Social Networking Website-Based Learning Activities to Develop Critical Thinking Skills among Undergraduate Students in Saudi Arabia

Thesis submitted for the degree of Doctor of Philosophy at the University of Leicester

by

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2017

Abstract

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The aim of this study is to investigate whether the use of social networking (SN) website-based learning activities can promote students' critical thinking (CT) skills and their participation in course activities. For this, an educational intervention was designed and implemented through several stages, drawing from the ADDIE (Analysis, Design, Development, Implementation and Evaluation) learning design model. The intervention is a type of learning activity design based on the WebQuest model, and included open-ended questions and different SN website sources. In order to answer a given question, students were required to browse, criticise and evaluate the source content and present their thoughts in an argumentative essay.

I adopted the design-based research (DBR) approach within a mixed methods research design framework to evaluate the effectiveness of the research intervention. Research tools included a CT rubric and student questionnaires as the quantitative tools; and observations, student focus groups and student reflections as the qualitative tools. The main study was conducted in one semester course (16 weeks) with 24 undergraduate female students at King Saud University (KSU), in the first semester of 2014-2015.

The quantitative and qualitative data were analysed at the same stage, at the end of the semester. The quantitative data was analysed using one-way repeated measures analysis of variance (ANOVA), Pairwise Comparisons (post-hoc test) and some descriptive statistics. In addition, the qualitative data was analysed thematically using the research questions as a basis for the analysis themes.

The intervention revealed positive findings in terms of students' CT and argumentative writing skills as well as their attitudes. The findings also provide a deeper understanding of students' perceptions of SN website usage and investigate the factors that affect students' participation in these course activities. This study found that SN websites alone cannot promote student participation in course activities. SN website usage should be combined with other aspects/factors such as choosing activity topics, the teacher's role in introducing and implementing activities and consideration of students' time and other course's requirements. This study contributes to knowledge by exploring how social constructivism propositions can apply to SN website-based learning activities to help Saudi students learn and apply CT skills.

Acknowledgment

In the name of Allah, the Most Gracious, the Most Merciful.

I thank Allah Almighty for giving me the patience, time and strength to accomplish this thesis.

Prophet Mohammed said: "He will not be thankful to Allah, he who would not be thankful to people". I would like to express my deep appreciation for several individuals who supported and helped me throughout my PhD journey.

I would like to express my sincere gratitude to my supervisors Dr. Palitha Edirisingha and Dr. Olfat Fodah for their unfailing assistance, patience and dedication. Their immense knowledge and expertise helped me the entire time I was researching and writing this thesis.

I would like to acknowledge a debt of gratitude that can never be repaid to my parents, Jehad Alsaleh and Rajaa Abdulrazaq. My gratitude because they kept me motivated to continue working until the thesis was finished, and because I inherited their wonderful genes, which has helped me achieve my goal. May Allah bestow them with health.

My profound gratefulness goes to my beloved husband, Rashed Binmethem. We married when I was young and you supported me from the very beginning and throughout my PhD program with a lot of love and encouragement. My beloved husband, your sweet love, understanding and patience have motivated me to remain persistent. I love you most.

A lot of love and appreciation to my mother in law, Haya Almasoud, for her constant prayers for me to be safe, happy and successful.

To the best thing that happened in my life, my children, Alanoud, Nawaf, Alhaton, Haya and Khaled; there are not enough words to describe my thankfulness for your patience and for sharing the ups and downs with me throughout the duration of my study. I am sorry for the times that I spent far from you and was unable to concentrate on your needs.

Warms thanks and my heartfelt appreciation go out to my sisters, brothers and their wives for their love, devotion and understanding, which were a source of inspiration throughout the study period. I would like to express my love for my Aunt Reem, Aunt Amany and Aunt Balsam as well as my great friends, Nouf Alweseedy, Khadija Alghamdi and Gouom Alshamary, because they believed in me and continued convincing me that I could do it.

Special thanks to those who supported my study journey with a lot of help, advice and encouragement. Dr. Mervat Albufalasa for her friendly assistance, and G. Dougherty, you are the best thing that happened in my PhD journey. Also, thank you to all the specialists who advised and assisted me with the statistical part of the study. Finally, my sincere gratitude goes to King Saud University for granting me a scholarship to pursue this study.

Nada Jehad Alsaleh, Wednesday, 2 November 2016

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List of abbreviations

- **CT:** Critical thinking skills.
- SN: Social networking website such as Twitter, Facebook, YouTube, blogs and Wikis.
- KSU: King Saud University in Riyadh, Saudi Arabia.
- **ITD:** Instructional Technology Department one of School of Education departments at King Saud University.
- **241 ITE:** Learning Technology and Communication course, which is a requirement for all the students in the School of Education.

Chapter 1 Introduction and Background

1.1 Introduction

The focus of this research was to investigate whether the use of social networking (SN) website-based learning activities can promote students' critical thinking (CT) skills and their participation in course activities. This research provides innovative ways to use SN websites for learning purposes to promote CT skills. SN websites are used as a resource for critiquing, evaluating, comparing and judging different opinions, then used to form and present their personal opinion, in order to discuss an argument. Therefore, an educational intervention based on a set of SN websites resources was designed, developed and evaluated in order to achieve the research goals.

This chapter provides an introduction to this study. It is comprised of eight sections: background information to identify the general landscape on which this study is based; the context of the study, followed by the rational for the research. Then, the research topic and its importance are discussed, followed by the research aims and questions. Finally, the thesis guide is presented in order to provide a general overview of the study's evolution.

1.2 Background

Recent statistics gathered by a Social baker survey (2015) have revealed a rapid increase in social networking (SN) websites and this generation's use of them; at the same time, others studies, such as one by Alwehaibi (2012), indicated that Saudi students are lacking in skills such as critical thinking (CT). The rapid increase in the use of SN websites, made more accessible by being free for everyone around the world, makes teaching and coaching students critical thinking skills when using these websites, a vital goal. From this point of view, teachers should focus more on CT skills and find innovative ways to enhance them in students.

A social networking (SN) website is defined as a linked collection of web pages that allow members to communicate with one another, as well as post personal information including blogs, pictures and videos (Malesky and Peters, 2012). SN websites allow users to create social networks and build relationships with people throughout the world as well as share information and interests with people in those networks. Caruso and Salaway (2008) argue that the vast majority of university students have profiles on at least one SN website, such as Facebook. Moreover, Alabdulkareem (2015) study's findings found that 73% of the university students use some SN websites and applications for learning purposes. Crook and Harrison (2008) suggest that integrating SN websites into education offers benefits, including improvement in student participation, social relationships, interactions with teachers and other students, communication and facilitation of learning.

Although SN websites offer many benefits, educators need to be aware of the potential risks SN websites pose for students. The Internet generally makes knowledge and information freely available, often without limitation, but without any guarantee of the information's accuracy and validity. This makes CT a key skill necessary for using SN websites. Having CT skills might help students evaluate and assess the information and resources they obtain from SN websites, and make a decision about whether to accept the information or not.

Critical thinking has been defined as "the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action" (Paul, 1992, p.1). Since it is unrealistic to expect students to limit their SN website use, students need to learn to evaluate and assess everything they receive and share through such sites. In other words, they need to think critically about every resource they use.

To conclude, the purpose of this research is to investigate whether the use of SN website-based learning activities promotes students' CT and their participation in course activities as reflected in their argumentative writing. The aim of these learning activities is to coach students on how to evaluate different points of views from SN websites and express their own opinions. Furthermore, this research analyses whether teachers can promote students' participation in course activities by using tools that are attractive to the current generation, such as those found on SN websites like Twitter, Facebook, YouTube and blogs.

1.3 Study context

This section offers an essential account of the context of the study. The historical background of Saudi Arabia and its educational system will be described. Moreover, information about the university under study is presented as well. The rationale underlying this section will help in understanding some of the issues that may impact teaching and learning practices, such as the culture of the country and its educational system. Providing the context of the study helps in understanding the students' attitudes and perceptions regarding their participation in the research intervention. In addition, providing a full description of the research context will help other researchers generalize these research findings in similar contexts (Bryman, 2012).

1.3.1 Saudi Arabia and its educational system

The Kingdom of Saudi Arabia (KSA) is the second-largest state in the Arab world after Algeria and is considered one of the Middle East countries and the birthplace of Islam. It lies at the crossroads of three continents: Asia, Africa, and Europe, and it extends over two million square kilometres (124,300 square miles) (Central Department of Statistics and Information, 2016). According to the first census in 1974, the Kingdom's population was just over 7 million. However, since that time, the population has grown dramatically. The 1992 census gave a figure for the total population of 16.9 million; much of that growth has been due to an exceptionally high birth rate, rather than immigration, where an estimated birth rate in 1992 was estimated at about 36 per thousand. In 2016, the Central Department of Statistics' Demographic Survey put the population of the Kingdom at 31 million (Central Department of Statistics 2016).

Almost all native Saudis are Muslim and they are bound together by a high degree of cultural similarity, as reflected in their common mother tongue (Arabic), strong family tribal relationships and an adherence to Islam (Central Department of Statistics and Information, 2016). The Kingdom of Saudi Arabia is a monarchy whose constitution is based on the Holy Book, the Quran (Koran) and Shariah Law. Saudi culture is primarily determined by Islam. Indeed, all aspects of social and cultural life are centred on Islam and a Muslim identity. The religion of Islam covers all aspects of peoples' lives and places particular emphasis on education. It is particularly important to understand that Islam accords education a very high status. Religion and education are seen as

indivisible and the purpose of education, and the respect for those involved in it, have their basis in religion (Hamdan, 2014).

In 1925, six years after the consolidation of the Kingdom of Saudi Arabia, the Directorate of Education was created and established government schools (Albalawi, 2007). The educational system, formed in the same year, offered six years of elementary and five years of secondary school education (Albalawi, 2007). In 1953, the Directorate became the Ministry of Education, and by 1958, the government changed the educational system to conform to standards current at that time in the Gulf countries: a 6-year elementary school, 3-year intermediate and 3-year secondary schools, followed by a separate higher education function (Rugh, 2002).

In accordance with Islamic law, there is no co-education at all levels of school and higher education in Saudi Arabia, in terms of buildings and teaching staff. Historically, this education was supervised by different agencies: The Ministry of Education supervised schools for boys, and the General Presidency of Girls Education, created in 1960, supervised schools for girls, preschools and the eleven girls' colleges, until 2002 when it was abolished and its responsibilities were given to the Ministry of Education (Rugh, 2002). Additionally, higher education was the responsibility of a different ministry: The Ministry of Higher Education. This ministry controlled all the public and private universities and colleges in Saudi Arabia. In 2015, one of the most important changes took place in the educational system in Saudi Arabia, the Ministry of Higher Education and the Ministry of Education merged into one ministry under the name of the Ministry of Education (Ministry of Education, 2016).

The administration of the general education system in Saudi Arabia is highly centralised. All education policies are controlled through the Ministry of Education, which is directly subject to government control. The curriculum, syllabus and textbooks are uniform throughout the country. Curricula are unified throughout the kingdom and there is a curriculum department in the Ministry of Education. This department is responsible for curriculum development and the preparation of subject textbooks. For each subject and for every grade there is a textbook that must be used in all the kingdom's public and private schools. The academic year is divided into two semesters, each with a duration of about of 18 weeks, including examinations. Students prepare and study for these examinations from the textbooks and teachers are expected to devise exam questions only from the content in the textbooks (Oyaid, 2009).

The Ministry of Education has given weight to education under the slogan "Education for All". Education is free at all educational levels through postgraduate, and university students receive a monthly stipend as an incentive (Rugh, 2002). This was initially done to encourage Saudis people to engage in public and higher education. However, the situation has changed and the demand for higher education has increased dramatically; and the number of graduates has become a new challenge to the Saudi Arabian government, in terms of finding suitable careers for them.

Interest in higher education began after the first university in Saudi Arabia, King Saud University (KSU), was founded, which coincided with the establishment of the Ministry of Higher Education in 1975 (Gazzaz, 2006). The Saudi government used to allocate a large share of its budget to education. As a result, the number of Saudi universities jumped within a few years from eight universities in 1998 to 32 universities in 2012; 24 of them are public and the rest are private. There are also 494 colleges distributed over 76 cities and regions, as well as 12 new university towns in Saudi Arabia designated as scientific and developmental centres (Ministry of Higher Education, 2013).

The learning and teaching procedures in Saudi Arabia have been influenced, directly or indirectly, by the culture of the country and its educational system. The current education system is based on the transmission of uncontested knowledge from teachers to students, depending heavily on rote learning (Hamdan, 2014). Rather than engaging in dialogue with students, teachers tend to force information that may be irrelevant to students' lives and experiences. The educational system in Saudi Arabia can be described as a teacher-centred class rather than a student-centred class. This educational approach entails two major issues that contribute to the passivity of learners, an issue that must be addressed by the ministry of education if Saudi citizens are to critically engage in creating a knowledge-based economy: 1. students' overdependence and overreliance on teachers to solve problems and provide ready answers; 2. instilling in students the inability to question a teacher's answers (Hamdan, 2014). What is taught at school and university is not supposed to be questioned. Saudi students learn from a very young age that all knowledge is fixed as "truth [and constitutes] a static entity that is context and value free" (Ghosh and Abdi, 2004, p. 37). The Ministry of Education and

educators have recognised the need to provide new educational characteristics that suit the requirements of the 21st century and meet the needs of a modern knowledge-based economy (Rugh, 2002).

1.3.2 Attempts to develop education in Saudi Arabia

A number of studies (e.g., Rugh, 2002; Oyaid, 2009; Alsultan and Alzahrnah, 2012; Asiri et al., 2012) have indicated several reasons for developing Saudis' educational system, including the radical expansion of information and communications technology (ICT), changes in the current generation of students' interests and habits and new societal requirements. The international trend towards a knowledge-based economy has stimulated change in the Saudi education system (Rugh, 2002). This trend has affected society's requirements of education. Saudi society now needs more than graduates who have simply memorised their textbooks (Pithers and Soden, 2000), it needs independent thinkers who can exercise their own cognitive skills using different tools.

Since 2001, the Ministry of Education and Higher Education in Saudi Arabia have made several attempts to develop education and its outputs. These attempts covered different areas such as courses aims, teaching approaches, learning methods and integrating new technologies in all educational processes (Rugh, 2002; Oyaid, 2009; Alsultan and Alzahrnah, 2012; Asiri et al, 2012). Saudi educational institutions receive the largest portion of the country's financial appropriation: around 25% of the Saudi Arabian budget (Alsualtan and Alzaharanh, 2012; Ministry of Higher Education, 2013). This budget is invested in developing curricula, adopting educational innovations and providing training programs for teachers (Ministry of Higher education, 2013). Finally, the Ministry of Education has invested a considerable amount of research into educational innovations, learning skills, teaching approaches and integrating new technologies into education.

Moreover, there has been increased interest from higher education institutions to achieve Academic Accreditation. In 2006, The National Commission for Academic Accreditation and Assessment (NCAAA) was established in Saudi Arabia and is responsible for the accreditation of higher-education institutions beyond the secondary level, with the exception of military education. The NCAAA seeks to upgrade the quality of private and public higher education to ensure clarity and transparency, and to provide codified standards for academic performance (Hamdan, 2014). Despite the high budget allocated and the progress made in the Saudi education systems, educational institutions still face challenges and have been unable to achieve many of their development plan goals. The educational system still follows some traditional practices. For example, students concentrate on memorizing and retrieving information in order to show their understanding. Schools and universities still depend on traditional tests to assess students' achievements. Teachers are also still using traditional ways of teaching courses. The educational system in Saudi Arabia needs to take serious action in order to change traditional practices and make the best possible use of the available budget and resources to invest in new technologies and modern infrastructure, to achieve this development plan.

1.3.3 King Saud University

This study was conducted in the School of Education at King Saud University (KSU). KSU was the first university, established in 1957 in Riyadh, the capital city of Saudi Arabia. It is comprised of 28 colleges offering different specialisations, ranging from health and the sciences to the arts and humanities (KSU, 2013). It currently has 75,318 students, with females accounting for nearly 40% (KSU, 2013). The system at King Saud University is similar to public education in Saudi Arabia, women study in separate facilities and are taught by female teachers, or, in some cases, women are connected by closed-circuit television (one-way video, two-way audio) with a male teacher. KSU is ranked 261st worldwide and 1st in the Arab world according to the Academic Ranking of World Universities (KSU, 2013).

KSU's mission is to "provide students with a quality education, conduct valuable research, serve the national and international societies and contribute to Saudi Arabia's knowledge society through learning, creativity, the use of current and developing technologies and effective international partnership" (KSU, 2013). To achieve this mission, KSU creates an environment that enables lecturers and researchers to easily improve both education and learning practices. Additionally, KSU provides significant financial and moral support to its researchers, as well as a professional network throughout the campus where students and teachers can access the Internet through Wi-Fi enabled devices such as smart phones, iPads and laptops.

King Saud University receives the largest share of the higher education budget annually, based on the number of students and the overwhelming demand to study at this

university (Ministry of Higher Education, 2013). In 2013, the university received about 9.5 billion Saudi Riyals, to establish new buildings, extend the campus, adopt educational innovations and integrate ICT at all university facilities (KSU, 2013). Moreover, the budget was used to establish different research centres, such as the King Abdullah Institute for Nanotechnology, the King Abdullah Research and Consulting Institute and the National Diabetes Centre (ibid). Indeed, the university has witnessed much development in quality and quantity since it was established, to the extent that it is now one of the most distinguished institutions of learning in the region.

1.4 Rationale for the research

There are several justifications for this research. It is rooted in the need to improve students' CT skills, the need to respond to the growth in web-based technology, such as SN websites, and my personal interest.

1.4.1 The need to improve students' critical thinking (CT) skill

Critical thinking has been recognized as one of the most important thinking skills, and one of the most important indicators of student learning quality (Quitadamo and Kurtz, 2007). Developing critical thinkers should be central to the mission of all educational institutions; and educational leaders, politicians and parents have called on the educational system to produce graduates who are able to solve problems and think critically (Quitadamo and Kurtz, 2007). By ensuring that students learn to think critically and fairmindedly, we ensure that students not only master essential subject matter, but also become effective citizens, capable of reasoning ethically and acting in the public good (Paul and elder, 2006). As a set of cognitive abilities, CT skills provide students with tangible academic, personal, and professional benefits.

Furthermore, the rapidly changing technological age has led to students' need to be equipped with the necessary skills to critically evaluate what they receive from different internet sources, express themselves clearly both verbally and in writing, and develop reasoning abilities that render acquired knowledge usable and transferable to other contexts (Bers, 2005). People receive a significant amount of information from SN websites, and they need to know how to evaluate this information and how to judge the accuracy of different opinions. Therefore, coaching students on thinking skills and CT is vital. Educators, and those concerned about education, in Saudi Arabia have expressed concern that university graduates cannot adequately solve problems and think critically. Moreover, Saudi teachers lack experience in enhancing these skills in students and do not consider promoting students' CT skills to be a serious concern (Aldegether, 2009; Alwehaibi, 2012). Alwehaibi (2012) describes how in Saudi universities (such as the Princess Noura Bint Abdurrahman University), CT skills are not effectively emphasised and the teaching approaches adopted are not appropriate for developing these skills. Moreover, many Saudi teachers only have a vague understanding of what CT is and how to teach it successfully (Aldegether, 2009; Alwehaibi, 2012).

According to Paul and Elder (2006), to successfully teach CT, it must be knitted into the curriculum content and teaching approaches, and sequenced at all grade levels. However, a study of real practices in universities show that teaching approaches have a tendency to focus on subject content rather than the development of CT. This tendency may be for several reasons: the curriculum content is typically intensive and generalizable for all students' abilities (Kember, 1997). For example, the curriculum in Saudi Arabia is central and unified in all Saudi regions. This may cause pressure on some teachers, especially those who are new to teaching, to try and exceed course targets and improve students' CT skills.

Moreover, although a considerable amount of educational literature has been aimed at enhancing teachers' awareness of the importance of fostering CT in their students, teachers have been offered few examples of what these skills are, what forms they take and how they can assess them (Kuhan, 1999). Additionally, Hatcher (2006) believes that there are numerous important questions that have not been answered yet, such as how CT skills are best taught and which approach is most effective for teaching them. Therefore, it is crucial for education providers to find out the best and most suitable ways to promote students' CT skills using new methods and technology.

1.4.2 Response to growth in web-based technology

Interaction and Information technologies have reshaped the way we live our lives today. Saudi students and teachers' use of smart phones, iPads and other portable devices is ubiquitous and they are continually looking for innovative technologies. All these portable devices are equipped or able to download SN applications and websites, like Facebook, Twitter, Wikipedia, YouTube, WhatsApp and Instagram (Alabdulkareem, 2015). A Social baker survey (2015) found that SN websites ranked among the main interests of Saudis. The statistics indicate that 94% of Internet users in Saudi Arabia have at least one account for social media, and 89% have a Facebook account, with Saudis being ranked as third most frequent users of Facebook globally. Out of nearly one billion users worldwide, Saudi Arabia accounts for more than five million Facebook users (Facebook, 2015). Twitter also ranked as the most visited and used website amongst Saudis, with 14 million tweets (out of 200 million) per month originating in Saudi Arabia (Twitter, 2015). In Saudi Arabia, 77% of the Internet users have a Twitter account and 55% of them are students (Twitter, 2015).

Since SN websites are among the main interests of Saudi students, any educational development plan in Saudi Arabia should not ignore them, but rather integrate them into the curriculum and teaching approaches. As Barnes et al. (2007) state, this generation is accustomed to using media in their learning and depend on the internet to access information. Education should provide for a new trend of learning approaches that allows students more freedom than before to use a wide range of media and technology in learning.

Moreover, many of the modern learning theories emphasise the importance of technology in learning. For example, Connectivisim recognises that the digital and networked nature of our daily lives requires learning that occurs through interactions with various sources of knowledge and participation in communities of common interest, social networks and group tasks (Siemens, 2005). It also emphasises the important role that technology plays in the learning process and the connection of individuals with technology, as well as with other individuals through technology (Jovanovic et al., 2012).

Research on SN websites have demonstrated the benefits of them for educational purposes such as engagement, interaction, communication or collaborative learning (Mason, 2013; Alabdulkareem, 2015). However, upon reviewing the relevant literature, there have been few published works on whether SN websites can improve students' higher thinking skills such as CT (Crook and Harrison, 2008). Within the Saudi context, little work has been done to research the effectiveness of the use of SN websites, such as Twitter, Facebook, YouTube, blogs and wikis, on promoting students' CT skills. Some of the trends in the field have been focused on studies that have tried to investigate the effectiveness of teaching CT skills through a special thinking skills curricula (Alwehaibi, 2012), while others have investigated the factors that influence enhancing CT skills (Aldegether, 2009). However, there is limited literature that examines how technology such as SN websites might be used to promote students' CT. Accordingly, this research aims to fill this gap and investigate if the affordances of SN websites make them good tools to promote CT rather than just using these tools for communication and peer review.

1.4.3 Personal interest

I have been a lecturer at KSU for nearly eight years and have over ten years of experience in computer software design through my Bachelor's and Master's studies, as well as a personal interest in the learning design field. My mission as a lecturer is to "Teach subjects by connecting them with students' reality, and by providing them with interesting lectures and interactive learning; and to provide course activities that help students engage in higher levels of thinking". In some ways, this mission contributes to, and builds off of the university's mission to provide a "quality education" and to "contribute to Saudi Arabia's knowledge society through learning, creativity, [and] the use of current and developing technologies" (KSU, 2013).

As a lecturer, I have been driven by the belief that education should go beyond the curriculum's borders and goals, to encompass the student's emotional side, and respond to those needs. My personal motivation for this research is driven by my mission, teaching experience and knowledge of learning design. Moreover, my goal is to encourage teachers to engage students in constructive homework by using innovative ideas that will improve their higher level thinking skills, such as CT.

In addition, from my experience as a lecturer, I noticed that many of the students had difficulty reflecting their opinions or effectively evaluating others' opinions. Moreover, students had difficulty writing essays as they lacked writing skills and needed additional practice and support in this area. This was further compounded by my observation that the students tried to avoid doing complicated or time-consuming activities or homework that challenge or improve their high levels skills. As a result, my interest in this area grew and I wanted to investigate whether integrating attractive tools, such as SN websites resources, into learning activities or homework could encourage students to participate in activities that require higher levels of thinking skills and productivity.

1.5 Research topic

An important and modern role of teachers, lecturers and learning designers is to produce innovations in educational environments by taking advantage of all available technologies and resources that might help in improving educational practices and further developing the educational system.

Therefore, I employed an educational practice related to the design and assessment of learning activities using SN website tools aimed at promoting students' CT skills. I designed, developed and evaluated learning activities that combined a set of CT teaching strategies (questioning techniques, argumentative writing, critical browsing for SN website resources and peer reviews). All of the activities were based on different SN websites' resources. The research intervention aimed to explore how these activities affected students' CT skills as reflected in their writing, and whether SN websites had the factors needed to encourage students to participate in learning activities.

The research intervention suggests new ways to use SN websites for educational purposes, namely using SN websites as a medium for study and critical thought. This involves browsing different SN websites (Twitter, YouTube, Facebook and blogs), analysing the content, identifying the similarities and differences, evaluating the ideas and then expressing a personal opinion about them. I chose to use SN websites as a basic resource in the research intervention for the following reasons: First: usage of SN websites in Saudi Arabia has increased dramatically and there is a lack of literature discussing how best to use these tools for learning purposes, and how to educate users (specifically students) on how to take advantage of them. Second: people are often very opinionated on SN websites, which means one can find an extensive range of opinions on any subject, which makes SN websites a good resource for evaluation and critique versus books and articles. Third: these activities require students to browse and critique a variety of different opinions on SN websites, and evaluate these opinions before accepting or rejecting them. With continuous practice on the research activities, students are able to understand that SN websites are just opinions and not scientific facts, which helps them critically assess information found on SN websites.

1.6 The importance of the research

The amount of information that students receive daily through the internet and application, such as SN websites, is increasing at an unimaginable rate. The concerns and opportunities that this imposes on our knowledge and understanding are also increasing. Having information so readily available brings with it the expectation that each student can and will increase their knowledge base to build on what they already know. However, without CT, students may fall prey to modern communication media, which presents a world where the pre-packaging of intellectual positions and views is so ingenious that thinking seems unnecessary (Macknight, 2000). As Macknight (2000, p.38), states, "Students must be able to examine logical relationships among statements of data, construct arguments, respect diverse perspectives, view phenomena from different points of view, and have the flexibility to recast their thinking when reason leads them to do so. This, too, requires critical thinking".

According to Alwehaibi (2012) and this research's pilot study findings, Saudi students at university level exhibit weakness in some CT skills, such as constructing an argument, making judgments that rely on evidence, seeing more than one point of view, and expressing their opinions. With such a significant lack of knowledge, with respect to the use of SN websites in higher education to improve students' higher thinking skills (Conole et al. 2006 and Minocha, 2009), especially in Saudi Arabian universities (Alebaikan and Troudi, 2010; Alshehri, 2010; Alhojailan, 2013), the importance of this research becomes apparent.

Research is needed to develop and facilitate the effective use of SN websites. This research contributes to knowledge in that field through the design, development and evaluation of SN website-based learning activities to promote students' CT skills, as well as by exploring other affordances provided by using SN websites in the field of education.

This study will add to the existing knowledge by providing insights on whether SN website activities affect students' CT skills and whether SN websites have the factors needed to motivate students to participate in learning activities. The findings will help teachers and lecturers become more aware of factors that may affect any course activity's implementation. It is hoped that the insights gained from the study will contribute to improvements in using SN websites in developing activities. Additionally,

that the outcomes will encourage teachers to consider the positive outcomes of using SN website-based learning activities to promote student's CT and writing skills. Finally, this study will provide some important insights into students' motivation and attitudes towards SN website-based learning activities. Teachers can consider the impact of the intervention on students' attitudes when applying such learning activities.

1.7 Research aims

The research aims to:

1. Determine whether students are able to evaluate different points of views from SN websites and express their own opinions through argumentative writing.

2. Investigate whether using tools that are attractive to the current generation, such as those found on SN websites like Twitter, Facebook, YouTube and blogs, can promote students' participation in course activities.

3. Explore the factors that affect students' participation in course activities.

1.8 Research questions

Students will use and evaluate different SN resources, such as YouTube clips, messages on Twitter, Facebook posts, Wikipedia content and blogs, throughout the learning activities used to develop and inform the present research. This will enable the following research question to be posed: What is the effect of SN website-based learning activities on promoting students' CT skills and their participation in course activities?

This question is divided into the following five sub-questions:

Question 1: Do SN website-based learning activities promote students' CT skills? This question investigates whether students are able to apply CT to their writing through the use of SN website-based learning activities, and consequently produce persuasive and organised argumentative texts.

Question 2: What are students' awareness of CT and argumentative writing skills before and after these activities? This question aims to gather information about students' thoughts about any changes in their CT skills.

Question 3: What are students' attitudes towards SN website-based learning activities? This question aims to explore whether students like or dislike these activities.

Question 4: Does merging SN websites' resources with the learning activities have an effect on promoting students' participation in the course activities? This question investigates whether merging SN websites in learning activities could encourage students to continue constructive work at home.

Question 5: What are the factors that affect students' participation in the learning activities? This question focuses on gathering data to determine what promotes students' participation in the learning activities.

1.9 Thesis outline

The remainder of the thesis is outlined below:

Chapter 2, Literature review: This chapter provides a review of the literature, highlighting the relationship between SN websites and CT to establish a conceptual framework to direct how data is collected and analysed in order to achieve this study's purpose. The review of the literature starts by providing definitions of the main concepts in the research such as CT skills and SN websites. The literature will then be discussed in relation to the suggested conceptual framework.

Chapter 3, The methodology: This chapter provides a brief overview of research paradigms, and describes my stance that was adopted to collect the data required to answer the research questions. Then, an explanation of the research context, participants, a brief introduction to the intervention, and procedures used for data collection and analysis are provided. This is followed by a description and discussion of the theoretical framework, trustworthiness of the research, and ethical issues.

Chapter 4, Intervention design: This chapter explains the intervention design, drawing on a design-based research (DBR) as the methodology of the research, along with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) learning design model that was used to design, develop and evaluate the research intervention. The design process is represented through the three phases of the study: two pilot studies and a main study. This chapter gives an overall view of the three phases of the study that led to establishing the intervention.

Chapter 5: Findings: This chapter presents the findings of the study. It is divided into five main sections, each answering one of the research questions. The Research questions are addressed by giving equal weight to the quantitative and qualitative data. There was overlap in the data presentation, where the findings were presented in relation to specific observations rather than by the data collection tool.

Chapter 6: Discussion: This chapter discusses and interprets the research findings using the relationship between the direct themes and indirect themes, which have all been collected from the research data. Additionally, this chapter will discuss the findings in relation to literature in the field.

Chapter 7: Conclusion: this final chapter aims to summarise the main findings, draw conclusions from the research questions, highlight the contributions of this research and provide recommendations for future research.

1.10 Conclusion

This chapter sets the scene for current research. It has shown that Saudi's society is a good environment for educational research and, in particular, this research area for several reasons: 1. The trend towards developing the educational and learning practices of Saudi's schools and universities. 2. The need to promote and improve students' higher level thinking skills such as CT skills. 3. The increasing interest of the current generation of students in SN websites. 4. The need to find new way to enhance students' CT skills using new technology. 5. The lack of research in the area of SN websites and their role in promoting CT skills. This research will fill the gap in the research regarding the effectiveness of using SN websites resources in an innovative way to promote students' CT skills.

Chapter 2 Literature Review

2.1 Introduction

This study investigates whether the use of social networking (SN) website-based learning activities can promote students' critical thinking (CT) and their participation in course activities. The following section provides a review of the literature, highlighting the relationship between SN websites and CT in order to establish a conceptual framework to direct how data is collected and analysed to achieve this study's purposes. The review of the literature will start by providing definitions of the main concepts in the research such as CT skills and SN websites. The literature will then be discussed in relation to the suggested conceptual framework presented.

2.2 Definitions of the concepts

2.2.1 Critical thinking

Alfadhli (2008, p.35) states, "While there is agreement regarding the importance of critical thinking skills in the learning process, there is less agreement on a definition of critical thinking". The first serious discussions and analyses of CT were made by John Dewey (1916, cited in Kuhn, 1999), who discussed the concept of critical thinking skills in education. Dewey saw CT as a process that begins with a problem and ends with a solution and self-interpretation. Bean (2011, p.3) elaborates on this point by stating that the problem should "evoke students' natural curiosity and stimulate both learning and critical thought".

Many researchers agree with Dewey's point of view that CT starts with students' engagement with a problem. For example, Kurfiss (1988, p.2) defined CT as "an investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that can therefore be convincingly justified". Moreover, Pithers and Soden (2000, p.238) state, "Critical thinking involves being able to identify questions worth pursuing, being able to pursue one's questions through self-directed search and interrogation of knowledge, a sense that knowledge is contestable and being able to present evidence to support one's arguments". This suggests that CT can be defined as an individual thought process that starts with the intent to solve a problem, or answer a

question, by examining different options and choosing the most suitable and logical one.

From a cognitive psychologist's view, Halpren (1997, p.4) emphasises that CT is the "use of those cognitive skills or strategies that increase the probability of a desirable outcome. It is used to describe thinking that is purposeful, reasoned and goal directed". Halpren (1997, p.4) states, "Critical thinking is purposeful, reasoned, and goal-directed. It is the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions. Critical thinkers use these skills appropriately, without prompting, and usually with conscious intent, in a variety of settings". In other words, when people think critically, they are evaluating the outcomes of our thought processes, how good a decision is or how well a problem is solved.

Furthermore, Paul (1992, p.1) states that critical thinking is "the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by observation, experience, reflection, reasoning, or communication as a rubric to belief and action". Paul and Elder (2006, p.4) expand on this point of view by defining CT as "the art of analysing and evaluating thinking with a view to improve it". These definitions indicate that CT is the ability to apply cognitive skills, such as analysing, applying and evaluating, when thinking.

From the above review of CT definitions, it is important to mention that no one definition of CT is applicable to every discipline at every level. Although researchers generally agree that CT is a high-level thinking skill, teachers' experiences and goals, as well as students' needs, determine the specific skills that need to be developed (Condon and Kelly-Riley, 2004). In this research, I define CT skills as "the ability to present an argument by presenting and evaluating different claims, providing evidence to support or deny these claims and providing a personal opinion about the main argument". The argumentative writing activity was the medium used to help deliver CT skills to students. I focused on these cognitive skills of CT in particular, because such skills are not commonly practiced in Saudi universities and fit appropriately with the research's context and aims (this is covered in more detail in section 2.3.2).

2.2.2 Social networking websites

Social networking (SN) websites are a central feature of Web 2.0 that focuses on common applications such as blogs, video sharing, social networking and podcasting; a more socially connected Web which allows people to contribute as much as they can consume (Anderson, 2007). Anderson (2007, p.5) defines them as "a group of technologies which have become deeply associated with the terms: blogs, wikis, podcasts, RSS feeds etc., which facilitate a more socially connected web where everyone is able to add to and edit the information space". Boyd and Ellison (2008) describe them as:

[W]eb-based services that allow individuals to (1) construct a public or semipublic profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site. (p. 211)

SN websites have been known by different terms such as social software and social media, which all imply networks that "allow users to connect with others with similar interests, build and maintain relationships with friends, and feel more connected with their community" (Cain, 2008, p.1). In addition to connecting users with each other, SN websites connect them with online resources and tools to facilitate media and information sharing, and allow for collaboration and participation (Evans, 2014). In other words, the main characteristic of SN websites is its ability to connect people anywhere and exchange and share information without barriers on distance. However, others prefer to classify SN based on the function it performs, such as Minocha (2009), who has categorised types of SN websites based on the website's main function and its applications. She classifies these websites into different types:

- Social software tools and discussions forums, such as wikis, blogs.
- Social networking sites, such as Facebook, Ning.
- Photo-sharing sites, such as Flickr.
- Social bookmarking.
- 3D virtual worlds, such as Second Life.
- Micro-blogging, such as Twitter.
- Web conferencing, such as Skype.

Dohn (2009) defined SN as a range of activities or practices, rather than technologies, characterized by issues such as collaboration, distributed authorship, openness and activity, which are all provided and established through Internet networks. It is important to note the difference between a technology and an activity to emphasize that using SN websites such as a blog, for example, as a technology or resource in teaching does not necessarily make it a SN activity.

Beetham (2013) and Qiao et al. (2009) describe learning activities as interactions aimed at achieving specific outcomes between students and their environment. Interactions may happen between students and teachers, with other students, or with resources, tools or services. In addition, Dabbagh (2005), Karns (2005) and Baharom (2013) argue that learning activities should engage students in meaningful and relevant tasks so that they can see the direct implications of their actions and further apply the knowledge gained in context. This suggests that it might be useful to design learning activities that provide tasks related to students' perspectives and context.

In this study, learning activities have been designed based on the different sources available through SN websites. In each activity, students were required to answer a question about a contentious issue as it related to the course syllabus. Students were asked to browse these sources and evaluate them, as well as share their argumentative essays, provide peer reviews and interact with each other. The results of the study were used to explore how these activities can affect students' CT skills and whether SN websites motivate students to participate in course activities.

2.3 The conceptual frame work of the research

Most researchers agree that CT refers to the use of cognitive skills or strategies, and that through teaching and coaching, students can master it (Fisher, 1998; Halpern, 1999; Pithers and Soden, 2000). Gelder (2005) explains that CT skills can be taught the same way other cognitive skills are taught. He claims that knowing the theory of CT and its related concepts, practicing these skills in real situations, and then transferring these CT skills to different situations makes students critical thinkers. It seems that there is agreement between researchers (Facione, 1990; Halpren, 1999, Kuhan, 1999; Pither and Soden, 2000; Fuiks and Clark, 2002 etc.) about the ability to teach and learn CT skills;

however, some of them disagree on several issues related to teaching and learning these skills:

- 1. Where to teach CT skills, whether CT should be taught in specific course of CT theory and skills or in general courses?
- 2. What CT skills should be taught?
- 3. How to teach and assess CT skills?
- 4. Can technology promote students' CT skills?

In order to organize the ideas and achieve the research's purposes, a conceptual framework of the main debates in the area of teaching CT was used. According to Miles et al. (2014), a conceptual framework is an analytical tool with several variations and contexts. It is used to make conceptual distinctions and organize ideas. The next section presents the conceptual framework of the research, and discusses the literature in light of the four main debates held by researchers in the field of teaching CT (Figure 2.1).



Figure 2.1 The conceptual framework of the research

2.3.1 First debate: Where to teach CT skills?

Researches disagree on where to teach CT; whether CT should be taught in specific courses of CT skills (CT as an isolated set of skills), or in general courses (as part of other subjects) (Perkins and Salomon, 1989). This section discusses this debate in more detail (Figure 2.2).



Figure 2.2 First debate, where to teach CT skills ?

2.3.1.1 Teach CT in specific courses

Critical thinking skills can be taught in a specific course that focuses on CT theories, skills and practices. Supporters of teaching CT as a specific set of skills suggest it should be taught as a dedicated programme that aims to provide students with the CT theoretical framework, concepts and skills. For example, Gelder (2005) claims that promoting students' CT begins by teaching them the basic elements. Students have to understand the theory of CT, the related vocabulary and specific skills. Williams and Worth (2001) investigated the difference effectiveness of teaching CT skills in specific courses compared with incorporating CT skills into general courses, not related directly to teach CT skills. They found that the first option offered some promise in promoting CT, while the other option produced marginal improvements in CT.

The outcome of many studies supports the idea that the best way to enhance CT is to teach its theoretical background. For example, Alwehaibi (2012) investigated the effects of a dedicated CT programme during a five-week intervention with 40 female undergraduate students in the English Department at Princess Noura Bint Abdulrahman University in Saudi Arabia. She found that the CT programme had a significantly positive effect on the students' CT skills. This result aligns with the findings of Bensley et al. (2010) of 47 psychology students who were tested at a small mid-Atlantic, public university. In their study, they compared the CT skills of 47 students, who had been broken up into two groups. The first group received instruction in CT skills during their course (students studied a methodological course that focused on statistics and was supplemented with a CT textbook). Students in the second group received instruction

that was focused on learning statistics, research design and methodology, as well as how to write an American Psychological Association (APA)-style research report, but they did not have explicit instruction in CT skills. The group that received instruction in CT skills showed a significantly greater increase in their argument analysis skills compared with the other group. These results support the researchers' views teaching CT skills require it to be taught as any other cognitive skill, which is by teaching it explicitly rather than incorporating it in a separate course.

Kuek (2010) also supports teaching CT skills through dedicated courses. He experimented with a 12-week intervention with two groups of university students in Sudan. The first group were taught reasoning and CT skills to enhance their argumentative writing abilities. The other group studied the same course (reasoning), but without the dedicated CT theory and skills component. He found significant differences between both groups. In the first group, students' CT, reasoning and argumentative writing skills improved radically after the intervention. Moreover, students' attitudes towards thinking skills were improved.

Although research provides evidence on the effectiveness of formally teaching CT, this strategy might not fit well within all educational systems. For instance, in Saudi Arabia not all university programmes provide CT components, so some students graduate without having had the opportunity to study CT, and hence may lack these skills as a result. Dedicated courses also rely heavily on the teachers themselves and their experiences (Alwehaibi, 2012), which affects the final output and the extent to which the aims of the individual courses are achieved.

2.3.1.2 Coach CT in general courses

Unlike the previous approach, Hatcher (2006) claims that CT skills must be a main part of any course and students should practice these skills in depth. In his study, he argues that an integrated approach to teaching CT achieves significantly better outcomes than teaching CT as a stand-alone course. Moreover, he states that one of the beneficial consequences of this approach is that it becomes possible for teachers from a variety of disciplines to provide the needed instruction in CT skills as part of their normally taught courses, rather than having to rely on select teachers to teach the skills in stand-alone courses.
Supporters of coaching CT skills as part of each course believe it is a mistake to concentrate on theory instead of practice. Perkins and Salomon (1989) claim that the mistakes teachers usually make stem from their belief that skills naturally follow from knowing the theory. Gelder (2005) argues that it is not enough to learn about CT; it is not enough to teach students a course on the theory of CT and assume that those students will end up better critical thinkers. Students need to practise these skills in different contexts.

Halpern (1999) notes that, after 25 years of work on CT theory and pedagogy, teaching students a set of thinking skills does not seem to be enough for them to master CT skills. Students should have the chance to practise CT skills in different contexts and in different situations in order to gain a more comprehensive understanding of the theory and how to apply it. Kuhn (1991) argues that if teachers want their students to master these skills, they should help them learn how to apply that knowledge and those theories in different situations. This suggests that CT skills should be a goal of each course.

Hager et al. (2003) gave an example of how to coach undergraduate students CT skills through science courses. They designed and evaluated tasks related to applications of chemistry and physics in everyday life with the goal of fostering CT skills of first year students at an Australian university. Students were required to complete tasks in cooperative groups and to interact in these groups in ways aimed at fostering some CT skills such as analyse arguments, ask and answer questions of clarification, define terms and judge the credibility of a source. Evidence obtained from students' discussion platforms, questionnaires and teachers' observations indicated that many students considered their thinking skills, and especially some CT skills, were enhanced by the experience of attempting the tasks in small co-operative groups.

Macknight (2000) argues that teachers can engage their students in a wide range of activities that can contribute to intellectual growth generally, and CT specifically. He confirms that CT affects all forms of communication - speaking, listening, reading and writing, and, as such, can be practiced daily in every interaction. It is not a separate activity from problem solving, creativity, inquiry or collaborative learning. Paul and Elder (2006) argue that any course should be designed to help students think within a discipline; and the only way to learn any discipline is to learn to think critically within that discipline. They indicate that students need to see that there is an ordered and predictable set of relationships for all subjects and disciplines. Every subject generates purposes, raises questions, uses information and concepts, makes inferences and assumptions, generates implications and embodies a point of view.

Duron et al. (2006) claim that all disciplines need to design and manage courses in such a way that ensures that students are effectively moved toward CT. They suggest a fivestep framework based on existing theory and best practices in cognitive development, effective learning environments and outcomes-based assessments. They argue that this model can be implemented in any course and will move students towards CT. This model consists of the following steps: 1. Determine learning objectives; 2. Teach through questioning; 3. Practice before you assess; 4. Review, refine and improve; and 5. Provide feedback and assessment of learning. In short, implementing CT through this framework clearly requires a commitment to active, student-centred learning. Furthermore, teachers should give thoughtful consideration to current instructional methods and the personal beliefs that drive them prior to contemplating this particular approach to teaching.

Halpern (1998) suggests a model that consists of four components to guide teaching and learning for CT: 1. A dispositional component to prepare learners for effortful cognitive work; 2. Instruction in the skills of CT; 3. Training in the structural aspects of problems and arguments to promote trans-contextual transfers of CT skills; and 4. A metacognitive component that includes checking for accuracy and monitoring progress towards the goal. Previous models show that teachers from any context can modulate their context on these models in order to enhance students' CT.

To sum up, the methods used to teach CT skills were to teach specific courses about CT theory and skills, or, alternatively, to coach students on CT skills as part of any course by providing students with different learning activities or teaching strategies aimed at promoting students' CT skills. Every approach has its own strengths and weaknesses; for example, the first option concentrates on the importance of learning the theory before practice, but is limited to some courses and subjects. On the other hand, coaching students on CT skills in every course they study ensures that students graduate with at least a minimum amount of CT skills. However, this approach requires special skills from teachers and a stimulating environment.

Since I teach students different courses in the ITD, that are not specifically related to CT theory and skills, I decided to adopt the second approach by coaching students on CT skills within these courses, specifically within 241 ITE (Learning Technology and Communication), without focusing on CT theory. Moreover, I considered CT as a thinking process reflected in students' writing, which was the medium used here to assess their CT skills; this is explained in more detail in section (2.3.3.2).

2.3.2 Second debate: Second debate: What CT skills should be taught?

Although there is agreement that CT is a human cognitive process that enables one to use a specific set of cognitive skills, significant controversy surrounds which skills should be taught to develop such thinking (Alwehaibi, 2012). Because of the multiple definitions of CT, researchers/teachers disagree about the skills that make a person a critical thinker. This section presents some CT skills' taxonomies (Figure 2.3).



Figure 2.3 Second debate, what CT skills should be taught ?

Many authors have tried to determine and classify the most important CT skills. Taylor (2002, p.12), for example, describes CT skills as "the ability to clearly communicate one's reasons for one's judgments". Furthermore, he posits that critical thinkers usually commit to their own position and at the same time have the ability to change their position if they face convincing evidence otherwise.

Giancarlo and Facione (2001) state that CT has conceptual connections with reflective judgment, problem framing, higher order thinking, logical thinking, decision-making, problem solving and use of the scientific method. Moreover, Swartz and Parks (1994) list thinking capably and carefully about causal explanations, predictions, generalizations, reasoning and the reliability of sources as major CT skills. Critical thinking is assumed to be in understanding and thinking within every context. Paul and Elder (2006) assume that CT is the ability to read, write, speak and listen effectively. It enables people to give meaning to events and patterns of events, as well as to assess the reasoning of others. They state that if students want be critical thinkers they should be able to master systems, become more self-insightful, analyze and assess ideas more effectively and achieve more control over their learning, their values and their lives. In other words, CT is a broad set of skills and characteristics that sustain and define lifelong learning.

Teaching CT skills and coaching them requires a careful review of the theory behind them and the related taxonomies. The literature on CT provides a number of taxonomies of CT skills. For example, Kuhn (1999) categorizes CT skills as metacognitive, metastrategic and epistemological. Metacognitive skills refer to people in control of their own beliefs in the sense of exercising conscious control over their evolution in the face of external influences. They know what they think and can justify why. Their skills in the conscious coordination of theory and evidence also put them in a position to evaluate the assertions of others.

As Kuhn (1999) states, people who have developed strong meta-strategic skills apply consistent standards of evaluation across time and situations. They do not succumb to a view of a favored assertion as more probable than its alternatives because of its favored status and, therefore, it is subject to different standards of evaluation. They also resist the offer of local interpretation.

Finally, according to Kuhn (1999), epistemological understanding is the most fundamental underpinning of CT as it helps people see the point of thinking in order to engage in it. If knowledge is entirely objective, unconnected to the human minds that do this knowing, or alternatively, if knowledge is entirely subjective to the tastes and wishes of the knower, then critical thinking and judgment are superfluous.

Another taxonomy is Dick's (1991) taxonomy. He reviewed research in the area of CT for the last forty years and indicated that CT consists of identifying and analysing arguments, of considering external influences on arguing, of scientific analytic reasoning and of logical reasoning. Dick (1991) suggested this taxonomy for CT:

- 1- Identify arguments: this includes themes, conclusion, reasons and organization.
- 2- Analyse arguments: this includes assumptions, vagueness and omissions.
- 3- Consider external influences: this includes value, authority and emotional language.
- 4- Scientific analytic reasoning: this includes causality, statistical reasoning and representatively.
- 5- Reasoning and logic: this includes analogy, deduction and induction.

In addition, Halpern (1998) proposed a taxonomy of CT skills as a guide for instruction, which consists of five main skills, listed below:

(a) Verbal reasoning skills; this category includes those skills needed to comprehend and defend against the persuasive techniques that are embedded in everyday language.

(b) Argument analysis skills; an argument is a set of statements with at least one conclusion and one reason that supports the conclusion.

(c) Skills in thinking as hypothesis testing; the rationale for this category is that people function like intuitive scientists to explain, predict, and control events.

(d) Likelihood and uncertainty; because very few events in life can be known with certainty, the correct use of cumulative, exclusive, and contingent probabilities should play a critical role in almost every decision.

(e) Decision-making and problem-solving skills; in some sense, all of the CT skills are used to make decisions and solve problems, but the ones that are included here involve generating and selecting alternatives and judging among them. Creative thinking is subsumed under this category because of its importance in generating alternatives and restating problems and goals (p.452).

In the Saudi context, Alwehaibi (2012) focused on the development of five particular skills: causal explanations, determining the reliability of sources, arguments, predictions, and determining part-whole relationships. She asserts this selection is based on their suitability in terms of the academic level of the students she studied and the importance of CT skills to students' learning and daily lives.

The consensus reached by the researchers and teachers, who participated in the American Philosophical Association's Delphi project on the definition of CT, is that the characteristics of a critical thinker include traits such as being inquisitive, fair-minded, flexible, diligent, and focused on enquiry (Facione, 1990). In Facione's taxonomy (1990, p.12), CT is made up of six main skills, each containing sub-skills, as shown below:

- 1. Interpretation
 - Categorisation
 - Decoding significance
 - Clarifying meaning
- 2. Analysis
 - Examining ideas
 - Identifying arguments
 - Analysing arguments
- 3. Evaluation
 - Assessing claims
 - Assessing arguments
- 4. Inference
 - Querying evidence.
 - Conjecturing alternatives
 - Drawing conclusions
- 5. Explanation
 - Stating results
 - Justifying procedures
 - Presenting arguments
- 6. Self-regulation
 - Self-examination
 - Self-correction

Facione (1990) asserts that CT is focused, self-judgment that results in interpretation, analysis, evaluation, and inference, as well as an explanation of the evidential, conceptual, methodological, or contextual thoughts upon which that judgment is based.

From the previous review of CT taxonomies, I found that Facione's (1990) taxonomy provided a wide view of CT skills. The taxonomy was a combination of skills indicated in other taxonomies. In addition, it provides detailed subskills, which makes it easier for a non-specialist in the CT field to understand and adopt it. Finally, several studies (Astleitner, 2002; Fuiks and Clark, 2002; Bers, 2005 and Hatcher, 2006) have reviewed or used this taxonomy and provided different experiences, which all serve as good references for any research in the field. Therefore, I decided to adopt and coach students on a core set of cognitive skills based on Facione (1990): interpretation, analysis, evaluation, inference, explanation and self-regulation, with minor adjustments of the sub-skills to fit this research's context and aims, (see Table 2.1).

	Main Skills	Sub-skills of Facione (1990)	Sub-skills of this research
1	Interpretation	CategorisationDecoding significanceClarifying meaning	• Develop a clear main argument that answers the given question.
2	Analysis	 Examining ideas Identifying arguments Analysing arguments 	• Describe the main claims of the argument and present a wide variety of viewpoints, judgments, and beliefs to support each claim.
3	Evaluation	Assessing claimsAssessing arguments	• Assess each claim about the argument and provide a personal viewpoint or opinion on it.
4	Inference	Querying evidence.Conjecturing alternativesDrawing conclusions	• Give clear and accurate reasons and examples to support each claim.
5	Explanation	 Stating results Justifying procedures Presenting arguments 	• Provide a personal viewpoint about the argument and present clear examples to support this position.
6	Self- regulation	Self-examinationSelf-correction	• Provide an answer that indicates a suitable review of a wide range of resources, and present clear and logically organised ideas.

Table 2.1 Adjusment on Facione's (1990) Taxonomy

Chapter 3, section 3.4.1 provides further explanations of how this study included the previous skills in the CT rubric and how it was used to assess students CT.

2.3.3 Third debate: How to teach and assess CT skills?

It seems evident from the literature that there is general agreement that CT includes a range of mental processes and skills such as interpretation, analysis, evaluation, inference, explanation and self-regulation. Nevertheless, it is important for the teacher to decide how to teach and assess these skills. Indeed, using strategies to teach and measure the improvement of CT skills is extremely complicated and diverse (Figure 2.4). I will discuss this matter in more detail in this section.



Figure 2.4 Third debate, how to teach and assess CT skills ?

2.3.3.1 Strategies to teach CT skills

With the different taxonomies of CT skills, it remains to ask what the appropriate strategies are for teaching CT skills. Different studies have discussed the effectiveness of using specific strategies to enhance CT skills, e.g., class discussions, problem-based learning, collaborative learning, discussion methods, questioning techniques and evidence-based projects (Kuhn, 1999).

In order to teach CT skills and enable students to master them, teachers should choose a strategy that encourages students to understand and apply such skills. Lawrence et al. (2008) examined teachers and students' views to determine from which activities CT skills best emerged. They found that both teachers and students thought that critiquing

journal articles, engaging in debates, writing research papers, evaluating case studies and discussing questions helped them practise CT skills. This can be accomplished by having teachers ask students to critique a journal article in a way that teaches them CT skills, such as asking them to look at multiple perspectives, question those perspectives, see if they have sufficient evidence/research to back up their claims and/or assess if the author of the journal is biased (e.g. is the article written in a way that only favors one side).

Questioning techniques, in addition, play an important role in inducing students' higherlevel thinking skills, such as self-reflection, revision and social debate, all of which are essential to CT. Socratic questioning is one of the most popular and powerful teaching approaches that can be used to guide students in generating thoughtful questions, and thus fostering their CT skills (Yang et al., 2005). Yang et al. (2005) investigated the effects of using Socratic questioning to enhance students' CT skills in an asynchronous discussion. They conducted the experiment for two consecutive sixteen-week semesters with sixteen veterinary undergraduate students at a Midwestern university in the United States.

The results of their study indicate that, with appropriate course design and instructional interventions, CT skills can be refined and maintained in Socratic questioning techniques (Yang et al., 2005). This may be because this questioning technique affords students the time needed for thoughtful analysis, composition, negotiation and reflection, as their discussion of an issue evolves and allows instructors to model, foster, and evaluate the CT skills exhibited during the discussion.

Pithers and Soden (2000) support the questioning technique as a strategy to enhance CT, and point to other approaches that, according to their review of literature, brought about changes in students' thinking. The most important of these involves students consciously reflecting on their main ideas and encouraging them to analyse these ideas. Students, for example, can be assisted in analysing their ideas by the teacher asking about similarities, assumptions, and alternatives; by questioning prior assumptions; by using classifications; and by deciding what data or information support the idea.

Furthermore, Hansen and Salemi (2012, p.98) made a strong case for using class discussions to develop higher-order cognitive skills. They noted that "in the course of discussion, students aim at producing their own answers and interpretations and at

understanding and evaluating the interpretations and opinions of their colleague". The dynamics and continued nature of an effective discussion allows for a flow of ideas and development of all participants' thinking. They suggest five steps to design a successful class discussion: "1. Defining the goals of the course; 2. Choosing materials; 3. Preparing sets of questions to guide the discussion itself; 4. Planning the mechanics of the discussion itself; and 5. Defining the responsibilities and evaluating the performance of discussion leaders" (Hansen and Salemi, 2012, p.41).

Tayler (2002) also believes in the role of classroom discussions to foster CT skills, as a classroom discussion about course content can teach students what to do with the content and provide students with an opportunity to practice forming their own judgments in an atmosphere that is safe, supportive, and instructive. Tayler (2002) elaborates by stating that teachers' roles are very important in the classroom as they can lead discussions in a way that helps students think critically. The role of the teacher is to arrange conversations by: 1. Deciding what kind of conversation to begin the class with; 2. Being aware of the type of conversation that is occurring at any given point; and 3. Asking the right kinds of questions to initiate the type of conversation the teachers wants to occur.

There is another, more specific, idea teachers can adopt that is likely to enhance CT. A reading strategy, specifically reading between the lines, and trying to understand hidden messages and arguments. To illustrate this, Pithers and Soden (2000) state that students might be asked to read a brief article that makes certain claims and are then tasked with suggesting ways of investigating the validity of these claims, implementing their suggestions and, finally, reaching a conclusion about the validity of the article.

Moreover, writing activities are a strategy that have been used for long time in the field of enhancing CT. Condon and Kelly-Riley (2004, p.66) assert that "writing acts as a vehicle for critical thinking, but writing is not itself critical thinking". Cohen and Spencer (1993) provide an explicit model for using writing to teach CT. They note that the writing process provides an essential structure by which students can generate ideas and clarify their thinking about the relationship between those ideas. They further assert that writing can be an effective tool for teaching students a key element in CT: how to develop persuasive arguments supported by logic and evidence. In a review of literature by Daempfle (2002), clarifying the relationships between writing and CT, he identified nine empirical studies that generally support the hypothesis that students who experience writing have higher reasoning skills than students who experience traditional science instruction. He found that the amount of time spent on, and the explicitness of instruction to teach reasoning skills, affected overall CT performance. Building on this concept, Bean (2011) provides guidelines on writing activities to promote CT skills. He emphasizes writing assignments as one of the most flexible and effective ways to integrate CT activities into a course because the writing process itself involves complex CT skills. He claims that writing activities that aim to promote CT should shift from topic-centered assignments to problem-centered assignments that are primarily argumentative or analytical.

Similarly, Quitadamo and Kurtz (2007) studied the efficiency of a writing strategy on students' CT. The participants included 310 non-major undergraduates who were taking biology to satisfy their general education science requirement at a state-funded university in the Pacific Northwest. In the study, they compared the CT performance of students who had experienced a laboratory writing exercise with students who experienced a traditional quiz-based laboratory exercise in a general education biology course. The effect of writing on CT performance was investigated using the California Critical Thinking Skills Test (CCTST). The results of their study indicated that the writing and non-writing groups differed significantly. The strength of the relationship between the writing/non-writing groups and their CT performance though modest was significant, accounting for more than 6% of the variance in critical thinking performance. Specifically, analysis and inference skills increased significantly in the writing group but not the non-writing group. Writing students also showed greater gains in evaluation skills; however, these were not significant. In short, previous reviews showed that writing is a useful strategy that can be used to enhance CT skills.

Pither and Soden (2000) suggest problem-based learning (PBL) as another strategy that seems promising for developing CT. Well-designed problem-based courses are likely to encourage students to think critically about content since the courses start with problems rather than with the content of the lectures and tutorials aimed at teaching students a body of knowledge. For example, students are required to understand and analyse the main issues within the problems, suggest a plan that might help resolve the problem, evaluate the proposed resolution and decide on the final solution.

Moreover, Tiwani et al. (2006) investigated the effects of a PBL approach on the development of students' CT compared with lecturing approaches. They examined 79 year-one undergraduate nursing students at a university in Hong Kong who were randomly assigned one of two parallel courses delivered by either PBL or lecturing over the academic year. The primary outcome measured was students' CT disposition, as measured by the California Critical Thinking Disposition Inventory (CCTDI). The findings showed that there were differences in the development of CT disposition between the two groups of students. The PBL students had significantly higher overall CT disposition scores on completion of the course compared with the lecture students; and they continued to have higher scores compared to the lecture students for two years afterwards, albeit to a lesser degree.

Questioning techniques, reading, writing and PBL approaches are quite similar to general academic study skills. Some researchers argue that there is an overlap between CT skills and other study skills, such as detecting fallacies, getting to know one's audience, critical reading strategies and writing skills (Stapleton, 2001; Bean, 2011). They assert the importance of recognizing the differences between them. Where CT is a thinking process, study skills are strategies to practice and reflect CT skills (Bean, 2011). To illustrate this, Bean (2011, p.4) gave the example that "writing is the process of doing critical thinking and a product that communicates the results of critical thinking".

A review of the CT teaching strategies shows that there are various methods and activities that can be used to enhance students CT skills. Therefore, I will summarise some suggestions that might assist teachers in choosing and applying the most suitable strategy: First, Moseley et al. (2005) suggest a framework encompassing understanding, thinking and learning. According to Moseley et al. (2005), CT skills can be promoted through the use of several strategies at the same time, such as using reading and writing approaches. They propose that engaging students in focused writing activities, which begin with different reading strategies and follow the argumentative and persuasive writing style, will improve their CT skills.

Second, Karns (2005) asserts the importance of providing strategies and activities that fit within students' preferences and perceptions. To support this, he conducted a study to investigate students' perceptions of learning activities using survey responses from 227

students at eight universities in the United States. He examined students' preferences and the effectiveness of some learning activities; he found that students saw internships, class discussion, and case analyses as the learning activities that contributed most to their learning. Therefore, he claims that responding to students' preferences, through the use of these strategies, helps promote student learning.

Finally, Edman (2002) argues that within the variations of teaching CT strategies, that, whatever strategy is used, should be well designed. The design process needs to be based on a set of models, theories and a revision of the course aims and components of CT that the designers want to enhance. It should also be designed based on students' context and background.

To conclude, the suggestions of Edman (2002), Karns (2005) and Moseley et al. (2005) assisted me in creating this study's strategy and procedures. In this study, I designed, developed and implemented an intervention that mixed different CT teaching strategies, questioning techniques, reading, browsing, peer review and writing, to coach students on CT skills. Learning activities based on a WebQuest model (explained in detail in Chapters 3 and 4) were designed. In these activities, students had to browse and criticize different sources on SN websites, then construct an argumentative essay that reflects their CT skills. This strategy was chosen with the students' needs in mind, as they lacked argumentative skills and had significant issues with their writing skills (as revealed in the pilot study findings).

2.3.3.2 Strategies to assess CT

At first glance, there seems to be overlap and confusion between CT teaching strategies and assessment strategies as many people think they are the same; however, there are differences between them. For example, if students are asked to write essays to promote their CT skills and encouraged to use higher level thinking skills, such as analysis and evaluation, the submission of these essays does not mean the students have mastered CT skills; teachers need an instrument to assess these essays and make decisions about them. It is the same with classroom discussions; even if students participate in classroom discussions, their participation does not necessarily indicate they have critical thinking skills. The effective assessment of students' CT skills is a major issue for higher education. The issue here is whether teachers, during the process of a CT assessment, can reliably assess the level of a student's CT (Quitadamo and Kurtz, 2007). In fact, assessment remains a major concern in developing instructional activities to enhance students' CT skills (ibid).

There are different approaches to assess CT skills (Ennis, 1993; Andrade, 2000; Bers, 2005; Paul and Elder, 2006 and Peach et al., 2007), and it is important for teachers, who would like to enhance these skills, to decide at an earlier stage what type of approach they will use and why. As Fadhli (2008) states, there are three main approaches to assessing CT, and teachers can use any of them based on their goals. These are: 1. Commercially available, general knowledge standardized tests; 2. Researcher or teacher designed assessments that attempt to capture aspects of CT more directly related to the purposes of the research project or subject of instruction, such as rubrics; and 3. Teaching students to assess their own thinking. This allows the teacher to build his/her own assessments to fit within the course goals, students' needs and the teacher's aims. The choice between these approaches will depend on the course's goal and aims, students' needs and abilities, and the ability and availability of the teacher.

Critical thinking standardized tests are one of the most popular tools used to assess CT and they have been examined and explained in several studies (Norris and Ennis, 1989; Pascarella and Terenzini, 1991; Pendarvis, 1996 and Bers, 2005). For example, the California Critical Thinking Skills Test (CCTST) is one famous instrument in this field that measures cognitive and meta-cognitive skills associated with CT. It is based on a consensus definition of CT and has been evaluated for validity and reliability for measuring CT at the college level for four years (Facione, 1990). The CCTST measures the cognitive skills indicated by a Delphi panel of experts on the component skills of critical thinking (analysis, inference, evaluation, induction, and deduction) (Quitadamo and Kurtz, 2007).

Another well-known measurement is the WSU Guide to Rating CT, which was developed by Washington State University (WSU). The earlier version of this instrument was first developed in 1997, and was used to evaluate students' CT through their writing abilities. Later, this instrument was improved to be adapted by teachers to suit their instructional and evaluative methodologies, and to be employed across the curriculum to evaluate students' CT outcomes (Condon and Kelly-Riley, 2004).

The rating procedures that are used in the WSU guide ensure that faculty are rating thoughtfully and consistently. Using a six-point scale for each dimension, teachers select one of the following levels as shown in the table below (2.2):

1	2	3	4	5	6
Not	Discernible,	Better than	Important	Better than 4,	Substantially
evident;	but not	2, but not	to the	but not yet 6.	developed;
can't find	developed	yet 4. Could	paper	May be	considered in
it		be confused,		substantially	full
anywhere		inconsistent		developed in	complexity;
in the				places, but	nuanced and
paper				not throughout	sophisticated
				the paper	
	1 Not evident; can't find it anywhere in the paper	12NotDiscernible,evident;but notcan't finddevelopeditanywherein thepaper	123NotDiscernible, but notBetter than 2, but notcan't find it anywhere in the paperdevelopedyet 4. Could be confused, inconsistent	1234NotDiscernible, but notBetter than 2, but notImportant to the papercan't find it anywhere in the paperdevelopedyet 4. Could be confused, inconsistentmortant to the paper	12345NotDiscernible, but notBetter than 2, but notImportant to theBetter than 4, but not yet 6.can't find it anywhere in the paperdevelopedyet 4. Could be confused, inconsistentImportant to the paperBetter than 4, but not yet 6.anywhere in the paperinconsistentImportant to the paperBetter than 4, but not yet 6.anywhere in the paperinconsistentnot here paperMay be substantially developed in places, but not throughout the paper

Table 2.2 WSU guide rating scale

Another guide for assessing CT was designed by Condon and Kelly-Riley (2004), and was derived from scholarly work, including Toulmin (1958), Facione (1990) and Paul (1992), and local practices and expertise, to provide a process for improvement and a means for measuring students' CT skills throughout their time at college. The guide can be adapted instructionally and can be used as an evaluative tool. It includes seven key areas of CT skills:

- 1. Identification of a problem or issue;
- 2. Establishment of a clear perspective on the issue;
- 3. Recognition of alternative perspectives;
- 4. Location of the issue within an appropriate context(s);
- 5. Identification and evaluation of evidence;
- 6. Recognition of fundamental assumptions, implicit or stated by the representation of an issue;
- Assessment of implications and potential conclusions (Condon and Kelly-Riley, 2004).

According to Condon and Kelly-Riley (2004), teachers are encouraged to use as many, or as few, of the seven points to emphasize in their classrooms based on the discipline,

their teaching styles, the makeup of the students in their course, and so on. Moreover, teachers are encouraged to distribute these criteria to students before assignments so that students can develop a clear understanding of expectations.

In terms of collecting and analysing CT tests, Bers (2005) reviewed the most popular CT tests and listed them as follows:

- 'Academic Profile'. This examines college-level reading and CT skills in the context of the humanities, social sciences, and natural sciences.
- 'College BASE'. This is designed to be administered after students complete a college-level core curriculum. It tests knowledge and skills in English, mathematics, science, and social studies, and gives performance rankings in higher-order thinking skills, such as interpretive, strategic, and adaptive reasoning abilities.
- 'Collegiate Learning Assessment Project' (CAL). In this assessment, the students are given open-ended tasks and asked to write essays in response. These are then assessed for their ability to identify the strengths and limitations of an argument; present a coherent argument in support of a proposition; or interpret, analyze, and synthesize information.
- **'Tasks in Critical Thinking'.** This test is performance-based and generates group rather than individual scores. Students are asked to solve a dilemma or task in an area of humanities, social sciences, or natural sciences. Teachers use rubrics to evaluate responses, targeting the skills areas of inquiry, analysis, and communication.
- **'Test of Everyday Reasoning'.** This thirty-five-item multiple-choice test is designed to assess an individual's or group's basic reasoning skills.
- 'Watson-Glaser Critical Thinking Appraisal'. This test was developed in the 1960s, and, in addition to a total score, it features five sub-scores in inference, recognition of assumption, deduction, interpretation, and evaluation of an argument. This test, as with all of the standardized tests presented thus far, is intended to test students' ability to think critically.

Although some of the previous tests are very common and have been cited numerous times in different research such as CCTST, they might not be appropriate for use in any study in any context. Teachers should have a defensible elaborated definition of CT

when selecting a test. Teachers must also have a clear idea of the purpose for which the test is to be used. Moreover, there are some limitations surrounding the use of standardized tests that were indicated by Ennis (1993); for example, 1. These tests should be examined twice, as a pretest and posttest, in order to determine if there is any improvement in CT skills; however, this implementation poses a potential problem of informing the students of the test questions. 2. Most of the CT tests are multiple-choice tests, which are not comprehensive; they lack information that is important in CT. 3. The differences in background, views and assumptions between teachers and students can sometimes result in different answers to test questions. 4. Results might be expected in too short period; learning to think critically takes a long time.

Other researchers, Ennis (1993), Quitadamo and Kurtz (2007) and Fadhli (2008) suggested different methods to assess students CT skills and to avoid the weaknesses of standardized tests; teachers can design their own scale to measure CT skills, which fit within the research aims and goals. Rubrics are one of the most common tools used to assess students' CT; a considerable number of example rubrics are now available as guides (Ennis, 1993; Facione and Facione, 1994; Andrade, 2000; Hersh, 2007; Mansilla et al., 2009). In order to design and use a rubric, Peach et al. (2007) assert that teachers must develop one that captures their learning outcomes in a way they find meaningful. The key is to "get it down, then get it right" (Peach et al., 2007, p.316). Moreover, teachers must learn that in developing rubrics they likely will not get it right the first time. If teachers understand that assessment is a journey, they will not expect perfection on the first try; instead, they will develop a usable rubric understanding that it can be improved over time (ibid).

Facione and Facione (1994) developed a four-level scoring rubric for considering the subject matter or context in which CT skills are applied, called 'Holistic Critical Thinking Scoring Rubric'. It does not enable an institution to compare students' results with national norms, but it is based on extensive research assessing CT. The scoring form consists of 4: Strong; 3: Acceptable; 2: Unacceptable; 1: Weak, and are used to assess the following skills:

- Interprets evidence, statements, graphics, questions, etc.
- Identifies the salient arguments (reasons and claims) pro and con.
- Analyzes and evaluates major alternative points of view.

- Draws warranted, judicious, non-fallacious conclusions.
- Justifies key results and procedures, and explains assumptions and reasons.
- Fair-mindedly follows where evidence and reason leads.

Writing has long been perceived as a tool to assess CT skills (Ennis 1993; Halpren, 2001; Beowen et al., 2004; Hersh, 2007; Quitadamo and Kurtz, 2007). Condon and Kelly-Riley (2004) clarify their opinion about using writing as a tool to assess CT:

The best way to learn to think is to read a lot of good writing and write a lot about what you have read. Writing and the communication of ideas are central to all disciplines whether one is in college or the workplace. One of the most important skills in the digital age is, in fact, one of the oldest - writing. (p.56)

Ennis (1993) suggests that teachers can let students write an argumentative essay and then analyse those essays using a CT scale or rubric designed by the teachers based on their need. Cottrell (2005) defined argumentative writing as a writing style where the writer persuades readers to accept certain positions or points of view, by supporting the opinions with appropriate reasons and evidence.

Stapleton (2001) proposed a model to assess CT skills reflected in argumentative text. His model was based on a review of the literature, a pilot study and well-established models for analysing argumentative writing (Toulmin, 1958, cited in Crammond, 1998). Stapleton (2001, p.44) claims, "Identification of arguments is based on semantic structures and linguistic elements that typically signal the presence of reasons". In addition, he states that to investigate the extent and nature of CT skills in writing, the following basic elements should be observed: arguments, claims, reasons, evidence, fallacy, conclusions, recognition of opposite viewpoints, and refuting opposition, (Figure 2.5).



Figure 2.5 Structure of argumintative writing (Stapleton, 2001, p.128)

According to Stapleton (2001), the argumentative structure consists of a statement of belief (claim) supported by reasons that justify the claims made, and that raise and address counter arguments. Moreover, argumentative writing might contain intermediate conclusions, which can also serve as reasons before the final conclusion is drawn.

In addition, Stapleton's (2001) model includes assessment scale to assess CT elements, not just an evaluation of the argumentative writing structure, by identifying and counting the key elements of CT displayed in students' writing, such as: (a) the number of arguments; (b) the extent of evidence provided; (c) the recognition of opposing arguments; (d) corresponding refutations; and (e) the number of fallacies. Stapleton's (2001) model provides an educated tool to assess students' argumentative writing and test their CT skills.

After this review, I decided to use writing as an assessment strategy to reflect CT skills similar to Cohen and Spencer's (1993), Ennis's (1993) and Cottrell's (2005) methods. Additionally, I focused on argumentative writing instead of any other type, such as descriptive writing, because I found this style suitable to the research context and strategy. Within the argumentative writing structure, I adopted the previous model by Stapleton (2001) to assess students' essays structure, as it provides a very clear structure that is easy for students who are beginners in writing skills to follow. However, I did not adopt Stapleton's scale, because I found Stapleton's (2001) assessment procedure too specific and more appropriate for students studying specific argumentative writing and CT skills curriculum and lessons, unlike this course. I developed a CT rubric that

combines Facione's (1990) taxonomy of CT skills and Stapleton's (2001) model of argumentative writing (see Table 2.1) to assess students' essays. The rubric's rationale, design and evaluation are discussed in more detail in Chapter 3, section 3.4.1.

2.3.4 Fourth debate: Can technology promote students' CT skills?

Many researchers have tried to investigate the role of integrating technology for learning purposes, as well as the use of technology to enhance CT skills. Reviewing the literature in this area is important to draw the final vision for the research intervention, where this research intends to use technology (SN websites) to deliver CT skills. Astleitner (2002) provided a narrative literature review on the effects of collaborative computer-supported environments, computer simulations and logic software on CT. His findings have been cross–referenced with the literature and will be described in the next section, (Figure 2.6).



Figure 2.6 Fourth debate, can students be taught CT skills thround echnology?

2.3.4.1 Using technology without any instruction

In this approach, the technology itself acts as a tool for solving given tasks without providing any instructional functions about CT concepts and skills (Astleitner, 2002). For example, a teacher's use of a PowerPoint presentation to illustrate the lecture, a student's use of Word software to complete their homework, or the use of e-mail to contact a teacher or other students. In this approach, technology does not offer any instruction or information about CT skills or how to apply them; it is just tool to facilitate the teaching and learning process.

Scarce (1997) tested this approach by examining the efficiency of using e-mail to exchange assignments and communicate with other students to promote students' CT skills. He conducted his study during his 10-week sociology class. Students were asked to read and react to a book selected exclusively for this assignment. He found that using e-mail as a communication tool without any further instructional function did not improve CT when compared with traditional classroom instruction. Moreover, Santos and Deoliveira (1999) found similar non-significant results when using the Internet for content presentation. These findings align with other research within this type of approach (Wilkinsone et al., 1997; Scare, 1997 and Duffelmeyer, 2000). Using technology, such as computer software and Internet websites, without providing any CT skills, as a way to enhance CT skills, is ineffective and does not improve CT skills.

In contrast, Jonassen et al. (1998) argue that technology can be used as content (for teaching about technology) and as a tool (for problem solving) in order to stimulate and support CT. Expanding on this point of view, Hopson et al. (2002) saw positive effects through the use of computer tools such as spreadsheets, databases and word processing software in promoting undergraduate students' high-level thinking skills and CT, when they were used to take notes, produce assignments and construct projects. Furthermore, Medley and Horne (2005) described how using simulation technology provided undergraduates with an opportunity for decision-making, team building and CT. These differences in research findings may be due to the rapidly changing nature of technology, and calls for further research in this area.

To conclude, it is clear that there is no consensus about the role of technology without any instructional functions on promoting students' CT. However, being critical of internet websites and having tools such as e-mail available does not guarantee CT (see section 2.3.1).

2.3.4.2 Using technology with direct instruction

In this approach, technology is used to deliver direct instructional functions in different subjects (Astleitner, 2002). For instance, the use of a learning management system such as Blackboard to deliver distance learning, or logic software, internet websites or computer simulations to deliver some teaching functions.

According to Yeh and Strang (1997), computer simulations provide an alternative setting for teachers-in-training to become capable cultivators of critical thinkers. A program called Computer Simulation for Teaching CT was developed to assist teachers and is based on the assumption that teachers, through reflective teaching, will improve their professional knowledge and thus develop effective strategies for teaching CT. They found that young teachers were better skilled at teaching CT after using a computer simulation modeling daily for classroom problems.

Another study by Gokhale (1996) examined the effectiveness of integrating guided discovery computer simulation into traditional lecture-lab activities to enhance students' higher order thinking skills such as problem solving. The sample included 32 students divided into two sections (control and experimental), enrolled in an electronics course offered in an industrial technology department at a state university in the Midwest (in the United States). The treatment was a computer-based simulation software that enabled students to experiment interactively with the fundamental theories and applications of electronic devices. It provided instant and reliable feedback. Based on the study's results, it was concluded that the computer simulation software was effective in motivating students into self-discovery and developing their reasoning skills.

Moreover, Salleh et al. (2012) developed several web-based simulations for learning Communication and Networking in Education and delivered it through an interactive web-based learning environment. The aim was to enhance students' CT based on interactive simulation features, social constructivist theory and CT skills. To evaluate the effectiveness of the framework and the approach, a case study involving 21 university students was conducted to investigate the impact of the simulations on the students' CT skills; the results showed that the implemented web-based simulation learning framework had a positive impact on students' CT skills.

In addition, drill and practice programs offer positive findings in this area of research. For example, Ellis (2001) examined the effectiveness of multimedia in developing the CT capabilities necessary for applying facts learned in solving problems. In his study, a computer-based tutorial, and drill-and-practice program were augmented with multimedia features and given to 38 male and female students enrolled in the introduction to Computers classes, and Medical Office Procedures in the Division of Continuing Education campus in the Nova Southeastern University in the United States. The findings demonstrate that multimedia enhanced educational products are potentially effective in developing CT skills.

Jonassen et al. (1998) investigated a different type of computer software called "Mindtools software" to promote CT. They describe this software as a computer application that, when used by students to represent what they know, engaged them in reflective CT about the ideas they are studying, and helped them scaffold different forms of reasoning about content. Therefore, they argue, that using this type of software helps in promoting students' higher level thinking skills such as CT. However, they stress the importance of conducting more research on this type of software.

Moreover, some learning management systems, such as blackboard, offer some features that support student-centered learning approaches (Hamish et al. 2005). This approach aims to develop learner autonomy and independence by putting responsibility for the learning path in the hands of students (Garrison, 1992). Researchers (Pedersen and Liu, 2003; Jones, 2007 and Hannafin and Hannafin, 2010) agree that this style of learning (students-centered learning) takes students seriously as active participants in their own learning and fosters transferable skills such as problem-solving, reflective thinking and CT.

Astleitner (2002) reviewed studies in the area of using technology with direct instructions to enhance CT (e.g., Stenning et al., 1995 and Gokhale, 1996). He stated that using technology, such as internet websites and computer software, to facilitate self-learning had a positive effect and can be used to enhance CT skills; however, he advised that more research was needed. Although there has been more research

conducted in this area than in the previous approach, because of the rapid growth of technology, more research is still needed.

2.3.4.3 Using technology with indirect instruction

In this approach, technology can deliver some instructional functions within a traditional learning environment, where the teacher still controls and evaluates the learning process (Astleitner, 2002). Based on my survey of the literature, it seems clear that this approach had been studied more extensively than the two previous approaches of integrating technology to enhance CT. The research provided different technology strategies that could apply within this approach, such as online-discussions, web-based learning, inquiry-based learning and SN websites. The next section provides some examples of this strategy.

Teachers can engage their students in a wide range of activities that can contribute to intellectual growth. Diamond (1998) reviewed students in the distance-learning program at the University of Massachusetts that have used the online Café (WebCT's chat) for idea generation and online help sessions. The bulletin board offers the possibility for coaching discussions to take students' ideas to the next level to attain deeper, more intellectual and reflective learning through e-mail, or enable faculty communication with students one-on-one or one-to-many. Presentation tools give students the opportunity to work collaboratively on project planning, peer editing, and research reports. All of these tools can give students practice in sharpening their CT skills. Moreover, Newman et al. (1996) explored the quality of learning and depth of CT in seminars conducted via a computer conferencing system. Their findings indicated that computer conference discussions had significantly deeper CT than face-to-face seminars.

According to Mandernach (2006), using online instructional technology to support the traditional classroom provides two distinct benefits for teachers wishing to enhance students' CT about the course material. First, it provides a means of moving lower-level learning tasks outside of class time, so that limited student contact time can be devoted to higher-order CT activities. Second, it fosters the use of constructivist teaching philosophies by supplementing traditional face-to-face activities with opportunities for individualized, in-depth interactions with the course material. However, the focus should not be on the technology itself, rather the emphasis must be on the careful

selection of appropriate online instructional strategies to meet course content and process goals.

A significant number of teachers have investigated the role of online discussions in their teaching. Simkins (1999) suggested that Web-based tools, such as online discussions, can provide a different learning environment with interesting new opportunities for collaborative learning. Chizmar and Walbert (1999) used online discussions to help students clarify their thinking on different topics explained in class, and to identify what they see as the most important or least understood idea that been discussed. Vachris (1999) used online discussions as part of a strictly online principles course to have students comment on a reading assignment.

Greenlaw and Deloach (2003) argue that when online discussions are used effectively they can provide a natural framework for teaching CT to a group, as they can capture the best features of traditional writing assignments and in-class discussions. They based this on several factors: first, online discussions change the focus of the learning process, replacing the single view of the teacher with a variety of views from students. Second, this variety of views implicitly requires readers to compare and evaluate them. Third, the asynchronous nature of online discussions allows participants time to reflect on what others have said and how they wish to respond. Finally, unlike class discussions, every participant has the opportunity to be fully heard.

In addition, Macknight (2000) confirmed that teaching CT through online discussions is an important strategy in advancing teaching and learning in electronic forums. He states that online discussions offer the potential for collaboration and increased participation in the learning process, as well as reflection, peer tutoring, monitoring of student learning as it is taking place and an extension of classroom learning. He suggests some steps that should be used to support online discussions:

- 1. Maintain a focused discussion;
- 2. Keep the discussion intellectually responsible;
- 3. Stimulate the discussion by asking probing questions that hold students accountable for their thinking;
- 4. Infuse these questions in the mind of students;
- 5. Encourage full participation;
- 6. Periodically summarize what has or needs to be done (p.39).

Finally, Mandernach (2006, p.45) suggests a similar type of online discussion he named "Online Asynchronous Threaded Discussions" to promote students' CT. Threaded discussion boards provide an opportunity to take advantage of the benefits of studentteacher and student-student interactions in an environment that encourages planned, meaningful, and prepared discussions. It creates an outlet for in-depth interactions that may require additional thought, investigation or research.

Another strategy that can be used to enhance CT through using technology is web-based inquiry learning such as WebQuest, which is a type of resources-based learning (MacGregor and Lou, 2006). It is a strategy that requires students to analyze, synthesize and exercise information seeking strategies that represent higher levels of thinking skills (Dodge, 1995; MacGregor and Lou, 2006). MacGregor and Lou (2006) argue that this approach has great potential to improve the development of higher-order cognitive skills, CT and problem solving skills that the fast paced information age demands. However, in order for it to work, students need support and a framework for developing the requisite skills.

MacGregor and Lou (2006) designed a WebQuest intervention to obtain a better understanding of how to enhance the pedagogical effectiveness of WebQuest and of how students interact with the various features inherent to informational websites. The main objective was to explore the effectiveness of inquiry-based learning on students' CT skills. Thirty-two students from fifth-grade classes were the subject for this inquiry based learning, specifically, WebQuest activities, in their science classroom over a three-week period. The findings indicated that concept mapping templates, coordinated with the research tasks, enhanced students' free recall, the application of acquired knowledge, and helped promote higher level thinking skills such as CT.

In inquiry-based learning, especially on the Web, there are a significant number of resources within a few easy clicks of a computer mouse. However, unlike reference books and journals in a library, anyone can publish on the Web without being reviewed or approved by experts, and without following any standards in the design of the website's homepage (Nielsen and Tahir, 2001). Thus, in Web resource-based learning, learners are challenged with the need to quickly and critically evaluate both the credibility and content relevance of a website for a given task (Case, 2003).

From this point of view, the initial idea of this research was established. I decided to use web-based inquiry learning (WebQuest) to develop learning activities. These activities depend on a specific type of source, all from SN websites, such as blogs, Wiki, Facebook and YouTube. I have chosen SN websites as resources for the following reasons (Bryant, 2006; Boyed, 2007 and Davies 2011):

- 1. Popularity: They are very familiar to, and used regularly by, this generation.
- 2. Exciting: They encourage participation.
- 3. Availability: Can access and search for resources easily.

Although there are deterrents or threats to using SN websites as resources such as its unreliability, since anyone can post unsuitable or unreliable information without limitation or corroboration of facts, I found that SN websites were the most suitable medium for designing learning activities aimed at promoting CT skills. The next section focuses on SN websites and their uses in the field of education for learning purposes and for promoting CT.

2.4 SN websites in education

The continued growth of educational technologies challenges teachers to discover a novel technology that will assist current learning situations and their objectives. The modern technologies and associated networks, such as blogs, wikis, YouTube, Twitter and Facebook, which are called Web2.0 tools or social networking websites (SN), have been studied intensively over the last decade, (see Bryant, 2006; Mandernach, 2006; Bosch, 2009; Carlisle, 2010; Buus, 2012). The literature of Jean (2006), Bryant (2006), Bosch (2009), Sun (2009), Carlisle (2010) and Buus (2012) indicate that using SN websites for educational purposes fits well within the current educational policies in many countries, such as United Kingdom and United States, that aim to develop their educational practices and outcomes. Furthermore, they align with several learning theories, such as constructivism and social constructivism, in addition to offering educational advantages in several learning situations.

Liccardi et al. (2007) state that SN websites provide many features that can serve the learning sector in different ways. First, multimedia, or any content on the web, can be highly useful in tagging learning materials for sharing between students. Second, SN offers recommendations, tagging and sharing of resources and ideas, which can be

highly beneficial given that students may not meet physically. Finally, the social value of face-to-face discussions can be partially replaced through the use of SN.

Davies (2011) delved deeper into how SN websites benefit students, to investigate the implications of SN for curriculum development. SN websites allow students to add to, and even shape, content collaboratively in an interactive world. Furthermore, students find themselves in a teacher-facilitated environment that can better accommodate their individual learning styles and that promotes student autonomy. Finally, teachers and curriculum designers can use such applications to design and share lesson plans and create curricula collaboratively through an online network that makes cooperation easier and more convenient.

Kelly (2008) made a comprehensive review of the current practice of using SN in higher education internationally and provided an assessment of its relative position in the UK and the likely associated consequences. The review covered five countries, Australia, the Netherlands, South Africa, the United Kingdom and the United States of America. It looked at the following: 1. The areas in which SN is being used, including academic and administrative support; 2. The drivers of using SN in these areas; 3. The issues encountered and the responses made; 4. The perceived advantages and disadvantages of SN use; and 5. Prospective developments in SN use.

Kelly (2008) concluded that some teachers are using SN to enhance their teaching because of the affordances that it offers, or because their students are using the technologies already and it helps with engagement. SN is being used in a wide variety of ways including encouraging student reflection through the use of blogs and commenting on the blog postings of their peers; collaborative work through collective development of artifacts in wikis and as a form of lecture replacement through podcasts and vodcasts. However, he indicated there were some issues encountered using SN such as privacy and safety, a lack of new pedagogical models and time consumption.

A review completed by Minocha (2009), and written from the teachers' viewpoint, attempted to find the following: SN websites characteristics, the theoretical underpinnings of using SN methods and tools in education, how SN websites align with standard learning theories such as constructivism and behaviorism, the benefits to students and teachers of using SN websites in learning and teaching, the disadvantages of using SN websites, the preferences of using SN websites and the relation between students' skills and SN websites.

Minocha (2009) indicated that the interactivity of SN provides two-way communication and so lends itself to collaboration, co-operation and the development of a learning community. From the teachers' viewpoint the interactive nature of SN provides several benefits for students; for example, it allows students to participate in collaborative work, provides higher quality learning outcomes, benefits from both peer recognition and peer review, supports group interaction, fosters a greater sense of community and encourages more active learning.

Minocha's (2009) review showed that there are some barriers to using SN website in education such as the fear of the unknown that throws up a combination of resistance and inertia, invasion of privacy, exposure to ridicule and the fear that some learners will be penalized by lack of prerequisite computer skills. In addition, the review showed that there are many forms of SN websites such as blogs, wikis, podcasts and social bookmarking. Most of the UK universities have embraced blogs and wikis in particular.

Additionally, Alabdulkareem (2015) investigated teachers' and students' positions and views in regards to the use and access of smart devices, the current use of SN websites, views of the impact of SN on education and views on the possible impact of the official use of SN on teaching and learning. Participants of the study were made up of 63 science teachers and 782 students in intermediate public schools in Riyadh, Saudi Arabia. The study results indicated that both the teachers and the students were willing to use SN in education and believe it would enhance their educational experience, although the current practice and application of SN websites in education is significantly low. There was agreement that the current use of SN is for socialisation only. Moreover, although the infrastructure is available, the comprehensive educational view is absent, therefore, the researcher suggests that there is a need for training to evaluate the use of SN and to enhance abilities to use the available properties.

2.4.1 Using SN websites for learning purposes

There have been several studies on SN websites, in general, to investigate their teaching and learning purposes. Most of these studies were a type of empirical study that investigated the role of using SN websites to achieve learning aims. For example, Cho et al. (2007) investigated the relationship between SN websites and learning performance in a computer-supported collaborative learning community. The aim of their study was to empirically investigate the relationships between communication styles, social networks and learning performance in a computer-supported collaborative learning (CSCL) community. The participants of the study were 31 students from two engineering schools at two large eastern universities in the United States. The sample was conducted on a first come first serve basis during each institution's course enrollment process. Using SN analysis and longitudinal survey data, the results showed that both individual and structural factors, such as communication styles and a preexisting friendship network, significantly affected the way the learners developed collaborative learning social networks. More specifically, learners who possessed high willingness to communicate or occupied initially peripheral network positions were more likely to explore new network linkages. Moreover, the study found that the resultant SN properties significantly influenced learners' performances to the extent that central actors in the emergent collaborative SN tended to get higher final grades. The study suggests that communication and SN should be central elements in a distributed learning environment.

In addition, Glud et al. (2010) and Buus (2012) showed that integrating SN websites into a problem-based learning (PBL) approach made good sense, as the main properties of SN websites (social, collaborative and production-orientated pedagogical strategies) aligned well with most interpretations of PBL. Yunus et al. (2012) investigated the advantages and disadvantages of integrating SN websites into English as a Second Language writing classrooms and discussed ways to plan activities by integrating SN websites into the classroom. Data was collected through an online discussion board from students in a state university in Malaysia. The findings revealed that integrating SN in writing classes could help expand students' knowledge, increase their motivation and build their confidence in acquiring writing skills. However, students faced difficulties concentrating on the materials when they used a computer, as there was lack of equipment as well as access to the Internet, and teachers had insufficient time to interact with the students. These were regarded as the main disadvantages of integrating SN websites into writing classes.

In contrast to the previous studies that studied SN websites in general, there are other studies that focused on specific websites. For example, Bosch (2009) studied students'

use of Facebook at the University of Cape Town, as well as lecturer engagement with students. He drew on a qualitative content analysis of 200 students' Facebook profiles and interviews of 50 undergraduate students and five lecturers. The study showed that while there were some positive benefits of using Facebook in teaching and learning, particularly for the development of educational communities, there were certainly challenges as well, including ICT literacy and uneven access.

Lam (2012) attempted to develop a model of student motivation in learning with four Facebook benefits: 1. Interaction; 2. Communication; 3. Social relationship; and 4. Participation. Students of the School of Continuing and Professional Studies at the Chinese University of Hong Kong were invited to participate in this study. The survey was conducted to examine how these Facebook benefits relate to student motivation in learning. The results revealed that teacher-student interaction, convenience of technology and student attitude toward Facebook, had a significant positive influence on student motivation in learning; and from a statistical result, 83.4% of the students' motivation in learning variance can be explained by these three variables. Students' attitude towards Facebook has the strongest influence on students' motivation in learning, which implies that this factor is the most important one in engaging students. These results can provide encouragement for teachers to use Facebook with students to enhance students' learning motivation.

Moreover, Sanchez et al. (2014) argue that in order to realize the benefits of technology, teachers must better understand how students use it. To shed light upon this, they conducted a study whose objective it was to identify the factors that may motivate students to adopt and use social networking tools, specifically Facebook, for educational purposes. A group of 214 undergraduate students at the University of Huelva in Spain participated in the study. The study showed that social influence is the most important factor in predicting the adoption of Facebook; students are influenced to adopt it to establish or maintain contact with other people with whom they share interests. Regarding the purpose of Facebook usage, social relationships were perceived as the most important factor among all of the purposes collected. Our findings also revealed that the educational use of Facebook is explained directly by its purpose of usage and indirectly by its adoption.

Grosseck and Holotescu (2008) studied another type of SN, Twitter. They claimed that Twitter proved to be an effective tool for professional development and for collaboration with students; and that it could improve the educational practices and model good pedagogy that is responsive to student's learning needs. Expanding on this point, Dhir et al. (2013) did a systematic review of previous literature and the different pedagogical and instructional benefits and drawbacks of Twitter use in education. They found that a large body of work discussed the role and use of Twitter in education; however, there was very little solid empirical evidence that confirmed the long-term positive impact of Twitter on students' learning and academic performance. Dhir et al. (2013) suggested a framework for future research on this topic. This framework showed Twitter had a positive impact on informal learning, class dynamics, learning, social skills, social interaction, motivation, academic and psychological development. It even helped students learn foreign languages. However, the long term impact of Twitter on learning, academic performance, and educational spaces are unknown at the moment; the educational field still needs more research to assess these effects.

Bicen and Cavus (2012) also investigated the usage habits of undergraduate students on Twitter. The study was conducted on 93 undergraduate students. The data obtained by the survey showed that a majority of the students spent most of their time on Twitter for personal and social purposes, not for educational purposes. Therefore, they argued that more research focused on the usage of Twitter in education is needed, due to its characteristics and students' interest in this social network.

From previous reviews, the literature on SN websites is split into two main categories: 1. Studies that describe the use of SN websites by teachers and students or 2. Studies that test the pedagogical efficiency of using these websites, which are considered empirical studies. Both of these categories either pick one of the SN websites to conduct a study on, such as Twitter or Facebook, or they study SN websites in general. In addition, previous reviews show that most of the studies conducted on SN websites and their efficiency in the educational field investigated areas such as students' interactions, social relationships, communication and facilitation, while a very limited number of studies explored SN websites' effect on enhancing students' motivation and participation. This means that more research focused on the role of SN websites to enhance students' participation is required. This research will assist in bridging the gap in terms of exploring the role of SN website to enhance students' participation in course activities.

In order to address the research objectives, I reviewed the literature to determine how previous studies used SN websites to enhance higher-level thinking skills, in particular CT, and if they had any affordances that could help teach and promote CT skills. The next section further discusses the use of SN websites to promote CT.

2.4.2 Using SN websites to promote CT skills

While reviewing the literature, I found that some studies tried to explore the effect of SN websites on teaching and promoting students' CT indirectly. The focus of the research was on other aspects, such as social relationships and communication that can, in turn, help promote students' CT.

According to Duffy (2008), participation via blogs can promote higher level thinking skills such as critical, analytical, creative, intuitive, associational and analogical thinking. He suggested several ways to uses blog in education in order to promote these skills, such as comments based on subjects and student responses; a collaborative space for students to act as reviewers for course materials; an online space for review of works and projects or a space to provide peer reviews. Duffy (2008) states that within the structure of a blog, students can demonstrate CT, take creative risks and make advanced use of language and design elements. In doing so, the students acquire creative, critical, communicative and collaborative skills that may be useful to them in both scholarly and professional contexts. The growing popularity of blogs suggests the possibility that some of the work that students need to do in order to read well, respond critically and write vigorously, might be accomplished under circumstances dramatically different from those currently utilized in education.

Moreover, Yang (2009) explained how he used blogs as a reflective platform on the student teacher training programme in Taiwan in order to encourage students to engage in CT. The student teachers made use of blogs as a platform to critically reflect on their learning processes as well as to gauge the impact of blogs on their own professional growth. He qualitatively analysed the data, which consisted of student teachers posting messages and comments on the blog. The findings showed that the student teachers actively discussed different topics related to their training programme and their

academic career through blogs. All the participants reflected on their experiences and made significant comments. However, using blogs for reflection does not guarantee CT skills will be acquired, so more research in this area is required.

In addition, Hadjerrouit (2011) claims that the collaborative feature of some SN websites, such as wikis, can potentially provide teachers with significant opportunities to enhance CT. He argues that wikis can create socially engaged tasks that require active student participation and collaboration. Wikis allow students to work together to develop content on the web, giving them a sense of how writing can be carried out collaboratively. This type of practice offers opportunities, not only to practice writing and reading skills, but also to stimulate reflection, knowledge sharing and critical thinking.

Mandernach (2006) argues that technologies such as blogs and wikis offer different instructional advantages in the promotion of students' CT skills, and he suggested some uses for these websites in order to enhance CT. For example, blogs may be used within a course management system (usually private) or on a number of free, public blog sites available throughout the Internet (typically organized by common theme, topic or point of interest). In addition, wikis have an advantage in that they allow students to easily add and edit content. As such, it is especially suited for collaborative writing or group projects, which, through practice, will enhance students' CT.

Yunus et al. (2012) state that using SN websites in writing and reading can improve creative thinking skills. Since students are writing directly on SN websites, shy students may be less afraid to post publicly. On the discussion platforms, offered through these websites, students exchange ideas in order to improve their CT skills. SN websites provide more access and opportunity for interaction, planning and gathering more information. In general, it could be effective for students to promote CT by practicing SN reading and writing activities.

To sum up, there are few novel practices for using SN websites to promote CT skills. Most of the studies I reviewed used SN websites as a platform for discussion and communication, on the basis that discussion in itself will develop CT skills. However, the use of SN in higher education is still at an early stage (Heibergert and Loken, 2011 and Alabdulkareem, 2015), so additional research is needed. Minocha (2009, p.248) confirms that "there are few guidelines for good pedagogical practice related to the design and assessment of learning activities employing social software tools"; and he highlights the following questions:

- How are learning activities designed to include SN tools in teaching and learning?
- What are the benefits and problems associated with the use of SN tools?
- What is the role of these tools in enhancing the learning and teaching experience?

This study aligns with Minocha's assertion that SN websites require further research into the additional affordances these websites can provide to improve different types of higher-level thinking skills. Her findings provide the basis for the current research's questions and intervention.

2.5 The research intervention framework

Reviewing literature in the field of teaching CT skills helped me establish the guidelines of the research intervention. Based on the four main debates in the field of teaching CT skills, I decided to adopt a specific strategy to design and implement the intervention. In the first debate, there was a question about where to teach CT skills, whether in a specific course of CT or in general courses (section 2.3.1); I decided to coach students on CT skills through a general course, 241ITE. The course covers how to use technology in education and is not related to CT concepts and theories. I taught this course at the university and decided to integrate CT skills within the course activities.

In addition, from the various taxonomies of CT skills, indicated in the second debate (section 2.3.2), I chose the most general one, Facione's (1990) taxonomy; and coached students on skills such as interpretation, analysis, evaluation, inference, explanation and self-regulation. This taxonomy was adjusted slightly to fit within this research's aims and context, as shown in Table 2.1.

Moving onto the third debate about how to teach and assess CT skill (section 2.3.3), I chose to deliver CT skills by combining several teaching strategies, such as using questioning techniques, browsing, reading, peer review and writing. Additionally, argumentative writing was the strategy chosen to assess students' ability to think

critically. Students had to write argumentative essays following Stapleton's (2001) structure of argumentative writing and were assessed based on a designed CT rubric that was created specifically for the purposes of this research.

Finally, the fourth debate concentrated on the ability to use technology to enhance CT skills (section 2.3.4). The research's intervention was based on the view of using technology with indirect instruction to enhance CT skills. Because this research was aimed at investigating the role of SN website in this field, I designed learning activities based on SN websites sources, modulated as WebQuest activities that were provided to the students as homework (see Figure 2.7). A full explanation of the intervention's design and implementation is provided in Chapters 3 and 4.



Figure 2.7 The research intervention framework
2.6 Conclusion

Based on the literature review and the four main debates indicated through it, I found a gap in the literature and the need for further studies on SN websites and their effect on promoting CT skills. The field of technology in education needs more ideas of how to integrate SN websites into the educational environment and how best to benefit from their properties to promote students' CT skills. As a result, I built my research intervention model based on a review of the literature and the research conceptual framework.

In this research, I investigated whether learning activities based on SN websites' resources provided in a general course (241 ITE), could promote students' CT skills. I coached students on these skills of CT: interpretation, analysis, evaluation, inference, explanation and self-regulation. Students were assessed based on a CT rubric, designed for this research, that assessed the improvement of their CT skills through their argumentative writing. The following chapter explains the research methodology and procedures, and describes the research intervention in more detail.

Chapter 3 The Methodology

3.1 Introduction

This chapter provides a brief overview of research paradigms, and describes my stance which was adopted to collect the data required to answer the research questions. This is followed by an explanation of the research context, participants and a brief introduction to the intervention. Then, the procedures used for data collection and analysis are provided. Finally, a description and discussion of the theoretical framework, trustworthiness of the research and ethical issues are presented.

3.2 Research design

This section presents an overall discussion of paradigms, followed by an explanation of how the Pragmatist paradigm has provided the foundation for this research.

3.2.1 Research paradigms

Research paradigms are related to how people conduct research, explain their findings and acquire knowledge, and is concerned with the reality of the phenomenon studied. Neuman (2011, p.94) described a paradigm as, "a whole system of thinking. It includes basic assumptions, the important questions to be answered or puzzles to be solved, the research techniques to be used, and examples of what good scientific research is like". Crotty (1998) asserts that adopting specific research paradigms can justify the researcher's choice of a particular methodology and methods.

In other words, according to Guba and Lincoln (1994, p.105), a paradigm is "the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways". Cohen et al. (2011) state that gaining knowledge stems from two philosophical notions: ontology and epistemology. Ontology is defined as "an area of philosophy that deals with the nature of being, or what exists; the area of philosophy that asks what really is and the fundamental categories of reality" (Neuman, 2011, p.92). Epistemology refers to "an area of philosophy concerned with the creation of knowledge; focuses on how we know what we know or what are the most valid ways to reach truth" (Neuman, 2011, p.93).

The epistemological view focuses more on the different tools and techniques needed to acquire that knowledge. In other words, it focuses on the research methods. This can be quantitative, qualitative or a mixture of both, known as the mixed methods approach (Bryman, 2012). Quantitative methods are a "strategy that [emphasize] quantification in the collection and analysis of data" (Bryman, 2012, p.35). Creswell (2014, p.4) describes this approach as "testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analysed using statistical procedures". This approach primarily deals with numbers and statistics and is best used in 'objective' studies.

Qualitative research methods, on the other hand, are a type of "research strategy that usually [emphasize] words rather than quantification in the collection and analysis of data" (Bryman, 2012, p.36). Creswell (2014, p.4) describes this research method as an "approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem". The most familiar qualitative approaches, according to Cohen et al. (2011), are case studies, action research and ethnographic studies. Qualitative approaches deal with words and are generally subjective in nature.

Finally, a mixed research method refers to a research study that "combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study" (Johnson and Onwuegbuzie, 2004, p.17). Creswell (2014, p.4) claims that a mixed research method "is more than simply collecting and analysing both kinds of data; it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research". Moreover, he argues that using a mixed research method leads to complete understanding of a research problem (Creswell, 2014).

Mixed methodology presents an alternative to the quantitative and qualitative traditions by advocating the use of whichever methodological tools are required to answer the research questions under study (Teddlie and Tashakkori, 2009). A mixed methods approach can compensate for weaknesses in other research methods, provide more comprehensive evidence and help to answer a broader range of research questions (confirmatory and exploratory). This approach also adds depth to quantitative results and allows for an investigation of certain issues from different perspectives. As a result, the validity of the study is strengthened. Choosing the research method - quantitative, qualitative or mixed methods - is not enough to conduct the research, the researcher should also decide at an earlier stage which approach to follow in order to understand the phenomena and interpret the data. Researchers should indicate their positions in terms of the research paradigm, positivism, interpretivism or pragmatism, as it helps to set the foundation for the research (Blaikie, 2010; Creswell, 2014).

Positivist research sees the reality as "consisting of discrete events that can be observed by the human senses. The only knowledge of this reality that is acceptable is that which [is] derived from experience" (Blaikie, 2010, p.97). It relies on seeing the reality from an objective perspective (Freimuth, 2009). Quantitative research is associated with the positivist paradigm.

However, the interpretivism research paradigm is "guided by the researcher's set of beliefs and feeling about the world and how it should be understood and studied" (Denzin and Lincoln, 2005, p.22). In this paradigm, the researcher's subjective interpretations are essential to understanding social phenomena (Ernest, 1994). Qualitative research methods are associated with the interpretivism paradigm.

In contrast to the positivist and interpretivism paradigms, Creswell (2014) argues that some researchers have a pragmatic worldview in which they believe that adopting both objective and subjective points of view provides the best understanding of a research problem. He states that the pragmatic paradigm forms the underlying framework of the mixed methods approach. Wahyuni (2012) states that instead of questioning ontology and epistemology as the first step, pragmatist supporters start off with the research question to determine their research framework. She argues that "pragmatism believes that objectivist and subjectivist perspectives are not mutually exclusive. Hence, a mixture of ontology, epistemology and axiology is acceptable to approach and understand social phenomena" (Wahyuni, 2012, p.71). Additionally, "pragmatist researchers favor working with both quantitative and qualitative data because it enables them to better understand social reality" (Wahyuni, 2012, p.71). To sum up, the pragmatism approach is based on both observable phenomena and subjective meanings and can provide acceptable knowledge dependent upon the research questions.

3.2.2 My stance and its implication

According to Delamont (2012), it is important to understand the researcher's perspective, positionality and related implications for the research process. The researcher's own paradigmatic associations have important implications for the way they approach research. Introducing and applying an educational intervention with students will most likely produce a positive effect in some way, such as in their attitudes, perceptions or achievements. Therefore, in addition to understanding the effect of the research intervention (SN website-based learning activities) on students' improvements in the CT skills, I also want to understand how students accept, handle, think and behave towards it. The quantitative data I gathered from the CT rubric and the questionnaire were not enough to explain the findings, so other types of data that assist in interpreting the findings and providing a full picture of the reality were used.

Due to the research questions and requirements, I opted to focus on the pragmatic paradigm, as it was the most relevant to this study; and I decided to use a mixed methods approach for three reasons: 1- To focus on practical applied research, and integrating different perspectives helps interpret the data and understand the research problem. 2- My interest in both narrative and numerical data as well as the analysis; and 3- It is in line with the research design that I used in my study, Design Based Research (DBR), (explained in detail in Chapter 4). Maxcy (2003) argues that DBR methodology should base assessments on a wide variety of indices using multiple methodologies. He states, "It is perfectly logical for researchers to select and use differing methods, selecting them as they see the need, applying their findings to a reality that is both plural and unknown" (Maxcy, 2003, p.59). Anderson and Shattuck (2012) further elaborate by stating that DBR is largely agnostic when it comes to epistemological challenges due to the choice of methodologies used; and it typically involves mixed methods using a variety of research tools and techniques.

Of the different typologies for mixed methods strategies, the convergent parallel mixed methods design was used to conduct this research. I collected both quantitative and qualitative data, analysed them and then compared the results to see if the findings confirmed or disproved each other. The CT rubric and students' questionnaires were used as the quantitative data collection method and focus groups, observations and students' reflections were used as the qualitative data collection methods. Within the

convergent parallel approach, I adopted the embedded mixed methods approach, where the qualitative and quantitative data were collected and analysed synchronously (see Figure 3.1 and Table 3.1). Creswell (2014), states this approach nests one or more forms of data (quantitative or qualitative or both) within a larger design such as ethnography or experiment, and that it is ideal, in cases like this study, when the researcher needs to test an intervention or program in an applied setting.



Figure 3.1 Embedded mixed methods (Creswell, 2014, p.221)

Semester weeks	Action
During the semester weeks, while implementing the intervention (activities)	CT rubricObservationsStudents reflections
End of the semester	Student questionnaires

Student focus groups

Table 3.1 Data o	collection	sequences
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The previous table (3.1) shows that data from the CT rubric, observations and students reflections were collected continuously throughout the semester, and some of the data was used to construct the questions for the focus groups and improve the questionnaire. The student questionnaires and focus groups were then conducted at the end of the semester. Further explanation for the research tools and their implementation is located later in this chapter, section 3.4.

3.3 Main research procedures

3.3.1 Research context

Researchers agree that understanding the participants' context is essential for the researcher to explain the participants' behaviours and developments; and, it helps the researcher conduct efficient analysis and provide deeper interpretations (Van der Veer, 2007). To enable me understanding my research participants' context, I chose a context that is familiar to me (as a researcher) to conduct my research where I have worked for eight years - in the Department of Instructional Technology (ITD) at King Saud University's (KSU) female campus. In order to minimize drawbacks that might be caused by a researcher applying multiple roles in the research, specifically, separating my role as a teacher from my researcher role, I adopted several procedures discussed later in sections 3.7 and 7.4.2.

Learning Technology and Communication (241 ITE) was the course chosen for this research, as the main aims of the course are to introduce communication theory and the use of instructional technology for learning and teaching purposes. This course is a requirement for all students in the School of Education, and students have to take it before they graduate. It is a 16-week course, two hours per week, 32 hours of face-to-face, classroom time per semester. The total mark comes from different methods of assessment. There are the midterm and final exams, which constitute 60%, in addition to 40% from different assignments during the course (see Appendix 3.1).

Each semester there are several classes of the 241 ITE course taught by different faculty from the ITD and I teach some of the female classes. Students are provided with a full description of the course curriculum, syllabus and requirements at the beginning of the semester.

3.3.2 Participants

The participants who were involved in this study were undergraduate students from the School of Education at KSU. All the participants were majoring in Education and studying to become teachers. As mentioned in Chapter 1, the educational system in Saudi Arabia is not coeducational as males and females study at separate campuses and are typically taught by professors of the same gender. Therefore, the participants of this study were only female students. They ranged in age between 20-23 years, were all Saudi nationals and spoke Arabic as a first language.

In addition to some information gathered from the pilot study (see Chapter 4), as well as my experience teaching this course, I concluded that teaching this course was affected by several factors, such as the students' academic specialities. In general, the students from departments such as Special Education and Islamic Studies had a higher GPA (Grade Point Average) than students from other departments, and seemed to show more of a commitment to working hard and studying. Additionally, the time the class is taken seems to play an important role in students' participation and motivation in the course. Students tend to prefer the morning class more than the afternoon class. As a result, I decided to choose a class randomly to ensure that nothing would affect the research findings. This was especially important because I wanted to understand the average students' experience with the learning activities rather than simply gather information about specific students. The class that I taught was an afternoon class (from 1-3pm), and consisted of 33 students from different specialties in the School of Education, such as Islamic Studies, Arts, Kindergarten Studies and Special Education (see Table 3.2).

Participants	Students' specializations	Sum
11 students	Kindergarten Studies	24 students
6 students	Islamic Studies	completed
6 students	Special Education	the study
1 student	Art studies	
	· ·	·
1 students	Dropped out of the study	9 Students
8 students	Withdrew from the course	

Table 3.2 St	udy's p	articipants
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Out of 33 students who started the course, 24 of them completed the study successfully. Eight of the students withdrew from the course, but were able to take this course requirement in another semester; and one dropped out of the study, but completed the course. The student who dropped out of the study, but stayed in the course, did not participate in the learning activities used in the study and was assigned a different project (descriptive research).

3.3.3 Intervention

The research intervention is a type of learning activity (homework) given to the students to practice their knowledge, gain more information about specific topics that were challenging in the classroom, and build their CT skills. The activities are based on the WebQuest model. I used the 241 ITE course syllabus (lessons) and different SN website resources to support the main topic of some lessons. The design included open-ended questions, which students had to answer using a set of CT skills that were reflected in an argumentative writing style. For each activity, I provided students with a set of SN website resources that were related to the activity question. I asked them to think critically about the content of these websites, and in turn, to construct an argumentative essay to answer the question, see Figure 3.2, the process page in a typical activity. A full English example of one of these activities is in Appendix 3.2.



Figure 3.2 Typical activity process page

The intervention was designed and implemented through several stages drawing from the ADDIE (Analysis, Design, Development, Implementation and Evaluation) learning design model (Branch, 2009). It passed through two phases (phase 1 and 2) of study and improvements to meet the purpose and needs of the main study. The intervention design and process is described in more detail in Chapter 4.

3.3.4 The reviewers

I decide to involve two reviewers into the research process. They were two postgraduate students at the ITD at KSU. I selected them due to their request to participate in this

research, their qualifications and their ability to perform research. They were responsible for several things: 1- Assessing students' essays based on the CT rubric; 2-Attending classes and observing students while I was teaching them; 3- Observing the focus group sessions. In fact, involving these two reviewers in some of this research process helped to enhance the present study's credibility and dependability as will be shown later in this chapter in sections 3.7 and 3.8.

Before starting the study, I met with reviewers several times. At the first meeting, I met with them to explain the aims, goals and tools of this research and what I expected them to do. Then, we met again to discuss at length the principles underpinning each tool. For instance, we discussed the CT rubric and each criterion and the methods to assess students' essays based on it. These meeting continued throughout the semester and whenever there was a need. For example, after the first rating of students' essays, we met and discussed our assessments of the sample papers.

At the beginning of the semester, I introduced the reviewers to the students, and explained to the students their role in the course and in what areas they would be providing help. As the semester progressed, a good relationship between the students and the reviewers was established. Students started to express their points of view and discuss matters in front of the them without concern or embarrassment. This helped the reviewers provide me with a clear picture of students' attitudes and behaviours.

3.4 Data collection and research tools

There were five data collection methods that were used throughout the main study. I used both quantitative and qualitative data collection methods. The summary of the overall data collection methods that was used to answer the research questions is presented in Table 3.3, and the design and rationale of these tools are explained in detail later in this section.

Research Question	Themes explored	Tools answers the questions
RQ1: Do SN website- based learning activities promote students' CT skills?	Whether students are able to apply CT to their writing through the use of SN website- based learning activities, and consequently produce persuasive and organised argumentative texts.	 CT rubric Students' questionnaires Students' focus groups Observations
RQ2: What are students' awareness of CT and argumentative writing skills before and after these activities?	Information about students' thoughts about any changes in their CT skills.	 Students' questionnaires Students' focus groups Students' reflections Observations
RQ3: What are students' attitudes towards SN website-based learning activities?	Whether students liked or disliked these activities.	 Students' questionnaires Students' focus groups Students' reflections Observations
RQ4: Does merging SN websites' resources with the learning activities have an effect on promoting students' participation in the course activities?	Whether merging SN websites in learning activities could encourage students to continue constructive work at home.	 Students' questionnaires Students' focus groups Students' reflections Observations
RQ5: What are the factors that affect students' participation in the learning activities?	Data to determine what promotes students' participation in the learning activities	 Students' questionnaires Students' focus groups Students' reflections Observations

Table 3.3 Overall research questions and data collected

3.4.1 Design and rationale of the CT rubric

As explained in detail in Chapter 2, sections 2.3.2 and 2.3.3.2, the present study assessed the improvement in students' CT skills as reflected in their argumentative writing using Stapleton's (2001) model of argumentative writing structure and Facione's (1990) taxonomy of CT skills. Reviewing the literature showed that rubrics were a good tool in my case and allowed to me to design a specific tool to assess specific skills.

Paul and Elder (2006) defined a rubric as a tool that contains particular standards and scoring guides, which are used to assess students' achievements or outcomes. Andrade (2002) stated that rubrics help teachers assess students' projects quickly and efficiently,

as well as help teacher justify the grades they assign to students. Andrade (2002) claimed that rubrics are teaching tools that support student learning and the development of higher level thinking skills. Rubrics have been increasingly used in the field of education to assess students' performance and improvement in different areas, such as thinking skills, reading and writing.

For this study, I developed a CT rubric that included Facione's (1990) taxonomy; and I made minor adjustments to the sub-skills of the taxonomy to fit within the research aims and context as shown below (explained in detail in Chapter 2, section 2.3.2):

- 1. Interpretation: Develop a clear main argument that answers the given question.
- 2. **Analysis:** Describe the main claims of the argument and present a wide variety of viewpoints, judgments, and beliefs to support each claim.
- 3. **Evaluation:** Assess each claim about the argument and provide a personal viewpoint or opinion on it.
- 4. Inference: Give clear and accurate reasons and examples to support each claim.
- 5. **Explanation:** Provide a personal viewpoint about the argument and present clear examples to support this position.
- 6. **Self-regulation:** Provide an answer that indicates a suitable review of a wide range of resources and organises ideas clearly and logically.

Each of the previous criterion had three level of quality, which were labelled as Qualified (1 point), Developing (0.5 point) and Beginner (Zero); and each had a specific description, which made it easier for the students to assess themselves. The rubric and its criteria were explained to the students in the first class of the semester, when I introduced the intervention to them, and was published in the WebQuest as well. Students were asked to check the criteria each time they began to write an essay (the Arabic version of the rubric and its English translation are included in Appendix 3.3A and 3.3B, respectively). The reliability and validity of the rubric are explained later in this chapter in section 3.7.

3.4.2 Design and rationale of the questionnaire

Ruane (2005, p.123) stated that a questionnaire is a "self-contained, self-administered scale for asking questions". Questionnaires come in different formats such as scales,

true-false items, multiple-choice items, or rank order items, and types such as closedended and open-ended (Bryman, 2012).

In this study, closed-ended questionnaires were chosen because specific answers were required. The questionnaire had three purposes: 1- To explore students' general attitudes toward the activities, their design and their procedures; 2- To gather information about students' feelings about any changes in their skills; 3- To explore students' CT skills before starting the course (CT baseline); and 4- To gain a better understanding of the factors that affect students' participation in the course activities.

The questionnaire included three formats and sections: the first section contained a Likert-type scale, where students had to indicate their answers on a 5-point scale: strongly agree, agree, neutral, disagree, and strongly disagree. However, when I presented the findings (Chapter 5), the 5-point scale was collapsed into a 3-point scale: the "strongly agree" and "agree" was collapsed into "agree" and the "strongly disagree" and "disagree" was collapsed into "disagree". This was done to facilitate comparison between the groups. This section included three components composed of 26 statements. The first component had five statements about the design and efficiency of the activities, the second component had 12 statements about students' attitude toward these activities, and the last component had nine statements about the role that the SN websites played in the success of the activities.

The second section was in the form of 12-paired questions that asked about each CT skill indicated in the CT rubric; this assessed whether the student thought she had these skills or not. In addition, it investigated whether the students thought they acquired these skills from the activities applied in the course or if they knew them before. The general aim of this section is to gather information about students' CT skills baseline and students' thoughts about any changes in their CT skills after the intervention. To illustrate, the questions came in this form (one example):

Q1: Writes a clear introduction about the main topic.

 \Box Yes. \Box No. \Box I have not mastered this skill yet.

Q1.1: I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it through this course.

The last section questioned ranking, where students had to rank a number of factors from 1 to 8 on level of importance, where 1 represented most important and 8 least important, with regard to the structure and procedure of the intervention. This section was intended to gain a better understanding of the factors that affect students' participation in course activities.

The questions and the structure of the questionnaire were informed by the literature, the findings of the research phases (Phases 1 and 2) and ideas from previous studies (Chapter 4 explains the development and evaluation of this tool). Moreover, the questions/statements that were developed took into account the list of considerations for formulating questions and responses to questionnaires, as outlined by Kumar (2007) and Bryman (2012). This included the fact that questionnaires should use simple language and avoid technical phrases. Ambiguous questions were to be avoided as they could be interpreted differently by different participants. In addition, questions based on assumptions were to be avoided; this meant that questions and the choice of answers had to be clear. The initial draft of the questionnaire was piloted twice during this research and several improvements were made; section 3.7 explains the reliability and validity of the questionnaire.

The questionnaire was administered face-to-face and distributed by hand to the students at the end of the semester during the last class. All 24 students completed the questionnaire. In order to ensure that students found it easy to respond to the questionnaire, it was produced in Arabic, the participants' first language. The questionnaire in Arabic and its translation to English are shown in Appendix 3.4A and 3.4B, respectively.

3.4.3 Design and rationale of the Focus groups

A focus group involves a small group of people discussing meaning by building on each other's experiences and remarks (Cameron, 2005). Teddlie and Tashakkori (2009) argue that a focus group is a separate data collection strategy and that it combines interview and observational techniques. Redmond and Curtis (2009) state that the focus group is different from all other types of research because data is generated and collected through the group setting. Cameron (2005, p.159) claims that "the interactive aspect of focus groups provides an opportunity for people to explore different points of view, and formulate and reconsider their own ideas and understandings".

Several researchers recommend using focus group instead of individual interviews when the interaction between the group members is important for collecting data. In addition, Kitzinger and Barbour (1999) argue that focus groups are invaluable for examining how knowledge, ides, experience and opinion exchanges operate within a given cultural context, unlike individual interview, which focus on tapping into individual biographies. Based on these recommendations, I found focus groups more suitable for my research context and participants, as I thought the interaction between students might encourage them to express their opinions freely and feel more comfortable to talk as a group in front of me (their teacher).

At the end of the semester (week 16), I asked students to participate in focus groups to discuss some issues that would assist in gathering sufficient explanations for the current research questions. The focus group had three main purposes: 1- To gather sufficient explanations for the current research questions and the issues highlighted in the observations and students' reflections; 2- To triangulate the data collected from the other tools to fill in any gaps in the research; 3-For the students to further elaborate on any detail that might help the researcher understand the impact of the intervention.

Similar to interviews, focus groups have three main types: structured, semi-structured or unstructured (Dornyei, 2007). Dornyei (2007) distinguishes these three types of focus groups and states that semi-structured focus groups offer a middle option between complete structure and no structure at all. He claims that a semi-structured focus group is useful when "the researcher has a good enough overview of the phenomenon or domain in question and is able to develop broad questions about the topic in advance" (p.136), which was the case in this study.

This study employed a semi-structured focus group which consisted of a set of prepared questions that were mostly open-ended. I employed open-ended questions as they allowed more room for general information on the issues discussed. I was then able to gradually add specific questions to obtain answers to particular issues. Full focus group questions translated to English are in Appendix 3.5.

I noticed from students' reflections and the class observations that students resisted talking about their experiences. Therefore, in order to avoid a lack of information in the focus groups, I decided to follow Kitzinger and Barbour's (1999) advice of providing the participants with exercises and materials to encourage them to participate, such as a

flip chart and pens to list key concerns, or showing them advertisements, leaflets or cartoons as stimulus material. Kitzinger and Barbour (1999) argue that using these tasks encourage participants to concentrate on one another rather than the group facilitator, and may force them to explain and defend their differing perspectives. They focus discussions around key points of interest to the researcher and facilitate comparisons across the group.

In this research, I developed my approach to stimulating discussions, I merged the focus group questions with a drawing activity to encourage students to participate. To illustrate this, at the beginning of the focus group, I asked students to draw a picture of themselves (how they describe their engagement in the research intervention and how they see the previous experience), and when they finished, I asked them to explain them. I found this approach very helpful encouraging students to participate in the discussion freely and without stress, moreover, it encouraged some of the shyer students to participate and reflect their opinions clearly.

As the participation in this study was voluntary, I passed around a sign-up sheet to the students, asking them to indicate whether they would like to participate in the focus groups and the time that was most suitable for them. Twelve students agreed to participate and were distributed into four focus groups (see Table 3.4).

Focus group	Participants
FG #1	Stu ¹ 8, Stu9, Stu16 and Stu21
FG #2	Stu10, Stu17 and Stu24
FG #3	Stu22 and Stu23
FG #4	Stu6, Stu12 and Stu19

Table 3.4 Students distribution in the focus groups

Each focus group lasted for about 60 minutes and was conducted in Arabic, which is the students' first language, to ensure that they felt comfortable and to elicit better responses as they would be able to express themselves more freely. I facilitated all of the focus groups and transcribed them from voice recordings to stay familiar with the content. In addition, I asked the reviewers to attend the sessions, observe the focus groups and add any comments they had to the transcripts. All the transcripts were

¹ See students list in Chapter 5, Table 5.1

checked against the voice recording again to ensure accuracy. A translated transcript of one of the focus group sessions is located in Appendix 3.6.

3.4.4 Design and rationale of the observations (Teacher log)

Observational data collection strategy is defined as the "recording of units of interaction occurring in a defined social situation based on visual examination or inspection of that situation" (Teddlie and Tashakkori, 2009, p.218). Millis (1992) stated that observations conducted systematically and professionally can provide significant documentation of what happens in reality. Delamont (2012) indicated some positive implications for conducting observations; for example, it can help with data analysis and interpretation by providing more accurate data collection by the researcher.

My observations of the classes were used here to enhance results obtained through other methods and to help me form a big picture about the findings. Moreover, the data obtained from the observations helped me construct the focus group questions and procedures. A voice recording was taken during at each lesson, and transcribed immediately after each class. Additional notes gathered by the reviewers and me were added to each of the transcripts. I kept a diary throughout the semester and outside of class to accurately record students' questions, inquiries, excuses, submission dates and procedures.

3.4.5 Design and rationale of the students' reflection (Students' logs)

Reflection is considered a useful tool for qualitative data collection, enabling internal thoughts and feelings to be revealed in a way that could not be identified sufficiently through any other technique (Creswell, 2014). Student reflections provided students with a moment of reflection where they considered their thoughts after the completion of tasks, allowing them to understand their weaknesses, strengths and areas of improvement. In order to explore students' attitudes and their awareness of CT skills and SN website-based learning activities, I delved into how they felt and dealt with the course activities, which allowed for a better understanding of students' behaviours and thoughts. I asked them to log their reflections after each activity.

Students were asked to express their opinions, any difficulties or challenges they faced, as well as their experiences after every activity and after receiving feedback from me on their essays. Students were able to express their reflections via email or face-to-face in my office. However, during the semester I discovered that students were not expressing their opinions and reflections, and there was insufficient data gathered from this tool. Therefore, I began to send students, selected at random, specific questions via email about their opinions regarding how they did in an activity. This strategy was more helpful and allowed me to collect more data in this area.

All of the students' reflections were collected in a Microsoft Word file as soon as I received them, and were sorted by the date and students' names in preparation for qualitative analysis.

3.5 Data analysis

Data analysis is the process of systematically collecting, synthesizing and drawing inferences from the data. Patton (2002) suggests that data must be categorized and held together in some meaningful way; and that the differences between categories need to be bold and clear. In this study, there were two types of data analyses: quantitative and qualitative data analysis. The quantitative and qualitative data analysis was done at the same stage at the end of the study. Figure 3.3 illustrates the data analysis process.



Figure 3.3 The data analysis process

3.5.1 Quantitative data analysis

The quantitative data, namely the data from the CT rubric and the questionnaire outcomes, were based on numerical statistics. The purpose of this kind of data is to inform the efficiency of the intervention in promoting students' CT, explore students' awareness toward their CT and argumentative writing skills, investigate their attitudes towards the learning activities and explore the factors that affect students' participation in learning activities.

3.5.1.1 CT rubric

As mentioned in section 3.4.1, I used the CT rubric to assess students CT skills as reflected in their argumentative writing. The collected written essays were marked using the CT rubric, which provided a single mark (out of 6) based on an overall impression of the students' performance in their writing. There were three raters, who marked all of the essays using the rubric, and an average of the scores was calculated. The raters were the two reviewers mentioned in section 3.3.4, and myself, as the primary rater, having taught the course to the students.

At the end of the semester, students' averages for the four activities were organized in a spreadsheet and inserted into the SSPS software package to prepare for quantitative analysis. It is important to mention that because participation in this study was voluntary, it was difficult to force students to complete all four activities. Although students were encouraged to complete their homework and submit the essays on time, there were still some missing essays, where some students did not submit all four essays (seven students did not a submit an essay for at least one of the four activities for a total of nine missing essays), (see Chapter 5, Table 5.1). Statistically, there are different ways to evaluate the effect of missing data in the results and to deal with them to yield the least biased estimates. In the current analysis, I used Listwise Deletion (Complete Case Analysis) as a deletion method, where the analysis exuded the students who had data missing. This helped to ensure that the missing data did not affect the analysis and kept equal sample sizes in order to do the comparison (see Chapter 5, section 5.2).

In terms of choosing the appropriate quantitative statistical tests to analyse the CT rubric's results, there were several assumptions that needed to be considered. Martin (2012) for example, suggested two issues that need to be described:

1. The experimental design; how many factors and how many levels are there for these factors in the data?

2. The distribution of the quantitative data measured in the study. Is it a normal distribution or not?

Based on Martin's (2012) suggestions, in this study, I had one independent categorical variable, the activities: activitiy1, activitiy2, activitiy3 and activity4; and I had one continuous dependent variable, the students' scores. To illustrate, I had one group of students who were measured on the same scale (CT rubric) over four periods.

In addition, in order to examine the normality of the data distribution, a Shapiro Wilk normality test (p > .05) was performed to check whether each activity score followed a normal distribution. The test showed that the students' scores were approximately normally distributed in all the four activities, with a skewness of -.490 (SE=.501), a kurtosis of -.426 (SE=.972) and p = .383 for the first activity, a skewness of -.538 (SE=.472), a kurtosis of 1.014 (SE=.918) and p =.098 for the second activity, a skewness of -.370 (SE=.491), a kurtosis of -.631 (SE=.953) and p = .481 for the third activity and a skewness of -.552 (SE=.512), a kurtosis of -.312 (SE=.992) and p = .212 for the fourth activity.

With regard to the previous information, one-way repeated measures analysis of variance (ANOVA) was deemed the most appropriate to determine whether there were statistical differences in students' performance over time from the 1st to the 2nd to the 3rd to the 4th activity, as well as applying a post-hoc test (Pairwise Comparisons) to assist in providing more detail on the meaning of these differences. The findings are explained in more detail in Chapter 5.

3.5.1.2 Students' questionnaire

To analyse the questionnaires, I used descriptive statistics in the form of frequency percentages to summarise the participants' responses to each of the questionnaire questions. I chose this approach for two reasons: first, the questionnaire contained ordinal data (Likert-scale) and nominal data (discrete variable data), and, as Creswell (2014) stated, a non-parametric approach is the most suitable for this type of data. Second, the aim of the questionnaire was to gather information on students' attitudes, awareness and opinions, in general, and descriptive data can was the most appropriate

for gathering this information. All the statistics tests were conducted using an SPSS program and are presented in Chapter 5.

3.5.2 Qualitative data analysis

A coding approach based on thematic analysis principles was applied to analyse the qualitative data collected in this study. Thematic analysis is a method for identifying, organising, analysing and reporting patterns (themes) within data. It describes the data set in detail (Braun and Clarke, 2006), though it often goes further than that, to interpret various aspects of the research topic (ibid).

For the qualitative data, I used data from three sources: student focus groups, teacher observations and student reflections. After collecting, transcribing, reviewing and organising the data, they were analysed at the same stage at the end of the semester, though I did benefit from an informal analysis of some of the data obtained from the teacher's observation and students' reflection to construct the focus group questions and the questionnaire. I decided to analyse the data in Arabic, because I noticed that the translation of the transcripts to English changed the expressions, content and meanings, while an Arabic analysis provided more accurate findings. In the end, all the important themes and quotations were translated and presented in English (see Appendix 3.7).

In order to carry on the qualitative analysis, I initiated the following procedures, based on recommendations by different researchers, such as Shenton (2004), Thomas (2006), Corwin and Clemens (2012) and Miles et al. (2014). The procedures are as follows:

- In order to start the qualitative analysis, I bought a license for the "Atlas" software for qualitative analysis and downloaded it on my PC. Moreover, I took part in several workshops focused on Atlas software to ensure that I could use it appropriately.
- I inserted all the documents (data) I had from the main study onto the software: four documents from focus groups, eleven documents of lecture observations, one document that contained all the students' reflections and one document of student enquires and excuses.
- 3. I read the transcripts several times to identify codes. I started reading the focus groups transcripts first because they contained very rich information related directly to the research questions.

- 4. Although I used the research questions and aims to guide the process of coding the data, my approach did not involve only deductive analysis. I looked for specific information and codes, and began to notice other important codes that were not directly related to the research questions and aims, but were important to include. According to Thomas (2006), researchers sometimes find themselves merging both approaches, deductive and inductive, together even if they had decided to use one.
- I labelled these codes by different names, such as "Positive attitudes", "Negative attitudes", "General factors", "Using SN in the homework" and "Traditional homework", etc.
- 6. Occasionally, when I went to analyse and code a new transcript, I would notice that new codes had emerged. As a result, I went back and reread the others transcripts according to the new codes. I went back to recheck codes every time a new code was discovered in any of the transcripts.
- 7. After coding the four focus groups, I coded the observations following the same steps as before.
- 8. I used existing codes, as well as new ones, such as "WebQuest", "Resistant to talk", "Student enquires", "Attitudes toward writing", "Student understanding and opinions", etc.
- 9. The previous steps were used to code the student reflections. New codes emerged such as "Like", "Dislike" and "Change in the students' CT".
- 10. After coding all the documents, I reread all the codes and quotations thoroughly to make sure that every quotation was under the right code, and to verify the codes covered all the data and nothing was missing. At this stage, there were 43 codes and 1120 quotations.
- 11. I reread the codes and the quotations again to decide whether there was a need to group or delete any of them. I grouped some general codes with other more specific ones and deleted others. For example, I grouped the "Like" code with the "Positive attitude" code and the "Dislike" code with the "Negative attitude" code. I distributed the "General factors" code into "Positive factors" and "Negative factors" codes, etc.
- 12. I reviewed and defined the codes to categorize them into a general theme.
- 13. I asked one of the reviewers to review and evaluate the analysis findings. I provide her with a transcript, the codes and their definitions, and asked her to

evaluate, comment and assess the transcript coding. Her comments and feedback were taken into account to improve the codes schema.

14. The codes were categorized into themes; I had 14 themes. It is important to say that eight of these themes came from the research aims and the literature, and they directly answered the research questions (direct themes). In addition, six other themes were established through discussions with students, which were important to understanding and explaining the phenomena under study (indirect themes), see Table 3.5. A list of the research themes, their definitions and the codes are located in Appendix 3.7.

Direct themes	Indirect themes
Negative attitudes	Students' enquires and excuses

Students' struggle with the activities

Comments on the blog

Traditional homework

Using the rubric

Feedback system

Table 3.5 The direct and indirect themes in the qualitative data

15. Using the Atlas software feature, I drew relationships and connected the themes in logical ways to present the relationship between them and to understand what was happening in the observed practices and to help answer the research questions (presented later in Chapter 6).

3.6 Theoretical framework

Positive attitudes

Negative factors

Positive factors

Improvement in students' CT skills

Using SN websites in the activities Main Challenge: students' weaknesses

Improvement in students' writing skills

The intervention design and the assumption made about learning from SN websites are based on principles from the Social Constructivism Theory. In this theory, social interactions are seen to play a critical role in the processes of learning and cognition (Woo and Reeves, 2007). Some researchers stress that student learning is not an individual but a social phenomenon, and believe that individual cognitive skills are developed in a social context (Rogoff, 1990; Resnick et al., 1991 and Oliver, 2000). The importance of the social context to learning is emphasised by Lipman (1991) who believes that the development of a 'community of enquiry' is essential for the development of higher-level CT skills within individuals. Moreover, researchers, such as Newman et al. (2004), have highlighted the importance of interactions between student-student or student-teacher to construct knowledge and enhance CT skills.

Applying the Social Constructivism Theory in education suggests that educational practice needs to provide techniques that promote group work in large classes (e.g. rounds, line-ups, pyramids, projects, courts of enquiry, posters, brainstorming), critical peer and self-assessments, and resource-based individual and group learning (Newman et al., 2004). Woo and Reeves (2007) characterise some Social Constructivism principles that were used to guide the design and implementation of the research intervention:

- Authentic or situated learning: where the student takes part in activities which are directly relevant to his/her real life and which take place within a culture similar to an applied setting; learning and thinking should be situated in social contexts.
- 2. Educational applications of the Web: using internet services can support and improve highly effective types of learner-to-learner interactions based upon a social constructivist learning theory. Internet communication tools allow learners to exchange information and contribute to discussions. Online teachers can provide, through various communication tools, guidance, advice, coaching, and feedback. Moreover, the interactive nature of the Web allows learners to explore a variety of resources and establish connections with other knowledge domains that are meaningful to them.
- 3. Meaningful interaction: in an online learning environment designed on the principles of social constructivism, the interaction should include responding, negotiating internally and socially, arguing against points, adding to evolving ideas, and offering alternative perspectives with one another while solving some real tasks.

In addition to the previous propositions of Social Constructivism Theory, there are some other principles shared with the Constructivism theory indicated by Savery and Duffy (2001):

1. Understanding individual interactions with the environment. People deal with external reality differently, based on their experiences and beliefs about them.

Kiraly (2007) claims that learners may arrive at different understandings, but what is important is their ability to justify their positions. Savery and Duffy (2001, p.136) state that, "since understanding is an individual construction, we cannot share understanding, but rather we can test the degree to which our individual understandings are compatible".

- 2. Cognitive puzzlement is the incentive for learning and determines the organisation and nature of what is learned. Tam (2000, p.3) states that, "in the learning environment there is always some stimulus or goal for learning. In Dewey's terms, it is the 'problematic' that leads to and is the organiser for learning". Savery and Duffy (2001) prefer to talk about the learner's 'puzzlement' as being the stimulus and organiser for learning. The important point here is that it is the problematic situation or context that is central to the learning process.
- 3. Knowledge evolves through social negotiation and through evaluation of the viability of individual understandings. Social interaction is a major mechanism for testing that an individual understands, and the greatest source of alternative views with which to challenge it. Furthermore, it assists in building knowledge and helps people test the viability of their understanding (vonGlasersfeld, 1989).

These propositions can guide the practice of teaching and the design of learning environments (Tam, 2006); and some of them were used to guide the design and the implementation of this research intervention. Students should be allowed to construct meaning and justify their positions through argumentative writing in order to answer questions based on different SN website resources. Moreover, this intervention provided different types of social interactions, where students need to browse different SN websites, with different points of view, and draw conclusions from them, in addition to evaluating other students' essays and sharing comments on a blog. This research contributes to knowledge by exploring how social constructivism propositions can apply to SN website-based learning activities to help students learn and apply CT skills (see Figure 3.4).



Figure 3.4 The intervention strategy

3.7 Trustworthiness

This section elaborates on the steps this study took to verify the accuracy and credibility of its findings. Reliability and validity are more difficult to prove in qualitative research than in quantitative research. Validity in quantitative research requires drawing meaningful and useful inference from scores on the instruments, by looking to content validity, predictive or concurrent validity and construct validity (Creswell, 2014). However, qualitative validity requires the researcher to check for the accuracy of the findings by employing certain procedures (ibid) as described in more detail below. Reliability will also have a different meaning depending on whether it is qualitative or quantitative research. Reliability in quantitative research means examining the stability or generalizability, whereas in qualitative research, it means that the research's approach is consistent across different researchers and different projects (Gibbs, 2008).

Guba (1981) described reliability and validity as the trustworthiness of the research, and he constructed a model to examine it. He classified these into four criteria: credibility, transferability, dependability and confirmability. Shenton (2004) examined Guba's (1981) criteria and suggested provisions that the researcher might employ to meet them. The current research considered some of Shenton's strategies to identify the trustworthiness of the research as follows:

- 1- Credibility / validity: Guba (1981) argued that ensuring credibility is one of most important factors in establishing trustworthiness. He stated that credibility is concerned with the extent that findings match reality. According to Shenton (2004), there are different procedures that can be followed to ensure the credibility of the research:
 - a- Adopting well-established research methods: the quality of the intervention in this study was ensured through ongoing iterative design and implementation. I adopted a design-based research (DBR) methodology and ADDIE learning design model, which are approaches where the researcher investigates the phenomena through a circle of analysis, design, development, implementation and evaluation. In addition, this study's intervention and tools were piloted several times and passed through different steps of corrections (see Chapter 4).
 - b- Triangulation: triangulation enhances the credibility of the research findings, by checking the consistency of data coding at the data analysis stage (Wahyuni, 2012). This study used a mixed methods approach, which increased the chance of obtaining valid results. In other words, every research question was investigated and answered using different instruments. For example, the verification of the results of the CT rubric were checked against the results of the questionnaires; and the verification of the findings of the questionnaires were checked against the observations, as well as students' reflections and focus groups, which enhanced the validity of each research questions, the study in general, and minimized the likelihood of bias (see Table 3.3). By drawing upon the positivist and interpretive (pragmatic) paradigms that underline the quantitative and qualitative methods respectively, triangulation of the outcomes from the different sources also helped increase the credibility of this study.
 - c- Random sampling: the samples for all of the research phases were picked randomly and were one of the 241 ITE classes in each phase. Additionally, the students that were enrolled in theses class were randomly chosen as their enrolment was simply based on their preferences for class time and the lecturer.

- d- Examining the previous research findings: Shenton (2004) asserts that the credibility of the researcher is especially important in conducting the qualitative data, as it is that person who is the major instrument of data collection and analysis. Therefore, he asserts the necessity of examining previous research findings to assess the degree to which the project's results are congruent with those of past studies. In this case, this research provided a literature review (Chapter 2) in order to connect this research's findings with previous research and show the relation between them.
- e- Shenton (2004) and Thomas (2006) emphasise the role of the member check to bolster a study's credibility. Therefore, during the analysis stage, I asked one of the reviewers to review the codes' schema with regard to the transcripts. The focus was on whether the words and codes matched the actual intent. The reviewer read each code and the related quotations and checked to see if there was a clear relation between them. She also reviewed the transcripts to verify no important quotations were missing.
- f- The instruments validity: In this research, there were two quantitative tools, the CT rubric and questionnaire. The validity of the questionnaire was checked by calculated Pearson correlation coefficients between the total score of the items of the questionnaire with the total score of it. It was found to be significant at the 0.01 level, which meant the questionnaire had high validity. The validity of the rubric was investigated in a different way. According to Jonsson and Svingby (2007), there are different ways of looking at validity of assessments such as rubrics, and the most common is traditional criterion, content and construct validity. The content aspect of Messick's (1996) construct validity determines content relevance and representativeness of the knowledge and skills revealed by the assessment. Therefore, in order to enhance the validity of the rubric, the criteria of the rubric were carefully worded to make it clear, and were evaluated and piloted several times throughout the research phases (1 and 2); this will be explained in detail in Chapter 4.

In addition to the previous procedures, there were some tactics used to help ensure honesty from informants when contributing data; for example, each student who participated in the study was given the opportunity to refuse to participate either in the study or in any of the research tools, such as in focus groups. This was to help ensure that the data collection sessions involved only students who were genuinely willing to take part and were prepared to offer data freely.

Iterative questioning was used to return to matters previously raised during the observations and from students' reflections, to extract related data by rephrasing the questions. Different questions were sent via email to elicit detailed data from students, and I sought out more detailed explanations in the student questionnaires and focus groups.

2- **Transferability/ generalisability:** This concerns the extent to which the findings of one study can be applied to another context (Guba, 1981). The concern often lies in demonstrating that the results of the study can be applied to a wider population. Shenton (2004) argued that since the findings of a qualitative project are specific to a small number of particular environments and individuals, it was impossible to demonstrate that the findings and conclusions are applicable to other situations and populations. Nevertheless, he suggested a provision of background data to establish a context of study and a detailed description of the phenomenon in question to allow comparisons to be made. This chapter and the next one (Chapter 4) provide information on the following issues, which makes it easier for other researchers to transfer this experience to another context:

- a) The number of organisations taking part in the study and where they are based;
- b) Any restrictions in the type of people who contributed data;
- c) The number of participants involved in the fieldwork;
- d) The data collection methods that were employed;
- e) The number and length of the data collection sessions;
- f) The time period over which the data was collected.

In addition, this research aims to provide other teachers and researchers with learning activity' models that are well designed, and, with slight adjustments, can be used by any other teacher within their context.

3- **Dependability**/ **reliability:** This means that if the work is repeated, in the same context, with the same methods and with the same participants, similar results would be obtained (Guba, 1981). Guba (1981) stresses close ties between credibility and dependability, arguing that, in practice, a demonstration of the former goes some distance in ensuring the latter. In order to achieve this creation, Shenton (2004, p.71) stated that "the processes within the study should be reported in detail, thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results". Therefore, this research provides the research design, implementation, the operational detail of data gathering, the details of what was done in the field and reflective evaluation of the project, and evaluation of the effectiveness of the process of inquiry undertaken (see Chapters 3 and 4).

Instrument reliability was also checked to enhance the reliability of the study. There are many statistical techniques that can be used to measure instrument reliability, such as split-half, Kuder-Richardson 20 and 21, and Cronbach alpha (Cohen et al., 2011). Cronbach alpha was used to check the reliability of the questionnaire and the rubric. Cronbach's alpha takes values between 0 and 1. As the estimate of reliability increases, the error decreases, and therefore the measurements are more reliable. The reliability of the questionnaires was calculated using a split-half reliability measurement. A value of 0.89 was obtained for the questionnaire, suggesting highly reliable internal consistency.

In order to check the reliability of the rubric, I checked the reliability between the scores given by the two reviewers and me. I estimated Cronbach's alpha from these observations. The reliability scores were quite high: for the first activity 0.98, second activity 0.94, for the third activity 0.93, for the fourth activity 0.98.

In addition, other procedures were conducted to ensure the reliability of the rubric, such as meeting with the reviewers several times before and during the semester to discuss the rubric criteria and the assessment results. For example, after the first rating, I met the reviewers and compared our assessments of the sample papers. During this meeting, we discussed in detail some of the papers that had been given different marks in order to try and narrow down the differences and achieve a reasonable level of agreement about the criteria and how to use it. This meeting provided some linguistic corrections on some of the criteria. At the end, everyone felt

satisfied and confident in their ability to use the rubric successfully to achieve a high level of reliability. What was interesting, was the difference in marks that had existed in the first essays we rated were greatly reduced, and our ratings indicated a high degree of agreement on students' essays.

4- **Confirmability**/ **objectivity:** Shenton (2004, p.72) states, "The concept of confirmability is the qualitative investigator's comparable concern to objectivity". He suggested several procedures to ensure that the work's findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher. For example, the role of triangulation, researchers' admission to their own beliefs and assumptions, and providing recognition of any failings in the study's methods and their potential effects.

To reduce the effect of researcher bias and increase the confirmability of the research, two reviewers helped score students' essays and observe students during the classes and focus groups (as mentioned in section 3.3.4). A collection of quantitative and qualitative tools was used to triangulate the findings. In addition, data collected in earlier stages were used to inform the next stages and other data collection instruments. For example, data collected from teacher's observations and students' reflections were used to build student questionnaires and focus groups.

3.8 Ethical considerations

This research was conducted according to the ethical framework specified by the University of Leicester (UoL). Ethical approval was obtained before conducting this research's phases, and the main study was in accordance with UoL guidelines. Furthermore, I obtained an official consent from both UoL and KSU to carry out this study.

This research raised specific ethical issues. Firstly, considerations arise when a researcher studies their own students, such as the need for random selection, external viewers and removing the personal influence of the researcher (Bryman, 2012). However, there were some procedures that helped overcome these barriers:

- To respect the right of the participants, I provided them with a brief explanation of the study. I explained the intervention to the students, and told them the general nature of the study and what was expected of them.
- The students were made aware of the voluntary nature of their participation and their right to withdraw at any time. To ensure the voluntary nature of their participation, students had the opportunity to withdraw from the study at the beginning of the course after the study's aims and requirements had been introduced. Students could enrol in another class for the same course (eight students chose this option), or stay in the same class but under a different type of activity (one student took this option) (see Table 3.2).
- Students were informed of the purpose of every instrument. Any potential benefit or risk was explained. When conducting the questionnaire, the participants' approval was sought, and a cover page was attached to the questionnaire defining its purpose. Moreover, when conducting the focus groups, students were informed it was completely voluntary and that students could participate in the group if it fit their schedule, which is why 12 out of 24 students participated.
- In order to ensure the objectivity of the research, I involved two reviewers in most of the research process, as explained in section 3.3.4.

Secondly, during the semester, some students felt that getting involved in this research was too much work for them, which could be interpreted as creating a stressful situation for them. However, I reminded them that they can withdraw from the study at any time, and I encouraged them in different ways such as presenting their progress and highlighting their improvements.

The Third ethical issue lied in the use of online tools to collect data. This study used the Internet (the class blog) to post students' essays and collect data, which raised specific ethical issues regarding online studies, such as privacy and security concerns. Bryman (2012) stated that confidentiality, anonymity, accessibility and informed consent issues should be considered carefully, especially if the websites used are accessible to non-subscribing members. This research tried to address these issues by stressing that

participation was voluntary and stating that there was no anticipated potential risk by participating. Moreover, the online tools did not ask students for any private information.

Students were assured that their responses to the study tools would be kept secure and would only be used for the research. No one else would have access to the data, which would be discarded once the study has been completed. Furthermore, I took students' permission to record all the classes as well as the focus groups.

3.9 Conclusion

In this research, the goal was to go further than just investigating the efficiency of the SN website-based learning activities on students CT skills, but rather to delve into how students accept, handle, think and behave towards these activities. In addition, it was to understand SN's role in promoting students' participation in the learning activities. Since collecting one type of data, either quantitative or qualitative, would not help me achieve my research aims, and based on the pragmatic paradigm, I decided to use a mixed methods approach. I used two quantitative tools, a CT rubric and a questionnaire; and three qualitative tools, student reflections, teacher observations and student focus groups. The research methods were conducted within the convergent parallel approach, where the quantitative and qualitative data were collected and analysed synchronously.

Social Constructivism Theory's principles informed the design of the research intervention (learning activities), where knowledge was constructed by the students themselves throughout social interaction. Additionally, Social Constructivism occurs when students browse SN websites and view other people's opinions, as well as read and comment on what other students' have written, as this leads to deeper learning and thinking. The intervention was implemented with 24 undergraduate female students in ITD at KSU. The chapter also explains how Guba's (1981) model to examine the trustworthiness of the research was used to ensure the trustworthiness of this research and how ethical considerations were taken into account. The next chapter explains in detail the cycles of designing the research intervention and tools.

Chapter 4 Intervention Design

4.1 Introduction

This chapter explains the intervention design drawing on a design-based research (DBR) as the methodology of the research, along with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) learning design model that was used to design, develop and evaluate the research intervention. The design process is represented through three phases of studies: two pilot studies and a main study. This chapter gives an overall view of the three phases of studies that led to establishing the intervention.

4.2 Research methodology- Design based research (DBR)

This century has seen the appearance of a new research methodology for education research, namely, design-based research (DBR). A number of education researchers have bet the potential of DBR to make a significant difference in the quality and utilization of education research. DBR is a methodology designed by and for educators that seeks to increase the impact, transfer and translation of education research into improved practice (Anderson and Shattuck, 2012). Moreover, this methodology stresses the need for theory building and the development of design principles that guide, inform, and improve both practice and research in educational contexts (Gorard and Taylor, 2004). Design-based research covers a methodology that has been described using different terms in the literature, including design experiments, design research, development research (Wang and Hannafin, 2005) and design science (Cole et al., 2005).

4.2.1 The concept of DBR

Design-based research is a study conducted in a real context, which helps to provide a sense of validity and ensures that the results can be effectively used to assess, inform, and improve practice, in at least this context (Anderson and Shattuck, 2012). Design-based research can be defined as "an attempt to combine the intentional design of learning environments with the empirical exploration of our understanding of those environments and how they interact with individuals" (Hoadley, 2004, p.205). According to Wang and Hannafin (2005, p. 6-7), DBR is "a systematic but flexible

methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories". In other words, it is a methodology that focuses on the design and testing of an intervention in real context, as well as teamwork between the researcher and the participants.

According to Wang and Hannafin (2005), there are five main characteristics that differentiate DBR from other methodologies: 1- Pragmatic; DBR refines both theory and practice, and the value of theory is appraised by the extent to which principles inform and improve practice. 2- Grounded; the design is theory-driven and grounded in relevant research, theory and practice. Moreover, the design is conducted in a real-world setting the design process is embedded in and studied through, DBR. 3- Interactive, iterative, and flexible; the researchers are involved in the design processes and work together with the participants, so the processes are a cycle of analysis, design and implementation, and the researcher can make thoughtful changes on the initial plan when necessary. 4- Integrative; mixed research methods are used to ensure the credibility of ongoing research. Moreover, methods vary during different phases as new needs and issues emerge and the focus of the research evolves. 5- Contextual; the research process, research findings and changes from the initial plan are documented; and the research results are connected with the design process and the setting to construct and generalize principles or theories (Wang and Hannafin, 2005).

Cole et al. (2005) stress the design principle of DBR, and define it as a procedure that consists of processes concerned with the building and evaluation of technology artefacts to meet organizational needs as well as the development of related theories. Therefore, DBR is concerned with the innovation, rather than the natural, phenomena (Cole et al., 2005). It is concerned with developing principles of instructional practices and studying their effect on learners, which can be formulated as a kind of educational intervention.

As Anderson and Shattuck (2012) state, the intervention can be a kind of learning activity, a type of assessment, an introduction of an administrative activity, or a technological intervention. Seeto and Herrington (2006) and Baharom (2013) argue that DBR is a suitable methodology for research of educational problems and the design of technology-based solutions. In other words, DBR is concerned with creating pedagogical innovations; specifically, it can be useful for research on the design of technology-based learning environments.

This research was conducted as an intervention study in which learning activities were designed based on SN website resources, and actions were undertaken to improve students' CT skills (as reflected in their argumentative writing). Therefore, there was a need to follow a methodology that began with the principles of planning and designing the intervention, moved on to the development process and implementation and ended with the evaluation step. Based on those needs, I adopted DBR as a methodology for this research. This research was conducted across three phases to ensure dependability (reliability) and credibility (validity) of the research. The three phases lasted for a year and a half, beginning in September 2013 and finishing December 2014.

Although there is overlap between DBR and Action Research (AR), I found DBR more suitable for this research's aims. As stated in Chapter3, section 3.2.2, my aim is to go further than merely investigating the efficiency of the intervention in order to gain a deeper understanding of the role SN websites and others factors have in designing and implementing the intervention. Gorard and Taylor (2004) argue that AR stresses the effectiveness of the intervention, whereas, DBR stresses more on the design process. Section 4.2.2 will elaborate more on the differences between DBR and AR.

4.2.2 The differences between DBR and action research AR

Bell (2004) argues that there are many discussions about the nature of design experimentation. He claims that there is significant methodological coherence in various modes of design-based research once it is recognized that different efforts are focused on developing different kinds of theory, products and strategies for bringing innovation to scale. In my review of research methodologies, I found two similar types of research methodologies, design-based research (DBR) and action research (AR); highlighting the difference between them helped in making the decision to adopt one of them.

Action research is an approach of research that has a complex history because it has emerged over time from a broad range of fields such as science and social studies (Brydon-Miller et al., 2003). According to Avison et al. (1999, p.94), "Action research is an iterative process involving researchers and practitioners acting together on a particular cycle of activities, including problem diagnosis, action intervention, and
reflective learning". Baskerville (2001) defined AR as a fundamentally change-oriented approach in which the central assumption is that complex social processes can best be studied by introducing change into these processes and observing their effects.

In action research, the researcher attempts to try out a theory with practitioners in real situations, gain feedback from this experience, modify their theory based on feedback and then try it again (Brydon-Miller et al., 2003). Furthermore, Brydon-Miller et al. (2003) note that AR goes beyond the belief that theory can lead practice, to a recognition that theory can be generated through practice; and that theory is really only useful as it is put in the service of a practice focused on achieving positive social change.

Cole et al. (2005) believe that DBR and AR can significantly inform each other, as there is a great degree of similarity and overlap between them, especially since they are both proactive in that they intervene in, rather than study, a phenomenon after the fact. In addition, both of them identify problems and the actions needed to address them. Table 4.1 summarizes the main similarities and differences between AR and DBR.

	AR	DBR
	Avison et al. (1999), Brydon-	Baharom (2013), Cole et al. (2005),
	Miller et al. (2003), Reason and	McNiff and Whitehead (2011),
Literature	Bradbury (2001), Swann (2002),	Gorard and Taylor (2004), Collins
	Cole et al. (2005), Sein et al.	et al. (2004), Sein et al. (2011).
	(2011), Bryman (2012).	
	•The main goals are improved	The main goal is to construct
	practice and understanding	design principles that can inform
	professional action.	future decisions.
	 Driven from participants' 	 Driven from needed.
	interests.	
	Facilitated by the teacher or	 Facilitated by a designer or
	researcher.	researcher specialized in learning
Differences		design.
	• Stresses the effectiveness of the	 Focuses on the evolution of design
	intervention.	principles.
	Practical and theoretical	Practical and theoretical outcomes
	outcomes are grounded in the	are grounded not only in the
	perspective and interests of the	perspective and interests of the
	participants, and not filtered	participants but are also filtered
	through an outside researcher's	through an outside researcher's
	preconceptions and interests.	preconceptions and interests.
	• Both are set in a real-world conte	ext.
	Both have observable effects on p	practice.
	Both are iterative.	
Similarity	Both are collaborative with the pa	articipants of the study.
	 Both are able to produce theoretic Doth had to have here and here and 	cal output through new knowledge.
	Both lead to building new knowle	edge.
	• Mixed methods of qualitative and	i quantitative can fit within them.
	• Each is a work in progress.	

Table 4.1 Similarities	s and differences	between AR and DBR
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Table 4.1 shows that there is great similarity and overlap between the two approaches, however, there are some differences, such as DBR aims to create a theory to solve problems, whereas AR uses theory to inform the practice. Additionally, DBR allows researchers to act as both researchers and designers, while in AR the role of the researcher is generally that of a facilitator (Reeves et al. 2005; Wang and Hannafin, 2005). From this point of view, I found that using DBR as a methodology for this research reflected my role as researcher, teacher and learning designer. I designed my own intervention, developed and implemented it and then interpreted the findings.

4.3 Learning design model-ADDIE Model

Learning Design is known as one of the most important practices in the field of technology enhancing learning. Learning design, or instructional design, was defined by Smith and Ragan (1999, p.2) as a "systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources, and evaluation". The shift from 'instructional' to 'learning' design in some literature reflects the modern emphasis on student-based learning rather than teacher-based learning. Learning design therefore refers to the set of processes and procedures that guides students to learn effectively using the best tools (Jisc, 2004).

Learning design paths enable students to engage in the designed learning process and provide feedback on their progress (Karns, 2005). Therefore, students are an important factor in this process. The designer depends on their feedback in the design process. Moreover, teacher expertise is also important in determining which learning outcomes are most important and how those outcomes might best be pursued with the students in the class (ibid). Teachers' experience and students' willingness and capabilities are important to consider while designing any pedagogical activity.

From the many instructional design models suggested by researchers, such as Conole et al. (2004), Gorard and Taylor (2004), Cross and Conole (2009) and Qiao et al. (2009), I chose to apply the ADDIE model to design and implement this research intervention and tools. ADDIE is a systematic learning design model made up of five phases, Analysis, Design, Development, Implementation and Evaluation. Wang and Hsn (2009, p.79) defined the ADDIE model as "instructional design principles [that] constitute a systematic method that helps educators design learning activities consistent with learning objectives and evaluate learning outcomes". According to Woo and Reeves (2007), ADDIE helps to develop better instruction and learning through the integration of pedagogy and technology.

The ADDIE model was chosen to meet this study's purposes for several reasons: it is a generic and simplified instructional design model that shares similar processes, such as analysis, design and implementation, with DBR (Molenda, 2003; Wang and Hannafin, 2005 and Wang and Hsn, 2009). Moreover, ADDIE complements the research methodology DBR as both support the construction of meaning to enable the transition from theory to practice (Johnson et al., 2007), and make the analysis of students central

to the process (Petersson, 2003). In addition, this model has a general design process and is not restricted by a specific learning theory's features. It can be used to design different learning approaches based on different learning theories such as behaviorism, constructivism or social constructivism. My experience in using the ADDIE model during my career at the university also played a role in my decision to adopt the ADDIE model. Table 4.2 presents an overview of the purpose, procedures, and deliverables commonly associated with each of the five ADDIE phases.

Table 4.2 Common instructional design procedures organized by ADDIE (Branch,2009, p.3)

	A nalyze	Design	Develop	I mplement	E valuate
	Identify the	Verify the	Generate and	Prepare the	Assess the
	probable	desired	validate	learning	quality of
spt	causes of a	performances	the learning	environment	the
nce	performance gap	and	resources	and	instructional
Co		appropriate		engage the	products and
		testing		students	processes, both
		methods			before and after
					implementation
	1. Validate the	7. Conduct a	11. Generate	17. Prepare the	19. Determine
	performance gap	task	content	teacher	evaluation
	2. Determine	inventory	12. Select or	18. Prepare the	criteria
	instructional	8. Compose	develop	student	20. Select
	goals	performance	supporting		evaluation
	3. Confirm the	objectives	media		tools
res	intended	9. Generate	13. Develop		21. Conduct
npa	audience	testing	guidance		evaluations
006	4. Identify	strategies	for the student		
Pr	required	10. Calculate	14. Develop		
uou	resources	return	guidance		
um	5. Determine	on investment	for the teacher		
S	potential		15. Conduct		
	delivery		formative		
	systems		revisions		
	6. Compose a		16. Conduct a		
	project		Pilot		
	management		Test		
	plan				

According to Amiel and Reeves (2008), the ADDIE cycles of testing and improvement can produce more inclusive outcomes for the intended study. Therefore, this research applied the ADDIE cycle three times to develop the research intervention and tools. The first two phases of the study served as the pilot studies. These phases were not designed to obtain evidence or data, though they provided initial ideas based on the results; the aim was to test the techniques to be used and to improve the research by adapting the implementation process, instruments and data collection procedures. In addition, I gained experience in advance, which in turn helped to improve the main study and avoid errors. Figure 4.1 presents the research process and the stages of the ADDIE model.



Figure 4.1 Research process and intervention design process

4.4 First phase

The first phase served as the pilot study and was implemented from September to December 2013. This pilot study was conducted with fourteen female undergraduate students from the School of Education at King Saud University (KSU), enrolled in the Learning Technology and Communication course (code 241 ITE).

Based on DBR methodology and the ADDIE Model, I developed the intervention and research tools. I structured this study into five main stages based on the ADDIE Model, to establish and test the intervention: analysis stage, design stage, development stage, implementation stage and evaluation stage. The next section describes these stages in more detail.

4.4.1 Analysis stage

According to Branch (2009) and Wang and Hsn (2009), in the analysis stage of the ADDIE model, the designer should conduct a needs analysis relative to the target students. It should include an assessment of the content of the students' knowledge, the context, and the probable causes of a performance gap. In addition, the analysis should include their learning characteristics, motivation, technology affordances and learning aims. In this research, the analysis stage had some key considerations:

- 1- To ensure that enough data was gathered about the research context.
- 2- Collect data on students' weaknesses and their needs.
- 3- To define the CT skills that students needed and the best implementation process.
- 4- To discover if there was anything of significance that might help design and build this research's intervention.
- 5- To conceptualize the proposed intervention.

The data for the analysis stage was gathered from two main resources: the course and the lecturers.

4.4.1.1 Course analysis-241 ITE

It is important for any designer to have a full understanding of the situation in which the intervention will be used. This meant it was important for me to have a full understanding of the module's objectives, syllabus, course achievement requirements and any other conditions used in completing the course.

As mentioned in Chapter 3, section 3.3.1, I have taught in the ITD department for eight years and have a thorough understanding of the 241 ITE course and its syllabus (Appendix 3.1); however, through my analysis of the course, I familiarised myself with the other lecturers' course plans, teaching methods and students' projects. In addition, I investigated students' achievements and productions. Using this information, I developed a broad view of the different ways of teaching and assessing students in this course.

4.4.1.2 Lecturers interviews

Existing lecturers in the course were an important source of data. The aim of the interviews was to gather information that could help me build and implement the current research intervention. I was particularly interested in determining which skills, particularly higher level thinking skills, students lacked, in the lecturers' opinions, and which needed to be learned and practised. Moreover, to build an overview of the learning activities, and explore the lecturers' habits of using learning activities in teaching, I investigated lecturers' use of social networking (SN) websites in their teaching process.

After getting permission from the Head of the School of Education, I conducted the interviews. Six face-to-face interviews were conducted from the 2nd to the 12th of September 2013. The interviewees were six female lecturers in the ITD at the School of Education. All of the interviews were recorded using an iPad application, and took approximately one hour each.

Fourteen questions were asked in order to answer my inquiries. The questions were a combination of open-ended, closed-ended and multiple-choice options (Appendix 4.1). After that, I transcribed the interviews and the key points were highlighted and analysed.

4.4.1.3 The analysis stage findings

The analysis of data gathered from the aforementioned processes, showed that the lecturers are committed to supplying students with a course plan that clarifies the course syllabus and its related requirements. Students have a scheduled plan for all course activities. Moreover, there is general agreement about the kinds of activities given to the students, who usually engage in more than one activity during the semester. The course projects were either a PowerPoint presentation on one of the course's topics using computer software or applications to design a lesson or completing a descriptive research project.

The lecturers claim that they are aware of the importance of improving students' higherlevel thinking skills, and they try to promote these skills through their activities. Lecturers stated that they try to concentrate on Bloom's taxonomy of learning skills, such as analysis, evaluation and creativity. Moreover, the lecturers claim that they are trying to promote students' CT skills by encouraging them to undertake constructive activities. During these discussions, I noticed misunderstandings about the concepts and definitions of higher-level skills and CT skills, as some lecturers considered them to be the same.

This finding is consistent with that of Paul and Elder (2006), who indicated that a significant majority (89%) of United States university lecturers claimed that the promotion of CT skills was a main objective of their universities, yet only 19% could define CT and 77% had little to no idea what CT skills should be inherent in course content. Fuiks and Clark (2002) stress that teachers often confuse CT skills with other types of higher-level thinking skills, such as problem-solving, scientific reasoning, informal logic or creative thinking. These views confirm the importance of clarifying which specific CT skills this pilot study seeks to investigate. Additionally, students should be aware of the kinds of CT skills they will learn and practise.

ITD's lecturers engage students in different types of activities; for example, designing and building projects or giving oral presentations. However, students, especially undergraduate students, have not regularly used their skills to evaluate others or write essays. This omission might explain why "students have a weakness in writing skills and with expressing their opinions" (Lecturer interviews, 2013). Moreover, lecturers claim that students are weak in some CT skills and need more support. These skills include building arguments, making judgments dependent on evidence, seeing more than one opinion and presenting a personal opinion clearly. One of the lecturers stated, "The traditional ways of teaching will not help to improve these skills" (Lecturer interviews, 2013).

Many researchers (Ennis, 1993; Quitadamo and Kurtz, 2007 and Paxton, 2009) agree that using a writing strategy for teaching and learning is a good way to coach students on higher level thinking skills such as CT skills. Students' thinking can be reflected in their writing style (Bean, 2011). Moreover, writing strategies have been used by several researchers (Broad, 2003; Peach et al., 2007; Hersh, 2007 and Mansilla et al., 2009) as a tool to assess students' CT skills. Taking this into account, I made the decision to coach students on how to present their CT skills through argumentative writing and to assess their CT through their essays.

While investigating the role of SN websites in the teaching and learning process in this course, ITD lecturers claimed to have used SN websites during their courses for different purposes. Most of them used these websites as a tool for communicating with students, and others used blogs to engage students in module discussions. Although the lecturers had prior experience with these websites and their benefits, their usage was very limited in terms of quantity and quality. Moreover, SN websites were not largely used as a resource for, or a foundation of, learning activities; the current research investigated others' use of affordances offered by SN websites.

Lecturers agreed that SN websites offer many opportunities that might help improve students' thinking skills. Using SN websites, such as providing students with YouTube clips to obtain more information about topics and critically evaluate ideas may be a way to help students become better researchers and thinkers. Furthermore, using blogs as a platform to discuss issues and obtain feedback may help students express their opinions and accept the opinions of others. These opportunities support the idea that SN websites might be good resources to practice CT skills.

Based on the data gathered from the analysis stage, I established an idea for the research intervention that would be a type of learning activity based on SN websites and would require a set of CT and argumentative writing skills.

4.4.2 Design stage

In the design phase, the researcher tries to determine the learning objectives and design the learning strategies, learning activities, assessments and methods to best organize and present the content on the basis of the learning objectives (Wang and Hsn, 2009). The main output of this stage was a design on paper that included a map and plan of the intervention (learning activities), as well as the initial design for the CT assessment tool (rubric), as will be shown in the following section:

4.4.2.1 Designing the intervention

I used the 241 ITE course syllabus (lessons) to design the activities, and I used different SN website resources to support the main topic of each lesson. My aim in using these websites was to motivate students to think critically about the websites' content as it related to the main lesson and topic. I designed three activities titled as follows:

- 'Communication skills'; this was aimed at helping students think critically about the source of communication skills - are they acquired or hereditary? And present different arguments for each.
- 2. **'Instructional technology'**; this was aimed at helping students think critically about the positive and negative sides of using teaching aids in education, and present different arguments for each side.
- 3. **'Using internet websites in learning'**; this was aimed at helping students think critically about using modern instructional technology in education, rather than traditional ones, and present different arguments for each.

The design included open-ended questions, which students had to answer by using a set of CT skills in an essay, using an argumentative writing style. Moreover, I provided students with a set of SN website resources that were related to the activity questions, and asked them to think critically about the websites' content, and to analyse, interpret, and evaluate the content to construct an answer for the question.

I decided to base the activities on the WebQuest model, as it is based on the use of different Internet resources and requires different sets of self-directed learning skills. Dodge (2001, p.1) defined WebQuest as an "inquiry-oriented activity in which most or all of the information used by learners is drawn from the Web". Studies show that WebQuest learning is supported by four main constructs: critical thinking, knowledge

application, social skills, and scaffolded learning (e.g., Dodge, 2001; Vidoni and Maddux, 2002; Zheng et al., 2004).

Critical thinking is an important construct in WebQuest learning. Vidoni and Maddux (2002) argue that WebQuest are powerful tools for inspiring CT in students because they promote many CT elements such as (a) skilful thinking, (b) responsible thinking, (c) non-routine thinking, (d) applying criteria, (e) self-correction and (f) sensitivity. Dodge (1995, p.10) claims, "The instructional goal of a WebQuest is that a learner would have analysed a body of knowledge deeply, transformed it in some way, and demonstrated an understanding of the material by creating something that others can respond to, online or off". Based on this information, I found the WebQuest model a suitable framework to introduce the learning activities.

The learning activity design includes a class blog that students can use to post their answers and share feedback. Every activity is posted to the blog, and students are asked to access the activity, answer the question it poses and post their answer on the blog. After that, students have to read other students' essays and comment on them.

4.4.2.2 Designing the CT rubric

Similar to other research (Andrade, 2000; Hersh, 2009 and Kuek, 2010), I assessed improvements in students' CT skills as it was reflected in their argumentative writing. Based on the literature (Bers et al., 1994; Facione and Facione, 1994; Andrade, 2000 and Broad, 2003), students' needs, and this research's aims and context, I designed an initial CT rubric, which consisted of the following CT criteria used to assess students' argumentative texts:

- 1- **The Aim.** Answer the question in a clear and explicit way.
- 2- Analysis. Explain the idea clearly and correctly.
- 3- Interpretation. Use keywords to indicate each part.
- 4- Reasoning. Comment on, and give reasons for, each part.
- 5- **Inference**. Provide sufficient evidence from the available sources and properly document them.
- 6- Logical Organization. Follow a logical process for writing the argument.
- 7- Balance. Every idea occupies the same size and is significant in the written text.

The CT criteria were evaluated on a three-point scale: qualified, developed, and beginner. Students were given a specific description of what each grade in the scale meant, which was shown clearly in the Web Quest design. I decided to implement the rubric on students' essays after every submission during this phase and test the credibility and accuracy of the rubric's criteria.

4.4.3 Development stage

After careful analysis and design, the designer works toward the creation of the materials. In the development stage, the researcher constructs and delivers the intervention (Wang and Hsn, 2009).

In this stage, the 'paper design' was transferred to a real context. I researched the best software with which to build the learning activities, and searched for good SN resources that might be helpful in the learning activities.

The learning activities were designed using the Quest Garden website (questgarden.com) to implement a Web Quest model design. Based on the course syllabus, I developed three activities, which all had the same structure with some changes in content. All the activities were supported by different SN websites, such as YouTube, Twitter and blogs. Students browsed these resources to interpret, analyse, evaluate, and explain the contexts. As mentioned earlier in chapters 1 and 3, this research concentrated on coaching students how to critique the SN resources before adopting or accepting the content. Figures 4.2 to 4.8 detail the structure of the activities.



Cover page: Includes the topic of the activity and any related pictures.

Figure 4.2 Cover page



Figure 4.4 Task page

1- Watch both of the YouTube clips below, and note the following: Introduction **Process page:** A- The benefits of using new technologies Task in learning and teaching. Provides students B- The uses of the new technology in learning and Process teaching. Evaluation C- Obstacles that may prevent the expansion and use of technology in education. conclusion Teacher page correctly.

this question.

Figure 4.5 Process page, 1

with a guideline and specific steps to be followed in order to answer the research question



Figure 4.6 Process page, 2

The process page includes all the SN websites resources that discuss the topic and highlight the main argument. Students are required to browse all the provided resources and understand, compare and evaluate them in order to construct an argumentative essay.

Evaluation page:

criteria that will

be used to assess

students' essays.

Provides the

assessment



Figure 4.7 Evaluation page



Conclusion page: Concludes the main purpose of the activity and what students were expected to have learned.

Figure 4.8 Conclusion page

Additionally, I used Google's services to establish the class's blog and set it up for the students use (241ite.blogspot.com). Any student in the class could access the blog without needing special registration (Figure 4.9).



Figure 4.9 Typical blog

4.4.4 Implementation stage

As Wang and Hsn (2009) state, the implementation concerns the actual initiation of the intervention. It refers to trying out the design in a real situation. This stage helps the researcher apply a theory with practitioners (i.e. students) in real situations (the classroom), gain feedback from this experience, modify the intervention, and try it again (Avison et al., 1999).

The implementation stage of the design began in September 2013 and finished in December 2013, lasting one academic semester. The intervention was piloted with undergraduate female students from the Islamic Studies Department under the School of Education. This sample was selected randomly from the original population, which were all female undergraduate students in the School of Education who were enrolled in the 241 ITE course in the first semester of 2013. I conducted this study with 14 students who were enrolled in one section of this course. One of the 14 students withdrew from the course after three weeks, and two of the students dropped out of the study, though the rest of the students (11 students) completed the pilot study successfully.

At the beginning of the semester, I introduced the intervention to the students, took their agreement to participate, and explained their roles as well as the goals of the study. Moreover, I provided students with the course syllabus, the timetable and full description of the course activities. The learning activities were distributed throughout the course syllabus: one activity for each main topic. Students had two weeks to post their answers on the class's blog. One week was allowed for reading, understanding, and answer preparation. The second week was allocated for writing the answer, posting it on the blog, and checking other students' answers and commenting on them. Table 4.3 illustrates the activity topics and their distribution during the semester.

	Торіс	Date	Question given in the activity
First activity	Communication skills	From 19 Sept to 2 Oct 2013	"Based on the blogs that were given to you, what do you think about good teaching skills? Are they acquired or hereditary?"
Second activity	Instructional technology	From 10 to 24 Oct 2013	"Based on the YouTube clips that were given to you, explain to what extent you agree with the positive side of using technologies in education, and show the opposing opinions for using them."
Third activity	Using internet websites in learning	From 14 to 27 Nov 2013 ²	"The following YouTube clip shows an intervention to merge internet with learning. Describe this experience. State to what extent we can apply this intervention in Saudi schools."

Table 4.3 Activity topics and their distrubution during the semester

After the students posted their essays on the blog, I read their answers and added some brief and general comments on the blog for each student. Then I printed out all of the essays and corrected them in more detail, based on the CT rubric. I marked the answers out of seven points. Figure 4.10 shows the implementation cycle that students were supposed to follow.

²There was a week of holiday during this time



Figure 4.10 The implementation cycle

At this stage, I found the need to build a questionnaire to determine students' attitudes to these learning activities, their perceptions of CT skills and the difficulties they faced while completing these activities. The questionnaire was designed based on the literature, and reflected the steps of the pilot study. It was a mixed question questionnaire, with both open-ended questions (11 questions) and closed-ended questions (21 questions). At the end of the semester, after students had finished all the activities, I asked them to complete the questionnaire. Indeed, this phase of the research was a good opportunity to pilot the questionnaire and check its dependability and credibility before implementing it in the main study.

4.4.5 Evaluation stage

Evaluation is a main step in DBR and in the ADDIE Model, which requires that every intervention and its implementation step should be evaluated before making a decision to adopt them. The evaluation helps the designer or researcher determine whether the intervention was successful, and how it could be improved for the next implementation phase (Wang and Hsn, 2009). The evaluation step in this design was integrated into each stage starting from analysis and ending with the implementation stage. Data from each stage was gathered in order to enrich and improve the intervention design in order to apply it in the main study.

I evaluated the initial design of the learning activities, the CT rubric, the implementation steps and some research tools, such as the students' questionnaires, in several ways:

1. I presented the initial design of the learning activities to a number of professors at the School of Education at KSU who specialise in learning design and curriculum and teaching methods. I also presented it to specialists in e-learning design at the University of Leicester. I used their comments and notes to improve the designs.

- 2. I observed students' perceptions of the activities, by recording students' reflections and their feedback on the learning activities; and I noted any factors that commonly affected the implementation of the activity. As a result, I made changes to the activities after each implementation in order to improve them.
- 3. The CT rubric was applied three times during the intervention, once after each activity submission. I looked for any weakness and ambiguity in the CT criteria and I tried to determine if it was easy to use in order to judge students' essays and any improvements in their CT. All the data gathered from this stage (evaluation stage) was used in the analysis stage of the next phase.
- 4. I piloted the students' questionnaires to test the accuracy and clarity of the questionnaire questions, and find out how much time was needed to complete it.

The evaluation stage revealed several findings. Namely, that applying the CT rubric to students' writings indicated that the students lacked experience with writing skills, and that their texts did not reflect sufficient CT skills. For instance, students never supported their opinions with evidence, they rarely commented on the opinions of others, and they did not evaluate their arguments. Moreover, students did not cite references correctly. However, after the intervention in the pilot study, I noticed that there was some improvement in students' skills in expressing their points of view clearly and in providing different opinions from different resources, though students still needed more practice in the skill of evaluating the opinions of others.

Students were asked about the CT skills indicated in this research, and specifically, whether they practiced them in their life, whether they obtained them from this research activity or if they knew them before this intervention. The findings showed that even if the activities were not the actual source of a student's CT skills, they were a good way to practice them and build argumentative writing skills (Appendix 4.2).

Based on questionnaire responses, 42% of the students described the activities as difficult to do, which may have been due to the fact that this was the first time they had faced these kinds of activities, and it required a mix of CT skills, writing skills and self-directed use of web resources (I noted this from students' reflections and feedback after

completing the activities).Moreover, after participating in the learning activities, 91% of the students registered positive attitudes towards CT skills, and 58.3% of them stated that their attitude towards writing had changed significantly. However, 42% of the students stated that there had been minimal change in their attitude towards writing.

Furthermore, 83% of the students believed that their writing skills had improved dramatically. These findings confirmed that there had been some positive change in the students' attitudes toward writing skills and CT, and that it might be useful to apply these activities to a larger sample of students. Additionally, 67% of the students stated that this intervention helped them practice CT skills that they already had, while 33% stated that they learned CT skills for the first time through these activities.

The students thought SN websites were a useful resource to practice CT skills; and all of the students claimed that SN websites were a rich resource that helped them think critically. For example, the websites helped in creating discussions with people who held different points of views, provided a good space to critique others, helped raise social issues and discuss them, and enabled personal opinions to be presented without limits or restrictions. Moreover, students stated that SN websites helped them to increase their language vocabulary and develop their writing skills. Students showed that they preferred to use blogs, Wikipedia and YouTube in activities more than other SN websites, such as Facebook and Twitter.

To conclude, in the first phase I found some important issues in the designing of learning activities: students needed full instructions regarding the achievement requirements; they needed models or patterns to follow, adequate time and clear assessment criteria. Moreover, the pilot study provided an important lesson by highlighting the importance that adequate preparation and monitoring of students' performance has on applying the learning activity successfully.

4.5 Second phase

The second phase was implemented from February 2014 to June 2014. The second phase was conducted with a group from the same community of this research: female undergraduate students, from the School of Education at KSU, who were enrolled in the 241 ITE course. However, this time, the students were from the Department of Special Education. As in phase one, this phase followed five stages: analysis, design,

development, implementation and evaluation stage. The next section describes these stages in more detail.

4.5.1 Analysis stage

In order to carry on this intervention in the right way, the second round of analysis of the ADDIE Model, shown earlier in Figure 4.1, started with an analysis of data gathered from the previous evaluation stage. I then developed and built on this data to improve the intervention and implementation for this phase, as shown below.

First, the WebQuest model appeared popular as all of the students described the current design of the activities (using the WebQuest model) as creative and attractive. Moreover, they all claimed that the instructions given through the WebQuest design were very clear and easy to follow. This may suggest that a WebQuest design is a good platform to provide learning activities for students.

Second, students sorted the following processes and factors that were involved in the activity design and implementation, and that played an important role in the activities, in the following order from most to least important:

- 1- The activities themselves.
- 2- Evaluation model.
- 3- Posting the answers on the blog.
- 4- Lectures.
- 5- Comments from other students.
- 6- Teacher feedback.

This provides some pointers for future learning activity design and implementation. The activities were the most important factor that encouraged students to think critically, while lectures about CT skills were not ranked as important. Students are able to practice CT skills without direct instruction from the teacher in the class. This means they can depend on themselves and internet resources to learn and practise these skills.

Moreover, previous findings suggest that giving students specific assessment criteria (in the evaluation model or rubric) that they can use to guide and critique themselves, is also very important and students like it. This indicates that giving the students the CT rubric through the WebQuest design was helpful.

However, the proposed CT rubric showed that some criteria seemed unclear and did not clearly indicate whether students had achieved the skills in question successfully or not. Additionally, some of the criteria sub skills were unclear and difficult to identify. For example, the definition of some criterion were very general and ambiguous, such as "The Aim" criterion, which was defined as being able to answer the question in a clear and explicit way. Moreover, the "Balance" criterion did not seem to relate to argumentative writing skills. Therefore, modifications to the CT rubric were completed, and are explained in more detail in the design stage, section 4.5.2.

Additionally, although the student questionnaires helped to gather the required data, the implementation of the questionnaire showed that there were some students who misunderstood some of the questions. Furthermore, students complained about the number of open-ended questions, especially as they came after one semester of writing essays. Therefore, I made some changes and modifications to the questionnaire to prepare it for the next phase.

4.5.2 Design stage

4.5.2.1 Redesign the intervention

Based on the previous data, I decided to continue with the same activities and the same design, with just some simple modifications to a few of them. For example, I changed the third activity question, because I noticed students answered the question by writing a description essay instead of an argumentative essay, which meant it was unclear and students misunderstood the aim of the question. The third question became, "Based on the YouTube clips that were given to you, explain to what extent you agree with the exchange of using technologies in the classroom, from using traditional tools such as boards and games to more modern tools like iPads and smart boards". Other than that, students followed the same instructions and procedures to complete the activities.

4.5.2.2 Redesign the CT rubric

The initial CT rubric draft was improved for this phase; and some criteria were changed to become more specific and clearer. The following CT criteria was used during the second phase implementation:

- 1- Setting out the claim. Clearly state a claim and explain why it is controversial.
- 2- Analysis. Thoughtful analysis and evaluation of major alternative points of view.
- 3- **Interpretation**. Justify key results and procedures, explain assumptions and reasons.
- 4- Reasoning. Give clear and accurate reasons in support of the claim.
- 5- **Inference**. Provide sufficient evidence from the available sources with proper documentation.
- 6- Structure. Use appropriate indicator words and phrases concerned with the structure and organization of argumentative writing, such as 'on the other hand', 'the opposing view is' and 'in my opinion'.
- 7- Organisation. Employ an argumentative writing style.

In order to ensure the accuracy of this instrument before applying it in this phase, I applied it to some of the students' essays from the previous phase, and attempted to find out to what extent it was clear and suitable. Additional modifications were made to the criteria again.

4.5.3 Development stage

During this stage, I reviewed the three activities again, and improved them. For instance, I replaced the new question in the third activity. I updated some SN resources on some of these activities. I updated the course blog with new information for the semester. I modified the CT rubric and I published the new version on the WebQuest. Additionally, I modified some students' questionnaire questions to make them clearer and changed some open-ended questions to close-ended questions. The new questionnaire draft contained 25 close-ended questions and six open-ended questions.

4.5.4 Implementation stage

The implementation of this phase began with the beginning of the second semester, from February 2014 to June 2014 (for five months). I conducted this phase with eleven students; one of the eleven students dropped out of the study and did not participate in these activities, but the rest of the students (ten students) completed the entire phase successfully. The implementation stage followed a similar process as in phase one and the same considerations that were used in phase one were taken into account in this stage.

The implementation stage was conducted across these steps:

- At the beginning of the semester, I introduced the intervention to the students, received their agreement to participate, explained their roles and the goals I anticipate.
- 2- During the semester, students followed the same cycle of implementation as in phase one (see Figure 4.4).
- 3- At the end of the semester, I had the students complete the questionnaire to understand the effectiveness of the intervention, their attitude towards these activities and any important issues that might affect the implementation of the intervention.

4.5.5 Evaluation stage

The main focus of the feedback was to determine the usefulness of the learning activities' implementation, any issues students had with the activities, and to finalize the design of the intervention. Applying the CT rubric to the students' writings revealed that there was some improvement in students' CT skills, such as expressing their points of view clearly and commenting on the opinions of others. Moreover, students showed improvement in their argumentative writing style. However, the students still needed more practice in the skill of evaluating the opinions of others (Appendix 4.3).

Regarding the CT rubric design, each time that I used it to assess a student's essay, I focused on any difficulties and weakness that could impede the implementation of the instrument. I recorded all of these comments to improve them for the next phase. For example, the "Analysis" criterion was defined as "thoughtful analysis and evaluation of major alternative points of view". However, this proved to be an ambiguous statement that every assessor could evaluate in different ways based on their point of view. Moreover, the "Structure" and "Organization" criterion in the rubric seemed to evaluate students' writing skills more than CT skills. Therefore, I decide to rework the design of the CT rubric using the previous two designs, and after reviewing the research aims, questions and previous studies, to make it clearer.

Other data obtained from the questionnaire was used to evaluate the intervention as well. The questionnaire responses showed that 90% of the students described the activities as easy to do unlike the finding in the first phase, where a majority of the students described the activities as difficult to do. This may have been due to the students' specialties in the university. Students from the Special Education Department received higher marks when compared to their peers, which may indicate that they study more for their courses in general, than do students in other disciplines.

Regarding the intervention design, 90.9% of the students agreed that the activities were creative and that there were suitable and sufficient directions to follow. All the students (100%) unanimously agreed that the activities were engaging and not traditional. These findings confirm that the activities' design effectively met the students' needs and preferences.

Additionally, 72.7% of the students stated that although they had initial information about CT before starting the course, these activities were a good way to gain a deeper understanding and practice their CT skills. After participating in the learning activity, 45.5% of the students noticed that their attitude towards CT skills had improved and 54.5% of them stated that their attitude had improved significantly. Furthermore, 72.7% students believed that their attitude towards writing had changed dramatically, while the other 27.3% stated that there had been some change in their attitude towards writing. These findings corroborated the previous findings from phase one, which had shown positive changes in students' performances and attitudes toward writing skills and CT, indicating that it might be useful to apply these activities with students.

To conclude, the second phase highlighted some issues: the two phases, explained earlier, gave very close findings, in term of students' improvement in CT skills, their attitudes and perceptions of CT skills, which provided validity in this research's intervention and tools. Additionally, there was a need to modify the CT rubric and student questionnaires to make them better. Also, in order to evaluate students' performances and capture the full image of students' perceptions of the activities, I needed to additional data collection methods, such as focus groups and student reflections. Lastly, I found that three activities were not enough to give a final judgment about the students' improvement in CT skills, and therefore, there was a need to add one more activity to provide a complete picture of students' improvement in CT; so, a fourth activity was incorporated.

4.6 Main research

The main study followed the exact same stages as phase one and two, see Figure 4.1. I used the data gathered from these phases to finalize the intervention design, research tools and the implementation procedures. The next sections describe, in more detail, the intervention design and its implementation in the main study.

4.6.1 Analysis stage

Data that was gathered from the previous phases were the main source of information used to reconstruct the intervention. Previous phases showed that the design and the structure of the activities were really appealing to the students, which encouraged me to continue with the same design. The CT rubric showed some improvement in students' CT skills, but this improvement began to change in the third activity and did not provide consistent results; this led me to the decision to add one more (a fourth) activity to better assess any changes. Moreover, the CT rubric was ambiguous in some areas so I decided to make it more specific. Additionally, I decided to reorganize the questionnaire to make it easier to read and understand.

4.6.2 Design stage

4.6.2.1 Redesigning the intervention

Based on the information I received, I decided to continue the activities with the same design, but add a new activity for a total of four activities every semester. The fourth activity was titled: **'Using new technology in learning'**. Moreover, during the iterative cycle of implementation, my observations revealed that after the second activity students began to get bored with the activities and the activities were no longer engaging them. I addressed this by changing the third activity topic and question from **'Using internet websites in learning'** to a more attractive subject. The new topic was **''Trade through Instagram''**. At the end of the main study, the four activities were as follows:

- 'Communication skills'. This was aimed at helping students think critically about whether the source of communication skills - were acquired or hereditary, and present different arguments in this area as well as an opinion. The question was: Are teaching skills genetic or acquired?
- 2. **'Instructional technology'**. This was aimed at helping students think critically about the positive and negative sides of using instructional technology in education; and to present different arguments in this area as well as an opinion. The question was: What are the arguments used by supporters of technology in education and of those that oppose using technology in education? And to what extent do you agree/disagree with them?
- 3. **'Trade through Instagram'**. This was aimed at helping students think critically about the use of Instagram in trading, and to present different arguments about it as well as their own opinion. The question was: Is Instagram trading a way to earn a living or to defraud; and do you support or oppose the usage of these accounts for commercial purposes?
- 4. **'Using new technology in learning'**. This was aimed at helping students think critically about using modern instructional technology in education rather than traditional ones; and to present different arguments, as well as their opinion, in this area. The question was: To what extent do you support the replacement of traditional instructional technology, such as chalkboards or whiteboards, with the use of modern technology such as iPads and various online websites?

4.6.2.2 Redesigning the CT rubric

After reviewing the previous study phases' data and research questions, the CT rubric showed that some criterion were very general and difficult to identify and assess, so they were changed to provide clarity. At this stage, I decided to redesign the rubric and include Facione's (1990) taxonomy, as well as make changes in the sub-skills to fit with this research's procedures (see Chapter 2, section 2.3.2). I presented the design of the rubric to a group of professors at KSU. Their advice and feedback about the clarity and accuracy of the sentences and structure were taken into account. I piloted the rubric by applying it to some of the previous essays; I then used that information to complete any required improvements. Moreover, the evaluation and improvement of the CT rubric continued until the beginning of the main study. The CT rubric consists of these skills:

- 1. **Interpretation.** Develop a clear main argument that answers the given question.
- 2. **Analysis**. Describe the main claims of the argument and present a wide variety of viewpoints, judgments, and beliefs to support each claim.
- 3. **Evaluation**. Assess each claim about the argument and provide a personal viewpoint or opinion on it.
- 4. **Inference**. Give clear and accurate reasons and examples to support each claim.
- 5. **Explanation**. Provide a personal viewpoint about the argument and present clear examples to support this position.
- 6. **Self-regulation**. Provide an answer that indicates a suitable review of a wide range of resources, and presents clear and logically organised ideas.

The CT rubric is located in Appendix 3.3.B and a full description of the CT rubric rational and design is explained earlier in Chapter 3, section3.4.1.

4.6.3 Development stage

In this stage, I finalized the activities and updated the new rubric version. The English translation of one of these activities is in Appendix 3.2. In addition to updating the activities design and the CT rubric, I also updated the class blog to prepare it for students to use.

4.6.4 Implementation stage

I conducted the main study between September and December 2014, for four months, with 24 students from different departments in the School of Education that participated in the study (see Table 3.2) (additional details about context and participation can be found in Chapter 3). As with the previous phases, the implementation stage was conducted following these steps:

1- At the beginning of the semester, I introduced the intervention to the students, took their agreement to participate, and explained their roles as well as the goals of the study. Moreover, I provided students with the course syllabus, the timetable and a full description of the course activities.

2- During the semester, the course activities were distributed as shown in the following Table 5.1; one activity for each main topic of the course. The table shows that students were not taught or given specific topics on critical thinking or argumentative writing, however, they practice these skills indirectly through course activities and homework. This method supports the social constructivism theory where learners create their own information and knowledge through self-learning and social interaction. The students followed the same cycle as phase one and two of the implementation (see Figure 4.4). After every activity submission, I asked the students to send me their reflections on the activity and on what they think about my feedback and their scores in order to understand their perspectives and to help improve the activity design and implementation.

I kept observations during the fourteen weeks, and recorded any important comments. Additionally, I highlighted and analysed any interesting data as well as other data obtained from the students' reflections to finalize the student questionnaires and build the focus group questions.

Numb	Date (week	
of	beginning	Subject / topic / event
week	from)	
1	04/09/2014	Course registration
2	11/09/2014	Introducing the course, intervention and
		their requirements
3	18/09/2014	Instructional communication-part1, (read
		and prepare the first activity)
4	25/09/2014	Instructional communication-part2, (solve
		the first activity and post the essay)
5	02/ 10/ 2014	Midtorm boliday
6	09/10/2014	Middefin honday
7	16/10/2014	Instructional technology-part1, (read and
		prepare the second activity)
8	23/10/2014	Instructional technology-part2, (solve the
		second activity and post the essay)
9	30/ 10/ 2014	Instructional technology-part3
10	06/11/2014	Midterm exam
11	13/ 11/ 2014	The computer and the internet in education
		(read and prepare the third activity)
12	20/ 11/ 2014	E-learning tools (solve the third activity
		and post the essay)
13	27/11/2014	Instructional design-part1(read and prepare
		the fourth activity)
14	04/12/2014	Instructional desing-part2 (solve the fourth
		activity and post the essay)
15	11/ 12/ 2014	Revise course, and conduct the
		questionnaire
16	18/ 12/ 2014	Conduct the focus groups
17	25/12/2014	Final exam

Table 4.4 The activities' distribution through the course syllables

3- At the end of the semester, in the fifteenth week, I presented the students with a questionnaire to understand the effectiveness of the intervention, the students' attitude toward these activities, the role that SN websites played within it and the factors that encouraged the students to participate in these learning activities. Moreover, in the sixteenth week, I conducted four focus groups in order to collect data for the evaluation stage.

4.6.5 Evaluation stage

For the evaluation stage, data was gathered from five different tools: CT rubric, students' questionnaires, focus groups, teacher observations and students' reflections (discussed earlier in Chapter 3). The next chapter provides the evaluation of the main study.

4.7 Conclusion

This chapter covered the selection of methodology and the process that was followed to design the research intervention. Based on my role as researcher, teacher and learning designer, I found that using the design-based research (DBR) methodology allowed me to act as both a researcher and designer. DBR focuses on the design and testing of an intervention in real context, provided a sense of validity and ensured that the results could be effectively used to assess, inform, and improve the study.

I also chose to apply the ADDIE model to design and implement this research intervention and tools, because it is a generic and simplified instructional design model that shares similar processes, such as analysis, design and implementation, with DBR. The intervention went through three phases of study (two pilot studies and a main study) lasting one and a half years in total. The phases were conducted with different random samplings of female undergraduate students in the School of Education. The research phases helped shape the design and implementation guidelines.

The intervention was designed to focus on students' CT and writing skills through learning activities given to them. The activities required them to browse different SN websites and answer questions in an argumentative essay. Throughout the study phases, the design underwent several steps of evaluation and improvement. Each phase's data informed the next phase to ensure a well-designed intervention. The intervention showed similar findings in each phase. The findings showed that the intervention helped achieve this research's aims. The next chapter presents and explains the main findings that were obtained from the third phase (main study).

Chapter 5 Findings

5.1 Introduction

This study investigates whether the use of social networking (SN) website-based learning activities can promote students' critical thinking (CT) and their participation in course activities; five research questions were posited to fulfil the aim of this research. This chapter aims to presents the findings in terms of those research questions, therefore it has been divided into five main sections, each answering one of the research questions. The Research questions are addressed by giving equal weight to the quantitative and qualitative data. There was an overlap in the data presentation, where the findings were presented in relation to specific observations rather than through the data collection tool.

5.2 RQ1: Do SN website-based learning activities promote students' CT skills?

The first research question asked whether students were able to apply CT to their writing through SN website-based learning activities, to produce persuasive and organised argumentative texts. At the end of the semester, each student had four scores for the four essays they completed. Each essay was marked out of six points, based on the CT rubric (see Chapter 3, section 3.4.1 and Appendix 3.3B). Table 5.1 presents the performance scores achieved by each student in the four activities.

Stu #	Activity #1	Activity #2	Activity #3	Activity #4
Stu1	3.4	3.3	4.3	3.8
Stu2	3.8	4.7	4.9	5.3
Stu3	3.1	3.9	4.8	3.8
Stu4	4.5	3.3	3.1	4.5
Stu5	0.3	0.3	2.1	1.8
Stu6	2.5	2.6	4.1	4.7
Stu7	0.8	3.8	4.2	2.1
Stu8	5.5	5.9	5.7	5.9
Stu9	1.4	3.0	5.0	4.3
Stu10	M ³	3.7	3.4	3.7
Stu11	5.7	5.3	4.6	М
Stu12	4.3	4.1	5.4	5.1
Stu13	3.3	5.9	5.8	3.8
Stu14	М	3.9	4.6	М
Stu15	2.9	3.9	М	3.6
Stu16	3.6	5.7	5.8	5.9
Stu17	3.8	2.7	4.2	3.7
Stu18	1.0	2.6	3.2	2.3
Stu19	3.6	4.2	3.8	4.4
Stu20	5.3	5.7	М	М
Stu21	М	3.4	2.5	1.4
Stu22	2.7	3.2	2.9	М
Stu23	4.8	5.7	4.3	5.2
Stu24	4.8	4.8	5.4	4.7

Table 5.1 Students' scores out of six points

As Table 5.1 shows, twenty-four students were included in the study, however, they did not all participate in all four activities. Though all students participated in the second activity, there were three missing essays in the first activity, two missing essays in the third activity and four missing essays in the fourth activity. For those who did not participate in an activity, the performance score was considered to be missing, and statically, Listwise Deletion methods were used to deal with the variances (see Chapter 3, section 3.5.1.1). In addition, Table 5.1 shows that the progress of students in the activities were not uniform. Some of the students (2, 6, 8, 10, 16, 19, and 23) made linear progress from the first activity to the fourth one. Other students (1, 3, 5, 7, 9, 12, 13, 15, 18 and 24) made linear progress until the third activity and then their performance decreased in the fourth activity.

Additionally, another group of students (4, 11, 14, 17, 20, 21 and 22) produced mixed results. Student 4, for example, declined steadily through the first three activities and

³ Missing data

then in the fourth activity her performance increased to her initial start point. Student 21 did not submit the first activity and then her performance decreased dramatically through the last three. In addition, students 14 and 20 missed two assignments; however, their scores increased between the two activities they submitted.

To conclude students' performance in the four activities; summary statistics of the scores are presented in Table 5.2 below.

Variable	Ν	Mean	Std. Dev.	Min	Max
Activity 1	21	3.39	1.54	0.3	5.7
Activity 2	24	3.98	1.34	0.3	5.9
Activity 3	22	4.28	1.07	2.1	5.8
Activity 4	20	4.00	1.29	1.4	5.9

Table 5.2 Summary statistics of the students' performance scores in the four activities

Table 5.2 shows that the mean performance scores (SD) in activities 1 to 4 were: 3.39 (1.54), 3.98 (1.34), 4.28 (1.07) and 4.00 (1.29), respectively. This shows that the students' mean scores increased in the first three activities, but decreased slightly in the fourth activity. This is likely due to the fact that the fourth activity coincided with the end of the semester, and students were busy in preparation for their final exams, which might have affected students' enthusiasm to do the fourth activity (teacher's observation and students' reflections).

To assess whether the change in scores across the activities (the scores improved over time) is statistically significant, I used a one-way repeated measures analysis of variance (ANOVA), see Table 5.3.

Table 5.3 One-Way repeated measures ANOVA test
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Source of variation	Ν	Mean Squares	F	Sig.	Partial Eta Squared	Observed Power
Tests of within- Subjects contrasts	17 ⁴	10.588	22	.000**	.579	.993
(Linear)						

**Significant at the level of (p<0.001).

⁴ After applying Listwise Deletion on the data (see Chapter 3, section 3.5.1.1)

Running a one-way repeated measure ANOVA in SPSS (Table 5.3) returns that F=22, a p value of <0.001and Eta square=.579 for the activity scores, which indicates that overall there is a linear significant difference between students' scores for the four activities.

ANOVA simply suggests that there is a significant difference somewhere among the activities, but it does not state which activity is different from another. Therefore, I wanted to follow up and do another post-hoc (Pairwise Comparisons) test to see if there were differences between each set of scores and if the differences are significant (Table 5.4).

(I) Activities	(J) Activities	Mean Difference (I-J)	95% Confidence Interval for Difference	Sig.
1	2	706	(-1.313,099)	.025*
	3	-1.271	(-1.948,594)	.001**
	4	988	(-1.440,537)	.000**
2	1	.706	(.099, 1.313)	.025*
	3	565	(-1.027,102)	.020*
	4	282	(839, .275)	.299
3	1	1.271	(.594, 1.948)	.001**
	2	.565	(.102, 1.027)	.020*
	4	.282	(202, .767)	.235
4	1	.988	(.537, 1.440)	.000**
	2	.282	(275, .839)	.299
	3	282	(767, .202)	.235

|--|

^{*} Significant at the level of (p<0.05).

** Significant at the level of (p<0.001).

It can be seen in Table 5.4 that pairwise difference was significant, at least p < .05 over the first three activities with a significant increase in score over time, suggesting that students' CT skills, reflected through their argumentative writing increased over the first three activities. However, the fourth activity revealed different results where the statistics showed that there was no significant difference between the fourth activity and the second and the third one, which confirms the previous descriptive results, that students did not show improvement in the fourth activity. To conclude, the findings revealed that these activities had a positive effect on promoting students' CT skills as reflected in their argumentative writing.

The previous findings have been proven qualitatively as well. Students were asked during the first class, before the intervention, to explain their understanding regarding the concept of CT; the majority of the students were found to have an ambiguous idea about CT skills. Students perceived CT as an evaluation skill, a criticism or as providing value on certain issues, as seen in the following definitions students provided of CT skills:

- "Talking about personal opinions, especially after reading something."
- "Criticising people's speech."
- "Correcting some mistakes based on scientific theory, rules and certain ways."
- "Giving judgments, in non-random ways", (observation of lecture 1).

However, during the focus group interviews conducted after the intervention, students provided a wider definition of the concept of CT, as seen in the following extracts:

"I think critical thinking is about discussing a particular topic by presenting different opinions then presenting your own opinion. Also, I think it depends on the topic, some topics and opinions you can agree with and some you cannot; but the good thing is that I learned that to be a critical thinker you should not present only your opinion, but also present other, different opinions as well" (Stu16, FG⁵1).

"Presenting two opposite opinions then presenting your opinion and explaining if you agree with them or not" (Stu 8, FG1).

"Studying the topic that you would like to discuss by reviewing others' opinions about it and deciding on your position with regard to these opinions, then presenting your own opinion clearly" (Stu 23, FG3).

"CT is watching and reading with a critical eye; and to be sceptical about everything. Also, it is related to listening to two different opinions then deciding which side you are on" (Stu12, FG4).

⁵ (FG) refers to focus group.
"Having more than one opinion about a topic, then deciding your own opinion about it. It is not enough to be a critical thinker to give your opinion only" (Stu19, FG4).

The students' statements demonstrate some improvement in understanding the concept of CT, and their ability to focus on specific components of CT which are the essential CT skills this study is focused on; these are the skills of being able to present different arguments and opinions, evaluate them and present a personal point of view.

As this study examined students' CT skills as reflected in their argumentative writing, their perceptions of their argumentative writing skills was important to investigate. At the beginning of the semester, and specifically in the first class, I asked students what they thought arguments and argumentative writing meant. Some of their answers were as follows:

- "It is giving and taking between two people."
- "Exchange of views" (several students gave this response).

Students expressed that they understood arguments and argumentative writing to mean a discussion between two people in order to exchange opinions only. However, during the focus groups, after the intervention was finished, students were asked the same question, and if they could now recognise the difference between argumentative and descriptive writing; they all stated, "yes, we can". The following statements from Students 9, 16, 23, 12, 19 and 6 illustrate this:

"The argumentative writing has views and opinions, not only definitions and features like the descriptive writing" (Stu9, FG1).

"When you read an argumentative essay you feel as if there is a debate about a topic, not just a definition and examples provided on it" (Stu16, FG1).

"The argumentative writing presents many views, people's opinions and my own opinion, as well. In contrast, descriptive writing provides a description of a topic with all its' elements from one point of view" (Stu23, FG3).

"The descriptive writing includes one opinion only"; and Student 19 interjected: "It is only to describe an issue". Student 6 added: "The descriptive writing is biased on one opinion, but the argumentative writing presents the opposite opinions" (Stu12, Stu19, Stu6, FG4).

Students' responses suggest that their ability to recognise the differences between descriptive and argumentative writing has improved. Moreover, students developed the ability to use their CT skills with their knowledge of an argumentative writing structure to build argumentative essays.

In addition to the students' improvement in defining CT skills and argumentative writing, and with regard to using SN website sources, some students started to become sceptical about SN websites' information and were unsure of the reliability of these sources. This was noticed when I asked students in the focus groups about using SN as a source for their homework. Student 8 stated:

"The most important challenge I faced while doing these activities was getting reliable information from SN such as blogs, where they are public sites where people write their opinions and what they see, only from their point of view. This means these websites reflect the personal views rather than the basis of evidence that substantiates or denies that information" (Stu8, FG1).

This is the opposite of some students' statements at the beginning of the semester when they said they usually view SN sources without thinking about the reliability of the content (observation of the lecture 1).

In addition, 63% of the students agreed with this questionnaire's statement: "These activities changed my point of view about the accuracy of SN website resources"; whereas 33% were neutral. Moreover, 63% of the students agreed that they were able to browse SN websites, such as Wikis and blogs with a critical eye, and 83% of the students claimed that their ability to use SN websites had improved, as shown in the following Table 5.5. This finding suggests that the activities made the students more cautious about the accuracy and reliability of information available on SN websites. This was an essential aim in this study, to enhance students' awareness about SN websites' content by making them use their CT skills to critique these websites.

Skills		Agree ⁶	Neutral	Disagree
These activities changed my point of view	F	15	8	1
about the accuracy of SN website resources		63	33	4
I learned to browse SN websites with a critical	F	15	1	8
eye	%	63	4	33
Doing these activities has helped me improve	F	20	2	2
my ability to use SN websites (browsing, citing and other).		83	8	8

Table 5.5 Students' awareness of using SN websites

To conclude, both quantitative and qualitative findings indicate that the activities had a positive effect on students' performances in terms of applying CT skills, such as presenting different arguments, comparing arguments and presenting their personal opinion. Moreover, students had a clear image regarding the concept of CT and argumentative writing, which allowed them to use these skills in others contexts. In addition, students showed more confidence in using SN websites.

5.3 RQ2: What are students' awareness of CT and argumentative writing skills before and after these activities?

The aim of research question two was to gather information about students' thoughts about any changes in their CT skills. In addition to the statistics data that indicated there was improvement in students' CT skills, I wanted to know to what extent students had CT skills before applying the intervention (students' CT skills baseline), their feeling about any changes in their skills and whether activities were the main source of their CT skills. The students were asked about each CT skill indicated in the CT rubric; whether they thought they mastered this skill and if they acquired it from the activities that were applied in the course or whether they knew it before taking this course.

The questionnaire shows that students noticed some improvement in their CT skills and were aware of the skills they needed to practice more (Table 5.6).

⁶ The 5-point scale was collapsed into a 3-point scale: the "strongly agree" and "agree" was collapsed into "agree" and the "strongly disagree" and "disagree" was collapsed into "disagree" (see Chapter3, Section 3.4.2).

Skills				I have
		l	No	not
		Yes		mastered
				this skill
				yet
White a clean introduction shout the main tenia	F	18	1	5
writes a clear introduction about the main topic.	%	75	4	21
Writes a linked sentence in the introduction part	F	15	1	8
that clearly states the main argument.	%	63	4	33
Describes different claims about the argument.	F	21	1	2
	%	88	4	8
Presents different viewpoints that support each	F	13	3	8
claim.	%	54	13	33
Obtains different claims and opinions from the	F	23	0	1
social networking websites.		96	0	4
Cites every resource used.		21	3	0
		88	13	0
Comments on each claim by adding a personal		9	8	7
interpretation and evaluation.	%	38	33	29
Gives clear, accurate and realistic examples that	F	15	6	3
support each claim.	%	63	25	13
Declares a personal viewpoint that clearly	F	16	3	5
illustrates a personal position on the argument.	%	67	13	21
Defends a personal viewpoint by providing		15	6	3
reasons and realistic examples that support the		63	25	12
position.		05	23	15
Uses words and phrases that clearly indicate the	F	12	4	8
meaning.		50	17	33
Writes a clear conclusion that summarises the	F	16	3	5
main ideas.	%	67	13	21

Table 5.6 Students' awareness of their own CT skills

Table 5.6 shows that students self-reported that they improved in most of the CT skills indicated in this study, with 96% of the students claiming that they were able to use SN websites more than before to obtain different claims and opinions. 88% of the students stated that their ability to present different viewpoints that support each claim improved. Furthermore, more than half of the students stated that they were better able to support claims using clear examples, present their personal point of view clearly and support it with realistic examples. These were the skills this study focused on and were inserted in the rubric of CT. However, only 38% of students thought they could evaluate others' opinions and add their personal interpretation.

Regarding students' argumentative writing skills, Table 5.6 shows that more than half of the students thought their writing skills had improved in areas such as constructing a clear introduction about the main topic (75%), declaring the main argument (63%) and writing a conclusion that summarises the main ideas (67%). On the other hand, only half of the students thought that they were able to use words and phrases that clearly indicate the meaning and 33% of the students thought they needed more practice in this skill. While students noticed an improvement in their CT and argumentative writing skills, it became apparent that students demonstrated more of a commitment to using the argumentative structure in their writing, as they included an introduction describing the arguments, presented two different claims, commented on them and presented their personal opinion; specifically, the improvement in this area was higher than their improvement in CT skills.

For example, some students felt there were some CT skills they were still weak in and needed to practice more, such as commenting on different claims by adding their personal interpretation and presenting different points of view that support each claim. In fact, it became apparent that the majority of the students did not have the confidence to comment on others' opinions and showed resistance to criticising other's opinions. Moreover, most of the students presented only one opinion for each claim and still had difficulty finding several examples that supported the same point. This weakness was noticed by other researchers such as Kuhn (1991), who claimed that students could not justify their different opinions, and provide evidence to support their opinions. Students lacked the basics of general reasoning and argumentative skills. I agreed with the students vill have weakness in some CT skills such as critiquing others' opinions, and students were writing scattered ideas with no flow of information.

In addition, students' responses indicated that they though that the activities were the main sources of their CT skills (Table 5.7).

				I knew it
				before,
				but have
		Before	Through	practised
Skills		this	this	it well
		course	course	through
				this
				course
Weiter a share inter hereiter share the main territ	F	1	15	8
writes a clear introduction about the main topic.	%	4	63	33
Writes a linked sentence in the introduction part	F	2	18	4
that clearly states the main argument.	%	8	75	17
Describes different claims about the argument.	F	0	15	9
	%	0	63	38
Presents different viewpoints that support each	F	0	22	2
claim.	%	0	92	8
Obtains different claims and opinions from the	F	3	11	10
social networking websites.		13	46	42
Citerent	F	11	8	5
Cites every resource used.		46	33	21
Comments on each claim by adding a personal	F	1	20	3
interpretation and evaluation.	%	4	83	13
Gives clear, accurate and realistic examples that	F	1	21	2
support each claim.	%	4	88	8
Declares a personal viewpoint that clearly	F	0	16	8
illustrates a personal position on the argument.	%	0	67	33
Defends a personal viewpoint by providing	F	2	18	4
reasons and realistic examples that support the	%	8	75	17
position.		0	75	17
Uses words and phrases that clearly indicate the	F	2	16	6
meaning.	%	8	67	25
Writes a clear conclusion that summarises the	F	6	15	3
main ideas.	%	25	63	13
Total percentage	%	10	68	22

Table 5.7 Students' opinion about from where they acquired their CT skills

Table 5.7 reveals several issues: first, the activities applied in this research (the intervention) were the main source of students' CT skills; 68% of the students indicated that they learned about these CT skills in this course and had not heard about them before, while 22% of the students stated they had heard about these skills, but were able to practice them well in this course. This revealed that the activities were effective in promoting students' CT skills. Second, the previous table (5.7) shows that students

began the course with a very limited level of CT skills, where only 10% of the students indicated that they knew and had mastered these skills before. Third, the table shows the extent of students' weakness in CT skills, where 0% of students indicated they were familiar with skills such as describing different claims about the argument, presenting different viewpoints that support each claim and declaring a personal viewpoint that clearly illustrates their personal position on the argument. Finally, the high percentage, 68% of students who indicated they learned these skills through this course, confirmed that CT skills can be coached through general courses activities.

For a more thorough understanding of students' feelings about their improvement, I analysed transcripts from students' focus groups, observations and students' reflections. These showed that students were very clear about their weaknesses in CT skills before and during the course. For example:

- Some students stated that they could not express their opinions without bias (Stu16, FG1); (Stu22, FG3); (observation of lecture 1); but more than that, they were afraid of talking about their opinions (Stu22, FG3); (Stu10, FG2).
- In addition, other students claimed that they could not recognise the difference between different opinions (Stu17, Stu24, FG2) and how to connect these opinions and their ideas (Stu22, FG3); (Stu6, FG4); (observation of lecture 7).
- Moreover, the majority of students stated that they do not know how to comment on others' opinions and provide examples to support their personal opinion (observation of lecture 4).

Furthermore, students indicated some weakness related to their writing skills such as:

- Inability to use formal Arabic in writing (Stu21, FG1);
- They could not start writing easily (Stu6, FG4); (observation of lecture 1);
- Dependence on using copy and paste (Stu23, Stu22, FG3); (observation of lecture 7 and 11); (Stu12, students' reflections);
- Unfamiliar with how to cite data and quotations (Stu10, Stu17, FG2);
- Inability to convince people about their opinion through writing (Stu8, Stu16, FG1); (Stu22, FG3); (observation of lecture 1).

At the end of the semester, students felt more confident with their CT and writing skills. The majority of students felt that their ability to express their opinions orally and through writing had improved, as had their ability to evaluate other peoples' opinions (Stu16, Stu8, Stu9, Stu21, FG1); (Stu10, FG2); (Stu22, FG3); (Stu9, Stu12, students' reflections). Student 10 stated:

"When I attend a seminar or lecture I am able to discuss and express my opinion, and argue every issue that I am faced with; and I can express my opinion about what I see and hear, what is right and what is wrong. Now, I have the confidence to express my opinion" (Stu10, FG2).

In terms of writing skills, students indicated that the time that they needed to construct an essay decreased dramatically (Stu9, Stu16, FG1); (Stu10, Stu17, Stu24, FG2); (Stu12, FG4); (Stu2, Stu11, Stu 14, students' reflections). They also became more organized during the writing process (Stu18, Stu16, Stu9, Stu8, Stu12, Stu21, students' reflections). Students began to gain confidence in their writing. Student 17 stated, "When I read my writing, I say to myself, 'that is great'. It is first time I am able to write such an essay" (Stu17, FG2).

In other words, the data shows that students have an awareness of their strengths and weaknesses with regard to their CT and argumentative writing skills. In fact, the majority of students after the intervention were satisfied with their ability to use SN websites to search out different opinions on a claim, and present them in an argumentative way. Moreover, some students claimed that they began to gain confidence in presenting their opinions on any claim. Students were also aware of areas they had weaknesses in such as commenting on others' opinions and using words and phrases that clearly indicate the meaning and connect the ideas together.

5.4 RQ3: What are students' attitudes towards SN website-based learning activities?

This research question explores whether students like or dislike these activities. In order to answer the research question, data were collected from students' questionnaires, focus groups, students' reflections and teacher's observations. I will begin by summarising students' general attitudes from the data collected from focus groups, then I will go into more detail to explain their attitudes as obtained from each of the different sources.

After the intervention, and during the four focus group sessions, students were asked to draw their general feelings during the semester and specifically for the activities through simple pictures. After that, they were asked to explain their drawings. These drawing activities were my way of stimulating discussion, to encourage all students to express their opinions and ensure that all students were heard. In addition, this activity was used to open up the discussion and make students feel more comfortable and open towards me and other students in the group.

Student 19, in Figure 5.1, for example, explained that she was very confused at the beginning and unsure about what to do; however, she became more organized and confident about what to do later in the semester. She explained how she felt by stating:

"At the beginning, I was confused, under pressure and not sure about what to do. I was using different devices like my iPad, laptop and computer to collect the information. After that, these emotions started to disappear and I started to be more organized when I searched for information, and I started to use fewer devices. In the end, I was happy that I could do the homework successfully in an organized way" (Stu19, FG4).

Figure 5.1 Student is confused about the research process, Student 19

The following picture (Figure 5.2) is for Student 22, who I considered to be the shyest and calmest student in the class. She did not speak up very often during the semester;

so, I was surprised to see how the drawing activity helped her talk and present her opinion clearly (see Figure 5.2).



Figure 5.2 Student's feeling about her improvement, Student 22

Student 22 interpreted her drawing by stating:

"My experience with these activities was such as whirlwind, because I have a serious problem in my personality that I cannot express my own opinion, especially through my writing. 'I cannot express my own opinion so how do you expect me to express other people's opinions?' This was the problem that I faced with each homework; I could not express my opinion and connect it with others' opinions. However, with continuous practice I started to become more capable and confident in expressing my opinion through my writing" (Stu22, FG3).

In fact, her happiness and enthusiasm were obvious during the focus group.

Student 8, during focus group 1, and Student 10, during focus group 2, presented how they were unhappy and worried at the beginning of the semester; however, at the end their attitudes changed to being happy and proud of themselves (Figure 5.3). Students attributed the reason for that as having become accustomed to the activities. Student 10 stated that "the activities were difficult at the beginning, but after that, as I adopted them gradually [they became easier]" (Stu10, FG2).



Figure 5.3 The change in students' negative attitudes, Student 8 and Student 10

Moreover, Student 9 expressed her attitudes toward the activities in the drawing below (Figure 5.4), by saying:

"At the beginning, I felt sad. I felt the activities need a lot of work and I have a lot of courses this semester so I felt mad. What I understood from your explanation was that the activities are like a short research that needs an introduction, content, conclusion and personal opinion; that is why I was very depressed and I came to your office to discuss this. The second homework I did not know how to do it; I struggled with it for few days, but I did not know how to start. Before the third homework, you showed us our mistakes, discussed them with us and you told us to write and just write; so in the third one I started to be more comfortable and happy, I started to know how to organize my ideas. The fourth one took 10 minutes only; I was very happy about my performance and my mark as well" (Stu9, FG1).



Figure 5.4 Student 9 attitudes toward the activities

Student 12 reflected that her happiness coincided with her improvements in terms of the time that was required to finish an essay and the number of drafts. In the following picture, Figure 5.5, she stated:

"I went through two periods of time; in the first one, I was spending a long time finishing the homework. I used a lot of paper and drafts; that is why during that time I was very sad and depressed. However, in the second period of time, I started to be more excited to do the homework because I was organized and could finish it in two hours maximum" (Stu12, FG4).



Figure 5.5 Student's improvement in terms of time and drafts, Student 12

To conclude, students' drawings showed that, in general, students initially reacted negatively to the activities at the beginning of the semester, but their attitudes changed gradually over the semester until the students' positions changed positively towards the activities. The next section discusses students' negative and positive attitudes, the reasons behind them and how they were developed.

5.4.1 Students' negative attitudes

Students stated that they had negative attitudes toward the activities and the course at the beginning of the semester and when they started doing the homework. Some students thought about withdrawing from the course (observation of lecture 7), while others felt they would not be successful in completing the activities (Stu21, FG1); (Stu10, FG2); (Stu23, FG3). This made them worry about their marks (Stu2, observation of lecture 7). The students were most concerned about their marks; all their thinking at the beginning of the course was to avoid anything that might affect their achievement. In this case, students were worried about doing the activities the wrong way as it might affect their grade in the course.

During the focus groups, students used different expressions to clarify their position at the beginning of the semester, such as "I was surprised"; "my mother felt sorry for me"; "I felt sad"; "I was in shock"; "I found the activities very difficult and not exciting" and "I was confused".

During the semester, some students kept complaining about the requirements for the activities and the effort needed to accomplish and complete them (observation of lecture 3, 7, and 11). Moreover, the number of students who withdrew from the course was considered large in comparison with other courses, 9 out of 33, and was justified by the students as being due to the activities' requirements (observation of lecture 7).

In fact, as the teacher responsible for the intervention, I started to worry about my students' suffering and complaints. Therefore, after the second activity, I integrated some procedures to enhance the students' motivation. For example, I modulated the third topic to find one familiar to students and close to their life, like 'Trade through Instagram', to encourage students to participate. Additionally, I made commenting on other students' essays on the blog optional and not compulsory.

5.4.2 Students' positive attitudes

In comparison to the negative attitudes at the beginning of the semester, students showed positive attitudes towards their improvement and the activities. This section will discuss students' positive attitudes in light of these two themes.

5.4.2.1 Students' positive attitudes toward their improvement

The data collected from the questionnaire shows that students had a positive attitude towards themselves and their improvement in some of the CT and writing skills (Table 5.8).

Skills		Agree	Neutral	Disagree
I am happy about the improvement in my level	F	20	3	1
of argumentative writing.	%	83	13	4
The writing became more interesting to me.	F	14	7	1
	%	58	29	4
I feel more confident now about writing	F	18	3	3
argumentative essays	%	75	13	13
I love writing more now than before.		9	8	7
		38	33	29
I feel proud when I write my essay in the blog		13	6	5
		54	25	21

Table 5.8 Students' attitudes toward their improvement

Although 38% of the students claimed that writing was still not their favourite activity or homework, most agreed that their writing skills had improved (Table 5.8). Most of the students, 83%, were happy with their improvement in writing skills, especially in writing argumentative essays. A little over half the students, 58%, became more interested in writing, while 75% of students were more confident in their ability to write argumentative essays. In addition, 54% of the students were proud of publishing their essays on the blog.

Moreover, additional information gathered from the focus groups and students' reflections aligned with these attitudes. Student declared that they were happy because they learned new skills, such as CT and writing skills (Stu9, Stu21, Stu16, FG1); (Stu22, FG3); (Stu8, Stu11, Stu16, students' reflections), and that they became faster writers (Stu16, Stu9, FG1); (Stu10, Stu17, Stu24, FG2); (Stu12, FG4); (Stu2, Stu11, Stu14, students' reflections). In addition, they liked how their skills and abilities when talking and expressing their opinions had developed (Stu10, FG2); (Stu8, FG1).

Student 21 stated: "When I read my writing I feel proud of myself, I cannot believe that I wrote this" (Stu21, FG1). Moreover, Student 8 declared, "I see myself improving day after day, and after each homework. Although I faced difficulties in the beginning, I

thank God that I am much better now" (Stu8, students' reflections). This shows that these activities have some positive effect on students' writing skills and motivation.

5.4.2.2 Students' positive attitudes toward the activities

Students' answers to some of the questions on the questionnaire indicated that they liked the activities the way they were designed and their performance in them (Table 5.9).

Skills		Agree	Neutral	Disagree
I think the estivities' ideas are prestive		21	3	0
I think the activities incast are creative	%	88	13	0
I think the activities' instructions are clear and	F	23	1	0
easy to follow		96	4	0
I enjoyed doing these activities.		18	4	2
		75	17	8
Doing these activities allowed me to understand	F	17	5	2
the course topics better		71	21	8
I enjoyed browsing the SN websites while doing	F	18	4	2
these activities	%	75	17	8

Table 5.9 Students' attitudes toward the activities

Table 5.9 shows that 87% of the students thought the activities were creative, and 96% of the students thought the activities' instructions were clear and easy to follow. The redesign of these activities after every research phase, ensured that students were provided with well-structured activities. Moreover, 75% of the students enjoyed doing these activities and enjoyed browsing the SN websites while doing them. In addition, 71% of the students thought these activities helped them understand the course topics.

Information gathered from the students' focus groups revealed more about these positive attitudes. Students thought that these activities were better and more useful than the traditional homework they were used to (Stu10, Stu, 24, Stu17, FG2); (Stu23, FG3); (observation of lecture 4); (Stu2, Stu11, students' reflections). Students also stated that their participation in these activities was engaging and an interesting experience; and that they would like to take the same activities again in another course (Stu9, FG1); (Stu10, Stu17, Stu24, FG2); (Stu22, Stu23, FG3); (Stu8, observation of lecture 5); (Stu23, observation of lecture 6); (Stu12, Stu21, Stu21, Stu2, students' reflections). Student 9 thought that as much as she misunderstood the activities' performances at the beginning, her position changed by the end of the semester, and she claimed that "after

the fourth homework, I could see there were no negative side in these activities" (Stu9, FG1).

The information above showed that students liked the way the activities were designed, the idea of the activities and found them more interesting and useful than traditional types of homework.

To sum up, students had negative attitudes towards the activities at the beginning of the intervention due to reasons such as students not being used to these types of activities, their ability to express their personal opinions freely and due to their writing skills ability. However, the intervention supplied encouragement as well, causing students' attitudes to change positively at the end of the semester and after the intervention; and the students did not mind practising these activities again in other courses.

5.5 RQ4: Does merging SN websites' resources with the learning activities have an effect on promoting students' participation in the course activities?

One of the most important debates in the educational field is about the role new technology and SN have on students' performance and achievements. One of this study's aims is to investigate whether incorporating SN websites in learning activities could encourage students to continue constructive work at home and improve students' participation. What I observed in reality (observing the students during the semester) was different from what students stated on the topic. This section delves into these differences in more detail.

5.5.1 Students' opinions regarding the use of SN in the learning activities The questionnaire (Table 5.10) shows that students enjoyed the activities and liked using SN websites as part of the activities.

Skills		Agree	Neutral	Disagree
Merging the social network websites with these	F	19	2	3
activities made solving them more enjoyable.		79	8	13
Dealing with the social network websites	F	3	3	18
(browsing, citing and others) is more difficult than I expected.	%	13	13	75
I enjoyed browsing the SN website while doing	F	18	4	2
these activities.	%	75	17	8

Table 5.10 Students' opinions about using SN websites in the learning activities

A majority of the students, 79%, claimed that merging SN websites with the activities made solving them more enjoyable; and 75% of students said they enjoyed browsing SN websites while doing these activities and thought that using the SN websites to complete homework and class activities was easy. This is likely due to some of the characteristics of a SN website that engages students, such as the socialization, diversity of context and visual content.

The students shared their opinions clearly in the focus groups and student reflections about the benefits of using SN in the course activities. They stated that providing SN sources made searching for opinions easier and more exciting (Stu8, Stu21, Stu9, FG1); (Stu17, Stu10, Stu24, FG2); (Stu23, Stu22, FG3); (Stu6, Stu12, FG4); (observation of lecter1); (Stu8, observation of lecture 5 and 11); (Stu23, observation of lecture 6).

In addition, some students claimed that these types of activities were better than the traditional way of doing homework, because their academic life became immersed in SN and they were enthusiastic about that (Stu8, Stu9, Stu16, Stu21, FG1); (Stu17, Stu 24, Stu10, FG2); (Stu22, FG3). Student 21 stressed that "SN is our life now" (Stu21, FG1).

Students also thought that using SN websites for homework could save them time, for several reasons (Stu12, FG4); (Stu8, observation of lecture 4 and students' reflections). First, providing SN source links helped students know exactly what the teacher wanted them to research (Stu8, FG1); (Stu23, FG3); (Stu6, FG4). Second, students could browse the websites from anywhere using a smart phone or tablet; they did not need to go to the library or find a desktop computer (Stu21, Stu8, FG1); (Stu24, Stu10, FG2); (Stu22, FG3). Student 8 stated, "Sometimes I browse the links that you provide to us in the car on my way home from the university" (FG1). Third, SN gives direct, specific

and brief information compared to other internet websites (Stu24, FG2); (Stu22, FG3). One of the most important characteristics of SN websites is that, in general, it provides a large amount of information with fewer words and pages, as it is more specific and concise (Stu9, FG1).

Furthermore, the students saw other advantages of using SN websites for homework. For example, Student 16 claimed that using SN helped her read more (FG1). Student 17 stated that she could easily remember the information provided on SN because they contain different media inputs such as audio and visual objects (FG2), such as images and videos, which are more appealing to students.

However, although students saw different advantages of using SN websites for the course activities, they suggested some limitations for using them. First, students suggested having different types of homework that did not all depend on SN, as students might become bored with the homework if they are using these websites the whole day (Stu16, Stu21, FG1); (Stu23, Stu2, FG3); (Stu19, FG4); (observation of lecture 5 and 6).

Second, students claimed that teacher should choose topics that can excite students (Stu9, Stu16, FG1); (Stu10, Stu17, FG2); (Stu23, FG3); (observation of lecturer 8 and 10); (Stu8, students' reflections). Student 10 stated, "The activities were really good so do not change them, but take care with choosing the topic. Do not restrict yourself to the curriculum topics, go out and choose some creative topics such as Instagram" (FG10). Student 17 added, "It was a really nice topic" (FG2). Student 9 stated, "The Instagram topic was really nice and we liked it; maybe because it is familiar to us and we are used to being on it" (FG1).

5.5.2 The effectiveness of SN websites in promoting students' participation

Although students stated their preference with regard to using SN websites in the course activities and stressed some of the positive aspects of using it, the data gathered is not adequate enough to conclude that using SN websites promotes students' participation in course activities. This conclusion was obtained for several reasons: first, although the activities depended on a set of SN website sources such as YouTube clips, blogs, wiki, Twitter and Facebook, students did not show enthusiasm in solving the activities. The majority of the students started to solve homework just few days before the deadline and usually submitted homework on the same day as the deadline or a day before at

most (observation of the lectures and students' reflections). Furthermore, some of the students needed to be followed-up with after the deadline to push them to submit their homework (observation of the lectures). Moreover, there was some missing homework for each activity except the second one (Table 5.11).

The homework	Homework	Missing
	submitted by the	homework ⁷
	deadline	
First homework	21 out of 24	3
Second homework	24 out of 24	0
Third homework	22 out of 24	2
Fourth homework	20 out of 24	4

 Table 5.11 Students' homework submission procedures

Second, there were some students who were resistant to doing the activities. These students kept complaining about the activities' requirements and the effort it required. For example, a group of students during lecture 7 expressed their feelings toward the activities and said, "We would like to do a presentation instead of this homework, because we do not want to browse all of these websites" (observation of lecture 7). Student 7 expressed her opinion as well by saying: "I have never seen the WebQuest or the resources that the teacher provided for us, I googled the title only to see what I could find related to it. I prefer if she gives us regular research" (Stu7, observation of lecture 11).

Finally, my initial thought was that students like to participate on SN websites, such as blogs, because of the characteristics indicated in 5.5.1, and based on the literature, which describes this generation and their interest in using these types of websites (Carlson, 2005; Bames et al., 2007; Kelly, 2008 and Worley, 2011). However, I noticed that students resisted reading and commenting on each other's posts and rarely participated via the blog to provide feedback (Table 5.12).

⁷ Those who did not submit their homework.

The homework	Number of	Number of
	comments	Students who
		commented
First homework	32	4
Second homework	32	7
Third homework	9	2
Fourth homework	3	2

Table 5.12 Students' comments on the blog

Table 5.12 shows the limited number of students who participated via the blog, and how the number of the comments dropped after the second activity, when I informed the students that commenting on other posts is optional, not compulsory.

Students provided different reasons for their resistance to participating via the blog. For example, the pressure of the semester's courses, their obligations and family's circumstances, which all required a lot of time (Stu17, Stu10, Stu24, FG2); (Stu22, FG3). Student 21 stated, "Some essays were very long and I did not have time to read and comment on them" (FG1). Other students avoided commenting on the blog due to sensitivity concerns and not wanting to annoy others (Stu10, Stu17, FG2). For instance, students were worried about revealing other student's mistakes to the teacher and those students seeking to retaliate next time (Stu8, Stu16, FG1); (stu24, FG2); (observation of lecture 7). Moreover, students' confidence in themselves was important. Students were uncomfortable in their ability to provide correct and suitable feedback to others (Stu17, FG2); (Stu6, FG4); (observation of lecture 4).

It is important to say that although students showed resistance to commenting on other students' essays, they showed interest in receiving comments from the teacher and other students. For example, Student 8 sent me several emails asking when I was going to read her essay on the blog and comment on it. In addition, Student 23 stated, "I refresh the blog's page ever few hours waiting for your and other students' comments. I like to receive comments and feedback from others, but I am not sure that others like that" (Stu23, FG3). This seemed to be the opinion of most of the students; they like to read my comments on their essays, but were hesitant to provide their own comments on other student's essays.

To conclude, I can say that using SN websites as a tool to encourage students to participate in homework was not a useful tool alone; it needs to be combined with other important factors. The following section will discuss these other factors in more detail.

5.6 RQ5: What are the factors that affect students' participation in the learning activities?

Research question five aims to investigate the positive and the negative factors that affect students' participation in course activities. Studying and understanding these factors are important to successfully apply this intervention or future interventions. These factors were collected using different sources, such as student questionnaires, focus groups, students' reflections and teacher's observations.

5.6.1 Students ranking of the important factors

In order to determine the important factors affecting the implementation of the activities, I asked the students through the questionnaires to rank eight factors that were involved in the intervention design and implementation. I used a scale out of eight, with one representing the most important and eight representing the least important. I collected students' answers on these factors and calculated the sum of each factor. As one represents the most important, the smallest sum indicates the most important factor. The findings are shown in Table 5.13.

Statement	Sum	Position
The teacher performance.	46	1
The design of the activities as a Web Quest.	76	2
Using social network websites in these activities.	80	3
The teacher feedback.	101	4
The assessment method (rubric).	122	5
Students' reflections.	140	6
Writing the answers in the class blog.	149	7
Students commenting on other essays in the class blog.	185	8

Table 5.13 Finding of the factors ranking

As seen in Table 5.13, the teacher's role in the classroom is the most important item in the application of the activities. Students stated that the way the teacher applied the activity, encouraged students to do them, followed up on them and the procedures given by the teacher, such as clarifications and feedback, were all very important (student

focus groups). This might indicate to what extent the students in the university depend on their teachers and rely on them to achieve their academic goals. Alharbi (2010) confirmed that Saudi students still prefer teacher-led learning, where the teacher guides their learning and studying procedures. They are accustomed to education in a structured system owing to the conventional norms of education in Saudi Arabia (Alharbi, 2010). This factor will be discussed in detail in Chapter 6, to explain how the educational system in Saudi Arabia affect the adoption of CT philosophy in teaching and learning process.

Another important factor was WebQuest, as students ranked the design of the activities on WebQuest as the second most important. Using SN websites was ranked the third most important. This shows that the design of the activity and the way SN websites are used were liked by students and, to some extent, enhanced the students' participation. Everhart (2006) suggests using thematic structures to design learning activities, linking the course material to guide learners to outside sources and using many types of SN tools such as chat, forums and blogging, to encourage students to adopt the activities and react well.

Students thought that the teacher's feedback was more important than the selfassessment with the rubric; this relates to the first finding that students resist being selfreliant and rely on the teacher for all their learning and coaching practice. Moreover, students do not typically use these types of assessments tools. Students indicated that they usually receive their assessments from the teacher and they are rarely asked to assess themselves based on a rubric (Stu17, FG2); (Stu19, FG4). Other students indicated that in some courses, recently, some teachers have started using a rubric to assess students; however, the students found the rubrics unclear and were not given detailed explanations for their mistakes (Stu8, Stu24, FG1); (Stu24, Stu10, FG2); (Stu23, Stu22, FG3).

In addition, an unexpected result was that students ranked posting their essays on the blog as well as sharing comments and feedback on the blog, as the least and second least important items. This might point to the way students actually use SN websites. Students seem to like to read and browse these websites; however, they do not like to participate on them. Moreover, this supports the point of view that students might use SN websites for social and personal reasons not for educational ones. In order to

investigate and describe the previous factors in more detail, information from the focus groups, observations and students' reflections were gathered and analyzed.

5.6.2 Negative factors

Students attributed their weakness in doing the activities to a number of factors that they thought were the reasons. These factors fell into three main categories: factors related to the structure of activities, the students themselves or another external factor.

5.6.2.1 Factors related to the structure of activities

Although this intervention was piloted twice, there were some factors related to the structure of activities that affected students' participation. First, students were not familiar with these type of activities, which made them unsure of what to do. Students stated that it was the first time they were given activities such as these as they were used to more traditional homework, such as completing a presentation or research (Stu8, Stu9, Stu21, FG); (Stu10, Stu24, Stu17, FG2). Student 8 claimed, "Our homework is very familiar, either shortcutting a lesson from the book and preparing a presentation or researching the topic and printing it out; that's all." (Stu8, FG1).

Student 21 added:

"We have never been asked to do free research or writing. I have never been asked to write something from myself. We usually do research on a topic using internet websites (copy and paste) and we are asked to cite this information and provide a simple explanation; that is all. But not writing like what you asked us to do" (Stu21, FG1).

Second, students associated the reasons behind their weak performance to the activities' requirements. They stated that the activities included several requirements: writing, publishing, commenting and submitting homework via different media (e-mail and blog) (Stu 23, Stu22, FG3); (Stu6, G4); (group of students from observation of lecture 6 and 7). Furthermore, students complained that these activities required them to check all the sources the teacher provided, which took a lot of time (Stu16, FG1); (an unidentified student from observation of lecture 5); (Stu8, observation of lecture 7); (Stu11, students' reflections).

Third, students stated that the activity topics were complicated and not exciting; they asked to be provided with topics that were not related directly to the course syllables, such as the Instagram topic (third activity) (Stu9, Stu16, Stu21, FG1); (Stu6, Stu9, FG4); (Stu24, observation of lecture 8); (Stu21, students' reflections). Student 9 stated that she would like to repeat this intervention with one condition: "That you provide us with more exciting topics, not like the ones we had; they were very boring"(FG1).

Fourth, some students said that because the activities had a lot of the course's marks assigned to them (6 marks for each), it made them worry about their grade for the course (Stu8, FG1); (Stu24, FG2); (Stu23, FG3); (group of students from observation of lecture7). However, it was difficult to assign a value lower than this mark, because then students would not be concerned about doing them. In fact, some students claimed that marks are the students' first motivation, and putting a mark on all of the activity requirements convinces students to do them (Stu 16, Stu8, FG1); (Stu23, Stu22, FG3); (Stu6, Stu19, FG4). During the fourth focus group, a discussion on this came up between the students and me about the importance of the marks on students' motivation:

Teacher: "Do you think if I assign a mark for each activity's requirement, for example, posting the essay on the blog, commenting on others' posts and providing the teacher with feedback, this might push you to do them?"

The students all laughed, and altogether answered, "Yes". Student 19 added that "Students like marks"; Student 6 interrupted, saying, "This is what we are used to, since intermediate school; we are studying to collect marks, not for the studying itself" (Stu19, Stu 6, FG4).

Finally, although a few students said that the need for a computer and internet connection to complete the activities were obstacles to completing them successfully (Stu22, Stu23, FG3), most of the other students did not mention these as obstacles.

5.6.2.2 Factors related to the students themselves

The findings also showed that there were some personal factors affecting students' participation and performance in the course activities. For instance, it was time consuming; students made excuses about the pressure of their other courses or personal and family circumstances (Stu9, FG1); (Stu10, Stu24, Stu 21, FG2); (Stu22, FG3); (Stu19, Stu12, FG4); (group of students during the observation of lecture 5); (Stu11,

students' reflections). A majority of the students, 70%, stated that pressure from other course obligations was the main barrier to doing these activities in the right way (students' questionnaire).

Another important factor was students' weaknesses in the skills needed to complete their homework, such as writing skills, CT skills or using technology like SN websites (students' weaknesses are explained in greater detail in section 5.3). Students' weaknesses became apparent while correcting their papers and from their statements. Some examples of these weaknesses were in writing skills: students found it difficult to construct essays from the beginning; students were trying to avoid any writing exercise; students had common habits during writing such as using a bullet point structure for all essays. Additionally, students had weaknesses in some CT skills, such as evaluating their and others' opinions. Moreover, some students did not have enough knowledge about using technology, such as publishing essays on the blog (observation of lecture 1, 6 and 8).

5.6.2.3 Some external factors

There were other factors that were not related to the students or the activities, such as technical problems related to internet connections or blog access (Stu21, FG1); (Stu6, Stu19, FG4); (group of students from observation of lecture 4 and 6); (Stu 23, Stu 14, observation of lecture 5). Additionally, the lecture time was later in the day, from 1 to 3 pm, on the last day of the week, so students were already tired and easily bored (Stu10, FG2); (Stu22, Stu23, FG3); (Stu6, FG4); (observation of lectures 4, 6, 8, 9 and 11). Finally, some students thought the teacher's personality was too kind to the students and that she did not force them to complete the activities (Stu16, Stu8, FG1); (Stu19, FG4).

5.6.3 Positive factors

Enhancing the positive factors in the activities can improve students' participation and encourage them to achieve more. Therefore, I focused on registering all the positive factors that students liked and thought were helpful. In addition to the important factors that were explained in section 5.6.1, the qualitative data indicated there were other factors, which are detailed in the following sections.

5.6.3.1 Factors related to the teacher's approach to introducing the activities

Students thought that some of the procedures I applied were helpful. For example, in this research I provided a full introduction on how to complete the activities and how to post essays on the blog (Stu10, FG2); (Stu23, FG3); (observation of lecture 4 and 6). Additionally, students stated that they liked the method I used to evaluate them, in which I assessed students based on fair and specific criteria (rubric) (Stu10, FG2); (Stu12, FG4); (Stu8, observation of lecture 7); (Stu8, Stu9, students' reflections). Several students reported that they liked my feedback style (Stu8, Stu9, Stu16, FG1); (Stu22, Stu23, FG3); (Stu6, Stu12, Stu19, FG4); (Stu8, Stu9, Stu17, students' reflections). I provided the students with different types of feedback; for instance, writing comments on students' papers, providing examples for students' mistakes and how to avoid them; as well as providing encouragement for the well-written essays in the classroom.

Students indicted that they experienced a large shift in the way they assessed and exchanged feedback in the course. Students complained about how they were evaluated and assessed in their other courses, and stated that this affected their ability to do the activities the right way. For example, I asked students a question about how often they receive written feedback on their papers; Student 24 said, "I have never been given my papers or projects with written feedback, teachers only give me my mark" (Stu24, FG2). Student 21 stated, "The last time that I saw written feedback it was in the school days [K-12th grades]" (Stu21, FG1). Other students indicated that they were unused to seeing their mistakes, because most teachers only display their marks (Stu24, Stu10, Stu17, FG2); (Stu23, FG3); (Stu6, Stu12, Stu19, FG4); (Stu8, students' reflections). In addition, students indicated that getting detailed and continuous assessment on their projects is uncommon, and depended on the teacher's experience and personality (Stu8, Stu16, Stu21, FG1); (Stu21, FG2); (Stu22, tu23, FG3); (Stu6, FG4).

Furthermore, students pointed out some negative points in the way they exchanged feedback with their teachers and other students. For instance, Student 16 stated, "Some teachers prefer to carry on the lecture without opening a discussion, whether on the class's topic or students' inquiries about the topic; and I think this is due to the lecture time" (Stu16, FG1). Other students indicated that teachers usually delay responding, or do not even respond, to their emails. Students stated they had not been asked to criticize

other students' projects or performance during any other class, as only the teacher does that. Students also claimed that they do not practice how to use rubrics to evaluate themselves or other students (Stu8, Stu16, FG1); (Stu17, Stu10, FG2); (Stu19, FG4).

Some students indicated that my personality was an important factor. A number of students shared the following about me as their teacher in this course: "Your personality and positivity encouraged us to carry out the activities" (Stu23, FG3). Some students thought that my personality was happy and warm, that my behaviour towards them was courteous and I that showed belief in the activity's benefits and usefulness (Stu22, Stu 23, FG3); (Stu12, FG4), (group of students during observation of lecture 4 and 6); (Stu22, Obs11); (Stu22, Stu12, Stu13, Stu17, Stu11, students' reflections). This may indicate that some special characteristics and experience in a teacher can benefit students.

5.6.3.2 Factors integrated from the activities

Students attributed their positive attitude toward the activities to some features that were part of the activities' structure and procedures. In addition to the use of SN websites in the activities, explained earlier in section 5.5, the activities introduced WebQuest, which was an exciting idea that provided the platform for free writing and thinking (Stu10, Stu17, FG2); (Stu22, FG3); (Stu6, st19, FG4). Moreover, students thought that the separation of time between the activities (two weeks) was a comfortable amount of time for them (Stu16, FG1); (Stu10, Stu17), FG2); (Stu22, FG3).

Students liked how the activities required only a one-page submission, which did not require too much writing (group of students during the observation of lecture 1 and 3). In addition, students liked the activities because they were individual homework and not a collaboration or group work (group of students during the observation of lecture 4).

Moreover, although students relied on the teacher's assessment to improve their performance, some students indicated that providing students with the criteria (rubric) that was required to be covered in the activities provided them with enough guidance to do well (Stu8, Stu16, Stu21, FG1; Stu24, FG2; Stu22, Stu23, FG3; Stu12, Stu19, FG4). Student 19 stated, "Following the rubric helped me to sort the essays in the right way" (Stu16, FG4). Moreover, Student 12 explained, "Reading the rubric shows me how I am going to assess, which helps me understand how to do the activities" (Stu12, FG4). Although students provided positive feedback on using the rubric, many of the other

students indicated that they submitted their essays without checking the rubric or only checking it one time at the beginning of the course (Stu21, FG1).

To sum up, the success of carrying out any educational intervention does not depend merely on the use of technology and SN websites; it should also take into account a number of important factors such as the structure of the intervention, teacher performance, students' circumstances and students' previous experiences.

5.7 Conclusion

This chapter tried to answer the research questions by presenting, analysing and interpreting the statistical findings of the quantitative data obtained from the CT rubric, student questionnaires, information from qualitative data retrieved from the focus groups, teacher's observations and student reflections. A presentation of each research question's findings was carried out separately. I presented data from different sources, which helped to provide full answers to the research questions.

The research findings show that the intervention had a positive result on students' CT and argumentative writing skills. Students were able to construct argumentative essays following the argumentative writing structure. They were able to present different claims and arguments. Moreover, their ability to express their own opinions improved dramatically. However, students still need more practice on some skills such as evaluating others' opinions and supporting their claims by presenting different examples.

Most of the students had little confidence in their CT and argumentative writing abilities before starting the intervention. Moreover, they had low expectations of success, were dissatisfied and anxious about the problems in the intervention, and had negative attitudes towards the intervention. At the end of the semester, after completing the intervention, students' awareness and attitudes were enhanced. They all shared common accomplishments such as feeling they had improved in their CT and argumentative writing skills, a positive attitude toward themselves and the intervention, and a desire for further improvements in the future. Students' awareness about the positive impacts of the intervention may motivate them to exert more effort and spend more time engaging in similar activities again. This research indicated that SN websites as tools are not sufficient to enhance students' participation in learning activities. There are other factors that play an important role in enhancing students' participation, such as providing students with enough time to complete their homework, choosing attractive topics for the writing activities, the teacher having belief/confidence in the intervention and providing students with comprehensive feedback. The following chapter discusses the previous findings in light of my personal interpretation and previous literature.

Chapter 6 Discussion

6.1 Introduction

Chapter 5 focused on answering each research question using data gathered from the participants that was related directly to the questions. This chapter discusses and interprets those research findings using the relationship between the research themes, which have all been collected from the research data. Additionally, this chapter will discuss the findings in relation to literature in the field.

6.2 The map of the research themes

The aims of this study were to investigate whether the use of social networking (SN) website-based learning activities could promote students' CT skills and their participation in course activities. In addition, the study focused on students' attitudes towards this pedagogical intervention and assessed important factors that might affect students' participation in the course activities.

The purpose was to go beyond simply understanding the effectiveness of the intervention, and to explore how students accept, handle, think and behave towards the intervention. Moreover, it was to investigate the circumstances that might affect the implementation of the pedagogical intervention. Therefore, this research adopted a wide range of data collection methods, such as a CT rubric, a questionnaire, focus groups, student reflections and teacher's observations, to acquire the required information.

The data analysis was helpful to derive a number of direct themes relevant to the research aims and the literature and to answer the research questions. Additionally, there were some other indirect themes that were established through discussions with students that were important to understanding and explaining the phenomena under study (see Chapter 3, Table 3.5).

Figure 6.1 presents the direct themes, indirect themes and the relationship between them. In addition, it highlights the three main periods of time that students passed through during the intervention implementation: at the beginning of the semester, in the middle of the semester and at the end of the semester.





In this chapter, the dissection of the findings will be presented in light of Figure 6.1. The discussion will begin by describing students during the first period of time when the intervention started; it will then move on to students' reactions in the middle of the semester, and end with a description of students' improvements at the end of the semester.

6.3 At the beginning of the semester

At the beginning of the semester, and specifically in the first class, the activities and their requirements were introduced to students. Starting from the third week of the semester, students began to solve the questions in the activities and submit them to me (the teacher) as homework. Unfortunately, at this stage, most of the students reacted negatively towards the activities and had a negative attitude as well (Figure 6.2).



Figure 6.2 Students' positions at the beginning of the intervention period

Figure 6.2 illustrates students' positions toward the intervention at the beginning of the semester, when the intervention was introduced to them. In addition, the figure shows the related reasons that shaped these attitudes. Next sections will discuss this matter in more detail.

6.3.1 Students' negative attitudes

The findings suggest that students had negative attitudes toward the activities for almost half the semester (until the 9th week), before the third activity was introduced. They complained about the requirements of the activities and questioned the benefit of these activities. Students asked to have the homework changed and to provide them with another type of homework that was more familiar. Students were impatient and worried about the activities.

The students not only had negative attitudes and performed poorly at the beginning of the intervention, but they also resisted the new homework strategy. An extreme example of this resistance appeared when nine of the students left the study during the first half of the semester, and their friends stated that the difficulty and the requirements of the homework were the reasons behind their withdrawal (observations of the lectures). This view was shared by many students at the beginning of the study, as was learned later during the focus groups. Students' resistance and dissatisfaction toward a new teaching or learning approach is not new phenomena and is consistent with research by Kuhn (1991). Kuhn (1991) was also met with resistance and complaints when attempting to adopt a new teaching method with students. In addition, Sergeant (2001) claimed that the most important threat facing the introduction of new ideas at school or universities was related to the human condition of dealing with resistance and anxiety.

Although students' negative attitudes had a significant effect on their performance (Alharbi, 2010), which might be disappointing for a researcher or teacher at the beginning of the intervention implementation (Kuek, 2010), a large number of studies (e.g., Alharbi, 2010; Kuek, 2010 and Mervat, 2013) indicate that with good planning and constant guidance, students' attitudes usually change for the positive. To illustrate this, Kuek (2010), for example, was initially faced with resistance and disagreements from students towards the intervention, which was aimed at improving student' CT skills by integrating pedagogical interventions into teaching English classes, but Kuek (2010) found, in the end, that students had positive attitudes and had shown improvement in most of the skills targeted. This finding matches the findings of this research with regard to the positive change in students' attitudes, which is explained in greater detail later in this chapter (see section 6.5).

What is important to understand is that there are reasons and circumstances that influence students and shape their attitudes, and to help students adjust and handle difficulties in order to successfully adopt the intervention. Data analysis of the reasons that caused students' negative attitudes toward the intervention revealed two main reasons: 1. Negative factors; and 2. Students' weaknesses, which was the main challenge. The next section will discuss the causes of students' negative attitudes in greater detail.

6.3.1.1 Negative factors

Students stated that there were some factors related to the structure of the activities (the intervention) that shaped their negative attitudes: First, the activities were a new idea that students were unused to. Although there is a trend toward developing educational goals and their practices in Saudi universities, students claimed that they had not been given similar activities before and that their teachers usually provided them with traditional types of activities and homework, such as a descriptive research project or summarising a lesson and creating a presentation about it. This implies that the research activities were a new pedagogy, in addition to SN and CT training. Instead of providing students with traditional homework, these activities required students to write argumentative essays using information obtained from different SN websites' resources and present them in a critical way.

Students' resistance to integrating a new pedagogical approach was a negative factor that shaped their attitudes and contradicted my initial expectation. Students reflected in Chapter 5, section 5.6.2.1, their frustration with traditional types of activities and projects that do not benefit them; therefore, I expected that an application of new interventions and ideas would be a positive factor that might enhance students' positive attitudes and enthusiasm for learning. However, the data analysis showed different results. Integrating a new pedagogical approach was a negative factor that did not help students participate in the activities and complete them. The contradiction in students' statements might be due to basic human resistance and concern towards new ideas, which was discussed in more detail in section 6.3.1. It might also because students were not confident about their previous knowledge and the skills that were required to achieve the intervention goals, and were worried about facing new challenges. This is explained in more detail in the second point. Second, these activities required some higher-level skills that students indicated they were unfamiliar with and had not practised. The activities had several main components: 1. A WebQuest model, which required self-directed learning; 2. Browsing and evaluating a set of SN resources; 3. The ability to use argumentative writing; and 4. Providing peer review via the class's blog.

As these activities required higher-level thinking skills, such as CT and argumentative writing skills, students, as supported by Sergeant (2001), were resistant to try them and worried about their ability to complete them. Kuhn (1991) also argued that when learning activities require complex and higher level thinking skills, students require enough time and practice to adopt and accept the activities and overcome any lack of required skills. Kuek (2010) suggested that in order to help students adopt the new pedagogical approach and acquire the required skills, teachers should overcome their concern with students' reactions and ability to master these skills, and have more trust in their students' capabilities. In addition, teacher should help students overcome their weaknesses by providing them with enough time, patience and systematic and deliberate help.

In addition to practicing higher level thinking skills, students stated that the activities focused on a set of requirements rather than one main idea. Students found that trying to learn multiple skills at once, such as following WebQuest, browsing SN websites, writing essays, publishing the essay on a blog, commenting on other students' posts and submitting homework to the teacher via email, was confusing and exhausting. This contradicts the widely-held views that students from this generation are capable of multitasking. For instance, Barnes et al. (2007) claim that multitasking is a way of life for many of today's students. However, Carlson (2005) argues that this generation has a very short attention span, in part because of the rapid nature of the media they spend their time on. Therefore, students complain about activities demanding time and attention.

Third, the students did not like the activity topics. They described the topics as boring and tedious. According to the students, choosing topics that relate directly to the curriculum lessons without any other considerations, such as students' preferences and familiarity, made solving the activities boring and unexciting. Students indicated that these topics did not motivate them to read, write and solve the questions. The students' claims matched the findings of a study by Greenlaw and Deloach (2003) and Yunus et al. (2012) who found that choosing a topic that interests students and is related to the student's context is important to motivate students to participate. If students do not like the topics, they will not react well. This might be a challenge that teachers could face if they decide to teach CT skills through general courses, as I did in this research (see Chapter 2, section 2.3.1). In this approach, a teacher is supposed to cover the topics of the course syllabus and focus on enhancing CT skills at the same time. For example, when I taught students the "communication skills" topic (on the course syllabus) it was difficult to provide them with a question that was related to communication skills, was still interesting to students and also required CT. Therefore, I tried to change the topics as much as I could to appeal to students' interests. For example, I changed the third activity's topic to one that was more interesting to the students. The topic was about "Trade through Instagram", which was not too far from the main course syllabus "Computer and Internet-websites in Education".

What was observed during this research, was that choosing a topic that relates to students' context and real life can improve students' writing quality, not just their motivation. For example, the third activity topic was changed to **'Trade through Instagram'** instead of the one from the curriculum, **'Using internet websites for learning purposes'**; this appealed to the students and generated a lot of discussion about it in the classroom. In addition, the quality of students' writing, which was apparent through correcting their papers, did improve. Students showed that they have a lot of information and ideas, and that they can provide sufficient examples from real life to support their information. Students stated their opinions clearly, which may have been because they had a lot of experience with this topic. In fact, this point of view is consistent with the social constructivism notion that learning and thinking happen when students take part in activities that are directly relevant to their life and which take place within a culture similar to an applied setting (Brown et al., 1989).

Fourth, another factor was students' concerns about their marks. Students indicated that the marks that were assigned to the activities were too much (40% of the total grade). Students stated they were worried about their final grades and kept thinking about the marks more than succeeding or achieving the activities' goals. Although the students complained about the marks during the semester, it was difficult to change them, because students might not participate if fewer marks were assigned for each activity.
This is precisely what happened when the commenting on the blog became optional, students stopped commenting. Some other students indicated that the marks were the first motivation for students to work. They thought that putting more marks on the activities would push students to complete them. Students revealed that their marks and grades are their main concern and that they are usually more concerned with getting high marks than focusing on their weaknesses and improving their skills.

Finally, there were other factors outside of the intervention itself, such as the time commitment required, other courses' requirements and exams, and their family's circumstances that contributed to, and shaped, students' negative attitudes towards doing the activities and gaining any advantage from them. There is a substantial amount of research (Mervat, 2013; Alharbi, 2010; Fadhli, 2008 and Sun et al., 2008) that coincides with this finding that study loads and social life circumstances affect students' motivation and attitudes toward any new pedagogical intervention. Alharbi (2010) interpreted students complaining about the limited time and overload responsibilities as being due to the fact that some types of learning activities require a certain degree of commitment and time-management skills that might be difficult for students, especially in the context of a long history of traditional and dependent styles of learning that characterize the Saudi context.

In addition to the previous factors that affect students' attitudes, students stated that there were other challenges they faced that caused their negative attitudes toward the intervention. According to the students, most of these challenges were in regards to their weakness in the skills that were required to complete the activities. The next section will discuss students' weakness in CT and writing skills.

6.3.1.2 Students' weakness (students lack of some skills)

Based on the results obtained from this study, the correction of students' essays, observations of the class and students' statements, it was apparent that students started the course with a lack of CT skills. For example, students seemed to accept other people's opinions and arguments without evaluating their validity. Students showed weakness in recognising and interpreting different arguments. In addition, students could not reflect or provide convincing personal opinions. Students' weaknesses were not surprising due to Saudi Educational system's practices. As mentioned in Chapter 1, section 1.3.1, the Saudi Educational System is based on the transmission of uncontested

knowledge from teacher to student, which depends heavily on rote learning. It is described as a teacher-centred class rather than a student-centred class, which supports the behaviourism learning theory more than any other learning theory. The findings indicate that the Saudi Educational system and its pedagogical approach practices are responsible for student's weaknesses and is consistent with earlier research by Fadhli (2008) and Hamdan (2014). They argued that the Saudi pedagogical approach is responsible for the passivity of learners and their weakness in some CT skills. In fact, this seems to be a general phenomenon for other cultures that have similar educational system features. Kuek (2010) confirmed that the educational practices in Sudan (an Arab country) also affect students' CT skills. Kuek (2010) found that students' poor performance in CT skills was a direct consequence of the educational emphasis on rote learning, where memorization and regurgitation is expected from students (as a behaviourist position). Therefore, there is a need to change the old practices of teaching and learning to a new one that focuses on student-centred learning with more emphasis on enhancing students' higher level thinking skills.

The findings also indicate that students lack argumentative writing skills. Students showed weakness in their ability to construct an essay from the beginning, use a wide range of ideas, connect the sentences and the ideas using appropriate phrases and words that logically reflect the meaning, and explain their personal opinion through their writing. Moreover, students' attempt to write was made up of scattered ideas with no flow of information. This resulted in producing weak arguments. Based on their responses, argumentative writing is a new kind of writing they were unused to and did not have the skills to master it. This is supported by Minocha's (2009) point of view that student's need a basic level of skills to start and continue higher level thinking skill activities, such as constructing essays and thinking critically.

In fact, investigating the reasons behind students' weakness showed that there was another important reason, in addition to the traditional teaching practices and type of activities and homework that students stated they were used to (sections 6.3.1.1 and 6.3.1.2). Students claimed that the type of feedback they were used to receiving from their teachers was another reason.

According to the students, the usual practice of exchanging feedback they are used is traditional and does not help promote students' CT skills. As such, students claim that

teachers avoided opening up discussions to students about the class topic or to answer students' inquires. In addition, students indicated that they were rarely asked to reflect on their opinions or to evaluate the curriculum, teacher or any other issue related to the course; and that this, in some way, affected their ability to evaluate and present their personal opinion. This is in line with Hamdan's (2014) claim that rather than engaging in conversation with students, teachers tend to impose information that may be irrelevant to students' lives and experiences, and this generally fails to impart critical and analytical thinking skills. There is a substantial amount of research (Pither and Soden, 2000; Tayler, 2002; Yang et al., 2005 and Hansen and Salemi, 2012) that stresses the importance of classroom discussions and exchanging feedback on promoting students' CT skills. However, classroom discussions and exchange of feedback seem to be affected by other factors such as it being too time consuming, teacher's experiences in managing the exchange of feedback and classroom discussion or the teacher may not believe in the importance of the feedback and a student's right to it (Tayler, 2002). In fact, if students are not asked to think critically and reflect their opinions about internal issues in the course, such as the course content, the teaching and assessment process and the teacher's performances, it is difficult to ask students to think critically about general issues such as claims other people make.

Additionally, in terms of feedback from other students, students claim that they are unused to completing peer reviews. Students indicated that they had not been asked to seriously criticize or evaluate other students' projects or performance and only their teacher does that. However, in some individual cases when the teacher has asked students to comment on and evaluate another student's project, students stated that they were not confident in their ability to provide suitable comments and feedback, especially if they were not provided with criteria or a rubric to assess them. Moreover, students indicated that when they have to provide others with comments they usually comment on their friends' work only, and they provide them with very general and positive comments to avoid annoying or embarrassing them or others. This explains students' lack of interaction with other students or with me, their teacher, through the student reflections, as well as students' lack of commenting on others essays on the blog and the poor quality of the available comments. This will be discussed in more detail in section 6.4.2. The research findings also revealed students' dissatisfaction with the usual assessment procedures and tools. According to the students, they like to receive feedback from teachers, learn their exact mistakes and how to avoid them later. However, students claimed that they were usually provided with only their marks without any written feedback on their papers. Students also indicated that they did not get continuous assessments on their projects, and usually followed up after the teacher for assessments. Students claimed that although they do not have a specific criteria or rubric, they are used to accepting their teachers' assessments without complaint or discussion.

I concluded, based on this research, that the previous practices of exchanging feedback in the university affected students' CT ability and their performance on research activities. The way that teachers exchange feedback with students affects students' CT skills such as the ability to evaluate, criticize and present a personal opinion. This opinion is supported by Kuhn's (1999) point of view that students might not be motivated to engage in CT skills unless they have good models to copy. Moreover, Kuhn (1999) asserts the importance of convincing students of the value of providing feedback and evaluations. Students need to see their evaluation results; and the results of their evaluation affect their motivation to keep doing them. For example, when students criticize the curriculum syllabus, students need to see some improvement in the syllabus in the next semester to carry on providing honest feedback.

6.4 In the middle of the semester

Students' negative attitudes and their weakness in CT and writing skills affected their performance in the learning activities. The study revealed that students were struggling in the activities and needed continuous support from the teacher. In addition, students showed that they did not perform well with the activities' requirements, such as using the blog and the rubric, as shown in Figure 6.3. Students' performances were observed in the middle of the semester through different resources, such as classroom observation and students' reflections, and matched the data that was gathered from the focus groups conducted at the end of the semester. The next section will describe the consequences of students' weaknesses on the intervention performance.



Figure 6.3 Students' reacting in the middle of the intervention period

6.4.1 Students struggling to carry out the activities

The study showed that students were struggling with completing the activities up until the third one. The students' struggles were not just apparent from students' negative attitudes, but also through students' questions and inquiries throughout the semester. Many of the students' inquires and questions were posted to the teacher via email or face-to-face, asking for an explanation and clarification about the intervention process and procedures.

For instance, students posted questions about how to use the resources that were posted on the WebQuest. Some students stated that they do not want to use the resources provided for them and preferred to use others resources such as books and articles, because they were familiar with them. Other students resisted browsing the WebQuest and resources, and only wrote using general information they had acquired previously about the topic. In fact, those students who stated that they did not check or browse the WebQuest and the available resources, were the students who performed most poorly in the activities and obtained lower marks (Stu5, Stu7 and Stu18). Those students seemed to exhibit extreme resistance to participating, and because the participation was voluntary, I could not force them to complete the activities. In addition, students struggled with the writing procedures, specifically constructing an argumentative essay. Students showed that they needed a lot of support and help on how to apply CT and writing skills. Through the correction of students' essays, I noticed that although students could follow the argumentative writing structure, introduction, first claim with suitable evidence, second claim with suitable evidence, personal opinion and conclusion, they were struggling with applying some CT skills, such as evaluating and interpreting others' opinions and providing sufficient, suitable examples to support their claims. Students also presented superficial, personal points of view without enough support or examples. This is supported by Quitadamo and Kurtz's (2007) findings (see Chapter 2, section 2.3.3.1). Quitadamo and Kurtz (2007) conducted an intervention aimed at investigating the effectiveness of a writing strategy on students' CT, by comparing the CT performance of students who completed a laboratory writing exercise with those who completed a traditional quiz-based laboratory exercise. The findings indicated that the writing strategy was very helpful and made a significant difference in students' analysis and inference skills, but not in students' evaluation skills. They interpreted that as meaning that evaluation skills were more complicated and required more practice.

Moreover, students had several questions regarding technical issues, such as how to deal with the WebQuest and with the blog for posting and commenting. This finding aligns with Bosch's (2009) study that indicates that the main challenge facing students while using information technology (IT) or SN websites in their studies is their ability to use certain information communication technology (ICT) tools. Although the general view on students' competencies is that they are able to use all types of technology and SN websites, this is not entirely accurate. Students still need support with these tools and teachers should not expect them to have previous knowledge of them.

Additionally, student reflections during the semester showed that the students were not dealing with the intervention smoothly. They provided several excuses and reasons to justify their struggle in completing the activities. For example, students provided excuses such as they did not know how to solve the activity, they did not know how to use the blog, or they had technical problems with their internet connection. Several other students made excuses such as pressure from other course requirements, family circumstances and a shortage of time. This all indicates that students were uncomfortable doing these activities and needed a lot of support.

The results of this study are consistent with prior research (Case, 2003; Macgregor and Lou, 2006 and Alharbi, 2010) that indicates that most students are accustomed to didactic instruction and directed learning. Students often feel insecure, uncomfortable and unable to learn effectively in learning environments that call for new skills in managing complex information, higher-order cognitive processes, sufficient metacognitive awareness and self-regulated learning skills (ibid).

6.4.2 Students' resistance to participate via blog

Researchers, such as Cayzer (2004), Yang (2009) and Alhojailan (2013), support blogs as project lifecycle management tools, as well as collaborative document building that can motivate students to learn and participate. However, this study revealed that there was a lack of student participation via the course's blog. Students ranked the posting of their essays and commenting on others as the least two important items in the structure of the activities (see Table 5.13). The study showed that although most of the students committed to posting their essays on the course's blog, very few participated by reading, commenting or through discussions (see Table 5.14). It is important to mention that they were given marks for posting the essays on the blog, but not on the comments and discussions. This contradicts Alhojailan's (2013) point of view about using the blog for educational purposes. He found that Saudi students have a positive perception and attitude towards using blogs in education. This might be because the style and purpose of the blog he used was different from that used in this study. Alhojailan (2013) used a blog with students to publish and read general articles, then exchange questions and comments with the teacher. This is also different from what this study used blog posts for. In this study, it was used to provide feedback and comment on others students' works, which is a more sensitive issue.

More explanations were acquired from students during the focus groups in order to further describe and explain the reasons behind the lack of students' participation via an online platform such as the blog. Most of the students stated that they like to post their essays on the blog and receive comments from the teacher and others students; however, they did not like to comment on others' essays, due to concern about other students' sensitivity. Other students stated that they usually read and comment only on their friends' essays and not all the essays on the blog. Furthermore, some students chose only good essays to comment on so they could leave positive comments. One student stated that she had a negative experience previously when a misunderstanding occurred with her friend regarding feedback, so she stopped providing anyone with comments and feedback. It was clear that students were trying to prevent misunderstandings and the chance of annoying other students by not providing assessments or feedback to other students.

Students indicated other reasons for their lack of participation on the blog; for example, students were not confident about their ability to provide feedback and were concerned they would provide unsuitable or incorrect feedback. Other students thought that providing students with feedback on the blog might alert the teacher of another student's mistakes, and they were concerned the student might retaliate next time. Indeed, students shared their preference to provide face-to-face comments rather than comment on the blog, because they stated that it seemed safer and more meaningful. This is supported by Greenlaw and Deloach's (2003); Karn's (2005) and Liccardi et al.'s (2007) studies, which concluded that students avoid participating via text-based asynchronous communication such as email, blogs and wikis, or they usually provide very weak comments and feedback. In addition, they indicated that students avoid online discussions and prefer face-to-face discussion, because it allows students with a greater ability to provide the correct meaning and a sufficient explanation.

Another reason for student's lack of participation was lack of time. Students indicated that reading other students' essays, particularly the longer essays, and commenting on them, overloaded them with work and took a long time. Students claimed that they had a lot of social responsibilities, requirements and exams for other courses, which all made them resist taking the time to comment on other students' essays.

Finally, although several studies (e.g., Armstrong and Fanklin, 2008; Dohn, 2009; Schroeder et al., 2010 and Alhojailan, 2013) indicated that students have positive attitudes towards using SN websites such as blogs, this research's findings aligned with Afari-Kumah and Achampong's (2010) assertion that positive attitudes towards the technology does not translate into intentions to use the technology; or as Cheung et al. (2010) and Bicen and Cavus (2012) state, it does not guarantee using them for educational purposes. This conclusion is supported by Alabdulkareem's (2015) study, which found that both the teachers and the students agreed that they use SN for interaction with others and for purposes other than education.

6.4.3 Misunderstandings using CT rubric for self-assessment

Although students mentioned that the rubric was important and helpful in improving students' performances in the activities, most of the students mentioned that they usually submit their essays without assessing themselves using the rubric. Students relied on the teacher's feedback and assessments more than using the rubric.

Students stated the following reasons for that: first, most students were unfamiliar with this type of assessment. The lack of practice using rubrics seemed to affect students' ability to evaluate themselves and judge their performances. Second, in the cases where students had used rubrics before, they stated they were confused by these rubrics and found them difficult to follow. Students expressed that they were unable to decide which part of the rubrics criteria specifically they agreed or disagreed with, which might relate to students' weakness in CT skills mentioned in the previous section (6.3.1.2). Finally, the teacher-centred learning style, which is the standard format in most classes at KSU (see Chapter 1, section 1.3.1), made it difficult for students to conduct self-directed assessments. Hamdan (2014) claims that students' overdependence on teachers to solve problems and provide ready answers weakens students' self-directed learning skills. Due to this research's activities' procedure and structure, they required many of those skills. According to Thomas (2000), students have difficulty benefiting from this type of learning; chief among these difficulties are those associated with managing time, using technology productively and self-evaluation.

6.5 At the end of the semester

At the end of the semester, and immediately after the third activity, students' improvements were registered through a variety of data from student reflections, class observations and essay assessments. The study revealed that the interventions had a positive impact on students' attitudes and CT and argumentative writing skills, as shown in Figure 6.4. This section discusses students' improvements and the causes.



Figure 6.4 Student' improvement at the end of the intervention period

6.5.1 Students' improvements

6.5.1.1 Improvement in students' skills

Even though students did not believe there was a benefit to the activities at the beginning of the course, in time, the research findings indicated an improvement in the students' skills. The statistical results of this research provided an answer to the main research question, which aimed to examine the effect of SN website-based learning activities on promoting students' CT. Running the suitable statistic's tests, one-way ANOVA with repeated measures and pairwise comparisons, revealed that there were significant differences between students' performances in the four activities. Students showed linear progression through the four activities and the tests showed that there was a significant difference between students' first essay and the last one. Students showed significant improvement in their argumentative writing skills. This indicated that the students benefited from these activities and were able to produce argumentative essays using some CT skills. In addition, a high percentage of students (68%), (see Table 5.5), agreed that most of their information about CT skills was obtained while studying this course (241ITE) and through practicing the course activities. This is supported by research from Perkins and Salomon (1989), Gelder (2005), Paul and Elder (2005) and Hatcher (2006), that CT skills can be taught through general courses and do not require special CT skill's courses to learn them (see Chapter 2, section 2.3.1.2).

The correction of students' essays revealed that students improved in different aspects. For example, the majority of students were able to recognize the application of CT skills, express their opinions and recognize different arguments. Students showed the ability to follow the argumentative writing style. They were able to compare between two opposite opinions, support them with different examples and provide their personal opinions clearly. However, although some students showed some improvement in their ability to evaluates others' opinions and arguments, this skill seemed to be the skill least mastered among the students and required more practice. It is therefore important to ensure that students have enough time to practice CT skills and make these basic skills that accompany teaching in other courses as well.

In addition, students noticed the impact of the intervention on their argumentative writing skills. According to the students, in addition to improvements in the CT skills, writing an essay did not take as long as it used to as they became faster writers. A large majority of the students felt more confident in their abilities, more determined to do well in writing exercises and not give up as easily, even if the activities were difficult.

To conclude, the research findings revealed that CT skills are difficult to foster, but not impossible. If students are asked to experience, explore, and test their ways of thinking, they will find it to be substantial work; however, with sufficient practice they will master it. Kuhn (1991) argues that CT skills are not easy to develop and students will not get better without a lot of practice. Furthermore, Ennis (1993) states that learning to think critically takes a long time and requires reflective practice with many examples in a diversity of situations. I agree with this perspective and suggest that CT skills should be taught as general skills at all university levels, if not before university. Moreover, CT skills should be enhanced through all of the courses' activities, teaching methods and educational practices. Finally, the positive gains in students' CT and argumentative writing skills provides evidence that applying this intervention (learning activities) in different contexts with different sample groups is worth the effort.

6.5.1.2 Improvement in students' attitudes

As I mentioned briefly in section 6.3.1, the study shows that by the end of the semester, a great change happened in the students' attitudes towards themselves, the intervention and the course. The intervention seemed to have fostered positive attitudes in the

students, as they felt proud of themselves, proud of their skills improving and their successes in a new experience.

Students' attitudes towards themselves changed remarkably as they were able to imagine themselves as people who could write and communicate well with others, unlike their attitudes at the beginning of the course when they doubted their ability to do well either in writing or communicating. This suggests that as the students started to feel more confident and started to trust in themselves and their abilities, they felt more satisfied and happy.

In addition, in contrast to students' request at the beginning of the semester to change the type of activities, students committed to repeating this experience again, because they lost their fear and had adapted to the new process and understood how to work with these types of activities. Additionally, they understood the usefulness and impact this intervention had on them. This was an encouraging finding and can serve to support teachers attempting to try and integrate new pedagogical interventions, especially when students refuse to participate at the beginning of the intervention period, as long as the teacher believes in the role of the intervention.

Moreover, the study showed that students' attitudes towards the course changed as well. Students felt more satisfied about the course and the goals they achieved in it. Students shared their gratitude for studying this course and their participation in these activities. In addition, many students exhibited very positive attitudes towards me, as their teacher, and my performance during the semester. In fact, changing students' attitudes from negative to positive is a positive finding that can encourage students to go further than this intervention to apply the skills they learned in other contexts. This perspective is supported by Huang et al. (2006), Abdel-Wahab (2008) and Alharbi (2013), who shared that the more positive an attitude is towards adopting technology, the stronger the person's intention is to adopt it.

6.5.2 Causes of students' improvement

Further investigation about the reasons that helped the intervention be successful, revealed two main reasons: first, the use of SN websites; second, the intervention structure and implementation. The next section will discuss these reasons in more detail.

6.5.2.1 Using social networking website sources

Although students complained about using SN websites in the activities at the beginning of the semester, by the end of the semester, students emphasised that using SN websites facilitated the activities' tasks for them, for a variety of reasons. First, dealing with these websites was more enjoyable than other websites or sources. Second, SN websites provide a large amount of differing opinions and arguments by a variety of people that is helpful for students to practice on and learn to analyse and think critically about. Third, SN website sources can save students time because they lead them to specific information directly. Finally, students indicated that the information provided through a SN website is more memorable. These findings are in agreement with Everhart (2006) and Kelly's (2008) findings that indicate that using SN tools in learning activities can enhance student learning because of the affordances they offer.

In addition, all the students stated that using SN websites as a topic for discussion and writing about them was very interesting and effective. Students indicated that my attempt to motivate them to participate in the third activity ran successfully; and because the activity's topic had changed to "Instagram Trends", students found this topic very relatable and familiar, so it was easy to write about. Students emphasised the importance of the activity topics, and that they are important factors in encouraging students to write more. Yunus et al. (2012, p.47) supports this point of view by stating, "When giving writing tasks to the students, teachers should give students to discuss about. These topics motivate students to write".

The findings also revealed that the flexibility of SN websites in terms of time and place was an important factor in changing students' attitudes. This finding is in accordance with prior research conducted by Lee (2001), Hao (2004), Sun et al. (2008) and Yaghoubi et al. (2008) who all indicated that while students have other responsibilities, such as a family or work, the flexibility of learning is an important factor that affects students' attitudes towards learning.

In general, although the findings showed that SN websites did not have a serious role in enhancing students' participation through the learning activities, SN websites were good resources for learning activities to promote CT skills.

6.5.2.2 Positive factors in the structure of the intervention

This study exposed the importance of some factors in designing and implementing the pedagogical intervention. First, even though students said initially that WebQuest was a new idea and they did not know how to use it, the study showed that by the end of the semester students found it easy and interesting to follow. Students indicated that providing them with a WebQuest that was well organized and had all the required information, resources and criteria was very helpful. Students also stated that using the same pattern for all four activities with only a change in the questions made students feel more organized and more confident about what they were doing. In addition, students were happy about the idea of being provided with all the resources they needed to do the task. This is supported by Everhart's (2006) suggestions of designing learning activities. Everhart (2006) states that having an interesting thematic structure helps engage students in the activities and makes learning more meaningful. Moreover, Everhart (2006) highlighted the importance of linking students with important materials to guide them during the activities process.

Second, students liked the continuous feedback that I provided them with while doing the activities. Students found that the written feedback on their papers and my comments on the blog were very helpful and encouraged them to carry on with the activities. In addition, students liked being provided with examples for their mistakes after each activity, as it helped to clarify the negative sides in their writings and how to avoid them. This is consistent with assertions by Everhart (2006) and Yunus et al. (2012) that providing students with quick feedback enhances and increases students' interests. This study also showed that although students were unsure how to do the activities, this misunderstanding decreased after each activity when I provided them with suitable feedback.

Third, students liked how I followed up with them and the activities and kept motivating them to carry on with their activities. Students received many messages the week after each activity to encourage them and remind them to do the activity and submit it on time. Students found this very helpful because sometimes they forgot to do the homework with all of their other course requirements and their family's circumstances. Furthermore, students felt like I cared about them wanted them to do well. This is supported by Fadhli's (2008) study that motivation plays an important role in the learning process of students. The teacher should devote sufficient time for students to

get accustomed to the new learning approach. The teacher needs to create an environment that shows that they care about their students and want to help them learn and succeed.

Fourth, students stated that my personality was very important in encouraging students to believe in the benefit of the intervention. During the lectures, students felt my optimism and belief in the benefit of the activities on students' skills and life. In every lecture, I talked to students about the importance of CT in their life and their need for skills such as CT and writing in their future careers. Moreover, in each class, I presented one SN resource, such as a clip from YouTube, and asked the students to judge the credibility of the clip. In time, this helped students understand the importance of these activities and their ability to judge and trust SN websites' resources.

This finding is supported by the research of Hackley (1997), Piccoli et al. (2001), Smeets (2005), Sun et al., (2008) and Alharbi (2012) on the effects of learning activities and how students' satisfaction is influenced by several factors. The first is the teacher's attitude towards the learning intervention. For example, a less enthusiastic teacher, or one with a negative view of the learning intervention, cannot expect to have students with high satisfaction or motivation. The effectiveness of the learning activities will be enhanced according to the teachers' attitudes. The second factor that affects students' satisfaction of the learning intervention, is the importance of the intervention in their own life. This is comparable with Minocha's (2009) study, that found that if students are unable to understand the role of the intervention in their learning, they will have an unsatisfying experience and may feel that the intervention is getting in their way.

Fifth, students liked how these activities were individual-based work; students preferred this type of activity more than collaborative ones. This contradicts the social constructivism theory principles that were adopted to design the research intervention. This theory focuses on collaboration and interaction between students to gain knowledge (Barnes et al., 2007). However, students' preferences for individual work and their lack of interaction with other students via the blog (see section 6.4.2) highlights important questions that need to be answered: to what extent could social constructivism theory succeed in an environment like Saudi Arabia, where students mainly depend on teachers to learn; and what are the factors needed to apply this theory

in the learning situation. The answer to these questions are outside the scope of this research, however, more research is recommended in this area.

Finally, there were some factors related to the activities' procedures; for example, students liked how these activities required only one paper of written work and that there was enough time allotted between each of the four activities (two weeks). This is opposite to what students said before, about having a lot of responsibility and not having enough time to complete the activities. This showed that students might only provide excuses when they are struggling or do not want do it.

6.6 Conclusion

This chapter provided a discussion of the research findings by presenting the relationship between the themes of this research during the three periods. At the beginning of the semester, students displayed negative attitudes toward the course and the activities, for a variety of reasons, some related to the intervention idea and structure and others related to students' weaknesses in the skills required to complete the activities. Students' negative attitudes and some skill weakness were reflected through students' complaints and resistance to participating during the semester. In fact, these factors affected, to a degree, the ability of the students to complete the activities correctly. Students were struggling with the activities and resisted participating on the blog or using the CT rubric to assess themselves. However, by the end of the semester, the study showed a significant improvement in students' CT and argumentative writing skills as well as their attitudes.

Chapter 7 Conclusions

7.1 Introduction

This final chapter summarises the main findings, draws conclusions from the research questions, highlights the importance of this research and provides recommendations for future research. The chapter begins by providing a review of the study, which includes the research aims, questions, the methodology, and context. This is followed by a discussion of the overall research main findings. Next, the contributions of the study, as well as its strength and limitations are presented. Finally, the chapter concludes with suggestions for further research.

This study set out to explore the role of using SN website-based learning activities to promote students' CT skills, and gain a deeper understanding of the role SN websites have on enhancing students' participation in the course activities. This study comes at a time when there is demand from Saudi educational institutions to focus on improving students' higher level thinking skills using new teaching methods and technologies to meet their society's requirements. The Saudi Arabian trend towards a knowledge-based economy has stimulated change in their graduates' quality (see Chapter1, section 1.3.2). In addition, usage of SN websites in Saudi Arabia is increasing dramatically and there is a lack of literature discussing how best to use these tools for learning purposes and how to educate users (specifically students) to take advantage of them (see Chapter1, section 1.4.2). I employed my role as a teacher, researcher and instructional designer to design and develop the learning activities (educational intervention), which are a type of homework that requires browsing different SN websites in order to discuss topics that relate to the Learning Technology and Communication (241 ITE) course syllabus, then applying some CT skills to construct argumentative essays. The research aims were:

1. Determine whether students are able to evaluate different points of views from SN websites and express their own opinions through argumentative writing.

2. Investigate whether using tools that are attractive to the current generation, such as those found on SN websites like Twitter, Facebook, YouTube and blogs, can promote students' participation in course activities.

3. Explore the factors that affect students' participation in course activities.

In order to pursue these aims, the following research questions were formulated, which the research sought to address:

- 1. Do SN website-based learning activities promote students' CT skills?
- 2. What are students' awareness of CT and argumentative writing skills before and after these activities?
- 3. What are students' attitudes towards SN website-based learning activities?
- 4. Does merging SN websites' resources with the learning activities have an effect on promoting students' participation in the course activities?
- 5. What are the factors that affect students' participation in the learning activities?

In order to answer the research questions, an educational intervention using SN websites was designed based on the ADDIE (Analysis, Design, Development, Implementation and Evaluation) model. Following the DBR methodology; I repeated the cycle of ADDIE three times, each one representing one of the research study phases (two pilot studies and one main study). The three phases of study lasted for a year and a half. The main study was conducted in a 16-week course with 24 undergraduate female students at King Saud University (KSU), in the first semester in 2014-2015. A mixed methods approach using quantitative (CT rubric and students' questionnaires) and qualitative (observation, students' focus groups and students' reflections) tools was used in this research.

7.2 Summary of main findings

The following sections provide a brief summary of the main research findings as they relate to the research questions.

7.2.1 The effectiveness of SN website-based learning activities on students' CT skills

The findings of this study revealed the following with regard to promoting CT skills:

First, SN website-based learning activities are an effective tool for promoting students' CT skills. Although students were not taught these skills directly, the results indicated that there was improvement in some students' CT and argumentative writing skills. This finding reveals that CT skills can be taught through general courses by providing

students with learning activities that require a set of CT skills. This is corroborated by the findings of Macknight (2000) and Paul and Elder (2006) that teachers can engage students in a wide range of course activities that can contribute to growth of CT skills. In addition, the research results support the use of technology, specifically SN websites, to promote CT skills by providing new pedagogy to coach students on CT skills, which is different from the method used in previous research studies (discussed in greater detail in Chapter 2, section 2.4.2).

Second, SN websites are suitable sources for conflicting viewpoints for students to analyse and evaluate. The findings indicate that SN-website based learning activities were a good idea to coach students on higher-level thinking skills, such as CT and argumentative writing. This is due to the following reasons: SN websites include an extensive range of opinions on any subject. These activities require students to browse and criticize many different opinions available on SN websites, and evaluate these opinions before accepting or rejecting them. Additionally, these activities provide a blog (SN website) as a platform to encourage students to interact with each other and do peer-reviews. As a result, this research suggests adopting the intervention (learning activities) from other teachers and lecturers in order to improve their usage of SN websites, the course's learning activities and students' CT skills.

Third, whether teachers decide to teach CT skills through a specific course for CT or through general courses (see Chapter 2, section 2.3.1), they should adjust their teaching methods, types of homework, projects and assessments methods, to ensure they are compatible with improving students' higher level thinking skills and CT. The focus should not only be on integrating CT skills into the curriculum and courses activities, but also on improving all the educational practices and procedures.

Finally, CT skills are not easy skills to master and require time and good planning. Although this study showed improvement in some CT skills, such as highlighting the main argument, presenting different opinions on it and presenting personal opinions clearly, students still need more practice in skills such as evaluating others' opinions, and providing logical and meaningful explanations and comments about them. Therefore, teaching CT skills cannot be specific to one or two courses for a few semesters. Teaching CT skills should be a continuous process beginning the first day students enters the university, if not earlier, in grade school. To conclude, in terms of the effectiveness of the course activities on promoting students' CT skills, the research findings revealed that: 1. Students need training in three things: CT skills, argumentation and giving opinions; 2. Training can help students learn these skills; 3. SN websites are suitable sources for finding conflicting viewpoints for students to analyse; and 4. Critiquing other people's opinions helps with learning CT skills.

7.2.2 Students' awareness of their own CT skills and argumentative writing

This research aimed, as well, to investigate students' thoughts about any changes in their CT skills. The data showed that the students were aware of their lack of CT and writing skills before starting the course, which was one of the main reasons behind their poor performance in the activities. For example, some students indicated that before the intervention they were weak in presenting their personal opinions, presenting different arguments, interpreting them, and constructing an essay (see Chapter 5, section 5.3). However, after the intervention many students noticed their improvement in their CT and argumentative writing skills. In terms of CT skills, students stated that they were able to recognize differences in arguments, and present and support them with examples in addition to expressing their opinions on them. Moreover, students thought that their writing skills had improved in areas such as constructing a clear introduction about the main topic, citing the source and writing a conclusion that summarises the main ideas. Students demonstrated a commitment to using the argumentative structure in their writing, as they included an introduction describing the arguments, presented two different claims, commented on them and presented their personal opinion.

In addition, students indicated that they were able to analyse what they saw or read in SN websites, they started to notice that these websites held only opinions and point of views that require a lot of evaluation and critique before adopting them. This was an important accomplishment for students and one of the research's main aims, which was to determine whether these types of learning activities help students learn how to evaluate different points of views from SN websites and express their own opinions of them.

7.2.3 Students' attitudes towards SN website-based learning activities

The findings showed that although the activities were introduced to the students as SN website-based learning activities where students were required to browes diffeent SN website sources and participate and interact via the blog, students initially reacted negatively towards the activites. It was evident that students had different concerns that affected ther attitudes, and using SN website did not help avoide their concerns. This finding conflicts with the claim that the internet and web-based interactions for learning are attractive options for "Net Genration" learners (Woo and Reeves, 2007). In fact, students seemed to be affected by several factors that shaped their attitudes (disscussed later in section 7.2.5).

The findings also revealed that, over time, students' attitudes changed gradually from a negative one at the start of the semester to a more positive position. This might indicate that students typically adopt new interventions gradually, as soon as they obtain the required knowledge on how to use it and experience its effectiveness. Therefore, teachers need to have patience and determination in order to continue with the intervention. Students' initial attitudes should not weaken a teacher's enthusiasm with regards to applying pedagogical innovations with students. Moreover, teachers should provide students with continuous help and assistance in the areas they need assistance in. Teachers should also be flexible to take advantage of students' reactions and feedback in order to improve the intervention and help them adopt it faster.

7.2.4 Effect of SN website-based learning activities on participation

This study provided some deep insights into issues related to the use of SN websites in education, and whether their features, such as their popularity and availability, can help enhance students' participations. Technology and SN websites are not the magic solution for educational problems. Contrary to what was expected and what previous literature indicated (Lam, 2012; Yunus et al., 2012 and Dhir et al., 2013) (see Chapter 2, section 2.4), SN websites did not have a serious role in enhancing students' participation. This study showed that students reacted differently to SN websites. Although students found SN websites to be a good resource for learning activities to promote CT skills, this feedback was not reflected in the students' participation. I think students treated these activities the way they have other activities and did not show more enthusiasm because they were already familiar with SN websites.

This finding contributes to the debate about the current generation of students and their use of technology and SN websites. First, although the students were very interested in SN websites and their features, they limited their usage to social activities, not for learning. Moreover, students preferred to discuss issues related to SN website resources more than they wanted to use them for learning. Second, although students use SN websites for a lot for different purposes they still need to learn how to interact positively with it (take students' lack of participation via the blog as an example). Third, students react negatively towards new pedagogical experiences that require more effort and time, even it was using technology and SN websites (see Chapter 6, section 6.3.1.1).

7.2.5 The factors that affect students' participation in the learning activities

One of the aims of this study is to go further than investigating the learning activities effectiveness and to understand what factors affect students' participation in the course activities. Applying this intervention with the students revealed several factors that affected students' participation, which is described in greater detail in Chapter 6. The factors that affected participation were:

- 1. Familiarity with the intervention idea: I found that students reacted negatively to being presented with new ideas they were unsed to for homework and activities. Background knowlede seemed to be an important factor to adopt any pedagogical intervention. Therefore, teachers should provide students with a clear introduction and ongoing clarification, as needed.
- 2. The structure of the intervention: while a majority of students indicated that they liked the design of the activities as they all had the same structure and similar procedures, they provided feedback that the activities should focus on only one main idea rather than a set of requirements.
- **3.** Choosing the activities' topics: the topic of the writing activity seemed to play an important role in enhancing students' writing. Students showed that they would like to discuss topics related to their lives and interests, as they are more apt to evoke ideas they can connect together. The research data revealed

that discussing topics related to SN websites was of more interest than using SN websites themselves.

- 4. Marks and grade schema: the teacher's attempts to promote students' skills by providing them with new pedagogical interventions were usually met with resistance from the students, especially since the intervention was tied to the students' marks and could affect their final grade. Students revealed that their marks and grades were their main concern and that they are usually more concerned with getting high marks than focusing on their weaknesses and improving their skills.
- 5. Using appropriate and clear assessment methods: because their marks were a concern to most students, providing them with specific assessment criteria helped them feel more comfortable and safe while completing the activities. Although this study indicated that the students rarely assessed themselves on the rubric before submitting the essays, the rubric was a helpful guideline for some of the students while completing the activities. Moreover, it is good practice to teach students how to evaluate themselves, which is a type of CT skill. In addition, teachers should provide students with continuous constructive feedback, which they can use to avoid or minimize future mistakes and misunderstandings.
- 6. Teacher's personality and enthusiasm: this study found that the teacher's role is more important than any technology. When the teacher shows confidence in students' learning goals and aims, it leads students to have confidence in them as well. It is important, before integrating any technology in the learning process, that we should ensure teachers are confident in the importance of the technology to enhance learning goals. Moreover, teachers' personality and behaviour are important as well. Teachers should make an effort to understand students' abilities and needs, and provide encouragement and follow-up. Some students need to feel their teacher cares about their success.

7. Allotment of time for activities: the time allotted for the activities is an important factor that affects students' attitudes and performance. Students complained about the courses' requirements and their family's circumstances, which limited their available time. Therefore, course activities should be on a specific timetable, allotting enough time to complete each of the course requirements.

7.3 Contributions of the research

This research was applied as an educational research with an educational intervention, therefore, its impact affects educational environments, specifically the use of SN websites in education. This research contributes to the body of knowledge on the use of SN websites in the educational community. The present research extends the current knowledge and takes an important step towards suggesting how teachers can use SN websites as learning activities to promote students' CT skills. It can also explain what factors affect students' interactions with SN websites and their participation in other learning activities.

The impact of the current research on the general community, serves to make multiple contributions to the body of literature regarding the use of SN websites for learning purposes, in general, and for promoting CT skills, in particular. This includes the contribution to knowledge, research methods and teaching pedagogy. The following section will discuss the research contributions in detail.

7.3.1 Contributions to knowledge

This study raises a number of issues related to the engagement of students with SN websites, CT and argumentative writing activities at a university level, as well as highlighting important areas that teachers should take into consideration while using SN websites in education.

This study contributes to exiting literature by providing data showing that coaching/teaching students to criticize and evaluate SN websites resources can enhance students' CT skills. This study provides some positive outcomes that fill in some of the gaps found in previous studies related to using SN websites to teach CT skills (see Chapter 2). The previous studies have focused on using SN websites as a communication tool, and indicated that exchanging information and comments via these websites promotes students CT. This study suggests new ways to use SN websites for educational purposes, namely using SN websites as a medium for study and critical thought. This involves browsing different sources from SN websites (Twitter, YouTube, Facebook and blogs), then analysing the content, recognizing the similarities and differences, evaluating the ideas and expressing a personal opinion about them. This study, therefore, is one of the first to use SN websites in such a way.

Moreover, this study contributes to the debate on teaching CT skills, and provides empirical findings about the effectiveness of teaching CT skill through general courses using technology to deliver indirect instruction of CT skills (see the four debates in Chapter 2). Moreover, instead of using one strategy to teach CT skills, as was done in other research studies, such as the questioning technique (Pithers and Soden, 2000), writing (Daempfle, 2002; Kelly-Riley, 2004 and Bean, 2011), problem-based learning (Tiwani et al., 2006) or reading (Stapleton, 2001), this research provides evidence about the usefulness of using mixed strategies to teach CT skills. This research intervention consisted of several strategies: inquiry-based learning (WebQuest), questioning techniques, browsing, reading, writing and peer reviews.

This research contributes to the body knowledge in this field by exploring how social constructivism propositions could apply to SN website-based learning activities to help students learn and apply CT skills. This study shows that although the intervention was designed based on some proposition of social constructivism theory such as problem-based learning (cognitive puzzlement), interaction with others, and evaluation of the viability of individual understandings (see Chapter 3, section 3.6), students showed that they still preferred to follow the behaviourism theory principles in their learning, which is the one most commonly used in Saudi Arabian educational institutions. Although students were provided with a variety of SN websites resources and class's blog to promote interaction with others, students avoided social interaction and preferred individual learning. This was mentioned in Chapter 6, section 6.5.2.2 and requires more research about social constructivism theory practice in Saudi educational institutions.

The current research also contributes to the theoretical debate regarding students' communication via electronic media, such as through blogs. This study found that female students in Saudi Arabia resisted participating in discussions and commenting on blog posts. This may be because students' offline experiences with discussing and commenting was transferred to online settings, and since most Saudi students are unused to evaluating others' opinions and commenting on them in the real world, these experiences transferred into the online environment. Improving students' participation via electronic media should begin by enhancing students' skills in commenting, evaluating and participating in real world discussions.

7.3.2 Contribution to research methods

This current research provides valuable methodological insights that can be incorporated into future research in this field. First, this research overcomes the methodological limitations of some previous studies, which used exclusively quantitative data (empirical study) to examine the efficiency of a pedagogical intervention, specifically the efficiency of using technology to enhance learning (discussed earlier in Chapter 2). These studies missed the opportunity to examine the role of a variety of factors in affecting the efficiency of any pedagogical intervention such as students' background and context. Therefore, going beyond statistical investigations of technological efficiency, qualitative data from students was used to track their improvement. The study quantitatively determined the extent of students' awareness of their skills improvement as well.

Furthermore, in order to understand the students' attitudes, awareness and factors affecting their participation in the course activities, I used a mixed method approach. While previous studies utilised only quantitative or qualitative methods exclusively (see Chapter 2), this current research contributes to the field methodologically by combining the data collected from the rubric and questionnaire with the responses from the focus groups and observations. Moreover, data collected from students' reflections provided a deeper understanding of students' attitudes and perceptions. Utilising this method provided an in-depth interpretation of students' interactions with SN websites and their role in enhancing students' participation.

In addition, this study contributes to the way that data has been used to collect, analyse and present the results. In terms of collecting data, in addition to using various types of tools to collect data, I incorporated my own way of stimulating discussions by using drawing activities as part of the focus groups to avoid students' reluctance to talk and participate, as well as ensure that no student's experience was ignored (see Chapter 3, section 3.4.3). This way of simulating discussions provided me with more thorough answers and encouraged many students to talk freely without stress.

In terms of analysing data, a thematic analysis was conducted on all the qualitative data at the same time using the same codes schema, where one code can be supported by different tools at the same time. I found that analysing the qualitative data at the same stage using the same codes schema gave me a wider view of the phenomena under study, as well as increased the validity of the research codes and themes. In addition, it drew a relationship between the research themes and indicated a logical conclusion.

In terms of presenting the research findings, all of the methods of data collection were given equal weight and were presented in relation to specific observations rather than by the data collection tool, as there was overlap in the data. The focus was on interpreting the findings clearly. This study presents the findings in two different ways: 1. By answering the research question directly using suitable data gathered from the research tools (see Chapter 5). 2. By providing a narrative discussion to explain the findings in light of all the themes that appeared from the qualitative data, whether they were related directly to the research question or not (see Chapter 6).

7.3.3 Contributions to teaching pedagogy

Students' statements such as "We have never been asked to do free research or writing"; "I have never been asked to write something from myself"; and "We usually do research on a topic using internet websites [copy and paste] ...not writing like you asked us to do", is an indicator of the limitations of the pedagogical practices in the School of Education at KSU. This research introduces a completely new pedagogy, in addition to SN and CT training.

This research provides innovative ways to use SN websites for learning purposes to promote CT skills. SN websites are used as a resource for criticizing, evaluating, comparing and judging different opinions, then connecting those opinions and presenting their personal opinion. This research provides teachers with a model of activities and guidelines that teachers can adopt in any course or subject in order to promote CT skills, taking in to account all the positive factors and negative factors that somehow affect the success of this intervention (discussed earlier in Chapter 6). Moreover, it provides teachers with a CT rubric that can be used to assess students' argumentative writing (see Appendix 3.3.B). In order to use these activities, teachers can use the activity template (see Appendix 3.2) and make simple modifications to it as follows:

- 1- Change the topic of the activity to fit with your class topic or subject and use suitable figures.
- 2- Update the introduction with one related to your topic or subject.
- 3- Find a main argument about your topic, then formulate your question.
- 4- Modify the process page by the required guideline to solve the activity in the right way.
- 5- Update the Process page with SN websites resources that talk about your topic and highlight the arguments that you mention.
- 6- Keep the rubric as it is, or change it with your own assessment criteria.
- 7- Make the required modifications on the conclusion and teacher pages.

7.4 Strengths and limitations of the study

7.4.1 Strengths

There is limited literature regarding SN websites and their ability to enhance CT in Saudi Arabia. The main strength of the current study is that it is one of the few studies to provide findings from research on the use of SN websites to promote CT skills with students. Additionally, it explores students' attitudes towards this usage as well as the factors that affect students' participation in the learning activities; all of which can be used to inform present and future pedagogical practices.

The intervention of this study and its tools were designed through three phases in the study in order to create confidence in the reliability of the results. Every phase passed through five stages based on the ADDIE model, and implemented a real sample from the same population of this study. The correction and the development of the intervention and its tools conducted after each phase were based on the data gathered from the evaluation stage.

In addition, the samples used in all the phases of this study were obtained using random sampling (see Chapter 3, section 3.3.2), which is considered to be a fair and unbiased method of selecting a sample from a given population. Moreover, due to the

representativeness of the sample obtained, it is reasonable to draw conclusions from the results of the study and make generalizations from the results of the sample to apply to the general population.

Another strength of the study was its ability to adapt various data collection instruments, such as the CT rubric, questionnaires, focus groups, observation and students' reflections and develop them for this research to better suit the Saudi context and hence reflect the actual views and attitudes of local students. The data from one instrument was strongly supported by data obtained from other tools, which provides more confidence in the results and deeper interpretation of the research findings.

7.4.2 Limitations

This study had some limitations that should be kept in mind when interpreting the findings. First, being the researcher as well as the teacher may have influenced the objectivity of the findings of the study as the students may have been intimidated and tried to meet the perceived expectations of the teacher/researcher. To avoid or minimize this, I initiated some procedures at the start of the course; for example, I explained to the students this was an educational intervention and I wanted to investigate its role in their learning but that there was no consequence for them if the research failed or they did not want to participate. Moreover, to avoid bias while collecting data, I asked for help from two reviewers (see Chapter 3, section 3.3.4) to observe the classes and the focus groups sessions and rate the essays. The participants were informed when carrying out the questionnaires and the focus groups that their answers, whether positive or negative, would only be used for research purposes, would be kept anonymous and would not affect them academically.

Second, it is important to note that since this study is not completely an empirical study, and does not administer tests or questionnaires before and after, it cannot provide a thorough baseline for students' skills and attitudes. Moreover, although I have provided students with specific questions in the questionnaire to help students determine their awareness of CT skills, it does not guarantee that the change in students' skills and attitudes came only from these activities. To minimize the effect of this limitation, alternative data collection methods were used to collect the same information from different sources to confirm or refute data results.

Third, an agreement has yet to be reached among researchers and teachers regarding the teaching and assessment of students' CT skills. This is apparent from the multiple definitions of CT and the debates regarding appropriate pedagogy and tools available for the assessment of CT. Using a specific rubric designed specifically for this research purposes and context might limit the generalizability, because they are limited to a prescribed definition of CT that may not be shared across other institutions. Another factor might affect this research generalizability, is that the study context was limited to KSU students, specifically students from the School of Education, who may be different from other students from other colleges, such as the School of Medicine, and might result in different findings if the study was conducted in a different context.

Finally, the duration of the study was short. Although the intervention was applied twice before (with different students in different semesters) applying it in the main study, a 16-week semester course of CT practice might not be sufficient to acquire the expected results. Teaching CT skills should not be limited to a few semesters, as teaching these skills should continue throughout their entire academic journey. Developing CT and writing skills is complex and takes time for the effects to be realised, which might explain the inconsistency of some students' results. Therefore, future research should consider conducting longitudinal studies for proper investigation and to offer students enough time to internalise the knowledge gained. Overall, such potential limitations do not negate or reduce the importance of the findings obtained in this study. Such limitations only highlight the fact that much work still lies ahead.

7.5 Recommendations for further research

Future studies can build on the results of this study to enrich existing knowledge in the area of CT skills and SN websites. While reviewing the literature, I found that studies seldom tried to explore the effect of SN websites on teaching and promoting students' CT in a direct way. The focus was on other aspects, such as students' social relationships, interactions and communication, but not specifically CT skills. Researchers assumed that CT would be the inevitable result of the previous practices. Based on the literature review (see Chapter 2, section 2.4.1), I found a gap in the literature and the need for further studies to discover other affordances of using SN website for learning purposes. Additional research, similar to this study, needs to be carried out to corroborate the findings of this study and to investigate innovative ways

to use SN websites to enhance students' higher level thinking skills and their effect on promoting CT skills.

It is clear that the use of SN websites in education is developing rapidly, and that the research approach to this development needs to be expanded as well. A study using observational techniques combined with other methods, such as interviews or focus groups could provide deeper insight into teachers' and students' usage of SN websites in teaching and learning, as well as obtain and evaluate information regarding factors supporting or hindering their usage. Moreover, I personally believe in the importance of a mixed methods approach rather than a quantitative approach to investigate the efficiency and role of using any type of technology intervention on students' performances, as using a mixed methods approach extensively in this area of research assists in bridging the gap in methodology used in these studies.

This research highlights the need to conduct further studies that investigate students' participation through SN websites and how to enhance the quality of their participation. Further studies promoting students' communication and peer reviews via electronic media are required as well. Ultimately, further studies on how best to apply social constructivism theory principles for learning practices and in pedagogical interventions to enhance students' interaction and communication are required.

This study was conducted on undergraduate students from the School of Education; however, I believe that CT and writing skills should start very early with students in grade school. I hope that this study will encourage other researchers to conduct similar research in this field and use SN websites to promote CT and writing skills with students. The usage of SN websites by teachers and students in school is still in its early stages of implementation and further research should be encouraged and welcomed.

7.6 Concluding remarks

In conclusion, this study provides a pedagogical intervention to enhance teacher's usage of SN websites to promote students' CT skills. It has provided a deep understanding of students' perceptions of SN website usage and investigated the factors that affect students' participation in these course activities. The intervention revealed positive findings in terms of students CT and argumentative writing skills and their attitudes; however, this study found that SN websites alone cannot promote student participation in course activities.

SN website usage should be combined with other factors such as choosing the activity topics, the teacher's role in introducing and implementing the activities and consideration of students' time and other course requirements.

Although this study had a few limitations, such as study context and the short period of implementation, every effort was made to minimize the impact of these limitation so they did not have a significant effect on the research outcomes. For example, the intervention completed several cycles of design and evaluation, and used random sampling to generalize the findings. Moreover, various data collection tools were used in this study and analysed at the same time to ensure rich information and deep interpretation.

The findings of this study indicate that although there is a growing body of literature in the field of SN websites, there is a need concentrate more on teachers' and students' usages of SN websites for learning purposes. In addition, this study found a gap in the area of research related to the use of SN websites to enhance students' higher level thinking skills such as CT and therefore, more research is required in this area.

Appendix 3.1: Course specification

Year	2013/2014		
Target Students	School of Education students- Female		
Level	4-7		
Period	Face to face learning		
Credit	100		
Department	Instructional Technology		
Module instructors			
Module Mark Scheme	Undergraduate		
Hours of teaching	24 hours / semester		

Module Title and Code: Learning Technologies and Communication, 241 ITE.

Grading Scheme	The duties of the individual	Midterm test	Quizzes	Presentations (group project)	Group discussions	Final test
	15%	20%	5%	10%	10%	40%

Course Description:

The course aims to cover the theoretical concepts in the field of educational technology and the most prominent theories upon which this field is based, such as communication theory and the systems approach as well as instructional design. In addition, the course aims to introduce students to the classifications of various criteria for, and definitions of, the latest developments in the technologies used in teaching and learning.

Course objectives

Knowledge:

- 1. Defines the concept of educational technology and the components of the domain and theoretical foundations that underpin them.
- 2. Defines the concept of the systems approach and its role in the educational process, and recognizes the best-known models of instructional design.
- 3. Defines the concept of educational communication and analyzes the models and conditions for successful communication in education, and the communication components of any educational process.
- 4. Defines the theories, patterns and methods of communication, verbal and nonverbal, and their effects on social and professional relations, particularly in the vicinity of the school and surrounding community.
- 5. Recognizes the classifications of educational media and steps in their selection and use.
- 6. Learns the basics of using computers in education.
- 7. Recognizes the concept of the World Wide Web, its aspects of use in education and technology and search strategies.
- 8. Knows the theories and strategies for the integration of technology in instructional design and other professional practices.
- 9. Defines the concept of e-learning and its properties and provides examples of it.
- 10. Learns the basics of virtual reality and the theoretical frameworks that underpin it.

11. Understands the concepts of modern techniques in the field of education, such as web quests and electronic e-books.

B – Professional skills:

- 1. Writes measurable behavioral objectives.
- 2. Chooses the most appropriate educational media to achieve the desired educational goals.
- 3. Uses various teaching aids in an effective and meaningful way.
- 4. Evaluates educational software according to specific standards.
- 5. Designs learning events and professional practice in the area of his/her specialization, making technology an integral component with the rest of the elements.
- 6. Collects and analyzes information and communicates with learners, parents, colleagues and members of the community through various media.

C- Professional trends:

- 1. Tends to establish social and professional relationships based on mutual understanding and respect with members of the learning community in school and classroom and the surrounding community.
- 2. Values the integration of technology in learning and professional practices and follows and adopt initiatives and innovations achieved by the integration.

Course assignments/projects/key assessments

- Group discussions
- Presentations
- Research projects, individual or cooperative
- Evaluation of group discussions
- •Evaluation of the performance of students in research projects
- The commitment of the student to meet requirements for the course in a timely manner
- Quarterly and final tests
- Interaction within the lecture

Teaching and Learning Methods:

- Lecture and presentations
- Individual projects and collective
- The use of e-forum
- Discussion groups
- Homework
- Link the theoretical and applied aspects
- Self-learning.
- Student participation through a presentation.
- Dialogue and debate among students about issues in the specialty related to the course content.
- Application of what the students have learned about the strategies of web search.
- Engage students in dialogues about the content of the course and how it is delivered.
- Give students a chance to lead the panel discussion.

• Give the student an opportunity to make a presentation about selected topics, in agreement with the Professor

Description of technology the instructor requires the students to use:

- Computer hardware and software
- Internet websites online, for research

Appendix 3.2: English translation of one of the research activities (Intervention)



Title page in the WebQuest



Introduction page in the WebQuest


Task page in the WebQuest

	1- Watch both of the YouTube clips below, and note the following:
Task	A- The benefits of using new technologies
Process	B- The uses of the new technology in learning and
Evaluation	C- Obstacles that may prevent the expansion
conclusion	and use of technology in education.
Teacher page	

Process page, 1, in the WebQuest

	2. Provise the following resources on social
Introduction	networking websites and gather different opinions about the positive and negative sides of using new
Task	technologies in education:
Process	🕒 🖬 🐝 🕒 You 💯
Evaluation	3- Start writing your essay to answer the following
conclusion	question: What are the arguments of the supporter and those
Teacher page	opposing the use of technology in education, and to what extent do you agree with them?
	4- While you are writing, I advise you to keep checking the rubric criteria on the evaluation page.



Introduction	5- Write your full answer on the class's blog : At-www.ite241.blog.com
Task	
Process	6- Take advantage of your reading and review of the
Evaluation	classmates' answers on the blog.
conclusion	
Teacher page	

Process page, 3, in the WebQuest

	Criterion	Qualified	Developing	Beginner
	(Score)	1	0.5	0
Introduction	1- Interpretation	Writes a clear introduction that clearly states the	Writes an introduction but does not state the main argument.	No introduction provided.
		main argument. Answers concisely	Answers but lacks	Answers include significant irrelevant or extraneous
Task		and relevant to the given question.	information or includes some irrelevant information	information.
Process	2- Analysis	Follows the argumentative writing style by	Describes different claims, but presentation is unclear	Describes one claim only.
Evaluation		describing different claims in order.	Does not support each claim with a different	Presents the claims without support them with a different
conclusion		Presents different viewpoints that support each claim.	viewpoint. Uses a limited number (3 or fewer) of social	viewpoint. Uses, or focuses, on only one social
Teacher page		Uses different social networking websites' resources.	resources. Cites only some of the resources used.	networking website resource. Does not cite resources.
		Cites every resource used.		
	3- Evaluation	Comments on each claim by adding a personal interpretation and evaluation.	Comments on only some claims.	Does not comment on the claims.

Evaluation page, 1, in the WebQuest

	Criterion (Score)	Qualified 1	Developing 0.5	Beginner 0
Introduction	4- Inference	Gives clear, accurate and realistic examples that support each claim.	Gives very general examples without any clarifications.	Does not provide any examples to support the claims.
Task	5- Explanation	Declares her personal viewpoint that clearly illustrates her position on the argument.	Does not declare her personal viewpoint, but it understands from the general meaning of the text.	Does not present or clarify her position on the argument.
Evaluation		Defends her viewpoint by providing reasons and realistic examples that support her position.	Defends her viewpoint based on self-interest or preconceptions.	Does not provide any reasons or examples to support her personal viewpoint.
Conclusion Teacher page	6- Self-regulation	Uses indicator words and phrases that clearly indicate the meaning. Writes a clear conclusion that summarizes the main ideas.	Uses weak indicator words and phrases that not attract the reader. Writes a conclusion but does not summarize the main ideas or presents new information.	Does not use indicator words and phrases. No conclusion provided.

Evaluation page, 2, in the WebQuest



Conclusion page in the WebQuest

Introduction	1- You have to submit your essay on Monday, Oct 22.
Task	blog at : <u>www.ite241.blog.com</u>
Process	3- You have to comment on at least one of your classmate's answers.
Evaluation	4- You must comply with the netiquette rules.
conclusion	5- After you receive feedback from the teacher, please provide me with your reflection on the activity and feedback.
Teacher page	

Teacher page, 1, in the WebQuest

	6-Your essay should be organized in an argumentative
Introduction	writing style:
Task	 Introduction, which clarifies the main argument and topic.
Process	 First claim, or point of view that related to the issue, supported by reasons and evidence and concluded
Evaluation	with your personal opinion, as it relates to the analysis of the claim.
conclusion	- Present the opposite viewpoint the same way you used to present the firs claim.
Teacher page	 Conclude with full ideas, present your position as it relates to the issue and identify the most significant implications and consequences of this issue within your context.

Teacher page, 2, in the WebQuest

		المستوى			مهارات
الدرجة	مبتدئة صفر	متطورة هر.	متمكنة ۱	وصفها	التفكير الناقد
	 لم تكتب مقدمة للنص. الإجابة تشتمل على الكثير من المعلومات التي لا علاقة لها بالسؤال. 	 تكتب مقدمة ولكن لا تُصرح فيها إلى موضوع الجدل القائم. الإجابة ناقصة أو تحتوي على معلومات غير مرتبطة بالسؤال. 	 تكتب مقدمة منظمة تُصرح فيها إلى موضوع الجدل القائم. الإجابة محددة ومرتبطة بشكل مباشر بالسؤال. 	تطوير جدال منطقي يجيب عن السؤال المطروح.	ا- التفسير
	 تذكر وجهة نظر واحدة حول الموضوع. تستعرض وجهات النظر دون دعمها بآراء مؤيدة لها. تستخدم أو تركز على مصدر واحد فقط من مصادر الشبكات لم توثق المعلومات التي تم اقتباسها. 	 تذكر عدد من وجهات النظر المختلفة، ولكن تدمجها معاً بطريقة مشتتة وغير منظمة. لا تلتزم بدعم كافة وجهات النظر بآراء مؤيدة و داعمة. مؤيدة و داعمة. تستخدم عدداً محدوداً وغير متنوع (٣ أو الشبكات الاجتماعية. التي اقتبستها. 	 تتبع أسلوب الكتابة الجدلية من خلال ذكر وجهات النظر المختلفة حول الموضوع بطريقة منظمة وواضحة. مؤيدة وداعمة لكل وجهة نظر. تستخدم عدد كبير ومتنوع من مصادر الشبكات الاجتماعية. ألتي اقتبستها في النص. 	وصف موضوع الجدل باستعراض المختلفة حول الموضوع، وتقديم آراء متعددة تدعم كل اتجاه	۲- التحليل
	لم تعلق على وجهات النظر المذكورة.	تعلق على بعض وجهات النظر المذكورة.	 تعلق على كل وجهة نظر بتقديم تفسير ها الشخصي لها وتقييمها. 	نقييم وجهات النظر المختلفة حول موضوع الجدل والتعبير عن الرأي الشخصي فيها.	۸- التقییرم
	تذكر وجهات النظر دون ضرب أمثلة عليها.	تضرب أمثلة عامة جداً بدون شرح كافي.	 تضرب أمثلة واضحة من الواقع تدعم كل وجهة نظر. 	تقديم أسباب واضحة وأمثلة من الواقع لدعم كل وجهة نظر	<u>۶-</u> الاستدلال
	 لم يُفهم موقفها الشخصي من المجادلة القائمة. لم تدافع عن رأيها بدعمه بأي أمثلة واقعية أو أسباب. 	 لم تصرح برأيها الشخصي من المجادلة القائمة ولكن يظهر من المعنى العام للنص. تدافع عن رأيها الشخصي بالاستناد إلى تفضيلاتها الذاتية أو أفكار ها المسبقة. 	 تكتب جزء مستقلاً في النص يوضح موقفها من المجادلة القائمة. تدافع عن رأيها الشخصي بتقديم الأسباب والأمثلة الواقعية التي تدعم رأيها. 	توضيح الموقف الشخصي من موضوع الجدل، مع دعمه بالأسباب والأمثلة الواقعية.	٥- الشرح
	 لم تستخدم كلمات ربط تشير بوضوح لمعنى كل جزء في النص. لا توجد خاتمة للنص. 	 تستخدم كلمات ربط ، ولكن ضعيفة لا تشد القارئ لما هو آت. الخاتمة لا تلخص الأفكار الرئيسية في الموضوع أو تحتوي على معلومات جديدة. 	 تستخدم كلمات ربط تشير بوضوح لمعنى كل جزء في النص. الخاتمة تلخص الأفكار الرئيسية في الموضوع. 	تقديم نص يُظهر اطلاع كبير على المصادر يدل على ترتب يذل على ترتب ومنطقيتها.	٢- التنظيم الذاتي

Appendix 3.3.A: CT rubric for the main study (Arabic draft)

Appendix 3.3.B: CT rubric for the main study (English draft)

. =			Score		
E I	Description	Qualified	Developing	Beginner	Mark
- 0	_	1	0.5	0	
	Develop a	□ Writes a clear	□ Writes an	□ No	
	clear main	introduction	introduction but	introduction	
	argument	that clearly	does not state	provided.	
no	that answers	states the main	the main	•	
atio	the given	argument.	argument.	\Box Answers	
ret	question.	-	-	include	
rpi	-	\Box Answers	□ Answers but	significant	
nte		concisely and	lacks some	irrelevant or	
I		relevant to the	necessary	extraneous	
-		given question.	information or	information.	
			includes some		
			irrelevant		
			information.		
	Describe the	\Box Follows the	□ Describes	□ Describes one	
	main claims	argumentative	different claims,	claim only.	
	of the	writing style by	but presentation		
	argument	describing	is unclear.	\Box Presents the	
	and present	different claims	_	claims without	
	a wide	in order.	\Box Does not	support them	
	variety of		support each	with a	
	viewpoints,	□ Presents	claim with a	different	
'sis	judgments,	different	different	viewpoint.	
aly	and beliefs	viewpoints that	viewpoint.		
An	to support	support each		\Box Uses, or	
	each claim.	claim.	\Box Uses a limited	focuses, on	
7		🗖 Uses different	number (3 or	only one	
			networking	social notworking	
		social	wobsitos	website	
		websites'	resources	resource	
		resources	resources.	resource.	
		resources.	\Box Cites only some	\Box Does not cite	
		□ Cites everv	of the resources	resources	
		resource used	used	resources.	
	Assess each	\Box Comments on	\Box Comments on	Does not	
	claim about	each claim by	only some	comment on	
E	the argument	adding a	claims.	the claims.	
atic	and provide	personal			
Ini	a personal	interpretation			
Eva	viewpoint or	and evaluation.			
	opinion on				
μ	it.				

4- Inference	Give clear and accurate reasons and examples to support each claim.	☐ Gives clear, accurate and realistic examples that support each claim.	☐ Gives very general examples without any clarifications.	Does not provide any examples to support the claims.	
5- Explanation	Provide a personal viewpoint about the argument and present clear examples to support this position.	 Declares her personal viewpoint that clearly illustrates her position on the argument. Defends her viewpoint by providing reasons and realistic examples that support her position. 	 Does not declare her personal viewpoint, but it understands from the general meaning of the text. Defends her viewpoint based on self-interest or preconceptions. 	 Does not present or clarify her position on the argument. Does not provide any reasons or examples to support her personal viewpoint. 	
6- Self-regulation	Provide an answer that indicates a suitable review of a wide range of resources, and presents clear and logically organised ideas.	 Uses indicator words and phrases that clearly indicate the meaning. Writes a clear conclusion that summarizes the main ideas. 	 Uses weak indicator words and phrases that not attract the reader. Writes a conclusion but does not summarize the main ideas or presents new information. 	 Does not use indicator words and phrases. No conclusion provided. 	

Appendix 3.4.A: Students' questionnaire (Arabic draft)

عزيزتى الطالبة

لقد انخرطت خلال هذا الفصل الدراسي ومن خلال دراسة مقرر ٢٤١ وسل "تقنيات التعليم والاتصال"، في مجموعة من الأنشطة المنزلية (الواجبات) والتي كانت على هيئة رحلات معرفية معتمدة على شبكات التواصل الإجتماعي، وتطلَب حلها كتابة مواضيع جدلية تجيب عن سؤال مفتوح مُختلفٌ حوله. وقد هدفت هذه الأنشطة في مجملها إلى تطوير مهارات التفكير الناقد لديك والمُنعكِسة في أسلوب كتابتك الجدلية. وحان الوقت لتقييم هذه الأنشطة ومعرفة مدى تأثير ها عليك ، وما اذا كان لديك أي مقترحات لتطوير ها.

لذلك عزيزتي أضع بين يديك هذه الإستبانة آملة منك الإجابة عنها بكل وضوح ومصداقية حيث أن كل إجابة ستقدمينها ستُسهم في تطوير هذه الأنشطة وتنميتها، علماً ان كل ما ستكتبينه سيبقى سراً ولن يستخدم إلا لهدف تطوير هذه الأنشطة.

تهدف هذه الاستابنة إلى : ١ - معرفة إتجاهاتك الحالية نحو هذه الواجبات (الأنشطة) ورأيك الشخصي بها. ٢- معرفة أثر دمج شبكات التواصل الإجتماعي في هذه الواجبات (الأنشطة) على دفعك لحلها وإنجاز ها بالشكل الأفضل. ٣- معرفة تقييمك الذاتي لمدى امتلاكك مهارات التفكير الناقد والكتابة الجدلية، ومستوى التغير فيهما بعد هذه الواجبات (الأنشطة).

٤- معرفة أهم العناصر والعوامل التي شجعتك وأثارت دافعيتك إلى أداء هذه الواجبات (الأنشطة).

شاكرة سلفاً حسن استجابتك ومقدرة تعاونك لدعم التعليم وتطويره،،،

الأستاذة ندى جهاد الصالح

- المحور الأول: تهدف العبارات التالية إلى الكشف عن إتجاهاتك نحو أداء هذه الواجبات، كذلك الدور الذي لعبته الشبكات الإجتماعية فيها.
- ُ على مُقياس من خمسة حددي موقفك من العبارات التالية، حيث أن ٥ تشير إلى أنك تتفقين جداً مع العبارة و ١ أنك لا توافقين ابداً عليها:

لا أوافق أبشدة ا	لا أوافق ۲	محاید ۳	أوافق ٤	أوافق جدا ہ	العبارة	م
	1				بم الواجبات وفاعليتها	تصمب
					أجد أن فكرة الواجبات تتسم بالإبداع.	١
					أرى أن الواجبات سهلة الأداء.	۲
					لم يعجبني تصميم الواجبات كرحلات معرفية.	٣
					أعتقد أن تعليمات الواجبات واضحة ويسهل اتباعها.	٤
					أستمتعت بأداء هذه الواجبات.	٥
		ľ	I	I	اهات نحو أداء هذه الواجبات	الاتج
					أشعر أن مهارات التفكير الناقد من المهارات التي لا تهمني كطالبة.	٦
					أصبحت الكتابة بالنسبة لي أكثر متعة.	٧
					أداء هذه الواجبات جعلني استوعب موضوعات المقرر بشكل أفضل	٨
					أداء هذه الواجبات ولد علي ضغط كبير خلال دراسة المقرر.	٩
					سعيدة بمستوى التطور في مهارات الكتابة الجدلية لدي.	۱.
					أشعر بالقلق عندما أضطر للتعبير عن وجهة نظري في موضوع معين.	11
					أشعر الأن بثقة أكبر في كتابة مواضيع جدلية.	١٢
					أعبائي الدر اسية هذا الفصل أعاقت أدائي لهذه الواجبات بشكل جيد.	١٣
					أقترح أن تضاف مثل هذه الواجبات إلى كافة المقررات.	١٤
					أصبحت أحب الكتابة أكثر.	10
					أشعر بالفخر عندما أنشر موضوعي في المدونة.	١٦
					قناعتي بأهمية التفكير الناقد دفعني إلى أداء هذه الواجبات.	١٧
					الشبكات الإجتماعية في هذه الواجبات	دور
					دمج الشبكات الإجتماعية في هذه الواجبات جعل أداءها أكثر متعة.	١٨
					غيرت هذه الواجبات من نظرتي حول مدى مصداقية مصادر الشبكات الإجتماعية.	١٩

لا اوافق أبشدة ا	لا أو افق ۲	محاید ۳	أوافق ٤	أوافق جدا ہ	العبارة	م
					لا أحبذ التعليق على مواضيع زميلاتي في المدونة.	۲.
					التعامل مع مواقع الشبكات الإجتماعية (من تصفح واقتباس وغير ها) أصعب مما كنت أتخيل.	۲۱
					ما زلت لا استطيع التمييز بين وجهات النظر المختلفة المنشورة في مواقع الشبكات الإجتماعية.	22
					- أصبحت أتصفح مواقع الشبكات الإجتماعية بعين ناقدة.	۲۳
					 طورت هذه الواجبات قدرتي على التعامل مع مواقع الشبكات الإجتماعية (من تصفح واقتباس وغيرها).	٢٤
					استمتعت بتصفح مواقع الشبكات الإجتماعية خلال هذه الواجبات.	70
					التعليق على مواضيع زميلاتي في المدونة يحرجني.	22

 للمحور الثاني: تهدف العبارات التالية إلى التعرف على تقديرك الذاتي لمدى إمتلاكك مهارات التفكير الناقد بشكل عام واالكتابة الجدلية بشكل خاص بعد أداء هذه الواجبات، ومدى التطور الحاصل فى مستوى هذه المهارات لديك.

> > > ٣٠ - تعلمتُ المهارة السابقة:

تبل در اسة هذا المقرر
 تنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٣١- استعرض وجهات نظر مختلفة حول الموضوع:
 نعم
 لا
 لم أتقن هذه المهارة حتى الأن

٣٢ - تعلمتُ المهارة السابقة:

قبل در اسة هذا المقرر
 عنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٣٣- أدعم كل وجهة نظر بأكثر من رأي:
الم أتقن هذه المهارة حتى الأن

٣٤ - تعلمتُ المهارة السابقة:

تبل دراسة هذا المقرر
 تنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٣٦ - تعلمتُ المهارة السابقة:

قبل در اسة هذا المقرر
 قبل در اسة هذا المقرر
 كنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٣٧-أوثق كل معلومة ورأي أخذته من مصدر خارجي:
الم أتقن هذه المهارة حتى الأن

٣٨ ـ تعلمتُ المهارة السابقة:

تبل در اسة هذا المقرر
 تنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٣٩ - أقيم وجهات النظر المختلفة:
اعم النظر المختلفة:
اعم النظر المختلفة:

٤٠ - تعلمتُ المهارة السابقة:

قبل در اسة هذا المقرر
 كنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٤١ - أطرح أمثلة من الواقع على كافة الأفكار:
 نعم
 لا
 لم أتقن هذه المهارة حتى الأن

٤٢ - تعلمتُ المهارة السابقة:

قبل در اسة هذا المقرر
 عنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٤٣-أعبر عن موقفي بشكل واضح نحو الجدال القائم:
الم أتقن هذه المهارة حتى الأن

٤٤ ـ تعلمتُ المهارة السابقة:

تبل دراسة هذا المقرر
 كنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٤٦ ـ تعلمتُ المهارة السابقة:

تبل دراسة هذا المقرر
 تنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٤٧ - أستخدم جمل ربط مناسبة للنص:
 ١ نعم
 ٢ لم أتقن هذه المهارة حتى الأن

٤٨ ـ تعلمتُ المهارة السابقة:

تبل در اسة هذا المقرر
 تبل در اسة هذا المقرر
 كنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

٤٩ - أكتب خاتمة تلخص كافة الأفكار الرئيسية في النص:
 ١ نعم
 ٢ لمهارة حتى الأن

٥- تعلمتُ المهارة السابقة:

قبل در اسة هذا المقرر
 تدر اسة هذا المقرر
 كنت اعرفها ولكن تدربت عليها بشكل جيد خلال هذا المقرر

- المحور الثالث: يهدف السؤال التالي إلى معرفة أهم العناصر والعوامل التي اشتملت عليها هذه الواجبات وكانت سبباً في تشجيعك وأثارة دافعيتك على أداءها.
 - رتبي العناصر التالية من ١ إلى ٨ بناءً على الأكثر أهمية بالنسبة لك، حيث أن ١ هو الأكثر أهمية و٨ هي الأقل أهمية:
 نشر الإجابة في المدونة.
 التعليق على إجابات الزميلات في المدونة.
 أداء الأستاذة في المحاضرة (حث الاستاذة الدائم وحرصها على أداء الواجبات).
 تصميم الأنشطة (الواجبات) على هيئة رحلات معرفية.
 استخدام الشبكات الإجتماعية في هذه الأنشطة.
 تموذج التقييم (مقياس التفكير الناقد).
 التعذية الراجعة من قبل الأستاذة (ملاحظاتها على ورقة كل طالبة وفي المدونة).
 التغذية الراجعة من قبل الطالبة (ملاحظاتها على ورقة كل طالبة وفي المدونة).

Appendix 3.4.B: Students' questionnaire (English draft)

Dear student,

Thank you for expressing an interest in participating in the research study for my PhD, entitled 'Social networking websites in Saudi higher education: Designing learning activities to promote critical thinking'. This research is the main requirement to obtain a PhD from the University of Leicester.

You have been participating in the research activities, which are a kind of WebQuest activity (homework), using social networking (SN) websites. This took place while you were studying the 241 ITE course in the first academic semester from September to December 2014. The aim was to promote your critical thinking (CT) skills as reflected in your writing.

Now, I am asking you to fill in this questionnaire which aims to:

- 1- Explore whether you liked or disliked these activities.
- 2- Investigate whether merging SN websites in learning activities would encourage you to continue constructive work at home.
- 3- Gather information about your CT skills and your feelings about any changes in your CT skills.
- 4- Gather information about the factors that motivated your participation in the learning activities.

Please note that the data obtained from the questionnaires will be anonymised and will only be used for research purposes.

Your participation in this questionnaire is greatly appreciated,

Nada J. Alsaleh

Researcher

First: The following statements aim to discover your attitude towards these activities and the role that SN websites played within.

	-	Totally	Agree	Neutral	Disagree	Totally disagree
Num	Sentence	agree	4	3	2	uisagice
~		5				1
The						
1	I think the activities' idea are creative.					
2	I found the activities easy to do.					
3	I did not like the design of these activities as WebQuest.					
4	I think the activities' instructions were clear and easy to follow.					
5	I enjoyed doing these activities.					
Attit	ude toward these activities	1				
6	I think that CT skills are not important					
	to me as a student.					
7	The writing became more interesting					
	to me.					
8	Doing these activities let me					
	understand the course topics better.					
9	Doing these activities put me under pressure while studying for the course.					
10	I am happy about the improvement in my level of argumentative writing.					
11	I feel worried when I have to express my opinion about an issue.					
12	I feel more confident now about writing argumentative essays.					
13	The amount of work this semester obstructed my ability to do these activities.					
14	I suggest adding the same activities to the other courses.					
15	I love writing now more than before.					

16	I felt proud when I wrote my essay on the blog.			
17	My conviction about the importance of CT pushed me to do these activities.			
The	role of SN website in these activities			
18	Merging the social networking websites with these activities made solving them more pleasurable.			
19	These activities changed my point of view about the accuracy of SN website's resources.			
20	I do not like to comment on my friends' essays on the blog.			
21	Using social networking websites (browsing, citing and others) is more difficult than I expected.			
22	I still cannot recognise the difference between points of view on SN websites.			
23	I was able to browse SN websites with a critical eye.			
24	Doing these activities has helped me to improve my ability to use SN websites (browsing, citing and other).			
25	I enjoyed browsing the SN websites while doing these activities.			
26	Commenting on my friends' essays embarrassed me.			

Second: The following questions are presented as pairs to identify your judgment and perception about your CT skills, in general, and your argumentative writing, in particular, after doing these activities.

27. Writes a clear introduction about the main topic.

 \Box Yes. \Box No. \Box I have not mastered this skill yet.

28. I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it well through this course.

29. Writes a linked sentence in the introduction part that clearly states the main argument.

 \Box Yes. \Box No. \Box I have not mastered this skill yet.

30. I learned the previous skill: □ Before this course. □ Through this course. □ I knew it before, but have practised it well through this course.

31. Describes different claims about the argument. □ Yes. □ No. □ I have not mastered this skill yet.

32. I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it well through this course.

33. Presents different viewpoints that support each claim. □ Yes. □ No. □ I have not mastered this skill yet.

34. I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it well through this course.

35. Obtains different claims and opinions from the social networking websites. ☐ Yes. ☐ No. ☐ I have not mastered this skill yet.

36. I learned the previous skill: ☐ Before this course. ☐ Through this course. ☐ I knew it before, but have practised it well through this course.

37. Cites every resource used.□ Yes. □ No. □ I have not mastered this skill yet.

38. I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it well through this course.

39. Comments on each claim by adding a personal interpretation and evaluation. □ Yes. □ No. □ I have not mastered this skill yet. 40. I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it well through this course.

41. Gives clear, accurate and realistic examples that support each claim. □ Yes. □ No. □ I have not mastered this skill yet.

42. I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it well through this course.

43. Declares a personal viewpoint that clearly illustrates a personal position on the argument.

 \Box Yes. \Box No. \Box I have not mastered this skill yet.

44. I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it well through this course.

- 45. Defends a personal viewpoint by providing reasons and realistic examples that support the position.
- \Box Yes. \Box No. \Box I have not mastered this skill yet.

46. I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it well through this course.

47. Uses words and phrases that clearly indicate the meaning. □ Yes. □ No. □ I have not mastered this skill yet.

48. I learned the previous skill: □ Before this course. □ Through this course. □ I knew it before, but have practised it well through this course.

49. Writes clear conclusions that summarise the main ideas. □ Yes. □ No. □ I have not mastered this skill yet.

50. I learned the previous skill:

 \Box Before this course. \Box Through this course. \Box I knew it before, but have practised it well through this course.

Third: The following factors are the factors that we think are important to encourage your participation in the course activities.

On a scale of eight, grade the importance of the following items in encouraging your participation, where 1 represents the most important and 8 represents the least important.

-The teacher's performance.
-The design of the activities (homework) as a WebQuest.
- Using social network websites in these activities.
-The assist method (rubric).
-Teacher feedback.
- Students' reflections.
-Writing answers in the class blog.
- Commenting on other answers in the class blog.

Appendix 3.5: Focus groups questions

I would like to welcome and thank you all for coming and participating in this discussion. Throughout this session we will discuss what we have learned this semester; we will also talk more about your experience with this course and other things that will help me understand in a better way what things you have gone through while applying the course activities. The session will take one hour and I will record it, if you don't mind?

Q1- Represent yourself by drawing a simple figure. Try to describe yourself for me and your previous experience with the activities in small drawing.

Q2- Discuss your drawing and explain it.

Q3- What is critical thinking? What is the difference between the argumentative writing and descriptive writing?

Q4- Do your teachers ask you to think critically and write critically when you do your projects? Do you usually receive feedback form them?

Q5- How do you see the role of SN websites in the success of these activities? Do you think it is a good resource to promote students' CT?

Q6- Do you think using SN websites has motivated you to do these activities?

Q7- What are the factors that affect your participation in these activities either positively or negatively?

Q8- What are the challenges you faced during these activities? How did you overcome them?

Q9- How do you explain why students did not follow the teacher's directions such as when she asked to send her feedback and comment on the students' essays?

Q10- If you have a chance to repeat this experience again, will you?

Appendix 3.6: Transcript of one of the focus group sessions (English draft)

Focus group #2

Monday 23/2/1436, 15/12/2014. From 11-12 By: Nada Alsaleh Observer: By the reviewer Amal.

Students who registered to do the focus group: Stu 10, Stu 15, Stu 4, Stu 24, Stu 13 and Stu17.

Students who actually attended the focus group: Stu 24, Stu 10 and Stu 17.

Teacher: I would like to welcome and thank you all for coming and participating in this discussion. Throughout this session we will discuss what we have come learned this semester; we will also talk more about your experience with this course and other things that will help me understand, in a better way, what things you have gone through while completing the course activities. The session will take one hour and I will record it, if you don't mind? Students: we don't mind; you may record it.

Teacher: First off, I know your names, now I want to know your areas of expertise.

Stu 10, special education for the deaf; Stu 24, art education; and Stu 17, special education for the deaf!

Teacher: Now, you have a paper and a pen. I want each one of you to draw herself while doing her assignments (activities). (Students laugh)

Teacher: Draw yourself. Draw something to make me understand everything

Stu 17: How? Draw someone?

Teacher: Draw anything that represents your previous experience.

Stu 17: Draw myself in the present moment?

Teacher: Now, before, draw anything you would like.

Girls started drawing...

Teacher: Stu 10, are you done?

Stu 10: Yes!

Teacher: Ok, write your name on it.

Stu 24 laughs as she is unsure of her drawing.

Teacher: I want you to draw feelings. Your feelings, which I will see through this drawing.

Stu 24: I see.

She started adding some details to her drawing.

Teacher: Please, do your best to finish now.

Teacher: Ok, now let's begin with Stu 10; show us your drawing and try to explain it to us.



Stu 10: First I was shocked. It is first time for me to have homework like that, first time! Then I felt I could not fit in. Then I gradually started to cope and do it. And at last I loved the idea. It is better than preparing presentations and field visits, especially since we did that often without benefit, and we forgot what we learned; still this one is not like that, we learned how we can argue and talk.

Teacher: Ok, Stu 10, can you tell us how long it took you to change from one phase to another?

Stu 10: Sorry, I don't understand.

Teacher: How long was the shock phase, for example?

Stu 10: (laughing)

Stu 10: Almost to the second homework. I hadn't coped yet, and had no knowledge of how to search or discuss; how to write an introduction and conclusion, and even how to discuss them with other students? Let alone how to deal with the homework requirements. We were used to a Copy and Paste in writing; but by the time of the last assignments, I was able to discuss my own ideas. I also used to have a problem citing references, I did not like it, thinking it was enough to only discuss, but in the end I loved the homework.

Teacher: When did the smile (number 3) begin?

Stu 10: Number 3 was almost in the third assignment and before the fourth one.

Teacher: Stu 24, show us your drawing, and go ahead and explain it to us.



Stu 24: A girl searching the internet (laughing), really concentrating on things around her, and at last she liked the idea. After taking such a long time, she loved the idea.

Teacher: Your turn, Stu 17.

Stu 17: Teacher, I didn't understand what you mean exactly, I though since I started the university!

Teacher: Ok, no problem, let us see.



Stu 17: My drawing represents things I used to use when I started the university and things I am using now. For example, I used to use my computer and the tools I used with it like a CD. But now, I use websites more often, like Instagram and twitter. Web surfing is very useful to me, things have become easier with it and I do research and mention references like Stu 10 said (laughing), so I feel this way is better for me.

Teacher: What is?

Stu 17: The way you used with us, to provide us with websites and let us do the search. I think this way is better.

Teacher: But you still have to mention the references.

Stu 10: Yeah! (laughing)

Teacher: I give you the references in order to save you time but should you take anything from them, you are to refer to such sites.

Stu 17 interrupted: Yes! (laughing) Of course, it is necessary to mention the references

Teacher: I would like to ask you a question which I asked in our first lecture, what is critical thinking? How do you define that?

Stu 10: It means that everyone expresses their own opinions.

Stu 17 interrupted: And consider others'.

Stu 10 agreed: Yeah, and consider others' opinions to see who's with and who's against his.

Stu 24: A critic establishes an argument about everything they read. The people argue the points after they read anything, whether supporting or opposing the idea.

Stu 17: A critic should compare a subject to themselves before judging it or people's opinions. They first observe the reality of the idea within themselves and then consider many other opinions before uttering theirs.

Teacher: Ok then, can you now distinguish between a descriptive and an argumentative writing?

Stu 10: Hmm, an argumentative one is a subject that can have many opinions. A descriptive one is no place for arguments.

Stu 17: A descriptive one, for example, present a topic from different area and just describing it.

Teacher: What do you think, Stu 24?

Stu 24: A descriptive subject may include a simple definition that has no opinions or proof.

Teacher: Good! Then you can now distinguish between the two?

Students all agreed and said: Searching for different opinions.

Teacher: I want to ask another question, do your teachers at the university ask you to think or write in a critical way?

Stu 17: No!

Stu 24: In my field of expertise, I need to be a critic.

Teacher: Why?

Stu 24: Because we are supposed to criticize the paintings we make. First, we observe the painting and give our opinions about it, and then we criticize.

Teacher: Criticize from your point of view or scientifically?

Stu 24: No, we have standards to apply, like history and so on; for example, the clothing, we suggest the era to which it belongs.

Stu 10: No, they don't.

Teacher: When you write a research paper, subject or even a presentation, do they ask you to criticize it or to think in a critical way?

Stu 10: No, never.

Stu 17: They never ask us to do this.

Stu 10: The only subject in our field is "Issues"; we can critique it but not the rest, only write reports on visits.

Teacher: What kind of report do you make on a visit?

Stu 10: Exact description of the school, classes, advantages, disadvantages and recommendations.

Teacher: Do you think that revealing advantages and disadvantages are a sort of critique?

Stu 17: It is sort of a critique, as I critique the place which I visit with its advantages and advantages.

Teacher: Do you not think that it is a critique?

Stu 17: I think so.

Teacher: Did your teachers tell you that it is a critique?

Stu 10: No.

Stu 17: They did, but not to this extent.

Stu 10: They just give us a list of standards that you should attend a class and write down how was the visit? Everything. The last things are advantages, disadvantages and recommendations, what are the things and courses you would like to find in the school.

Teacher: Do you write your own opinion?

Stu 10: Yes, I do. I write all of the above in my words, I just write the titles of the matters that I see in the school and when I'm back home I write down everything.

Teacher: Then critiquing is only in the field visits.

Stu 17: Yes, almost in the field visit.

Stu 10: The rest are just presentations; they give us a topic to prepare a presentation on it or to research it.

Teacher: When your colleagues present their presentations, do you critique them?

Collectively: No no no no.

Stu 17: We do not do this, the teachers ask them, we do not critique.

Teacher: So, you do not make any comments?

Stu 10: No, no.

Stu 17: I did a presentation last week and only the teacher was asking and critiquing, but the students were silent.

Teacher: There was no talking or criticism? If the presentation was not that good or special, can't you express your opinion?

Stu 10: No and never.

Stu 17: No.

Teacher: Why? Is it the fear?

Stu 10: No, we do not, because we aren't used to it. And we do not like to do this for fear that there might be sensitivity.

Stu 17: For example, it would annoy her if we say that her presentation is imperfect.

Teacher: Is that what makes you not comment on the blog?

Stu 10: Yes, it causes sensitivity, especially between us.

Teacher: Even if the comments are good?

Stu 10: No, when I tell her "wow" there would be no issue, as for critique she says that it is not your business.

Stu 24: They ask why did you make the teacher notice my mistakes.

Teacher: But how might this happen while the teacher gave them the standards that she would be evaluated upon them?

Stu 10: They say it directly: 'why did you speak?'

Teacher: Do you not think that the student will get an advantage from the negative points and help her to improve her mistakes later?

Stu 10: No, I do not think so.

Stu 17: No, it is ok for me, but other people take a stand or be sensitive.

Teacher: When you complete tasks and hand them to your teachers, do they provide you with feedback?

Stu 24: They do this rarely, you should go and ask about your task if it is good or not. Is there any mistakes? Correct them for me? And so on.

Teacher: They do not correct your tasks and comment that it is well done or so on?

Stu 17: No, they do not.

Stu 10: No, never.

Stu 17: The last time I saw it was in [grade] school.

Stu 10: She reviews your full criteria, says about so and so, wrote so and so, and gives you your marks at the end of the lecture.

Teacher: She shows you the criteria upon which she corrected you?

Stu 10: In only some specific context she shows us the criteria, you did so and so, you did not do a good job in so and so, so, I decreased your marks.

Teacher: Do you consider it feedback?

Stu 10: (hesitated) I do not know?

Stu 17 interrupting: Not all the teachers do this, most of them hang it on doors and who wants to see her marks go there.

Teacher: Does that mean you do not learn from your mistakes? Where it is? And how can you correct them next time?

Stu 10: When we see other presentations we know our mistake.

Teacher: From the others' experience?

Stu 10: Yes, some teachers do not bring test papers even, they just give us our marks, and if I ask for mine they think I doubt them, but sometimes there is some mistake in the correction.

Teacher: If you submit a research that you work on all the semester, does not she give you feedback, as: review this and correct that?

Stu 10: No, no.

(To Stu 24): And you, in art, does she criticize your paintings?

Stu 24: No, she does not, but evaluate us as A or A+ and so on; the evaluation is based on the best painting, if they are all excellent she gives only one of them A+ and we don't know why!

Teacher: Do you think that there is a defect in giving feedback?

Stu 10: For example, there is one teacher (...) gives us a face to face feedback, when we submit the homework or she send us her feedback by email before the due date so she tells us about our mistakes giving us a chance to correct them.

Teacher: Does that help you?

Stu 10 and Stu 17: Yes, a lot.

Teacher: I want to ask about the role of the social networking websites. How was it in the homework? Do you think it is unimportant to use them in the homework and we can replace them with the traditional searches from different resources?

Stu 17: Conversely, I feel that it is good, it is a change, you find things when you're making it and you have fun because you are always on these networks, I think it is better than the ordinary way which makes me search and so on, Websites are much better.

Stu 24: Websites are good, clear and brief, they even offer their experience directly, while in books, you sit all day to get just a piece of information, books sometimes are complicated not like websites.

Stu 10: It is good, I like it.

Teacher: How do you see these websites? Are things on it true, like personal experiences ?

Stu 10: Yes, no one narrates like this. I do not think they have other use for this thing especially in our section.

Teacher: Why?

Stu 10: I do not know, maybe because our subjects depend on field visits.

Stu 24 interrupts: If you mean that we depend on these websites, I don't think so, because some people write with no scientific evidence and we can't trust them. It is better to use known websites, from a teacher or specialist in the field.

Teacher: Do you think that social networks are a good mean of developing students' critical thinking?

Stu 10: Mmm, yes, good.

Teacher: Why?

Stu 10: Firstly, it is a change from what we are used to. At first, we were shocked by the marks because that task has eight marks on it; at first I did not know how that was. I was close to withdrawing from the course, but I changed my mind, because it was my last term and the field training; so, I decided to continue and try to do the second homework. I did the second task and I obtained a good mark, and after I saw this, to be honest it was so interesting, I wish all courses were the same.

Stu 17: I think these websites have different videos, that make me remember better, and criticize more; others are narrations and disorganized and it is difficult to get anything from them, so I find this better.

Stu 10: You put everything for us, all that we need we just open and see.

Stu 17: I can understand better and perceive more, maybe because I do not like reading; I prefer seeing and hearing more than reading.

Teacher: Research say that if the teacher uses attractive and preferable means to the students that encourages them to do complex tasks,

Stu 10 interrupted: True.

Teacher continues: Do you think if we mix the homework with these websites this will encourage you to perform boring tasks such as writing?

Stu 17: Yes, better.

Stu 10: A lot, especially when we attend a workshop it helps us speak freely, even in the "Issues course". We argue about what we find good or not and what should be, it gives us the confidence to express our opinion.

Teacher: What about you Stu 17?

Stu 17: Yes, great.

Stu 24: Yes, they can also use it anytime using their smart phone, they can browse and solve the activity. Websites are not that hard, unlike books that force us to go to the college and to the library, I find it difficult if we search in a book.

Teacher: Now, after 12 weeks of studying, what are the factors that affected your performance positively or negatively?

Stu 10: As I said, the advantage is that it gave me the freedom in writing, I'm not bound. You give us a subject to talk about and everything is ready, that's great. the disadvantages as I told you is citation, I have a problem with this. I like to give my opinion, my point of view without citation. I wish other courses like this, it is easier.

Stu 17: Advantage: it gave us the openness to talk about my opinion, but you asked us to present the opposing arguments and this was difficult. I prefer to write my own point of view and I do not know how to document so the disadvantage is that I do not find a lot about opinions from others and sometimes I can't find evidences about these arguments.

Stu 24: The advantages are more than the disadvantages, like using the internet is easier; but is difficult for searching for different arguments that talk about a specific issue.

Teacher: What are the challenges you faced completing the tasks?

Stu 10: To express my opinion without hesitation or fear, just say it, no one can prevent me from talking, saying that it is wrong, or how dare you say this, the matter was open for discussion.

Stu 24: Yes, accomplishment is possible. I accomplished all tasks in a good way, I try to do it but sometimes I fail

Stu 17: Somehow like her, to fully accomplish it and have full marks on it.

Teacher: How do you see your marks, Stu 17?

Stu 17: Thank God, it is suitable to my effort.

Teacher: Are you satisfied with your marks?

Stu 10: Yes.

Stu 17: Yes, I deserve them.

Stu 10: It is just, the marks put by the teacher are convincing, I was fully satisfied.

Teacher: Are you convinced with the evaluation marks?

Stu 10: A lot. I like your accuracy, you notice if there is a citation or not, how you spoke about the presentation, how you did.

Teacher: Ok Stu 10, I'd like to ask you about if you have certain standards that you should follow, what causes mistakes every time?

Stu 10: The second task which I did, I had a ready presentation, then I felt that it is not good so I wrote the third task's presentation myself.

The teacher interrupted: Ok excellent, so you avoided that mistake. Did you have any repeated mistake in more than one task?

Stu 10: I still have problem with the citation, the rest no.

Teacher: You, Stu 17 if I correct your paper and write down a note that you did not write a conclusion, why you make this again in another task?

Stu 17: I forget that you told me before.

Teacher: So you do not refer back to your first task and evaluation.

Stu 17: I usually check them when I finish not at the beginning.

Teacher: Do you not think it is helpful to look at the first task and my evaluation and do the second with them in mind?

Stu 17: I accept what you give but I do not review it.

Teacher: Why do you think you do not return to the first task?

Stu 17: I do not know, I did not think about that, I just know that, but I forget when I start doing the second.

Stu 24: I like what you told us about critical thinking, the way you think critically if I follow the items which are the presented standards, how I made them and reviewed mine to make sure if I did them or not. Some of the professors give us research, they ask us to make introductions and so, but they do not show us how to write the introduction for example, and if they do so they say that it is not perfect, it should be in the conclusion. At first I used to write the introduction like the conclusion but with a slight difference, but then they told me that the conclusion is an opinion, so I learned step by step, but when I saw yours I was amazed, why they do not give us so from the beginning which would make it easier for me.

Teacher: I'd like to ask you to give your opinion on the girls do not listen to the instructions of teachers, such as when I ask them to send feedback or comment on the blog?

Stu 10: It could be the pressure of subjects or the pressure in the house, not always from college, sociological conditions.

Stu 24: The same happened with me, pressure and oblivion. I try to finish the homework in the home then I find myself doing other tasks. I said to myself I will do it tomorrow in the university's computer lab and then I find myself busy with doing other stuffs. This semester I have 10 courses.

Stu 17: I feel that we did not get used to this kind of homework and some girls did not care; they say it is ok to not do it, and some say that it is pressure from courses and home.

Teacher: How do you expect we can fix this? Put marks on them?

Stu 10: Some girls do not know how to respond for fear that they might say something wrong or it does not suit the subject, like such. I expect.

Teacher: Why do not you send the teacher feedback giving them your opinions and the difficulties you faced?

Stu 10: No, we just want to finish the task.

Stu 17: It is more important to have our marks; the girls may be thinking in this way.

Stu 24: For me, I have sent you my feedback, because I was concerned to develop my skills in this homework.

Teacher: You think that girls are concern only about marks?

Stu 24 and Stu 10: Yes, yes.

Teacher: So if I give bonus on feedback they would do it?

Stu 17: Yes, they might do it.

Teacher: So it means that the target is marks not the benefit?

Stu 17: Yes.

Stu 24: Maybe they are not used to this or they do not check their e-mail.

Teacher: What about the idea that I send you reminders?

Stu 10: That's a great idea! (laughing) I felt you so concerned about us. It did not only revolve around you teaching us the subject and we leave and that's it.

Stu 17: Exactly! I like the idea very much. For instance, in our first assignment after the holiday, I did not expect it and did not know about it. I do not know maybe it was a wrong number but I found out other students have done their assignments while I have not because I forgot about it. So it was really great that you sent us reminders which made us follow up with you.

Stu 10: I saved all your messages, as I really loved how you caught up with us. I have saved your messages since the beginning of the semester.

Teacher: If you had a chance to do this homework again, would you?

All together: Yeah, we will (laughing).

Stu 10: I would do it even if it would stress me. Despite the stress, I would do it again (Instantly).

Stu 24: Yes, I would do it again.

Stu 17: I would do it again, of course.

Stu 10: I loved this experience and I am sure I will do better next time.

Stu 17: Of course, we would be more experienced then and we can do well this time.

Stu 10: Yeah, experience.

Teacher: Lastly, I would like to ask you to give me a piece of advice or tell me something I did wrong which I was not supposed to do either in presentations, assignments or the way I gave you them.

Stu 17: I do not think I well understood the assignments at first; that was why I did not do them. It is the first time to do it this way.

Stu 10 disagreed: You did explain everything well, you showed us everything and you even showed us how to log into.

Stu 24: Maybe our main concern was the marks these assignments took. That was very much, but everything was almost perfect.

Teacher: Isn't there any further advice?

Stu 10: Not at all! Do not change anything; it is all going very well. Only one thing, refresh your discussion subjects every semester, create new questions out of the curriculum, which would be creative; like the Instagram subject for instance.

Stu 17: Yeah, the Instagram subject was really interesting.

Teacher: Anything to add in the end?

Appendix 3.7: List of the research themes and codes

Theme	Theme definition	Sub- Theme		Codes	Resources
	Challenges that faced students during the semester: Students' weaknesses in some skills of CT and writing.	Related to writing skills	1	Wrote using formal Arabic language	(Stu21, FG1); (Stu21, SR)
			2	Some writing skills	(Stu22, FG3)
			3	Start the essay, the beginning is very difficult	(Stu6, FG4)
			4	Expressing the personal opinion through writing	(Stu22, FG3)
			5	Writing in argumentative way instead of descriptive way	(Stu9, SR)
			6	Students don't love reading	(Stu17, FG2)
			7	Construct something from the beginning	Ob1; Ob8
			8	We used copy and paste	(Stu22, Stu23, FG3); (Stu12, SR); OB7; OB11
kness			9	Citations skills	(Stu10, Stu17, FG2); OB4; OB6
nts weak			10	Can't convince people in writing	(Stu8, Stu16, FG1); (Stu22, FG2); OB1
s: stude			11	Students are trying to avoid any writing exercises	OB1; OB8
ıallenge			12	Students have common weakness in writing	OB1; OB7; Ob8
8- CI			13	Use bullets points structure	OB1; Ob7
		Related to CT skills	14	Difficult to find two opposite opinions, (the searching itself)	(Stu17, Stu24, FG2); (Stu9, SR)
			15	Expressing a personal opinion without fearing or hesitation	(Stu10, FG2)

			16	Connect the opinions and the ideas together or connect them with the personal opinion	(Stu22, FG3); (Stu6, FG4); Ob7
			17	The WebQuest was a new idea	(Stu8, SR), OB1
			18	Finding a reliable information in SN	(Stu8, FG1); (Stu24, FG2); (Stu8, SR)
			19	I can't convince people about my opinion	(Stu8, Stu9, Stu16, Stu21, FG1); OB1; OB6
			20	I can't express my opinion without bias	(Stu16, FG1); (Stu22, FG3)
			21	Using SN sources without thinking about the reliability of the content	Ob1
			22	Misunderstanding for the feedback concept and procedures	(Stu21, FG1)
			23	Commenting on others' opinions	OB4
			24	Providing examples from the reality	OB4
			26	The pressure of the semester's courses and their requirements	(Stu19, Stu12, FG4); (Stu11, SR)
		inces	27	The activities need a long time to be solved	Stu8, Stu4, Stu16, SR)
		Related to performa	28	Succeed in doing the activities in the perfect way and on time	(Stu24, Stu16, FG2); (Stu23, FG3)
	5- 0			Dislike commenting on each	(Stu8, Stu9,
-Comments on the blog	Explains the students willingness to use the social networking websites such as	Students' opinions	1	other on the blog	Stu21, Stu24, FG1); (Stu23, FG3); (Stu6, Stu19, FG4); OB4, OB6
			2	Determine marks on the comments will encourage us to comment	(Stu16, FG1); (Stu16, SR)

		3	Reading other students' essays is not useful	(Stu21, FG1); (Stu10, Stu17, FG2); (Stu23, FG3); (Stu12, FG4)	
		4	Students loved to publish their essays on the blog	(Stu22, Stu23, FG3)	
		5	Students see that hiding their names doesn't mater	(Stu22, Stu23, FG3)	
		6	Students like to receive comments and feedback from others	(Stu23, FG3); (Stu21, FG1); OB4	
		7	Students should feel safe to provide comments	(Stu21, FG1)	
		8	Commenting on the good essays only	(Stu16, FG1)	
	actices	9	I usually read the essays after I have finished mine	(Stu21, FG1)	
	s' real pi	10	Students are commenting on their friends only	(Stu21, FG1); (Stu23, FG3)	
	Students	11	I liked commenting, but when the other stopped I stopped	(Stu16, FG1); (Stu12, FG4)	
	01	12	I feel shy from others when they read my essay	(Stu6, Stu19, FG4)	
	g	13	The essays were too long, so I did not read them	(Stu21, FG1)	
	ent on the blo	14	Reading other students' essays makes me feel jealous	(Stu21, FG1) other students in the group disagree with her	
	comme	15	Opening the teacher's eyes to student's mistakes	(Stu16, FG1); (Stu24, FG2); OB7	
	stant to	16	Worried about students seeking revenge next time	(Stu8, FG1)	
	of the resi:	17	Avoiding commenting due to sensitivities, and it annoys others	(Stu10, Stu17, FG2)	
	easons (18	Students are unused to commenting on each other.	(Stu10, Stu17, FG2); (Stu23, FG3)	
	R¢	19	Fear of providing unsuitable or wrong feedback	(Stu17, FG2); (Stu6, FG4); OB4	
			20 21 22 23 24	The pressure of the semester's courses, their requirements and family circumstances, without enough time Forgetting Students don't like to receive negative criticism from others Did not submit all of her homework (weakness in the performances) Technical problems	(Stu17,Stu10, Stu24, FG2); (Stu22, FG3); OB5 (Stu24, FG2) (Stu23, FG3) (Stu23, FG3) (Stu9, FG4) OB5
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ir CT skills improvement	ement in the CT skills after on.	ts' CT skills	2	Students showed improvement in defining the CT Expressing the personal opinions orally and by writing	(Stu16, Stu8, FG1); (Stu10, Stu17, Stu24, FG2); (Stu22, Stu23, FG3); (Stu6, Stu12, Stu19, FG4); OB1 (Stu8, Stu9, Stu16, Stu21, FG1); (Stu10, FG2); (Stu22,
3-Students awareness of thei	3-Students awareness of their tudents' awareness about their improven the intervention. Improvement of students'	Improvement of studen	3	Evaluate others people's opinions	FG3); (Stu9, SR) (Stu12, SR)
4-Negative attitudes	Students negative attitudes toward the intervention and the course at the beginning of	Students showed negative attitudes toward the course and the activities	1	The activity topics were boring, because they were related to the course's subjects Students had a bad attitude toward the activities at the beginning of the course.	(Stu8, Stu9, Stu16, Stu21, FG1); (Stu23, FG3); OB10 (Stu21, Stu9, Stu16, FG1); (Stu10, Stu17, FG2); (Stu22, Stu23, FG3); (Stu6, Stu12, Stu19, FG4); (Stu2, SR)

			3	Feeling weak and couldn't succeed in doing the activities and achieve the target	(Stu21, FG1), (Stu10, FG2), (Stu23, FG3); OB4
			4	The activities need a lot of work	(Stu9, FG1)
			5	Worrying about the marks, because the activities have a lot of the course's marks	(Stu8, Stu9, FG1); (Stu10, FG2); (Stu23, FG3); OB7
			6	Worrying and don't know how to do it, because it was a new idea	(Stu8, Stu9, FG1); (Stu10, Stu17, FG2); (Stu22, Stu23, FG3), (Stu2, SR)
			7	The homework is difficult, needed to collect data from different sources, which required a lot of time	OB3, OB4, OB5, OB6, OB7, OB9
			8	Students were shocked, their marks were unexpected	(Stu17, Stu4, Stu1, Stu9, SR); OB5, OB11
			9	Disliking the activities in general	OB11, OB7
			10	Students thought about withdrawing from the course.	OB7
5-Negative factors	l students' s.	to the activities structure	1	The activity topics are complicated and not exciting	(Stu9, Stu16, Stu 21, FG1); (Stu6, Stu19, FG4); (Stu21, SR); OB8
	s that affecte urse activiti		2	The activities have new ideas, and students were unsure about what to do	(Stu8, Stu9, Stu21, FG1);(Stu10, Stu24, Stu17, FG2); OB1
	obstacles in the co		3	The activities have a lot of the course's marks	(Stu8, FG1); (Stu24, FG2); (Stu23, FG3); OB7
	tors and cipatior	s related	4	The activities required a lot of time to check all the sources	(Stu8, Stu16, FG1); (Stu11, SR); OB5; OB7
	ive fact parti	Factors	5	The activities need computer and internet to do them	(Stu22, Stu23, FG3)
	Negal		6	The activities were too much	(Stu12, FG4); (Stu2, Stu12, SR)

		7	The activities included a lot of requirement: writing, publishing, commenting and submitting the homework via different media	(Stu22, Stu23, FG3); (Stu6, FG4); OB6; OB7
		8	The activities (based on writing) are not related to the course subject	OB7, OB11
		9	The pressure of the semester's courses, their requirements, or the family circumstances, without enough time	(Stu9, Stu21, FG1); (Stu10, Stu24, FG2); (Stu22, FG3); (Stu12, Stu19, FG4); (Stu11, SR); OB5
		10	Students weakness in some skills such as writing and citation	(Stu21, FG1); (Stu10, Stu17, FG2); (Stu22, FG3); OB4
	actors	11	forgetting	(Stu17, Stu24, FG2); (Stu12, Stu6, FG4); OB5
	Personal	12	No self-motivation, the marks are the students' first motivation	(Stu8, Stu16, FG1); (Stu22, Stu23, FG3); (Stu19, Stu6, FG4)
		13	Delay to start solving the homework	(Stu21, FG1); (Stu22, Stu23, FG3)
		14	Students didn't have enough knowledge about using the technology, especially for publishing the essays on the blog	(Stu6, FG4); OB5; OB6; OB7
		15	Lectures' attendances (Students' absences)	OB4; OB8
L' tamp factore	S	16	Technical problems	(Stu21, FG1); (Stu6, Stu19, FG4); OB4; OB5; OB6
	External factor	17	Lecture time and day	(Stu10, FG2); (Stu22, Stu23, FG3); (Stu6, FG4); OB4; OB8; OB6; OB11; OB9
	[18	Teacher's personality	(Stu8, Stu9, Stu16, FG1); (Stu19, FG4)

	t help to shape		1	Happy because I became faster in doing the activities	(Stu9, Stu16, FG1); (Stu10, Stu17, Stu24, FG2); (Stu12, FG4); (Stu2, Stu8, Stu14, SR)
	reasons tha	~	2	Happy to learn new things that I did not know it before (watching myself improving)	(Stu9, Stu21, Stu16, FG1); (Stu22, FG3); (Stu8, Stu21, Stu16, SR)
	ster, and the	s themselve	3	When I read my writing I feel proud of myself	(Stu21, Stu16, FG1); (Stu22, FG3); (Stu19, Stu12, FG4); (Stu16, SR)
luring the semes	le toward student	4	Satisfied of our marks	(Stu8, Stu9, Stu16, FG1); (Stu10, Stu17, FG2); (Stu12, Stu3, Stu17, Stu14, Stu16, SR); OB5; OB6	
ndes	nselves ss.	Attitud	5	I love to talk about my opinions	(Stu10, FG2); (Stu8, FG1)
itive attit	rr and then se attitude		6	I was planning to withdrew from the course, but I changed my mind	(Stu10, FG2); OB5
6-Pos	on, teache the		7	I am happy with my writing skills improvement	(Stu18, Stu16, Stu9, Stu8, Stu12, Stu21, SR)
	terventi		8	It was challenging, it motivated me to do better	(Stu12, FG4); (Stu12, SR)
	urd the int		9	There are no negative sides in the activities specially after the fourth one	(Stu8, FG1)
change in students' attitudes tow	attitudes tow	he activities	10	I love the idea, it is better than the traditional homework	(Stu10, Stu24, Stu17, FG2); (Stu23, FG3); (Stu2, Stu11, SR); OB4
	shange in students' a	Attitude toward th	11	It is interesting, I would like to take the same activities again in another course	(Stu9, FG1); (Stu10, Stu17, Stu24, FG2); (Stu22, Stu23, FG3); (Stu12, Stu21, Stu2, Stu21, Stu2, SR); OB5; OB6
	The c		12	In general, it was a beautiful experience	(Stu22, FG3); (Stu17, FG2); (Stu2, SR)

		13	Now I understood the activities and the images became clear	(Stu22, FG3); OB10	
		14	The activities were difficult in the beginning, but after that, I adopted them gradually (they became easier)	(Stu8, Stu9, Stu16, FG1); (Stu10, Stu17, FG2); (Stu22, Stu23, FG3); (Stu12, Stu6, FG4); (Stu12, Stu2, Stu 3, Stu8, Stu9, SR); OB5; OB10	
		15	It was very useful	(Stu10, Stu17, FG2); (Stu4, Stu12, SR)	
		16	Stress, scientific value then comes excitement	(Stu16, FG1)	
		17	Stress then scientific value and excitement are the same	(Stu9, FG1)	
		18	Scientific value, excitement then stress	(Stu8, FG1); (Stu17, FG2); (Stu22, FG3)	
		19	Scientific value, stress then excitement	(Stu21, FG1), (Stu19, FG4)	
		20	Excitement, scientific value then stress	(Stu10, Stu24, FG2); (Stu23, FG3)	
			21	scientific value then excitement and stress are the same	(Stu6, Stu12, FG4)
	the course	22	I am happy to take the course with you and hope to take another courses as well	(Stu8, Stu9, FG1); (Stu10, FG2); (Stu24, FG3); (Stu9, SR)	
	Attitudes toward the teacher and	23	You are the best, all the professor's assessment criteria fits on you	(Stu10, Stu17, FG2)	
		24	You are perfect and your performances was great (you made the lectures interesting)	(Stu10, Stu24, FG2)	
		25	I benefited from the course	(Stu22, FG3)	
		26	I loved to come to the lecture and I'm very active	(Stu23, FG3)	
7- Posi The posit ive fact	Fact ors that	1	Providing examples for students' mistakes	(Stu9, FG1); (Stu12, SR); OB4	

		2	The teacher's comments and feedback on the blog and on students' papers Reminding students to do the activities and follow them	(Stu16, Stu8, Stu9, FG1); (Stu22, Stu23, FG3); (Stu6, Stu12, Stu19, FG4); (Stu9, Stu8, Stu17, SR) (Stu16, Stu8, Stu9, Stu21, FG1); (Stu10, Stu17); (Stu6,
		4	Providing a full introduction about how to do the activities and publish them on the blog	Stu12, FG4); OB6 (Stu10, FG2); (Stu23, FG3); OB4; OB6
		6	Encouraging students by providing them with positive feedback in the classroom	(Stu21, FG1); (Stu22, Stu23, FG3); (Stu8, SR); OB4; OB6; OB8
		7	Helping students all the time	(Stu22, Stu23, FG3); OB11
		8	The teacher gave us the freedom to express our opinions all the time	(Stu22, Stu23, FG3); (Stu8, SR)
		9	The teacher personality was (happy and smiley), your speech was (courteous), your behaviors were an upscale	(Stu22, Stu23, FG3); (Stu12, FG4); (Stu12, Stu13, Stu17, Stu11, Stu5, SR); OB4; OB6; OB11
		10	Teacher was concerned about students performances, and the class atmosphere was very comfortable	(Stu22, Stu23, FG3); (Stu12, FG4); OB4; OB6
		11	Teacher did not force us to do the activities	(Stu22, FG3)
		12	The teacher was very commitment to the lectures' times and requirements	Stu8, SR); OB6
	Factor s integra	13	I love the way that you used to evaluate us (based on fairly and specific criteria)	(Stu10, FG2); (Stu12, FG4); (Stu8, Stu24, SR); OB7

			14	Duplicate the marks	FG1 (Mona.Q, May.M); FG2 (Ahoud); FG3(Folwa, Bashayer
			15	The separation time between every two homework	(Stu16, FG1); (Stu10, Stu17, FG2); (Stu22, Stu23, FG3)
			16	The rubric was important to assess ourselves	(Stu8, Stu9, FG1)
			17	Read others essays on the blog very useful	(Stu8, SR)
			18	The idea of the activities, which is free writing and thinking	(Stu10, Stu17, FG2); (Stu22, FG3); (Stu6, Stu19, FG4)
			19	Using the WebQuest was excited	(Stu6, FG4)
			20	Writing essay within one paper	OB1; OB3
			21	It was an individual homework	OB4
	h their and the iivities.		1	Sometimes students think that some teachers assess students without reading their paper	(Stu8, FG1); (Stu22, FG3)
3-Feedback system ces in exchanging feedback with ats' opinions regarding the type <i>a</i> k that has been used in these acti	g feedback witl arding the type sed in these act	nt	2	Getting detailed and continuous assessment on our projects is individual cases, which depending on the teacher (nationality and education)	(Stu8, Stu16, Stu21, FG1); (Stu10, FG2); (Stu22, Stu23, FG3); (Stu6, FG4)
	ces in exchangin nts' opinions reg k that has been u	Teacher assessm	eacher assessme	We can't see our mistakes, because the teachers hang the marks only	(Stu8, Stu9, Stu21, FG1); (Stu24, Stu10, Stu17, FG2); (Stu23, FG3); (Stu6, Stu12, Stu19, FG4)
	xperien id stude ĉeedbac		4	students should follow their homework and ask about it	(Stu24, FG2); (Stu6, Stu12, Stu19, FG2)
	Students' e teachers. An way of the 1		5	Assessing based on criteria without explanation (evaluation criteria is unclear and not specific)	(Stu8, Stu9, FG1); (Stu10, Stu24, FG2); (Stu22, Stu23, FG3); (Stu19, FG4)

			6 7	We rarely receive our papers with written feedback Students prefer the continuous assessment and they find it useful for them	(Stu8, Stu9, FG1); (Stu24, Stu10, Stu17, FG2); (Stu23, FG3); (Stu6, Stu12, Stu19, FG4) (Stu10, Stu17, FG2); OB1
			8	Teachers are avoiding to open discussions and get questions in the classroom due to the class time	(Stu8, Stu16, FG1)
			9	Some teachers are not responding to our emails	(Stu8, Stu16, FG1)
			10	Students love to receive a feedback from the teacher	(Stu23, FG3); (Stu8m Stu12, SR)
			11	Students used to learn from others experiences and models, not from the teacher's feedback	(Stu10, FG2)
		feedback	12	Students' have not been asked to criticize others projects or performance, only teacher how is doing that	(Stu10, Stu17, FG2); (Stu19, FG4)
		changing	13	Some students had bad previous experiences for providing comments or feedback	(Stu9, FG1); (Stu17, FG2)
		Excl	14	Students usually provide others with positive feedback only	(Stu22, Stu23, FG3)
idents' res and dents'	stions it their mances	hnical stions	1	Can we make modifications on the homework before the final submission?	OB1, OB4, OB5
9-Stu enqui Stu	que abou perfoi	Tec	2	How should I submit the homework?	OB1

			3	Shall we write our names on the comment so you can recognize us?	OB2
			4	How many pages we have to write?	OB3
			5	Can you extend the due date?	OB6
			6	Having technical problems such as problem with using blog to publish	(Stu4, Stu1, Stu15, Stu8, Stu10, Stu11, Stu12, Stu16, Stu23, SR)
		ities	7	Asking more explanation about the Web Qwest	OB1; OB11
		ted to the activ	8	Writing's procedures (citation, personal opinion, present different opinions and commenting on other's opinions)	(Stu12, SR); OB1; OB6; OB7
		tions relat	9	Can I use other sources instead than SN, because I couldn't find enough information?	OB6
		Ques	10	How to comment on others essays	(Stu8, SR); OB6
			11	I did not attend the last classes	OB4
			12	I did not finish yet	OB4
		al excuses	13	I did not know that I should submit it via different ways (or the due date)	OB4
	Persona	14	The pressure of the semester's courses, their requirements, or the family circumstances	(Stu13, Stu6, Stu23, SR); Ob5; Ob11; Ob7	
		15	Forgetting	OB5	
	ed to es	16	I did not know how to do it	(Stu12, SR); OB4; Ob4	
		es relat activiti	17	I did not know how to use the blog	OB4; OB5
		Excus the	18	Technical problems	(Stu9, SR); OB5

			19	The internet is not available all the time	OB11
10-Students awareness of their writing skills improvement Students' awareness about their improvement in the writing skills after the intervention.	the writing skills	lent	1	Students can distinguish between the descriptive writing and argumentative writing	(Stu8, stu9, Stu16, Stu21, FG1); (Stu10, Stu17, Stu24, FG2); (Stu22, Stu23, FG3); (Stu6, Stu12, Stu19, FG4); OP1
	their improvement in the intervention.	ing skills improven	2	Students can write in the formal Arabic language	(Stu8, Stu16, Stu21, FG1); (Stu10, FG2); (Stu1, Stu12, Stu17, Stu16, Stu8, Stu21, Stu8, Stu5, SR); OB10
	Students' wri	3	The time that the students need to construct essay is decreased	(Stu9, Stu16, FG1); (Stu10, Stu17, Stu24, FG2); (Stu12, FG4); (Stu2, Stu11, Stu14, SR)	
	Students' 8		4	Students have started to be more organized when they draft an essay	(Stu17, Stu24, FG2); (Stu23, FG3); (Stu6, FG4); (Stu16, SR)
	of the		1	I have tried to develop myself, but I couldn't	(Stu21, FG1); (Stu10, FG2); (Stu22, FG3)
tivities	eginning eter on.		2	I don't know what I have to do, how I should start the essay	(Stu9, Stu21,FG1); (Stu6, FG4); OB4
the ac	in the b ment la	sions	3	I don't know if I am writing on the right way	(Stu8, Stu9, Stu16, FG1)
-Students struggling in	he activities leir improvel	ents' express	4	I was so confused! I don't know how to search and how to write	(Stu9, Stu16, FG1); (Stu6, Stu12, Stu19, FG4); (Stu9, SR); OB4
	tumbled in th ourse, and th	Stude	5	I have been working on the activity for days	(Stu9, Stu16, FG1); (Stu24, FG2); (Stu12, Stu6, FG4); (Stu9, SR)
11	Students si co		6	I have been working on different devices, laptop, computer and i-Pad (I was not organized)	(Stu16, FG1); (Stu19, Stu6, FG4)

ork versity comparing to the course activities.	iversity comparing to the course activities.	Types of homework	1 2 3 4 5	Doing presentation or descriptive research Creating magazine Write report about field visit or seminar We depend on the copy and paste We don't find the presentations or the reports are useful	(Stu8, Stu9, Stu16, Stu21, FG1); (Stu10, FG2); (Stu12, FG4) (Stu16, FG1) (Stu16, FG1) (Stu16, Stu9, FG1); (Stu10, Stu17, FG2) (Stu10, FG2); (Stu22, Stu23, FG3); OB1; OB7 (Stu10, FG2); (Stu23, FG3); (Stu23, FG3); (Stu22, FG4); OB4
homew	n the un		6	Presentation were easier than these activities	OB4 OB7
P-Traditional h s they doing in	work	7	Teachers have not been attempted to promote CT skills by writing or orally	(Stu8, Stu9, Stu16, FG1); (Stu10, Stu17, FG2); (Stu12, Stu6, FG4)	
	ing the activiti	Promoting CT through the home	8	Promoting CT is an individual cases based on the teacher and the course	(Stu9, Stu21, FG1); (Stu24, Stu10, FG2); (Stu22, Stu23, FG3); (Stu6, Stu19, FG4)
Students' opinions regardii	Students' opinions regarc		9	We did not practice to write people opinions and how to comment on them	(Stu9, FG1)
e activities activities ag the social es in these cting the ing them to	bout using	1	Instagram was very excited topic, we loved it	(Stu9, Stu16, FG1); (Stu10, Stu17, FG2); (Stu23, FG3); (Stu8, SR); OB8; OB10	
13-Using SN in th	The role of integrati networking websii activities in attra students and promo	Students' opinions SN	2	Providing SN sources made looking for information easier and more exciting	(Stu8, Stu9, Stu21, FG1); (Stu17, Stu10, Stu24, FG2); (Stu22, Stu23, FG3); (Stu6, Stu12, FG4); OB1; OB5; OB6; OB11

			3	Providing SN sources can save the homework time	(Stu12, FG4); (Stu8, SR); OB4
			4	SN good sources to promote CT	(Stu21, FG1); (Stu10, FG2); (Stu23, FG3
			5	Using SN helped me to read a lot	(Stu16, FG1)
			6	SN replaced a lot of computer's tools and internet web sites when doing the homework	(Stu17, FG2)
			7	Better than the traditional way of homework	(Stu10, Stu17, Stu21, FG2); (Stu23, FG3)
			8	I can remember the information provided on SN more	(Stu17, FG2)
			9	SN more closed and excited for the people, it is our life now	(Stu8, Stu9, Stu16, Stu21,FG1); (Stu17, FG2)
		Reasons	10	Providing SN sources' links help students to know exactly what the teacher want them to search about	(Stu8, FG1); (Stu3, FG3); (Stu6, FG4)
			11	Students can make the search from everywhere using smart phone or computer, they don't need to go to the library	(Stu8, Stu21, FG1); (Stu10, Stu24, FG2); (Stu22, FG3)
			12	SN gives a direct and specific information comparing with the books	(Stu24, FG2); (Stu22, FG3)
		r	13	Using different type of homework in different courses not all depend on SN	(Stu16, Stu21, FG1); (Stu22, Stu23, FG3); (Stu19, FG4); OB5; OB6
		Howev	14	Using SN not enough should choose the topic as well	(Stu23, FG3)
		15	Students disagree about to what extent they can trust on the SN information	(Stu10, Stu24, FG2); (Stu23, FG3); (Stu8, SR); OB1	
ng the rubric	ng the rubric ibes the extent ents' using the hinking rubric e activities and	pinions	1	Using the rubric to evaluate ourselves was very useful	(Stu8, Stu9, Stu16, FG1); (Stu24, FG2); (Stu22, Stu23, FG3); (Stu12, Stu19, FG4); OB6
14-Usi	It descr of stud critical to do th)	2	Teacher's comments on the blog and paper more useful than CT rubric	(Stu16, FG1); (Stu19, FG4)

		3	I feel depressed when I always fail in the same criterion	(Stu22, FG3)	
			4	Using the rubric makes students agree with the teacher's evaluation	(Stu22, Stu23, FG3)
			5	I haven't used the rubric to assess myself	(Stu21, FG1); (Stu17, FG2); (Stu23, FG3); (Stu6, Stu19, FG4); (Stu9, SR); OB4
			6	CT rubric criteria confuses me	(Stu22, Stu23, FG3)
	Reasons	7	Technical problem	(Stu6, Stu12, FG4); (Stu21, FG1)	
			8	The rubric difficult to follow	OB4

Appendix 4.1: Lecturer interviews

The Researcher:

Nada Jehad Alsaleh, a PhD candidate at Leicester University, and a lecturer at Instructional Technology Department at King Saud University.

Research Topic:

Social networking websites in Saudi higher education: Designing learning activities to promote critical thinking.

The target group:

The female lecturers at the Instructional Technology Department (ITD).

The aim:

My aim from this interview is to gather information that will help me implement and build the current research activities.

Introduction to the interview:

First of all, I appreciate your acceptance to participate in my research and to be one of my interviewees.

This interview will take approximately one-hour maximum. During this interview I will ask you some questions that will help me build and implement my research tools as part of my research proposal which is entitled: 'Social networking websites in Saudi higher education: Designing learning activities to promote critical thinking'.

Please be aware that your participation is fully voluntary and you have the right to quit at any time. I would like to ask your permission to record this interview.

To start, let's agree on the word "activities" as a synonym for all the homework, projects and work assessments which are given to students during the course.

The Questions:

- 1. What courses have you taught?
- 2. What kinds of activities are included in your course?
 - a. Weekly homework
 - b. Non-scheduled homework
 - c. One course project
 - d. More than one course project
 - e. Mix of the above, explain
- 3. What kinds of activities do you give to your students?
 - a. Writing essays

- b. Designing and building projects
- c. Questions that require short answers
- d. Mix of the above
- 4. How do you assess these activities?
 - a. Part of the final grade
 - b. Extra marks
 - c. Both of the above
- 5. From your point of view, what are these activities useful for?
 - a. To review the lesson at home
 - b. To make sure that students understand the lesson
 - c. To make sure that students memorize the lesson
 - d. Practice and implement the new information
 - e. Collect marks
 - f. Give students extra information about the topic
 - g. Help students to think further than the context
 - h. Promote students' higher thinking skills
 - i. More than one reasons of the above, which?
- 6. Do you think your activities can help to build students' higher thinking skills?
 - a. Yes
 - b. No
 - c. Some times
- IF YES or SOME TIMES:
 - 6.1 What kind of higher thinking skills will you try to promote?
 - 6.2 How can your activities help to promote students' higher thinking skills?
 - 6.3 Do you have any evidence for that?
- IF NO:
 - 6.1 Why do you think that?
 - 6.2 What is the solution for this?
- 7. Do you think you should give students weekly homework?
 - a. Yes
 - b. No
- IF YES:
 - 7.1 What kind of activities can you give them?
 - 7.2 What is the best way to assess them?
- IF NO:
 - 7.1 Why do you think you can't give students weekly homework?
 - 7.2 From your point of view, what is the solution for this?
- 8. Have you tried to promote students' CT through activities?
 - a. Yes
 - b. No

IF YES:

8.1 What kind of activities were they, and how did you use them?

8.2 How can these activities help to promote students' CT?

8.3 Which kinds of CT skills do these activities promote? IF NO:

8.1 Why not?

9. What are the main CT skills that you think are important to promote?

- 10. What are the main problems you faced with the students' activities?
- 11. Do you use SN websites in your course?
 - a. Yes

b. No

IF YES:

11.1 What kind of SN websites do you use?

a. Blog

b. Wiki

c. YouTube

d. Face book

e. Twitter

f. Other, which?

11.2 For what educational purpose do you use it?

11.3 How frequently?

IF NO:

11.1Why don't you use it?

12. Do you think we can use SN websites to promote students' CT?

a. Yes

b. No

c. I am not sure

IF YES:

12.1 How can we do this?

IF NO:

12.1 Why can't we use them?

13. What are the main problems and difficulties that you think might face students when they engage in SN websites' activities?

14. I will show you an example of an activity that uses a set of SN websites which aims to encourage students to use critical thinking skills and I will ask you for your opinion of it.

http://questgarden.com/157/25/8/130412112023/

Thank you very much for your time and your participation in the interview.

	First activity	Second activity	Third activity	Performance
Stu 1	5	5.5	5.5	Increase
Stu 2	4	6	4	Stable
Stu 3	3	5	3	Stable
Stu 4	4	3	5	Increase
Stu 5	4.5	3.5	6	Increase
Stu 6	5	6	5.5	Increase
Stu 7	6	7	7	Increase
Stu 8	3	2.5	4	Increase
Stu 9	4.5	6	1.5	Decrease
Stu 10	6	6.5	7	Increase
Stu 11	5	6	6.5	Increase
Stu 12	-	-	-	Dropped out
Average	4.5	5.2	5	

Appendix 4.2: The first phase (pilot study) data

Students' performances on the activities out of 7



Example of the analysis applied to student writing

CT skills reflected in argumentative writing	N	Yes	No	Some times	I do not know the importance of this skill in writing
I do not deviate from the main	12	5	0	7	0
purpose of my writing	12	41.7%	0%	58.3%	0%
I write in a style that fits in with	12	8	1	3	0
the target audience (reader)	12	66.7%	8.3%	25%	0%
I use keywords that make ideas		9	0	3	0
clear for the reader	12	75%	0%	25%	0%
I organise the written text in the		7	2	3	0
argumentative style	12	58.3%	16.7%	25%	0%
I support the argument with	12	8	2	2	0
evidence		66.7%	16.7%	16.7%	0%
I take notes from the resources		7	1	4	0
and references before I start writing	12	58.3%	8.3%	33.3%	0%
I write many drafts and revise	12	9	1	2	0
them before the final draft	12	75%	8.3%	16.7%	0%
I add my own voice to the ideas	12	8	1	3	0
	12	66.7%	8.3%	25%	0%

Students' awareness of CT skills

I obtained this skill	N	Before this course	Through this course	I knew it before, but practiced it well	I do not know what this is
I do not deviate from the main	12	0	5	7	0
purpose of my writing	12	0%	41.7%	58.3%	0%
I write in a style that fits in with	12	2	5	4	1
the target audience (reader)	12	16.7%	41.7%	33.3%	8.3%
I use keywords that make ideas	10	1	7	4	0
clear for the reader	12	8.3%	58.3%	33.3%	0%
I organise the written text in the	10	0	6	5	1
argumentative style	12	0%	50%	41.7%	8.3%
I support the argument with	118	1	6	4	0
evidence	11	8.3%	50%	33.3%	0%
I take notes from the resources		1	6	5	0
and references before I start writing	12	8.3%	50%	41.7%	0%
I write many drafts and revise	12	6	1	5	0
them before the final draft	12	50%	8.3%	41.7%	0%
I add my own voice to the ideas	12	0	8	4	0
-	12	0%	66.7%	33.3%	0%

Students' beliefs on how the	y obtained their CT skills
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⁸One of the students did not answer this question

Appendix 4.3: The second phase data

	First activity	Second activity	Third activity	Performance
Stu 1	2.5	4.5	6.5	Increase
Stu 2	4	3.5	4.5	Increase
Stu 3	7	5	6.25	Decrease
Stu 4	6.5	7	7	Increase
Stu 5	6	5.5	6.5	Increase
Stu 6	7	3.5	4.5	Decrease
Stu 7	4	3.5	4.5	Increase
Stu 8	4	5	2	Decrease
Stu 9	1.5	-	3.5	Increase
Stu 10	4	-	7	Increase
Stu 11	-	-	-	Dropped out
Average	4.7	4.7	5.15	

Students' performances on the activities out of seven

CT skills reflected in argumentative writing	N	Yes	No	Some times	I do not know the importance of this skill in writing
I do not deviate from the	11	4	2	5	0
main purpose of my writing	11	36.4%	18.2%	45.5%	0%
I write in a style that fits in		6	1	4	0
with the target audience (reader)	11	54.5%	9.1%	36.4%	0%
I use keywords that make	11	10	0	1	0
ideas clear for the reader	11	90.9%	0%	9.1%	0%
I organise the written text in	11	6	0	5	0
the argumentative style		54.5%	0%	45.5%	0%
I support the argument with	11	8	0	2	1
evidence		72.7%	0%	18.2%	9.1%
I take notes from the		7	1	2	1
resources and references before I start writing	11	63.6%	9.1%	18.2%	9.1%
I write many drafts and		3	1	5	2
revise them before the final draft	11	27.3%	9.1%	45.5%	18.2%
I add my own voice to the	11	8	0	3	0
ideas	11	72.7%	0%	27.3%	0%

Students' awareness of CT skills

I obtained this skill	N	Before this course	Through this course	I knew it before, but practiced it well through this course	I do not know what this is
I do not deviate from the main	11	1	3	7	0
purpose of my writing	11	9.1%	27.3%	63.6%	0%
I write in a style that fits in		1	3	7	0
with the target audience (reader)	11	9.1%	27.3%	63.6%	0%
I use keywords that make	11	1	5	5	0
ideas clear for the reader	11	9.1%	45.5%	45.5%	0%
I organise the written text in	11	0	4	7	0
the argumentative style		0%	36.4%	63.4%	0%
I support the argument with	11	1	5	5	0
evidence		9.1%	45.5%	45.5%	0%
I take notes from the	11	2	5	4	0
resources and references before I start writing		18.2%	45.5%	36.4%	0%
I write many drafts and revise		2	5	4	0
them before the final draft	11	18.2%	45.5%	36.4%	0%
I add my own voice to the	11	2	4	5	0
ideas	11	18.2%	36.4%	45.5%	0%

Students' beliefs on how they obtained their CT skills

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