then recall it in the exam, where the assessment method does not help make critical thinking authentic.

'We share ideas and information'

'No, we don't learn critical thinking, we just recall information'

Respons e	Frequency	Valid Percent
Yes	46	74.2
No	16	25.8
Total	62	100.0

Table 5.15: Does your school teach you how to think critically?

Q8: How is your school teaching you to think critically?

Almost two-thirds of the students thought that their school teaches them how to think critically, whether directly through their lessons, or indirectly through projects that are done outside school time. However, slightly under one-third of them thought that their school does not teach that kind of thinking. (See table 5.16)

Response	Frequency	Valid Percent
During the lesson, directly	9	14.5
Indirectly	33	53.2
By debate	3	4.8
They do not	17	27.4
Total	62	100.0

Table 5.16: How is your school teaching you to think critically?

Q9: Does your teacher use critical thinking strategy in your class?

Table 5.17 below shows that nearly half of the students believe their teachers teach them how to be critical thinkers by using strategies that promote critical thinking, like hot chair, one minute, and cause and effects. However, approximately half of the students held the opposite view, as they said that their teachers did not teach them this kind of thinking.

'When our teachers used teaching strategies, that would help us to learn

critical thinking'

'Our teacher takes our view into consideration'

Response	Frequency	Valid Percent
Yes	27	43.5
No	30	48.4
Rarely	5	8.1
Total	62	100.0

Table 5.17: Does your teacher use critical thinking strategy in your class?

GROUP 2: **Technology**

Q10: Is technology available in your school?

More than 80% of the students as shown in table 5.18 below stated that technology is available in their school. However, the students who said 'no' mentioned that technology is available in their school but not in their classrooms.

'In every classroom but not ours'

'We have them in each classroom'

Response	Frequency	Valid Percent
Yes	52	83.9
No	10	16.1
Total	62	100.0

Table 5.18: Is technology available in your school?

Q11: Is it easy for you to use technology?

Two-thirds of the students said 'yes', it is easy to use it, but the other third said it is not. The reasons behind their answers are that technology is not always working; it is slow or even inactive. (See table 5.19)

'We have computers in the resources room, which are easy to reach'

Response	Frequency	Valid Percent
Yes	42	67.7
No	20	32.3
Total	62	100.0

Table 5.19: Is it easy for you to use it?

Q12: What kind of technology do you have in your school?

The most common technology facilities available in schools are smart boards, which are fitted almost in every classroom, and computers that are fitted in the labs. On the other hand, tablets and projectors are the least available and used technology in schools. Students who mentioned tablets said they use it in the Math classes. (See table 5.20)

Technology facilities	Frequency	Valid Percent
Computers	49	79
Tablets	5	8.1
Smart boards	55	88.7
Projectors	8	12.9

Table 5.20: What kind of technology do you have in your school?

Q13: Does your teacher use technology in your classroom?

Most of the students as shown in table 5.21 said 'yes', our teachers rely on technology in their classrooms. Nevertheless, some students linked teachers' use of technology with the lesson's requirements. Some students who did not have technology in their classrooms said that most of the time the Math teacher brought her own devices.

'Most of the time they use technology'

'If a lesson needs it, they usually use it'

'The Math teacher brings her own'

Response	Frequency	Valid Percent
Yes	58	93.5
No	1	1.6
Rare	3	4.8
Total	62	100.0

Table 5.21: Does your teacher use technology in your classroom?

Q14: What are the benefits of using technology in your classroom?

As Table 5.22 below shows, most of the students find learning with technology easier and enjoyable (some students gave more than one response in relation to this question). A quarter of them mentioned that access to information at any time is one of the benefits of using technology in classrooms as well.

'The lesson is fun'

'Easy to get information that I don't know'

'I can collaborate with my classmates at any time'

Response	Frequency	Percent
Make learning easy	46	*74.2*
Enjoy learning	*26*	*41.9*
I have access to information at any time	*10*	*16.1*
The collaboration with other students more effectively	*4*	*6.5*
I learn at my own pace	*2*	*3.2*
Total	*88*	141.9

Table 5.22: What are the benefits of using technology in your classroom?

Q15: What is the down side of using technology in your classroom?

Nearly half of the students did not mention any particular disadvantages of using technology. However, more than a quarter of them stated that the difficulty of using technology in the classroom is due to the fact that some of their teachers simply lack familiarity with technology skills, or some of them came to the class unprepared, which led to a waste of the lesson's time. (See table 5.23)

'Sometimes, teachers don't know how to use it sufficiently'

'Some teachers come without proper preparation'

Response	Frequency	Valid Percent
Time consuming	3	4.8
Isolation	3	4.8
Hard to manage	11	17.7
Technical problem that occurs during lessons	6	9.7
No Internet	3	4.8
Health issue	3	4.8
Boring	2	3.2
Morally inappropriate	3	4.8
Neglected books	1	1.6
Confusion	2	3.2
Teachers lack of technology skills	2	3.2
None	29	46.8
Total	62	100.0

Table 5.23: What is the down side of using technology in your classroom?

Summary

This section is about interviews that had been conducted by the researcher with participants from among the teachers and the students. It seems that teachers are able to define the 'critical thinking' terminology to some extent, and some students were also able to identify some aspects of it. However, memorizing definitions or part of them does not mean students are actually able to grasp what these definitions reflect or they are able to use them comprehensibly. Nearly half of the students believe that their teachers did not teach them how to think critically. However, teachers thought otherwise.

High schools in Saudi Arabia seem to have an abundance of technology facilities. Most of them have a variety of technology devices, e.g. computers, interactive whiteboards and projectors. Also, every school, from primary until high school, has a resources room, which is considered the richest place equipped with technology facilities, and Internet access, though it is not widespread through all schools. All teachers and students agreed on this point. Teachers said they use technology in their classrooms. However, despite their apparent agreement with teachers regarding this point, some students see that most of their teachers either lack essential skills to use technology or come unprepared to use technology in the class.

5.3. Observations

For the research I also conducted unstructured observations during the lessons and focused on specific aspects of the lessons:

Lesson introduction: how did the teachers start her lesson? Did she motivate the students? How was the discussion?

The skill applied in the task: how did students respond to the task? Did they understand the skills that they were asked to apply?

Students' behaviour: how did students interact with each other in each group, with other groups and with the teacher?

Teacher's role: what did the teacher do during the lesson? and, what questions did she raise?

Technical issues: did the teacher face any technical issues? How were the issues tackled?

Researcher's observation of any problem, behavior, or anything usual in the class.

In this section, I will explain the first three lessons with regard to the following six aspects:

1) Lesson introduction

2) The skill applied in the task

3) How students behave

4) Teachers' role

5) Any technical issues faced during the session

6) Researcher's observation

The first lesson started by establishing a set of instructions that permit students to use SRPQ strategy. Then, students were asked to put these instructions in writing and put them on each table so that they will be considered in each session.

The first session

It was the first-time students had used a search engine to look for information required to answer their task questions in the classroom, though we believe of course they knew already how to use it but maybe not in a scientific or critical way. Therefore, after the introduction, I just explained the task to them and defined the skill that they are going to use. If the teacher asked the students to solve a problem without a proper instruction, the improvement will be little (Abrami et al 2008).

***Lesson introduction**:* In school 1, the teacher used to introduce her lesson by showing pictures, playing back a short video, or discussing some statements or news that may have spread in social media, such as Tweeter, Instagram, or Snapshat.

***The skill applied in the task**:* Evaluation of resources. What criteria make you accept or reject the source? What is the difference between facts and opinions? If you want to make an assumption about something or someone, what is the most solid foundation you can rely on? How would you know whether the source is biased or not? How would you judge someone if he or she is trustworthy or not?

Students' behaviour: The students were eager and enthusiastic to contribute to work within their groups, but they became slightly less excited as we moved on from the introduction. The dialog both within groups and with other groups was good.

Teacher's role: The teacher is mostly acting as a leader who directs the flow of the questions and the dialog across the class.

Technical issues: We experienced some technical issues relating to Internet in both schools. However, we gained support when needed.

***Researcher's observation*:** Students were more excited in the introduction phase than the rest of the lesson. That generally was due to the events taking place in social media, being more relevant to their interests and they have the knowledge that backs them up and consolidate their decisions regarding their agreements or disagreements or giving an opinion. That means the deeper the knowledge they have about something, the more critical thinkers they will be about it.

The second session

In this session, things went more smoothly than the first one. Students were more understanding of the SPRQ strategy, even though this session came after a midterm holiday.

***Lesson introduction*:** Review and refresh students' information about the SPRQ strategy and the unit that were studied. This also included an Illustration of the skill that they were going to practice.

The skill applied in the task: Observe the relationship between events, causes and the effects.

Students' behaviour: The interaction between students was more than good. They could distinguish between causes and effects. Few students did not participate in this activity.

***Technical issues*:** none

***Researcher's observation*:** The active dialogs between students made some of them feel peer-pressured, which caused to prevent them from expressing their views.

The third session

This lesson was the last one in the planning stage and the first lesson in a new unit.

Lesson introduction: A short video about what was happening in the Islamic world before the formation of the Ottoman Empire. Illustration about what and how concepts' maps could be used.

The skill applied in the task: Compare and Contrast + use concepts' maps. A concept map typically represents ideas and information as boxes or circles, which connect with labeled arrows in a downward branching hierarchical structure.

Students' behaviour*:* The students faced some issues of mapping their information, which they already acquired and critiqued each other about.

***Teacher's role*:** The teacher explained the skill once again and illustrated it with some examples.

***Technical issues*:** The Internet was a bit slow.

Researcher's observation: There was some hesitation on the students' side to critique each other's information, which is likely to be related to their belief that it is kind of a personal criticism. The age of the group ranged between 15 -17 years old. As teenagers, they are mostly likely sensitive to critique, which makes the situation understandable. We believe that they will pass that and get used to it.

5.3.1. Analysis of 'Lessons' Observation

Most of the time, students were able to reach complete information and reflect on their thinking about what they have read or done. The most common behavior noted among students was that they often gleaned their information from the first source that came up in the search engine, such as wikis, forums and blogs. Their behavior slightly improved through lessons. Students were able to express their perspectives freely most of the time.

In general, the dialog among students was good and positive, reaching to excellent when the subject is relevant to their daily life and interests, for instance, lessons 2, 5, 6, and 9 (table of lessons is provided in appendix) in ‘school 1’. Maybe this occurred because those lessons are a reflection on current events.

In regard to discussion in general, most lessons in ‘school 2’ were much motivating than in ‘school 1’. Maybe this was due to the nature of the lessons that were chosen for the study, and the neighborhood that the school was located in, which is considered mostly a well-educated upper-middle class community.

Most the time students hesitated to critique each other’s viewpoint. That was probably due to their young age, making them sensitive to critique in general, and to the concept that they carried out critical thinking. Students could be good thinkers if were taught how to do it. That leads us to teachers’ role and how they should be trained.

5.4. Participants’ Perspectives

After the research was finished, I asked all participants, both teachers and students, in both schools to have their say about this study in general.

5.4.1. Inspector’s perspective

The inspector was a specialist in the history subject, and she pays visits to the school regularly. She attended one of the lessons during which the strategy was applied, and after the lesson, I had a quick interview with her to explore her views about the study.

She had a positive view overall and noticed that the class was different and the students were motivated. She thought the strategy was new but would require more time to show noticeable results. On the other hand, this strategy depends largely on a good wide band Internet connection, which is not available throughout the whole school, making this strategy hard to apply in every class.

"Different class and motivated"

Each school in Saudi Arabia has Internet access, but not in the classrooms. There is a specialized area called 'resources room', which is under supervision of an IT assistant who provides technical support and advice. When needed, a teacher would be able to reserve the resources room for a class, and it would not be possible to apply the strategy without doing so.

5.4.2. Teachers' perspectives

Both teachers supported this strategy and were highly motivated to use it. One of them thought the students' thinking behaviour was positively changing thanks to using this strategy. The second teacher thought that this strategy should be generalized and used more widely.

"My students' thinking pattern which is reflected on their questioning was improving"

"We should use this strategy more"

They thought it was hard to use the SRPQ strategy on account that it is not accessible without a good Internet connection. They also said that a lot of preparation would be required, and teachers would need sufficient trained in order to be able to use this strategy.

"Not useful without the internet"

"Involves a lot of work"

"Teachers need training"

5.4.3. Students' perspectives

Most students thought the strategy is an enjoyable and a useful experience.

"It was a good experience and a change to normal routine to some extent"

"Good experience overall"

"It was a positive and useful experience"

"It was a change of routine and it was different from a normal classroom"

"It was an enjoyable and new experience for us"

Most students thought they learnt some new skills that helped them do their research more accurately and efficiently.

'I learnt how to research and use correct and credible sources"

"How to identify and recognise a credible source"

"I learnt how to present to peers and how to critique correctly."

They think this strategy enhance teamwork.

"Exchanging ideas and experiences was great"

"Presenting information and being involved in discussions showed that some opinions would clash, which was interesting"

Some preferred to work individually. The reasons is that some students do not collaborate effectively. They also thought that they would learn more and better that way.

"In a group, I wasn't allowed to research and write in depth as much as I would have liked to"

"The groups were not organized"

"Some students were not focusing on the given task"

Few students thought that this kind of learning, which they did not use to use it, would be “Boring” and “not practical”. They believed that some of this information is not required in their exams “*so why bother to know about them*”. This indicates the importance of exams’ type and how they should be prepared to effectively measure students’ thinking skills, such as making judgment, analyzing and critiquing, and not just testing their memory and recalling information.

Summary and reflection

In general, this experience had a positive impact on most of the individuals who precipitated in this study. This implies that it is acceptable and practical to use in Saudi classrooms. However, this has posed some problems related to the application of the strategy. The next chapter will address these problems in some detail under section 5.3. Wider issues will respond to one of the research questions: What are the problems of using technology in teaching critical thinking in Saudi classrooms?

5.5. Conclusion

This chapter discussed the study’s’ main findings. These findings are reflected in a combination of tests’ results, teachers and students’ interviews, observation of lessons involving students’ behaviour during the lessons, their interaction with each other within the group, with other groups and with their teacher. They also revealed the tests’ data to answer the main research questions, whether the use of ICT can be useful in teaching and learning thinking skills and critical thinking in Saudi schools. The study obtained data from three approaches that were undertaken in action research design. A new strategy called SRPQ was proposed that depends mainly on technology in teaching critical thinking. This strategy has been used over twelve weeks in two high schools, followed by doing achievement tests. These findings concluded that there was improvement in students’ achievement, and that this strategy is efficient to teach critical thinking.

The study’s results indicate that teaching critical thinking by using technology would be feasible in

Saudi schools' context, whereas the tests result shows improvement in students' academic progression. Also, students and teachers believed that critical thinking skills would be taught in the schools and the students will benefit from it to a large extent.

Summary of the findings

Research question	Data	Analysis	Conclusion
Are students successful in learning the curriculum when these strategies are being used?	Achievement tests	There is improvement in students scored	The strategy is likely adequate strategy to teach student their curriculum in classroom
Is the strategy practical to teach the curriculum?	Observations and interviews	The use of this strategy was in normal timetable infuse in history curriculum	The SRPQ is likely to be usable to teach the curriculum
Do teachers and students consider it as acceptable?	Interviews and participants' perspective at the end of the study	Positive attitude	Teachers and students believed The SRPQ is acceptable
What are the problems of using technology to teach critical thinking in Saudi classrooms?	The application of SRPQ strategy in Action research	Posed some problems	A successful implementation of this strategy, need several factors that work together in coordination

Table 5.24: Summary of the findings

The next chapter will discuss these finding in more detail and relate them to the current literature. It will also highlight the limitations of this study and suggests some recommendations for further study.

CHAPTER SIX: DISCUSSION

6.0. Introduction

The goal of this study is to propose and test a new strategy in education that relies on technology in a collaborative learning situation to teach history with critical thinking in a Saudi school setting. It sought to assess the extent of the acceptability and feasibility of this new strategy for both teachers and students. Students' success in learning the curriculum whilst engaging in activities designed to encourage their critical thinking was explored. This chapter reviews these approaches and activities and how they work together to enhance students' thinking in general and critical thinking in particular. This connects the research within the area of collaborative learning, technology, content and critical thinking teaching strategies.

The study raised four central questions to meet its objectives by gathering quantitative and qualitative data that was generated from the use of mixed methods selected for this research. Those questions are:

1. Is the SRPQ strategy feasible to use in classroom settings in Saudi Arabia?
    - Is the strategy practical to use in Saudi classrooms?
    - Do teachers and students consider it as acceptable?
2. Are students successful in learning the history curriculum when using this strategy?
3. What are the challenges in using technology to teach the history curriculum through critical thinking in Saudi classrooms?

This chapter intends to discuss the main findings presented in previous chapter. The aim is to address the primary research questions and relate the findings to the current literature and other

similar studies, whether Arabic studies (especially conducted in Saudi Arabia which can be found in the Appendix A), or other studies that focused on teaching critical thinking or using technology to enhance students' thinking skills and critical thinking. The purpose of the discussion is to understand the consistency of the results within the broader research, which might increase the validity of this study and underline any significant differences that might indicate the limits of applicability of earlier research.

This chapter addresses the following questions:

- What do the test results tell us?
- What do interviews and observation data tell us?
- What are the challenges identified through the research process?
- What are the limitations of the study?
- What are the recommendations regarding proactive and further research?
- What are the summary and reflection?

This study employed mixed methods to address the central questions to which the collaborative action research was the key approach, alongside with interviews and unstructured observation. The main findings of the research will be discussed here following the structure of the results chapter. First, we will discuss the tests' results to find out the significance of the collected data. Then, we will discuss the interviews, observation and participants' perspectives. Each item of the data will be followed by reflection on the research questions.

The present research is a multifaceted study that looks at the impact of a complex intervention that integrates different theoretical approaches to work together to support students' critical thinking in history in schools in Saudi Arabia. It introduced a new strategy using an action research approach that relies on technology within a curriculum context (history in this study) in a collaborative learning

setting. The utilisation of technology is at the heart of the proposed strategy SRPQ, where students were required to obtain a piece of information from Internet search engines, such as Google, Bing, and interpret it critically.

6.1. What do the tests result tell us?

As the researcher, I developed and refined with teachers a new strategy called SRPQ (Seek, Read, Present and Question) that depends on technology and collaborative learning to teach history with critical thinking based on an analysis of the gathered data. Following a pilot study and discussions with teachers and students, this strategy was applied to and integrated into nine lessons. Each topic covered three lessons in one cycle (plan, act, observe and reflect), and was discussed in collaboration with teachers in classrooms in two Saudi High schools for girls. Each stage of this strategy involved the use of a number of skills that we deemed essential to the process of critical thinking. In this SRPQ strategy, the letter 'S' stands for seeking information, which is a process that involves selecting resources, synthesizing useful data, and scrutinizing its reliability; the 'R' stands for reading, which involves reading, comprehending, simplifying, relating information, observing similarities, differences and contradictions, clarifying issues and making conclusions; the letter 'P' stands for presenting, which requires communication and self-efficacy; and 'Q' stands for questioning, which involves reflecting, thinking, risk-taking, sharing information and openness to changing views.

As both teacher and researcher, I believe that in order for learning and acquisition of skills to be effective, teaching needs to be explicit and requires skilled teachers who have the abilities to lead the learning activities. In each step of the implementation of this strategy, students were instructed to be aware of what they are doing and conscious of the skills they harness (look at table 6.1 below). Also, the discussion that originated from each phase of this approach provoked students' thinking so as to reflect on their activity. This facilitated self-correction and helped shaping their views accordingly concerning the question that had been posed. All that occurred in a collaborative learning

setting, which added more value to the SRPQ strategy, inspiring students to engage, enhance their motivation, generate more ideas, and deepen their understanding (See table 6.1).

Lesson	Critical thinking skills that apply in the lesson
First	Identifying and sourcing information, assessing its value, evaluating its resource and organizing it.
Second	Observing the relationship between events, causes and the effects.
Third	Analysing and evaluating claims.
Fourth	Comparing and contrasting information.
Fifth	Reasoning and interpretation of information.
Sixth	Summarizing information.
Seventh	Descriptive analysis.
Eighth	Simplifying, organizing and classifying information.
Ninth	Reaching a conclusion based on the gleaned information.

*T*able 6.1: Critical thinking skills that have been demonstrated in history

Before and after these nine lessons, which were based on the students' standard curriculum of history (in school 1) and humanities - the history part (in school 2), tests were conducted to measure and evaluate the students' learning outcomes.

The main findings of this approach were supported by the Achievement tests (pre-test, post-test, and a final curriculum test that was set by the schools) on three separate occasions.

The results are displayed below.

Test	Schools	N	M	Std.Dev
Pre-Test	School 1	26	12.58	3.10
	School 2	39	18.69	3.69
Ach-Test	School 1	26	35.12	3.73
	School 2	39	40.64	3.51
F-Ach-Test	School 1	26	41.58	7.82
	School 2	39	43.08	5.35

Table 6.2: Results tests

The above table shows statistically significant change between the pre- and post-test of achievement. This indicates that the students have markedly made progress during the undertaking of the research. This suggests that the SRPQ strategy can be used as a practical method to teach

history with critical thinking, as the students made progress during the intervention. It is applicable, practical and can be used within school curricula, though we cannot claim that the SRPQ approach was effective, without having a comparison group. The achievement test that is normally set by school also indicates that the students were successful in the curriculum tests. The teachers were generally pleased with the progress the students made and were satisfied with their test results, which helps to validate the pre- and post-test results. Again, we cannot conclude that the SRPQ strategy is more effective than the usual approach, nevertheless the students were successful at achieving the curriculum outcomes when the strategy was adopted.

Of course, it is not feasible to separate the different components of the SRPQ approach that involved a specific strategy formulated for both the teachers and students to use. This strategy comprised the use of the internet as a resource for obtaining information about some aspects of the history curriculum, and collaborative interaction in the classrooms. It seems likely that using technology had an influence on students' thinking in some way. For example, asking students to take responsibility for the sources they have consulted and encouraging others to challenge these sources may promote and boost greater critical thinking. However, it is not just about the technology; it is as much about how teachers as educators employ this technology to trigger students' thinking relying on inspiring activities and questioning.

Critical thinking is not a skill; there is not one aspect where students can demonstrate one skill that could be mastered on its own. It is a process of thinking and a set of talents in synthesizing specific pieces of information which build on each other; from the more straightforward abilities, as indicated in Bloom's taxonomy of learning (1956) and its revision (Krathwohl, 2002), such as remembering through understanding, to the more complex skills of evaluating and creating (Moseley et al., 2005). Students are faced with increasing amounts information that needs to be dealt with critically, which means they need to possess certain skills and abilities that will back them up. This study

demonstrates that aspects of critical thinking can be integrated in collaborative activities in history curriculum where students are encouraged to be critical about the sources that they use.

This indicates that technology can be a useful vehicle that supports the development of students' attainment and thinking in a positive way. However, the claim that the utilisation of SRPQ strategy to teach critical thinking is the only method or strategy that can influence and improve students' critical thinking is not what the study seeks to establish. Instead, as this is a feasibility study, I believe that the use of the SRPQ strategy in classrooms may be effective in teaching critical thinking and lead to improvement in students' performance, when teachers deploy it through carefully structured lessons and a selected technology. Overall, this study indicates the feasibility of the proposed strategy in Saudi classrooms. So, it can now be tested more rigorously to examine its success in delivering the aims of effective curriculum teaching, relying on technology, whilst developing critical thinking through collaboration. The result from the interviews show that about a quarter (25.8 percent) of the students thought their schools did not properly teach them how to be critical. This is according to some students' responses to one of the interview questions about whether their schools teach them to be critical thinkers. One of the students said, *'No, we do not learn critical thinking; we just learn to reproduce information'*. Also, the nature of the examinations does not help make an authentic assessment of critical thinking, even though there is often a statistically significant correlation between improvement of the standard tests of achievement and the development of higher order of thinking (Levine, 1994; Uresti, Goetz and Bernal, 2002).

From the observations in this study, most of the Saudi students were not able to analyse the arguments associated with that subject. They found it hard to do so; it was generally related to their context, but perhaps not to their particular interests. However, the students were able to demonstrate this ability when the general topic was relevant to their interest and existing knowledge. One example here was a story about the dentist who posted a clip on his Instagram account. He had imitated a song with nurses during their break, but during the official working day, leading to his dismissal from

his job. The teacher asked the students in the lesson's introduction: “Do you agree or disagree with this dismissal? And, why?” Students' evaluation of that situation varied; some thought he should be dismissed because he did not respect his work ethics'; others thought, it was during his break, and people should be allowed to do whatever they like in their own time.

“*Employees should respect the ethics of their work and unspoken culture”*

“It was rather fun”

“People should be allowed to do whatever they like, as long as they are at their break"

Reflection on the questions

I believe that a good teaching strategy and a skilled teacher can effectively deliver technology’s potential in a way that assists students to be successful critical thinkers. Obviously, the availability of technology itself is not sufficient; rather, it is how it is used. That could be found in many studies (for more details on these studies on chapter two). Some indicated a positive result not just on students’ critical thinking but also on their overall learning achievement. Some of those studies are related to technology, but others are not. This again suggests it is not technology, or even the strategy, but how it is used.

This study has demonstrated that the SRPQ strategy that relies on technology is feasible in Saudi classrooms and can be developed and applied. It is likely to be adaptable to other classrooms and schools.

6.2. What do interviews, observation and participants’ perspective data results tell us?

The study has used a range of methods to collect data in order to answer the research questions. It highlights the current situation in Saudi schools regarding the utilization of technology in classrooms and the methods employed in teaching critical thinking in that context. The data came from three

elements. First, interviews were conducted with both teachers and students to survey their viewpoints, attitudes and beliefs on the adoption of technology and critical thinking that took place at the beginning of the study. Second, unstructured observation was used for two purposes: 1) to triangulate the data that came from the interviews; 2) and to get deeper understanding of what has not been said in the interviews. These observations took place during the application of the strategy in each lesson. Third, participants' perspectives on the study and its strategy were gained at the end of the study.

6.2.1. About critical thinking

In terms of the definition of critical thinking, on the one hand, teachers who participated in this study were aware of its meaning, the skills associated with it, and the rationale and benefits of its teaching. However, they admitted a lack of knowledge and experience of how to apply these skills. Not only could they not give examples of how to do that (both teachers have more than ten years of teaching experience), but, based on the observations, most of time they were not used to asking questions that provoke students' high order thinking skills as well. Most questions were at lowest level of Bloom's Taxonomy (1956). Almost half of the students (48.4%) thought their teachers do not use strategies that help them think critically. Yet, teachers claimed otherwise. This might be due to the lack of training and support that would enable them to master these skills and exercise them in their lessons. It is perhaps not to be expected that teachers would master teaching' methods without receiving up-to-date proper training, as the schools are a unique dynamic setting in any particular culture. Of course, there are exceptions, and, very often, we can see teachers who seek self-development and keep abreast of changes, even after many years of experience.

On the other hand, most students were able to identify some features of critical thinking, indicating their ability to judge the extent to which their teachers use teaching strategies in teaching critical thinking.

Al-Tuwaijri (2015) in his investigation of '*Hadeeth'* (Prophetic Traditions) and '*Fiqh'* [Islamic Jurisprudence] describes two high school topics that teachers use in teaching critical thinking skills to students in al-Qassim region in Saudi Arabia. The study used a descriptive and analytical methodology to describe the teaching performance. Seventy-three of target teachers filled out a questionnaire. Twenty-four of them were observed in teaching '*Hadeeth'* and '*Fiqh'* to high school students in order to examine their actual performance. The findings of the study suggested that there was weakness in the teachers' interest in critical thinking skills. Despite that they theoretically understood the meaning of critical thinking skills, the observational findings showed the absence of exercising critical thinking skills in the teaching performance. However, the teaching performance of religious sciences' teachers has noticeably improved as the years of their experience increased.

Another interesting result comes from Darwish and Abu-Mahadi's study (2011). They found that the level of critical thinking skills integrated into the physics' curriculum was apparent. Yet, the students' level of critical thinking was poor overall, which may indicate the lack of sufficient strategies that teachers used to deliver the content. A fuller summary of other related studies can be found in Appendix A.

Further, interviews conducted by the present study revealed the teachers' and student's beliefs or attitudes toward critical thinking, which were mostly optimistic. Teachers recognized the importance of teaching students critical thinking skills, which aligned with their views that the Holy Qur'an promotes that kind of thinking. Although, students were aware of this significance, some of them did not realise whether the Holy Qur'an fosters critical thinking, which strongly affected their responses about whether they should or should not learn it. Those misleading assumptions were behind students' reluctance to learn this kind of thinking. Thus, teacher's responsibility was to correct these assumptions for those students.

Besides, the interviews revealed some worries that this kind of thinking may lead to atheism, which I can understand. In fact, critical thinking is a tool that can lead to a better understanding of religion and identifies the aspects of its beauty, which might reinforce one's faith. Hence, the teaching of critical thinking should not be simply ignored based on some unfounded fears that might or might not happen. This means, teachers, educators and even parents have a huge responsibility towards children to be able to be independent thinkers, especially in this age of technology where Islamophobia is increasingly widespread. Students should learn to hold their own beliefs, defend them and be able to represent them (more details about critical thinking in the Holy Qur'an is found in Chapter one, section two p. 5-18).

6.2.2. About technology

Schools were equipped with technology facilities (e.g. smart boards, computers and projectors) and these were available for both teachers and students, which should encourage teachers to use them in their classrooms. Both teachers and students agreed that most teachers use technology in their lessons, yet, nearly half of the students (46.8) believed that their teachers lack the skills that enable them to utilize technology sufficiently. This emphasizes the need for continuous training for teachers in order to overcome these practical obstacles.

Both teachers and students held positive beliefs regarding technology. They value the importance of technology integration into classrooms to boost teaching and learning. However, it seemed that teachers needed constant support to use technology effectively, as they often faced common technical problems in the classrooms. In addition, the weak internet signal appeared to be a common problem, besides a fixed Internet access is not widely available in classrooms in the schools. Mainly speaking, studies, such as in Almubdel's study (2010), showed that most teachers hold a positive attitude toward technology, though they were aware of their pressing need to be trained.

6.2.3. Reflection on the results:

- ✓ How do teachers utilise technology to teach critical thinking (if they do)?

Most teachers do not use technology in teaching critical thinking, but they use it in most of their classrooms.

- ✓ Do teachers fully understand the meaning of critical thinking?

Most teachers in this study - and other studies too - showed in theory that they recognise the meaning of critical thinking and identified some of its aspects. Yet, in practice, they demonstrated conspicuous lack of it, implying their essential need to continuous training.

- ✓ Do they use technology in their daily classrooms?

Most teachers in this study and other studies displayed the basic but not adequate ability to use technology, which signifies their compelling need to frequent training and support in this area.

- ✓ What beliefs do they have toward critical thinking and technology?

Most teachers in this study and other studies embraced a positive attitude toward critical thinking as well as towards the use of technology. They also recognised the need to adopt technology in order to prepare students properly for the world of today. Thus, the SRPQ strategy proposed in this study would be largely acceptable for both teachers and students in Saudi school setting, as they adopted a positive stance towards it during the conduction of this study.

6.3. Wider issues

One of the questions that was posed in this study was to see whether the use of technology in teaching critical thinking in Saudi classrooms and the use of the strategy, which relies entirely on the use of technology, was practical and realistic. I located some issues that could affect the use of technology to teach critical thinking, which will be discussed in more detail below.

6.*3.1. Technology*

Technology must be adequately available to use in classrooms. For example, in this study, it was not enough to have technology in the classes, but it also needs to be connected to the Internet because, without it, our study would not have been able to apply the 'Seek' strategy. Although most schools in Saudi Arabia are well equipped with technology facilities (such as computers, interactive boards and projectors) internet access was mainly exclusive to administration work. The only classroom in both schools that had an internet connection was the resources rooms, which were not available for every classroom or teacher. As a result, teachers had to bring mobile routers with them if they intended to have Internet access in their classes. With regard to our study, schools were very cooperative with us and fitted us in the resources rooms' timetable. However, the capacity of the resources rooms was not ideal to accommodate all students and limits access to when the resources rooms can be timetabled.

The wide range of studies confirmed the positive impact on students' attainments or on their critical thinking skills when the class makes use of technology facilities. For example, the results of the New Hampshire's Brewster Academy project (Bain & Ross, 1999) indicated a rise in student's scores after the integration of technology into classrooms. Further, according to the Centre for Applied Special Technology (CAST), researchers who evaluated the impact of using the internet on student performances affirmed that the students who have access to the internet and school's network carried out better projects than their peers who did not have Internet. This impact is not just on students' achievement but also on their critical thinking ability and their development of independency in critical thinking (Coley, Cradler and Engel, 1997. See also, Al-Ganim at el. (2006), who conducted their study in a private school in Riyadh in Saudi Arabia, implemented technology facilities including computers, internet access and other devices across the whole school). They utilised new teaching strategies associated with technology that relied on creative thinking and seeking information instead of traditional approaches of presentation and memorisation. Remarkably, that research had a positive impact on both teachers and students.

Furthermore, there are other studies whose results related to the use of technology and the improvement of students' critical thinking, e.g. (Rathakrishnan, Ahmad and Suan, 2017; Barahmeh and Barahmeh's study, 2013; Garor and Amosh's study, 2013; Khawaldeh and Tamemy's study,2012; Campbell's study, 2000) as explored in Chapter 2.

6.3.2. Learning environments

Learning environments should accommodate a set of elements, including the classrooms capacity, that optimise students' ability and enable them to learn with comfort and fun. As we mentioned before, we used the resources rooms in our study that were not ideal with regard to their capacity. In both schools, the size of classrooms was almost acceptable, especially school 1, where the students' number was reasonable (28 students). But, when we moved to the resources room, it was hard to fit and organize the groups there smoothly, as we wanted them to work collaboratively. This became even harder with school 2, where the number of students was quite large (40 students).

Also, an ideal learning environment for students involves a favourable psychological atmosphere; it is supportive, helpful, caring and assisting them to shape their personality, way of thinking, interaction with each other and with teachers and to enhance their learning progress. Therefore, many psychologists underlined the importance of looking closely at the social climate that teachers create in their classrooms, and whether that climate is likely to be persuasive or dissuasive to learning (Greenwood, 2002).

Abdul Mohsen Almubdel (2010) aimed to identify the relationship between the positive component of classroom environment and critical thinking skills among high school students in Riyadh, Saudi Arabia. The sample of the study included 1212 students. A pre-test and a post-test that were an Arabic adaption of WGCT-SF test were used. The positive components of classroom scale were developed in light of Murray's theory of environmental pressures and psychological needs, i.e.

participation in classroom decisions, social support, learning process engagement, clarity of standards and self-direction. The study found that there was statistically a positive relationship between the positive component of classroom environment and critical thinking skills. There were no differences on those components regarding the subject (Math or Grammar).

In the present study, students were able to engage in class decisions making at each stage of the application of strategy, and their views were taken into account (e.g. adding more time to the main session). Also, we established clear standards that would be followed either in relation to the proceeding of their work or the methods of assessing the outcomes. Students had all support that would be needed to work freely and safely, and most of the time they were able to direct themselves and express their views independently.

6.3.3. Teachers' skills

Teachers' skills enable them to utilise technology effectively and to be critical thinkers themselves. It is not sufficient for them to be able to define critical thinking or know technology, but they must be able to demonstrate these skills and integrate them in their classrooms. We cannot expect students to possess the skills of critical thinking while their teachers lack them, for good questions that come from teachers have great influence on students and inspire them to think (why), consider (how) and reflect on their thinking and thoughts. Cave's study (1992) that investigated the impact of teachers' behaviour and critical thinking disposition on Students' Critical Thinking asserted that high level of teachers' critical thinking would influence students' attainment positively, while low teachers' critical thinking would deploy a teachers-centred approach to students. Further, Stodolsky (1985) indicated that students will rely on being told what to do if the teachers apply self-centred methods.

This issue can also be seen in Taghva, Rezaei, Ghaderi and Taghva's study (2014) that attempted to examine the relationship between teachers' critical thinking and students' educational

achievement. It revealed a significant relationship between teachers' critical thinking and students' educational achievement. This suggests that the more critical thinking the teacher become, the more students' outcome might be boosted.

The teachers who participated in this study were positive about teaching critical thinking. They valued the use of technology and were eager to learn and adopt new strategies, despite acknowledging they needed support. Several studies emphasized the importance of teachers' training in Saudi Arabia. For instance, Almajed (2013) observed 40 chemistry teachers in high schools in Riyadh to find out the extent of their utilization of critical thinking skills in their teaching. He concluded that most teachers were at the middle level of the critical thinking utilization, whereas experienced teachers were more inclined to employ those skills in their teaching. Similar studies investigated the extent history teachers' exercise of critical thinking skills within their teaching. Most of those studies, in Jordan (e.g. Obeidat, 2007; Khraysha, 2001); in Syria, (e.g. Soliman, 2010); in Qatar, (e.g. Binali, 2001); and in Saudi Arabia (e.g. Al-Hamdi, 2014) showed indications that teachers' performance in this regard was below what might be expected, especially in terms of experience, though they were theoretically aware of most of those skills.

6.3.4. Good questions

Good categories of questions provoke students' thinking and help develop their critical thinking. Among these categories are well-planned and carefully designed questions; questions that enrich dialogues and encourage students take other views into account; questions that ignite ideas and reveal students' assumptions, beliefs and attitudes; and questions that inspire students to learn, develop and improve their skills and boost their knowledge in order to prepare themselves for the future life. Paul and Alder (1999) determined a wide range of strategies that are useful to teach critical thinking, and among these strategies is asking questions. A good question is not just only for teachers to ask, but students too should be trained to ask good questions. It may start with pointless ones, but with time, it will improve. It assists students to be self-checking whether the material is understood or not (Ciardiello, 1998). Research conducted by Manzo (1969, 1970) involved a method

or strategy called the ReQuest, which is an abbreviation for mutual questioning, a procedure in which the teacher and students take turns in asking and answering each other's questions about a reading or picture. Then, Ciardiello adapted this strategy to involve formal training and the use of procedural stimuli in the forms of signal word cues and question type facilitators (Ciardiello, 1998). He believed that this type of strategy, such as the ReQuest (which is designed to train students to ask good questions) is an appropriate strategy for teaching cognitive and metacognitive skills because it is a form of language instruction that serves the expansive range of thinking process (Ciardiello, 1998).

6.3.5. *Sufficient methods or strategies*

Sufficient methods or strategies enable teachers to deliver critical thinking' promises successfully. A considerable number of studies in Arabic and English have outlined new techniques to teach critical thinking in schools. Some of those techniques emphasized the use of technology, while others did not. However, to switch to or adopt new methods or strategies that teachers are not used to using them needs holding a positive attitude and belief on the part of teachers.

SRPQ strategy evaluation

The most important goal for teaching and learning is not just the application of the strategy into classroom, rather it is how the students engage with it and what benefits they gain from it. Hence, it is essential for a teacher not just to focus on the strategy (though a profound understanding of the strategy is important as well), but on what learning habits and behaviours were imparted and what skills the students have developed. Thus, teachers could write down or display in front of the students in each class what goals or skills for that lesson are being taught, which might help students to know what is expected and help teachers keep control over the direction of the lesson, checking during the class to see if a specific approach or strategy is working. If it is not, they might make some adjustment when it is appropriate. This approach is not yet common in Saudi schools

There are many ways to evaluate any strategy or teaching approach. In this study, we have used student evaluation and feedback as one approach of evaluating, which offers a rich and valuable

source of information. Most of the students had engaged with SRPQ strategy effectively, especially in the early stage of the application of the strategy, which we believe because it was new for them. They perhaps became used to some techniques, even saying that they sometimes get bored. This suggests using a variety of strategies is helpful to keep students on track and not just focus on one technique or approach all the time. Overall, most of the students showed a positive attitude toward the strategy.

Students are different in terms of their prior knowledge, experience, and their cultural values, which will affect their evaluation of the sources or information they read whilst using the SRPQ strategy. Students had to search for information from the Internet to respond to their tasks. In retrospect, it would have been helpful to spend more time on giving students the opportunity to explain their views and choices on that matter and whether they do or do not agree with information in a text. This might help students expand their views, change, adjust or justify what they already think they know.

To sum up, students must know from the start *what* they are doing, *how* they are going to do it and *why* they are doing it. This means encouraging them to reflect on these questions in terms of what they are learning so that they can enhance their critical thinking as they engage with the subject that is being taught.

6.4. Refection on research's questions

1. Is the SRPQ strategy feasible to use in classroom settings in Saudi Arabia?

    • Is the strategy practical to use in Saudi classrooms?

According to the results of this study, teachers who participated in this research were able to use and integrate the SRPQ strategy within their lessons and fit them in same duration of daily schools' timetable. They were also able to give feedback to the students and guide them through it, indicating the practically of this strategy. The teachers were able to bring their own routers to have Internet access in the classrooms, in terms of their affordability and convenience of carrying them. This

means that the Internet must be effectively available to every place in the school and easily accessible for teachers and students.

Further, this strategy was infused in one of the schools' curricula (history). As the results (observations and interviews) showed, there was a noticeable improvement in students' performance, and they were able to reflect on their learning activities as well as on others'.

- Do teachers and students consider it as acceptable?

The results of the study (Interviews) reflected a positive attitude towards the SRPQ strategy. Students were active when using it, despite their hesitation in the first lesson. Teachers thought it was a motivation strategy and it had an impact on students' behaviour afterward. However, they thought it was not easy to apply because of the required preparation and the limitation of the Internet connection.

1. Are students successful in learning the curriculum when this strategy is used?

This strategy was infused in one of the schools' curricula (history). As the results revealed, there was progression in students' performance during the course of the research, and teachers noted signs of improvement in students' reflection on their learning activities.

2. What are the challenges in using technology to teach the history curriculum through critical thinking in Saudi classrooms?

Based on the results of the present study, the use of technology in the classroom to teach critical thinking is not an easy task; it needs a number of elements that work together, as the classroom is a dynamic setting of complex and dynamic interactions that keep changing. There are many elements arising from this study, which work together in a complex way and should be considered in developing the approach. These elements are related to technology, the learning environment,

teachers' skills, effective questions, as well as appropriate methods or strategies. A further analysis of these elements can be found in this chapter, section 5.3 (Wider issues p. 244-249).

6.5. Challenges

Most the Saudi' teachers are not familiar with educational research in their teaching. Thus, the biggest challenge I have faced was to persuade teachers and encourage them to take part in this research. They see it as laborious for them and additional to their usual work, though the Ministry of Education supports and gives researchers access to schools and urge teachers to cooperate with research students. Further, the Internet as well constituted another challenge for this study, as it was not stable or available in all classrooms.

6.6. Limitations

The research in this study was an attempt to gain an insight into classrooms in Saudi Arabia: how technology is used, and how critical thinking can be taught and infused into the teaching of the curriculum. Then, it proposed a new strategy to teach critical thinking using technology, which was explored following a broad action research approach. Overall, the study is a small-scale feasibility research to examine the suitability of the approach in Saudi classrooms. However, this research does not attempt to generalize its findings to a wider population for many reasons. First, it was conducted at a small scale. It covered teachers and students from two high schools (two teachers and sixty-eight students), which obviously does not represent the whole population of Saudi schools. Second, it was limited to girls' schools, where access to boy's schools is not permitted to a female researcher (Saudi' schools are gender-segregated). Third, the nature of collaborative action research itself; McNiff (1994) claims that action research's validity is not about methodology; rather it is concerned with personal and interpersonal issues. However, Turnock and Gibson (2001) debate that it is often about the failure to examine the relationship between the theory and practice of data collection, as the action research focuses more on practice than on the theory.

In addition, this study was limited to a specific period of 12 weeks, which is the duration of the research application. Indeed, this period is not sufficient to verify the effectiveness of any educational strategy, and as is wellknown, the development of critical thinking needs a relatively long time.

Another limitation of this study was a concern about the sample selection. The choice of the study's sample was not random due to two aspects. First, action research does not usually deal with random samples or manipulated variables. Second, the study depended on the willingness of the participants, with regard to schools and teachers. As the researcher, I did not play any role in the sample selection of the classes and teachers involved.

Further, there was another limitation concerned with the research design, as the research used the action research as the primary method. This means there was no comparable (control) group to verify the findings of the study. In addition, the selection of schools was based on the curriculum available in the schools, where each school had one class that selected history in their timetable that term.

6.7. Recommendations

- As this research was an exploratory collaborative action research project investigating the feasibility of the SRPQ approach in Saudi classrooms, it was limited to a specific time. Changing pedagogy and developing critical thinking skills take a relatively long time. Therefore, it is recommended to re-conduct this study adopting a longitudinal approach to develop a strong claim about the feasibility of the proposed strategy being used into classroom.
- Teachers are responsible for the interpretation and delivery of the curriculum. Therefore, the emphasis on teachers' training is of paramount importance for education. Training should involve both strategies that enhance students' critical thinking skills and the ability to using technology sufficiently.

- It is significant to encourage research teaching in practice in order to increase the quality of teaching and learning and raise awareness about its importance among teachers and educators.
- Adequate fast Internet access must be provided in schools for teachers and students alike. However, it must be safe and restricted to use for academic research.
- We need to identify or create several areas of the curriculum that are useful, rich and varied, which can be related to most standard curricula, then arrange them in a sequence to create a series of exciting, stimulating and interesting tasks in order to motivate students to tackle them. This will help provide a space for teaching critical thinking, which is cumulative over time. (Craver, 1999). In History, this might be mapping tasks from ancient time to the present day according to the curriculum, or it may mean infusing thinking from simpler to more complex problems, such as in Mathematics.

6.8. Summary and reflection

Students may not be familiar with information, news or ideas that they receive for the first time. The reception of unfamiliar piece of information could lead to a misconception, as people sometimes tend to form opinions and adopt views prematurely. Critical thinking works as a filter to protect students against taking information, ideas, and knowledge at face value without reasoning and testing it for evidence, evaluating others' arguments against their own, or distinguishing between facts and opinions. Teaching students how to be critical thinkers benefits them not only in their study in schools but also in their life outside schools. Students should receive the strategies that equip them with the capability to build conceptual frameworks within which these strategies become the effective reference to distinguish between plausible and implausible arguments and correct erroneous statements. In doing so, they will have a distinctive understanding of ideas.

Further, teachers are the key elements in the education process. They know what works and what does not work. Therefore, efficient preparation of teachers and providing them with effective training and support would make a difference in students' thinking and learning over time. Al-Baqalani (1012) in his book *Inimitability of the Qur'an* "إعجاز القرآن" said that if people value something, follow it and compete in emulating it, as this thing becomes instinctive.

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Appendix A: Studies from Arabic-speaking countries

In preparation for the research I reviewed some Arabic studies concerned with how critical thinking should be taught, some involved technology and others focused more on critical thinking test. Further, there is an exploration of the similarities and differences between those studies and the present one. The purpose of this step is to identify the gap the current study could fill in the literature in terms of how it might relate to their findings.

There are two groups of studies: the first group is an Arabic's studies which they put in order from the newest to the oldest and the second one is non-Arabic studies that fit with the classification 'Other relevant studies', also organised from the newest to the oldest which also related to teaching critical thinking or improve it. Then I classified them into three categories: the first one is what kind of CT tests they used, the second one is how they apply their study and the third one is what strategies they used.

Some studies are more helpful than others in term of their approach or their results. However, each one helps to some extent to shed light on the current study.

- Ashraf's study (2014)

This work discusses the effectiveness of a program to develop critical thinking using the cognitive strategies and meta-cognitive skills among middle school students. The sample of the study consisted of (72) students (males and females). The researcher used several strategies, such as problem solving, brainstorming, concept maps, dialogue and discussion and thinking aloud. Also, he used pre-test and post-test for the critical thinking, which are an Arabic adaption of Watson–Glaser Critical Thinking test. The study concluded that the experimental group significantly performed better than the control group.

- Al-Hamazani's study (2013)

The main emphasis of this study was on measuring the impact of designed curriculum in 'doctrine' subject that infuses critical thinking skills into the main subject on students' critical thinking. He used experimental methodology, critical thinking test that was an Arabic adaptation of The Watson–Glaser Critical Thinking, and the achievement test. Pre-test and post-test were applied in his experiment. Al-Hamazani concluded that teaching critical thinking skills within a careful designed curriculum would lead to improvement of students' critical thinking, as the experimental group showed positive scores for both tests.

- Al-Harbi's study (2013)

The aim of this study was to measure the impact of the use of multimedia in the teaching of social studies course on the development of critical thinking skills and the trend towards the curriculum among the first-grade in the middle school students in Jeddah. She utilised pre- and post-test for critical thinking test, which is an Arabic adaption of Watson–Glaser Critical Thinking test. The study concluded that the experimental group performed better in both their critical thinking test and a positive disposition toward their subject.

- Nabeel Barahmeh and Haytham Barahmeh's study (2013)

This study aimed at exploring the effect of computer-assisted learning on the first graders achievement in social and citizenship education. The sample of the study consisted of (2) classes for males and (2) classes for females, which were randomly divided into (2) groups. First, an experimental group of (46) students, which was divided into a class of (17) males and a class of (29) females. This group was taught through the Computer-Assisted Learning. Second, a control group of (44) students, which was divided into a class of (25) males and a class of (19) females. This group was taught through the traditional method. An achievement test was prepared by the researchers according to the purpose of the study. The test was administered before and after the treatment. The results of the study showed that there were statistically significant differences (α=0.01) in first graders achievement (In favour of experimental group), and that there were no statistically significant differences (α=0.01) due to gender.

- Al-Dhafiri's study (2013)

This study aimed to teach history to 11th grade students using dialogue and discovery strategies. It measures the impact on students' critical thinking and their achievement afterward. The sample of the study consisted of (3) classes (each class consists of 19 students): two of them were a treatment sample (one was taught by dialogue strategy and the other one was taught by discovery strategy), and the third one was taught by the traditional method. They utilised pre- and post-test for both critical thinking test (an Arabic adaption of Watson–Glaser Critical Thinking test) and achievement test. The results signified a difference between the experimental groups and the control group in critical thinking skills and the students' achievement in favour of the experimental group.

- Al-Maqdami's study (2012)

The research aims to identify the impact of the strategy of cognitive contradiction in the development of critical thinking among high school students in history. The researcher used an experimental method. Two groups of students were formed; each group was 31 students. He utilised pre- and post-test for both critical thinking test (an Arabic adaption of Watson–Glaser Critical Thinking test) and achievement test. The results signified a difference between the experimental group and the control group in critical thinking skills in favour of the experimental group.

- Khawaldeh and Tamemy's study (2012)

This study aimed at investigating the effect of using computerized instructional package on the immediate and postponed achievement of the sixth primary grade students in Islamic jurisprudence concepts. The study sample consisted of (141) students. The researchers developed a multiple-choice test to measure the impact of immediate and postponed achievement. The study showed the following results: There was a statistically significant difference at ($\alpha = 0.05$) in the immediate and postponed achievement in Islamic jurisprudence concepts for sixth grade students in Islamic Education due to the method of teaching for the benefit of the group that used the computerized instructional package in their study. Also, there was no statistically significant difference at ($\alpha = 0.05$) in the immediate and postponed achievement in Islamic jurisprudence concepts for sixth grade students in Islamic Education attributed to gender, and the interaction between teaching method and gender.

- Mervat Araam's study (2012)

In her study, Araam aimed at determining the impact of using of K.W.L. strategy on acquiring concepts and skills of critical thinking of the "science subject" for the seventh-grade students. She followed the experimental method. The study was applied to a target sample of (97) female students from the seventh grade in Palestine (Khan Younis city). The study sample was divided into two groups: the experimental group of (48) students, and a control group of (49) students. The results revealed that there were statistically significant differences at level (0.05) between the experimental group and control group in the scientific concepts test in favour of the experimental group. Moreover, there were statistically significant differences at level (0.05) between the experimental group and control group in the skills of critical thinking test in favour of the experimental group.

- Ali's study (2009)

The study aimed to identify the effectiveness of using guided-discovery and brainstorming on the development of critical thinking skills and students' achievement in Islamic Creed (*'aqeeda*) curriculum in high school in Tabouk. The study sample consisted of 199 students who were divided into three groups. Each group had been taught critical thinking skills by a different approach; the first group by the guided-discovery method, the second by brainstorm approach and the last one, which was the control group, by the traditional approach. Pre-test and post-test was applied for both tests, i.e. achievement test and critical test, which is an Arabic adaption of WGCT-SF test. The study concluded that the students who were taught by using guided-discovery and brainstorm scored better than the students who were taught traditionally in both tests. Further, the students who were taught by the brainstorm strategy scored slightly better than the group who were taught by guided-discovery strategy in the critical thinking test.

- Hailat et al. study (2009)

The aim of this study was to investigate the effect of using historical documents on the critical thinking of 10th grade students as compared to using traditional methods. A random sample of 165 students

was selected from the First District of Irbid, Jordan. The experimental group consisted of 81 students, who were taught via using historical documents, whereas the control group consisted of 84 students, who were taught using the traditional method. The results of the study indicated significant difference ($\alpha = 0.05$) between the experimental and the control groups in favour of the experimental group.

- Al-sharfy's study (2009)

The study used qualitative and quantitative methods to identify the critical thinking skills utilised in studying the Holy Qur'an then employed them as a baseline to teach critical thinking in 'Hadeeth' subject in middle school in Makkah. The researcher used both pre-and post-test for both tests, the achievement test and critical thinking test which were developed by Mohammed Al-sharqi. A group of (55) students participated in the experiment. They were divided into two groups: 27 as an experimental group and 28 as a control group. The researcher identified 18 skills in studying the Holy Qur'an that are associated with critical thinking. He observed that there was a statistically positive outcome in both tests in favour of experimental group students.

- Ameen's Study (2008)

This study aimed to determine the effectiveness of the role-sharing strategy (Kagan's strategy) in the development of critical thinking skills in history in one of the high schools in Al-Madinah, Saudi Arabia. The sample study consisted of (64) students. The researcher used pre-test and post-test for achievement test and critical thinking test, which are an Arabic adaption of Watson–Glaser Critical Thinking test. The study concluded that the experimental group performed better than the control group. Further, the study highlighted the importance of teachers training and the use of diverse strategies in teaching critical thinking, especially those strategies associated with collaborative learning.

- Al-Otaibi's study (2007)

This study aimed to explore the effect of using CoRT thinking program for the development of critical thinking skills and the achievement improvement among a sample of high school students in Riyadh, Saudi Arabia. In order to achieve this goal, the CoRT thinking program (De Bono, 1998) and the Critical Thinking Scale (Al-Shargy, 2005) were applied on (40) male students from the 10th grade.

The students were divided into two groups: an experimental group and a control group. The researcher used the experimental method. The results signified a difference between the experimental group and the control group in critical thinking skills in favour of the experimental group. No difference between the experimental group and the control group was observed in the academic achievement. In addition, the study offered a number of recommendations, one of which was the development of curriculum contents, which concentrates on improving thinking skills in general and critical thinking skills in specific. The second recommendation was to prepare teachers through training sessions in order to develop different thinking skills and adopt positive attitudes towards evaluative questions.

- Al-Shebel's Study (2006)

The study aimed to measure the impact of the use of cognitive thinking strategies through the World Wide Web (Internet) on the learning achievement and the development of higher thinking skills among female students of mathematical programming course at King Saud University. The researcher used an experimental method. Two groups of students were formed; each group was 31 students. She utilised pre- and post-test for both high order thinking skills test and achievement test. The results signified a difference between the experimental group and the control group in high order thinking skills in favour of the experimental group.

- Al-Jaff's study (2005)

The aim of the research is to find out the impact of the use of short reports with current events on the development of critical thinking among third grade students (pre-servers teachers) in History. She utilised pre- and post-test for both of the critical thinking test (an Arabic adaption of Watson–Glaser Critical Thinking test) and achievement test. The results signified a difference between the experimental group and the control group in critical thinking skills in favour of the experimental group.

- Nawal's study (2005)

The aim of this study was to measure the impact of using the ‘exploring’ strategy to improve students’ critical thinking and scientific concepts in biology subject in two Saudi's high schools. In each school, the sample students were divided into two groups: a control group and an experimental group. The researcher designed a unit based on the student's curriculum with some modification to make students more exploring and inquisitive. The pre-test and post-test had been used. This study concluded that the experimental group performed better in each school in both their achievements test and critical thinking test. There was a positive correlation between students' achievement test and critical thinking test as well. Additionally, this study recommended teaching strategies' improvement, especially those linked to technology, training teachers and encouraging them to adopt new strategies in teaching their students.

- Al-Khadhra’s study (2005)

This study developed a new programme to teach critical thinking through ‘humanity’ subject in middle schools in Saudi Arabia. The researcher used an experimental method. Three groups of students were formed. She utilised pre- and post-test for both critical thinking test and achievement test. The first group was taught a developed curriculum to gain creative and innovative thinking skills; the second one was taught a developed curriculum of critical thinking skills infused within one unit of student' standard curriculum; and the last group was taught the regular curriculum in a traditional approach. The study concluded that there is no significant change in the first and third groups, where the second group showed improvement in both their achievement test and critical thinking test.

- Amal’s Study (2005)

This study suggested a programme to teach critical thinking in geography subjects based on current events and contemporary issues. It was conducted in one of Riyadh's high schools. The researcher used pre-test and post-test for both experimental and control groups. The critical thinking test was an Arabic adaptation of California critical thinking test (CCTST). Students in the experimental group scored higher than the control group in the critical thinking test. The study mentioned that teachers should be trained to utilise strategies that enhance students thinking, e.g. dialogue, problem-solving, concepts maps and questioning.

- Hossam Mazen's Study (2005)

This study aims to define the role of the scientific approach to gain thinking skills, such as information collection and management, information processing and analysis, information generation, information assessment; and cognitive skills, e.g. planning, control, evaluation in the age of technology. The main recommendations of this study were that science teachers should use approaches and strategies that stimulate students' thinking, support them and enthuse them about learning. It also suggested that the curriculum should put emphasis on the processes of thinking and problem-solving.

- Abdel Hamid Sabri's study (2001)

The aim of this study is to identify the impact of the use of the direct teaching strategy of thinking skills on students' learning in the first middle school level. Pre-test and post-test for both critical thinking skills and achievement were used. The research concluded that the direct strategy to teach critical thinking through discipline was effective, which would benefit all students not just the excellent ones as some may think.

- Huda Abdel Fattah's Study (2001)

This study sought to identify the impact of the use of collaborative learning strategy in teaching science in order to develop students thinking at the primary stage. The researcher has prepared an achievement test and a scientific thinking test. Also, pre-test and post-test were applied. The study found that a statistically significant difference between the control group and the experimental group was in favour of the latter. A collaborative learning strategy is a practical approach to develop critical thinking within science curriculum.

- Majdi Abdel Karim's Study (2000)

The aim of this study was to identify the impact of some strategies on the development of creativity in the educational stages as well as to identify some programmes that have proven useful in developing creativity. The study reviewed a range of strategies used to promote creativity at different educational levels, including the promotion of brainstorming, the mating and production of ideas,

learning innovation, rewarding innovative ideas, encouraging adventure, allowing mistakes and taking responsibility.

- Muhammad Khairy's study (2000)

The aim of this study was to identify the effectiveness of a programme based on the use of teaching kits in the development of problem-solving and critical thinking ability of pupils at the primary stage. The researcher utilised three different tests: critical thinking test, another test in problem-solving and the achievement test. The study found that there were statistically significant differences between the experimental sample and the control sample in favour of the experimental sample for each of the educational achievements (remember, understand, apply, analyse), a problem-solving method, and critical thinking capabilities (knowledge of assumptions, interpretation, discussion calendar, Inference, conclusion).

The researcher offered a number of recommendations. One of them was the enhancement of self-learning, and, in particular, the style of teaching kits in the preparation and construction of school content. He also encouraged the training of teachers on using these bags, and emphasized the need to pay attention to critical thinking processes during the course of the educational process, which enable pupils to distinguish, analyse and test the results against the problems they might face in their future lives.

- Ibrahim Al-Mahsen's study (2000)

The aim of this study was to measure the impact of teaching a designed module of the science curriculum for middle school students and to propose a teaching method that helps to develop creative thinking among learners. The experimental methodology used; two samples of students, each group was (75) students. Pre- and post-test were used to measure the development of students' thinking in terms of creativity, fluency, flexibility and originality. The results of the two groups were compared based on this impact. They showed a significant impact on the experimental sample. The study concluded that traditional teacher-centred methods oriented to teach students do not lead to any improvement of students thinking in term of creativity or flexibility; instead, they lead to lethargy and fatigue.

- Khadijah's study (2000)

This study is about teaching creative and critical thinking through Criticism and Eloquence subject utilising part one and three of the 'Cognitive Research Trust' CORT programme. It was applied to two groups in one of Saudi's high school, one of them was a control group and the other was an experimental group. The study utilised two tests for creativity and critical thinking. It concluded that statistically there were definite differences between the control group and the experimental group concerning both tests. Further, the study recommended more focus on those types of thinking, training teachers and adoption of methods that encourage students to be more creative and critique.

- Lafi's study (2000)

This study proposed a designed curriculum on reading subject about contemporary issues in order to improve students' critical thinking in two Egyptian high schools, one for girls and the other for boys. The study used two tests: pre-test and post-test for both the achievement test and the critical thinking test. The results of the study showed that the designed curriculum is effective and leads to some improvement in student's performance and their critical thinking.

- Bakhit's study (2000)

This study aimed to examine the possibility of a designed unit on home economics subject to improve students' critical thinking in high school. The research used part one of CoRT programme to plan the unit. The study was applied to the students of a high school, where a sample was selected and divided into two groups: a control group and an experimental group. Both tests of 'achievement' and 'critical thinking' were used. The study concluded that there were positive results in students' critical thinking and achievement, which were linked to the experimental group only.

Other relevant studies

- Rathakrishnan, Ahmad and Suan study (2017)

This study was conducted to examine the use of padlet online discussion and its effectiveness in enhancing critical thinking. Seventy university students participated in that experimental research

design. The students in the treatment class are divided into groups. Students in each group used padlet online discussion to deliberate the topic given, and they discussed and wrote their ideas in padlet that will be displayed in front of the class. The findings showed that students who used padlet online discussion have greater macro and micro critical thinking level than students who did not use online discussion.

- Bartlett and Cox's research (2002)

This study aimed to observe the change in students critical thinking over one academic year. Students took pre- and post-test of the California Critical Thinking Skills Test (CCTST). The study found statistically significant improvements in all subscales of students' test.

- Erickson's study (1999)

This study was conducted to identify the impact of the use of computer technology and databases on the development of students' critical thinking skills. The study used a quasi-experimental approach. The researcher divided the sample students into a control group and two treatments groups, and all of them were given a pre- and a post-test. The Watson–Glaser Critical Thinking Appraisal was used and the experimental group had received many workshops designed to teach creativity using some Computer programs. The study found that students' critical thinking improved, and there was a significant relationship between epistemic beliefs and critical thinking improvement

- David's study (1995)

This study aimed to develop a new model for teaching critical thinking as a negotiation model. This model has two elements that keep it continues: evaluation arguments and discussion issues.

- Carr, Kathryn's study (1990)

This study aimed to find an applicable way to teach critical thinking through the design of a series of activities. The study found that 1) thinking skills should be practiced at all levels of education; 2) teachers should not rely on special curricula or specific texts, but they should employ all subjects; 3) students should be encouraged to read in depth and find relations between things and ideas.

Appendix B: Ethical approval

Application for Ethics Approval

Name	Modhi Almaki
Email address	m.y.almalki @durham.ac.uk
Title of research project	Does effective adoption of ICT require a new approach to teach critical thinking in schools in Saudi Arabia?
Date of start of research project	1-1-2013

	Please tick one
PGR Student	x
PGT Student	
UG Student	
Staff	
Other	

For PGR, PGT and UG students

Programme	Education
Supervisor	Steven Higgins

For staff

Is the research funded	Y N
Funder	
List any Co-Is in the research	

Other

Please give further details	

(1) Does the proposed research project involve data from human participants? This includes secondary data. If the research project is concerned with the analyses of secondary data (e.g. pre-existing data or information records) please continue with Q6-9	(1) Y N
(2) Will you provide your informants – prior to their participation – with a participant information sheet containing information about (2a) the purpose of your research (2b) the voluntary nature of their participation (2c) their right to withdraw from the study at any time (2d) what their participation entails (2e) how anonymity is achieved (2f) how confidentiality is secured (2g) whom to contact in case of questions or concerns Please attach a copy of the information sheet or provide details of alternative approach.	(2a) Y N (2b) Y N (2c) Y N (2d) Y N (2e) Y N (2f) Y N (2g) Y N
(3) Will you ask your informants to sign an informed consent form? (please attach a copy of the consent form or provide details of alternative approach)	(3) Y N
(4) Does your research involve covert surveillance? (4a) If yes, will you seek signed consent post hoc?	(4) Y N (4a) Y N
(5) Will your data collection involve the use of recording devices? (5a) If yes, will you seek signed consent?	(5) Y N (5a) Y N
(6) Will your research report be available to informants and the general public without restrictions placed by sponsoring authorities?	(6) Y N

05/2015

(7) How will you guarantee confidentiality and anonymity? The schools, students and teachers who will participant in this research contain unnamed.
(8) What are the implications of your research for your informants? School1, and school2 Teacher1, and teacher2 Student
(9) Are there any other ethical issues arising from your research? The research will be conducted in Saudi school girls which means there is no photos or videos that will take place in this research at all.

Further details

Declaration

I have read the Department's Code of Practice on Research Ethics and believe that my research complies fully with its precepts.
I will not deviate from the methodology or reporting strategy without further permission from the Department's Research Ethics Committee.
I am aware that it is my responsibility to seek and gain ethics approval from the organisation in which data collection takes place (e.g., school) prior to commencing data collection.

Applicant signature ..... Date:.....

Proposal discussed and agreed by supervisor

S.C. Higgins 2015.05.17 15:12:10 +01'00'

Supervisor signature ..... Date .....

To enable electronic submission of applications, electronic (scanned) signatures will be accepted.

Appendix C: Permission to visit schools in Riyadh form the Ministry of Education in Saudi Arabia

المملكة العربية السعودية
وزارة التربية والتعليم
٢٨٠
الإدارة العامة للتربية والتعليم بمنطقة الرياض
إدارة التخطيط والتطوير

وزارة التربية والتعليم
Ministry of Education

الرقم : ١١/٣٦٩٢٢٩٦
التاريخ : ١٤٣٦/٤/٩ هـ
المرفقات : -

"تسهيل مهمة بحث "

اسم الباحثة	موضي يحيى المالكي .
الكلية / الجامعة	درهام .
الغرض من الدراسة	متطلب للحصول على درجة / الدكتوراه .
عنوان الدراسة	هل يحتاج استخدام التكنولوجيا في المدارس الى طرق جديدة لتعليم وتعلم مهارات التفكير في المدارس.
عينة البحث	معلمات .
نوع التسهيل	استيفاء الأداة(ملاحظة) من عينة البحث المحددة.

المكرمة مديرة المدرسة (الثانوية) ٦٠ حفظها الله

السلام عليكم ورحمة الله وبركاته وبعد ،،

بناءً على تعميم معالي وزير التربية والتعليم رقم ٥٥/٦١٠ وتاريخ ١٤١٦/٩/١٧هـ بشأن تفويض الإدارات العامة للتربية والتعليم بإصدار خطابات السماح للباحثين بإجراء البحوث والدراسات , وبناءً على تفويض مدير عام إدارة التربية والتعليم إدارة التخطيط والتطوير في الخطاب ذي الرقم ١١/٣٣٦٧٤٨٢٣والتاريخ ١٤٣٣/٤/١٤هـ بشأن تسهيل مهام الباحثين والباحثات , وحيث تقدمت إلينا الباحثة (الموضحة بياناتها أعلاه) بطلب إجراء الدراسة , نأمل تسهيل المهمة , مع ملاحظة أن الباحثة تتحمل كامل المسؤولية المتعلقة بمختلف جوانب البحث , ولا يعني سماح الإدارة العامة للتربية والتعليم موافقتها بالضرورة على مشكلة البحث أو على الطرق والأساليب المستخدمة في دراستها ومعالجتها.

شاكرين طيب تعاونكم .

مدير إدارة التخطيط والتطوير
سعود بن راشد آل عبداللطيف
١٤٣٦/٤/١٠

وزارة التربية والتعليم
إدارة التخطيط والتطوير
الإدارة العامة للتربية والتعليم بمنطقة الرياض

ص/ لمكتب تربية وتعليم (الروابي).
ص/ قسم الدراسات والبحوث .

البريد الإلكتروني planingm@rge.gov.sa / al-takhteet@hotmail.com هاتف ٤٠٢٠٤٣٨ - فاكس ٤٠٢٧٠٥٨ - سنترال ٤٠٥٥٩٥٠ تحويلة ١٤٠٤

Appendix D: Note form.

قوانين البحث العلمي في الصف الدراسي

عزيزتي الطالبة :

حتى تتمكني من الوصول إلى الإجابة الصحيحة بإذن الله عليك اتباع الآتي:

- **فكري بالسؤال جيدا ثم حددي المطلوب منه.**
- **ابحثي عبر إحدى محركات البحث عن الإجابة باستخدام " الكلمات الرئيسية"**
- **اطرحي تساؤلات حول الموقع الذي تستقين منه إجابتك :**
  - ✓ **هل هو مصدر موثوق ؟**
  - ✓ **كيف عرفتِ ذلك ؟**
  - ✓ **ما خصائص المصادر الموثوقة؟**
- **أعرضي إجابتك موثقة بالمصدر**
- **استمعي لما تعرضه المجموعات الأخرى ودوني ملاحظاتك**
  - ✓ **ما مصادر المجموعات الأخرى**
  - ✓ **ما أوجه الشبه والاختلاف بينك وبين غيرك من المجموعات**
  - ✓ **ما أوجه القوة والضعف فيما تم عرضه عليك**
- **استخلصي النقاط الرئيسية من الدرس مع ابداء رأيك ووجهك نظرك**

Appendix F: Consents

أقر أنا/ ..... برغبتي في المشاركة في الدراسة البحثية لإكمال متطلبات درجة الدكتوراه (هل يحتاج استخدام التكنولوجيا إلى طرق جديدة لتعليم و تعلم التفكير الناقد في المدارس الثانوية " بنات " في المملكة العربية السعودية) من جامعة درم بالمملكة المتحدة، والمتقدمة بها الباحثة/ موضي المالكي.

اعي كافة حقوقي وان لي الحق في الانسحاب من الدراسة في أي وقت وان جميع المعلومات المتعلقة بهذه الدراسة تُستخدم لإغراض بحثية بحتة وتعامل بسرية تامة.

عزيزتي المعلمة :

هذه المقابلة معدة من أجل إكمال متطلبات درجة الدكتوراه في تخصص تكنولوجيا التعليم " مدى تأثير التكنولوجيا على تعليم و تعلم التفكير الناقد في المدارس الثانوية " بنات " في المملكة) غي جامعة درم بالمملكة المتحدة. هذا اللقاء لن يأخذ من وقتك كثير.

الدراسة تهدف إلى معرفة الاستراتيجيات المستخدمة في الصف الدراسي مدعومة بتقنيات التعلم المتوفرة في المدارس مثل " الحاسب الآلي" و أثر ذلك في تعليم وتعلم التفكير الناقد.

وبالتالي الدراسة سوف تساهم في تطوير طرق استخدام " تقنيات التعلم الحديثة" في المدارس السعودية عن طريق تقييم استراتيجيات التعليم والتعلم المستخدمة في الصف الدراسي مدعومة " بالتكنولوجيا" والمهارات الحالية للمعلمات والمهارات المطلوبة.

جميع المعلومات سوف تُستخدم لأهداف البحث فقط وسوف تُعامل بسرية تامة. نود احاطتك بأن مشاركتك في تعبية هذا الود احاطتك بأن مشاركتك في تعبية هذا الاستبيان تطوعية بحتة ولك الحق في الانسحاب.

نشكر لك مشاركتك في اكمال هذا الاستبيان والذي سوف يكون له أبلغ الأثر في إكمال هذه الدراسة , مما سيُسهم بدوره في تطور العميلة التعليمية في المملكة العربية السعودية.

إذا كان لديك أي استفسار بخصوص هذا الاستبيان, لا تتردي في الاتصال بي عن طريق البري الإلكتروني التالي :

m.y.almalki@durham.ac.uk

<u>عزيزتي الطالبة:</u>

هذه المقابلة معدة من أجل إكمال متطلبات درجة الدكتوراه في تخصص تكنولوجيا التعليم (هل يحتاج استخدام التكنولوجيا إلى طرق جديدة لتعليم و تعلم التفكير الناقد في المدارس الثانوية " بنات " في المملكة العربية السعودية) من جامعة درم بالمملكة المتحدة.

هذا الاستبيان لن يأخذ من وقتك كثير.

الدراسة تهدف إلى معرفة الاستراتيجيات التعليمية المستخدمة في الصف الدراسي مدعومة بتقنيات التعلم المتوفرة في المدارس مثل "الحاسب الآلي" وغيره و أثر ذلك في تعليم وتعلم التفكير الناقد.

وبالتالي الدراسة سوف تساهم في تطوير طرق استخدام " تقنيات التعلم الحديثة" في المدارس السعودية عن طريق تقييم هذه الاستراتيجيات المستخدمة في الصف الدراسي مدعومة " بالتكنولوجيا" والمهارات الحالية للمعلمات والمهارات المطلوبة لذلك.

جميع المعلومات سوف تُستخدم لأهداف البحث فقط وسوف تُعامل بسرية تامة. نود احاطتك بأن مشاركتك في تعبئة هذا الاستبيان تطوعية بحتة ولك الحق في الانسحاب.

نشكر لك مشاركتك في اكمال هذا الاستبيان والذي سوف يكون له أبلغ الأثر في إكمال هذه الدراسة , مما سيُسهم بدوره في تطور وتطوير العملية التعليمية في المملكة العربية السعودية.

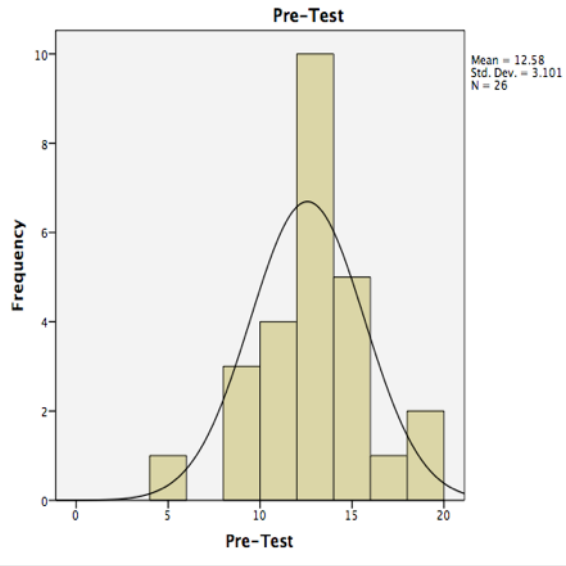
إذا كان لديك أي استفسار بخصوص هذا الاستبيان, لا تتردي في الاتصال بي عن طريق البريد الإلكتروني التالي :

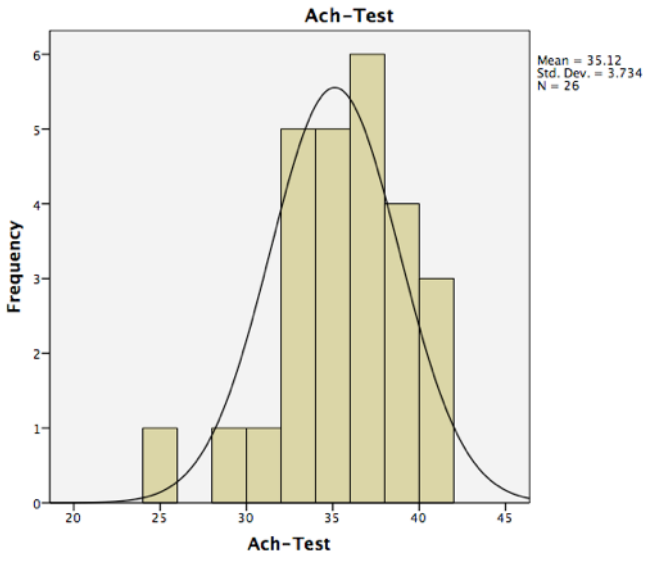
modhi.y.almalki@gmail.com

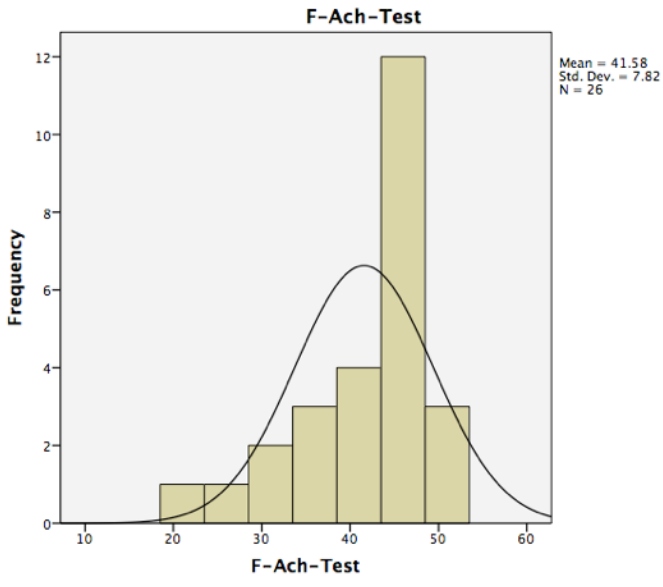
موضي المالكي

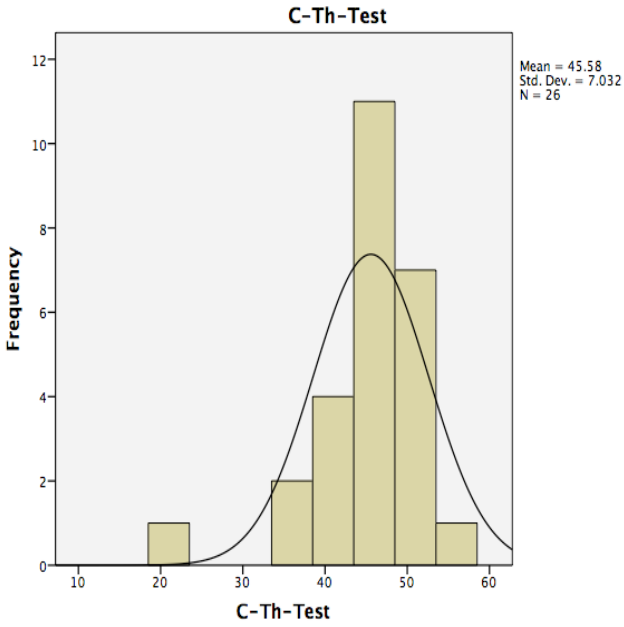
Appendix G: Quantitative results

Skew and Kurtosis (School 1)

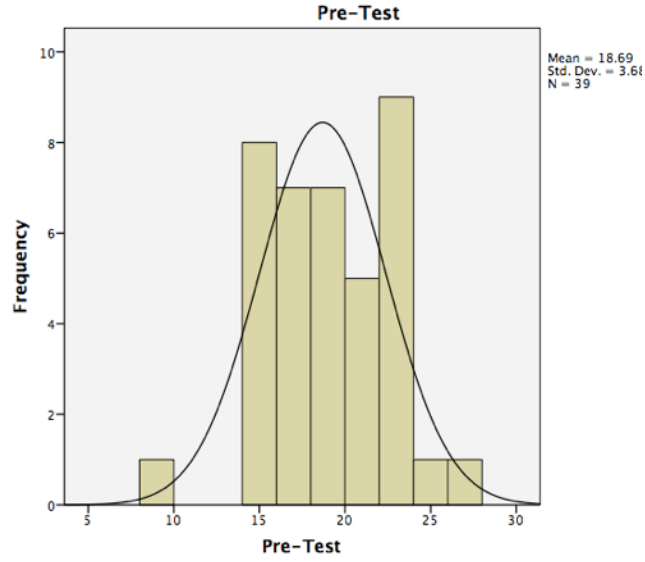


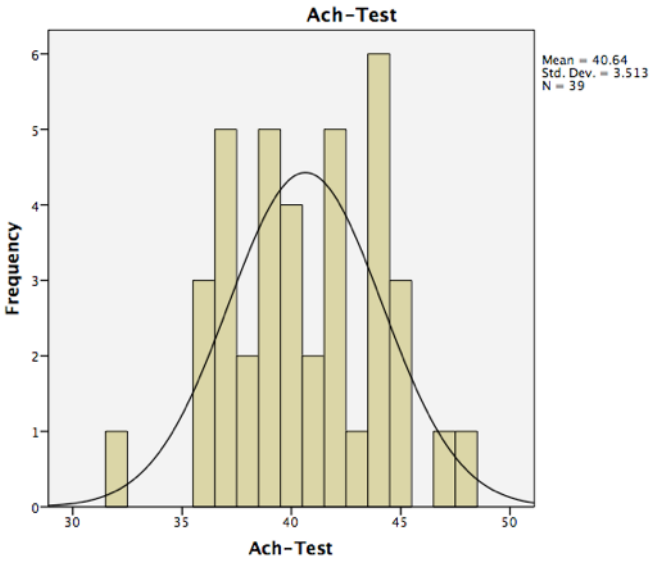


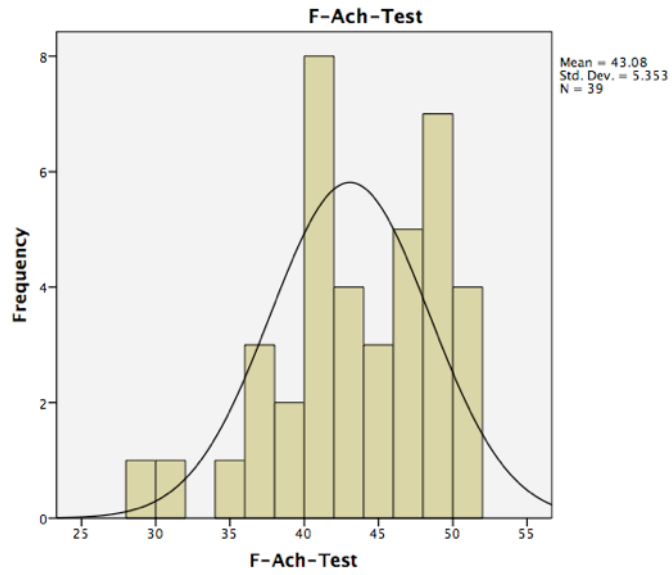


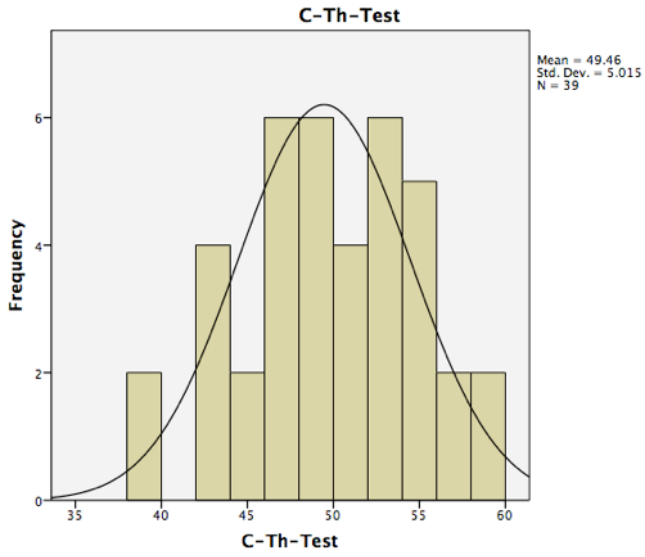


Skew and Kurtosis (School 2)









Skew and Kurtosis (Both Schools)