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Evaluating the impact of instruction in critical thinking on the critical thinking skills of English language learners in higher education

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Nada El-Soufi

Abstract

In 1994 the Lebanese government called for an education reform to introduce critical thinking (CT) in the curriculum. The reform failed as there was no consensus on how CT should be taught. Some commentators consider CT a cultural practice that cannot be taught in cultures that do not encourage independent thinking. This study examines whether instruction in CT can develop the CT skills of undergraduate English language learners in a system where politics and religion take precedence over the quality of education.

The thesis begins with a systematic review that synthesises empirical evidence of the effect of teaching CT on CT skills of undergraduate English language learners. Of 1,830 records, only 36 studies were deemed relevant. The review suggests indicative evidence that explicit instruction may be beneficial. However, because of methodological flaws, the strength of the evidence is weak.

To establish the effect of this approach, a cluster randomised control trial was carried out in a university in Lebanon involving 29 English classes (413 students). The trial was conducted over one term in which 11 lessons in CT (14 sessions) were substituted for material from the regular curriculum. Experimental students made bigger gains on the Cornell Critical Thinking Test between pre- and post-test (ES = +0.3).

Process evaluation shows that the key factors in successful implementations were teachers' positive attitude, training of teachers, and the readily available lesson plans that were integrated into the curriculum. Students' attitudes and lack of general knowledge were key barriers.

The predominance of poorly designed research in the review suggests that research in CT is underdeveloped and is not a priority for policymakers in non-native English speaking countries. More funding could be invested to strengthen research in CT. Overall, this study shows that the objective of the education reforms in Lebanon to introduce CT is not difficult to achieve if teachers are trained.

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List of abbreviations

Abbreviation	Explanation
CCTDI	California Critical Thinking Dispositions Inventory
CCTST	California Critical Thinking Skills Test
CERD	Centre for Education Research and Development
CCTT	Cornell Critical Thinking Test
CONSORT	Consolidated Standards of Reporting Trials
CPD	Continuing professional development
CT	Critical thinking
EAP	English for Academic Purposes
EFL	English as a foreign language
ELL	English language learners
ES	Effect size
ESL	English as a second language
IELTS	International English Language Testing System
ITT	Intention-to-treat analysis
L1	First language
L2	Second language
NNTD	Number of counterfactual cases needed to disturb the finding
NHST	Null hypothesis significant testing
P4C	Philosophy for Children
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomised controlled trial
SAT	Scholastic Aptitude Test
TIDieR	Template for Intervention Description and Replication
TOEFL	Test of English as a Foreign Language
WGCTA	Watson–Glaser Critical Thinking Appraisal

Declaration

I declare that this thesis results from my own work and has not previously been submitted for a degree at this or any other university

Part of this thesis, the systematic review, has been published in a peer-reviewed journal. Below is the reference of the journal article:

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Statement of Copyright

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PART I
INTRODUCTION

Developing the critical thinking (CT) skills of students is an important aspect of education, which is often ignored because schools have a curriculum to follow and syllabi to complete (Coil et al, 2010). In the US, the UK, and Europe, fostering CT is traditionally considered a fundamental role of university education (Eurydice, 2000; Mitchell et al., 2003; Roth, 2010). Some argue that it should be made a priority in higher education (Mitchell & Andrews, 2000). With the proliferation of information in our global world, and the prevalence of fake news, there is now an even greater need for young people to develop the ability to think independently. They need to be able to evaluate the integrity and validity of information they are confronted with, weigh the evidence presented to them, and make judgements about what to believe and what not to believe (Renaud & Murray, 2008).

Such skills are also increasingly in demand in a number of industries (Association of American Colleges and Universities, 2015). A report by the Foundation for Young Australians (2016), based on a comprehensive examination of 4.2 million online postings from 6,000 sources, found that demand for candidates who have CT skills has risen by 158% between 2012 and 2015. In a fast-moving global economy, Bradley et al. (2008) stress that the productivity of a country depends on the quality of its university graduates and not only on the number of its graduates. A report produced by UNESCO (Stabback, 2016), providing recommendations for designing a high-quality educational curriculum, highlights the importance of incorporating higher-order thinking, problem-solving, creative thinking and a sense of inquisitiveness in order to prepare learners for the workplace.

Despite its recognised importance, explicit instruction in CT skills is perhaps rare on university courses (Coil et al., 2011; Arum & Roksa, 2011; Bugarcic et al., 2014). While there have been attempts to teach CT in higher education explicitly, these were done as ad hoc lessons or not systematically (Taylor et al., 2000; See, 2016). Research carried out in the UK (See, 2016) shows that course modules and assessment modes in first-year undergraduate courses for most disciplines do not provide much opportunity for explicit teaching of CT. Emphasis is placed on dissemination and learning of facts, and teaching to the test. Certain disciplines may lend themselves better to explicit

teaching of CT than others, and thus, explicit instruction in CT may not be natural on these courses (Berrill, 2000). Others argue that the ability to read research articles is essential for all undergraduates and should be introduced at an early stage in academic study so that sufficient time is given to develop such skills (Van Lacum, Ossevoort, & Goedhart, 2014).

In some countries, especially in the Arab world, CT and argumentation are not encouraged. The education system in such societies tends to promote memorisation of facts and the emphasis is on passing exams rather than independent thinking. It is not clear whether CT can indeed be taught in such a culture (Ramanathan & Kaplan, 1996).

While there is broad recognition of the value of CT skills in most Western countries, the idea of developing independent thinkers among young people is less common in some Middle Eastern countries. The purpose of this thesis is to determine whether instruction in CT can help develop CT skills of English Language Learners (ELL - students whose first language is not English) in higher education in an education system where independent thinking and argumentation are generally not encouraged and in a culture where religion and politics dictate much of the school curriculum.

CHAPTER 1
Purpose of the study

1.1 Rationale for the study

Following education reform in 1994, the Lebanese government called for the teaching of CT to be introduced in the school curriculum. While the government recognised that CT is a useful skill, there is little support on how this is to be implemented. No teaching resources were developed and no training of teachers was organised to fulfil the objectives of the reform. One of the challenges of such a reform is the lack of consensus on how CT skills are to be taught or whether they can indeed be taught.

Ramanathan and Kaplan (1996) and Atkinson (1997), for example, argue that CT is a cultural construct or a social practice that cannot be taught. According to Atkinson (1997), CT is a cultural practice of the white middle-class population and it would be problematic to teach CT to non-native speakers of English. Ramanathan and Kaplan (1996) hold the view that CT is a sociocognitive practice that is inherent in certain individuals and thus it is not something that can be taught – you either have it or you do not. If we accept these views, then it would mean it is not possible to foster CT skills among young people in cultures where criticality is generally not encouraged. This study is therefore to test whether CT can be taught to young people in higher education in Lebanon who come from an education system which encourages rote memorisation rather than independent thinking.

Among those who think that CT *can* be taught, there are divergent views about how it should be taught. On the one hand, there are those who believe that CT is domain-specific and cannot be taught using the generalist approach (McPeck,1984; Bailin et al.,1999; Moore, 2011a). On the other hand, there are others, such as Berrill (2000) and Davies (2013), who argue that the ability to evaluate evidence and to think critically is a general skill that could and should be part of teaching and learning. Then there are some who question whether CT should be taught implicitly (e.g. Sigel, 1984; Ruggiero, 1988; Brown, 1997) or explicitly (Kirschner, Sweller & Clark, 2006; Beyer, 2008; Ku et al., 2014). It is therefore the aim of this study also to test whether the generalist approach to explicit teaching of CT is feasible, and if it can be effective in developing the CT skills of ELL in Lebanon.

There is a large body of research examining the effectiveness of an explicit generalist approach to CT. For example, there are a number of systematic reviews looking at the different instructional approaches to it (McMillan, 1987; Ten Dam & Volman, 2004; Torgerson et al., 2006; Abrami et al., 2008; Tiruneh, Verburgh, & Elen, 2014). However, none of these examined the teaching of CT skills specifically in an ESL (English as a second language) or EFL (English as a foreign language) classroom where thinking in the target language is required.

There are, hitherto, few if any experimental studies on developing CT skills among young people in higher education in Lebanon. Most of the literature on the Lebanese educational system consists mainly of reports that give an overview of the different school cycles that lead to the Baccalaureate exam. There are only a few studies like Farah-Sarkis (1999), BouJaoude (2004), BouJaoude and Ghaith (2006), Frayha (2009), Fontana (2016) and Hilal (2018) that are essentially a critique of curriculum reform and the negative consequences of the power that sectarian political parties have over the educational system. These studies are based largely on interview data or content analysis of the school curriculum. Experimental research on policies in education in Lebanon is rare (almost non-existent). Policy reforms of the education system are rarely based on empirical evidence.

This study is therefore unique and fills a gap in current research in this area. The findings of this study will contribute towards existing knowledge about the teaching of CT to English language learners in an education system where CT is not traditionally encouraged.

1.2 Aim of the study

The objective of the thesis is to establish whether instruction in CT can help develop CT skills of higher education ELL. Before we can commence on the research proper, it is essential to first examine existing evidence on the effectiveness of teaching CT to ELL in higher education to find out if there is any evidence that such instruction is beneficial, and if so, what are the most appropriate and promising strategies. This forms the first part of the research.

The aims of the study are therefore to

- Establish evidence of the effectiveness of teaching CT to English language learners in higher education
- Identify the most promising strategies/approaches to teaching CT
- Test the feasibility of teaching CT to learners of ELL in a private university in Lebanon
- Test whether explicit teaching of CT using a generalist approach can enhance the CT skills of these learners
- Establish if certain variables (like exposure to a foreign culture, job experience, etc.) have an effect on students' receptivity to those skills

1.3 Research questions

The research questions are therefore:

RQ 1   Is there evidence that instruction in CT can help develop CT skills of ELL in higher education?

RQ 2   What is/are the most promising approach(es) to teaching CT skills to ELL in higher education?

RQ 3   Can general CT skills be taught to ELL in higher education in Lebanon within the regular curriculum?

RQ 4a   Is it feasible to teach CT skills in an education system which does not generally promote independent thinking and argumentation?

RQ 4b   Is it feasible to teach CT skills in a culture where the curriculum is heavily dictated by religion and politics?

RQ 5   Do students' characteristics (e.g. gender, subject major, exposure to a foreign culture, job experience) affect their receptivity to CT skills?

To answer RQs 1 and 2 a systematic review of international empirical evidence was conducted to determine the evidence base for the effectiveness of CT instruction to ELL and to identify approaches that show the most promise in developing CT skills of ELL in higher education.

RQs 3, 4 and 5 are answered using a cluster randomised controlled trial (RCT) involving higher education students in one private institution in Lebanon.

1.4 Structure of the thesis

This thesis is organised in four parts, each of which consists of several chapters.

Part I consists of Chapters 1, 2, 3, 4 and provides background information to the study. It introduces the topic of CT, setting out the policy context and the rationale for the study. Chapter 2 discusses the state of the Arab world and Lebanon in particular with emphasis on the school educational system and the lack of emphasis on CT. As this study takes place in Lebanon, an overview of the educational system in Lebanon and the region is presented. Chapter 3 consists of a discussion of the major challenges in teaching CT skills. The chapter starts with a discussion of the major definitions of CT and then the challenges that face educators when teaching CT skills. Chapter 4 presents the debate over instruction in CT in general and in the language classroom in particular. It covers the debate over the best approach to the teaching of CT skills and the transferability of those skills.

Part II is the methods section. It is divided into three chapters. Chapter 5 details the steps involved in the systematic review from the formulation of the key words, the database search, and the screening to the appraisal of the studies. Chapter 6 describes the randomised controlled trial, the sampling strategy, the randomisation process, the development of the intervention, materials used, the training of teachers, and the conduct of the process evaluation. Chapter 7 is the method of analysis of the primary research data (the randomised controlled trial).

Part III is the findings section. Chapter 8 presents the results of the systematic literature review and synthesises the best evidence. Chapter 9 discusses the impact findings of the cluster randomised controlled trial. Chapter 10 presents the results of the process evaluation of the trial.

Part IV is the conclusion. Chapter 11 presents the limitations of the systematic review and the trial. Chapter 12 presents a summary of the research findings and provides recommendations for policy and practice.

CHAPTER 2
Background

With the proliferation of knowledge in an expanding global and technological world, and the spread of 'fake' news, the ability of young people to evaluate credible evidence and judge what to believe and not believe becomes more urgent and necessary. The increasing number of ways for young people to access instant information via social media, such as Google, Twitter, Facebook, blogs, and instant messaging, means that what students need nowadays is not always more information, but the ability to sieve through this information and evaluate, interpret, and critically assess the reliability of the evidence. CT is a useful skill to equip young people with to enable them to verify the validity and integrity of the information they receive. In some educational systems in the world, such skills are encouraged even from a very young age. In a number of primary schools in the UK, Philosophy for Children (P4C), an enquiry-based pedagogy to develop CT developed by the American philosopher Matthew Lipman, is being taught as part of the curriculum. P4C and similar has now become a worldwide educational approach.

However, there are some educational systems in the world that are still resistant to this notion of independent thinking, and young people are not encouraged to question ideas or authorities. An example of this is the education system in the Arab world. The following section provides an insight into the background of the Arab world. This is essential to help understand why the teaching of CT in such an educational context can be challenging.

To understand the education system in Lebanon, it is necessary to outline the cultural, religious, and political contexts of the Arab world, as these largely shape the thinking behind education in the region. For this, I draw examples from Qatar and Lebanon.

2.1 The state of education in the Arab world and Lebanon

The social uprisings and political instability that the Arab region has experienced since 2011 have added a great deal of damage to an educational system that already had problems. The Arab region scores low on the Human Development Index. Enrolment in higher education was 20% in 2002 and rose by only 3.7% in 2008. The quality of education is still below the acceptable level as measured by some standardised

international tests, such as the Trends in Mathematics and Science Study (TIMSS), in which Arabs continue to score below average. In addition, curricula and teaching methods do not encourage CT but instead encourage submissiveness to authority (Arab Human Development Report, 2016).

2.1.1 The state of education in Qatar

Education in many countries in the Arab world faces restrictions imposed by political regimes or religious beliefs. A good example is Qatar. Taking on a Foucauldian angle, Romanowski and Nasser (2012a) examine the State of Qatar's education reform, Education for a New Era, whose goal is to develop students' critical and independent thinking. Fostering CT in students necessitates that students and teachers have the freedom to discuss, evaluate, and criticise economic, political, and social aspects of society with no restraints. However, this comprehensive and unprecedented education reform was initiated in 2001 in an environment in which Islam is the dominant religion and is the governing force in traditions, politics, education, and all aspects of society. So, in contrast to the Qatari Regime of Truth, in the Qatari metanarrative, the regime holds the power to control knowledge and shape people's thinking by presenting a certain truth. In such a regime, "knowledge claims are granted authority as truths that are seldom questioned but that actively shape students' identities and thought" (Romanowski & Nasser 2012a, p. 123). This system of acceptance of knowledge as truth becomes "perpetuated by people unconsciously internalizing and accepting a particular version of reality" (p. 123). This regime of truth creates a grand discourse or a metanarrative and reduces people to blind followers. It reinforces a particular view of the world and suppresses all others. In this sense, the Qatari Regime of Truth determines the boundaries of knowledge to students and inhibits any sense of inquisitiveness. Criticising the educational system in the Arab world, Sheikah Mozah Bint Nasser Al Missned, the wife of the former Emir of the State of Qatar, affirms in a keynote speech at a conference:

> Scholars have affirmed that the "traditional" system of education in the Arab world, built upon the absolute power of those in authority, encourages learning by rote, and blind acceptance of power. In such schools, girls and boys, are taught not to question their teachers, just as individuals in society are taught not to question their rulers. In short, the type of education prominent in the Middle East sustains

autocratic regimes and inequalities – racial, class and gender (Romanowski & Nasser, 2012a, p. 126).

In a way, this speech is an indictment of the current education system and an acknowledgement of the need for change. On the surface, this New Era of education reform makes it appear that Qatar wishes to modernise the education system and develop thinking individuals, and not blind followers. However, in practice only certain topics that lie within the boundaries that the metanarrative sets for citizens are acceptable. For example, while students are encouraged to ask questions, questioning issues of a societal, religious, judicial, or cultural nature is considered inappropriate. This belies the whole education reform, the objective of which is to develop critical thinkers. It thus questions the motivation behind such an initiative when students are not permitted access to some knowledge and certain issues are beyond questioning (Romanowski & Nasser, 2012a).

In their evaluation of the Qatari education reform, Romanowski and Nasser (2012b) examined the teaching of CT skills in 12 government-funded independent schools that were opened specifically to realise the aims of the education reform to foster CT among young people. They found that teachers received no formal training to teach CT skills, although they were expected to do so. Priority was not given to CT. Emphasis was still on coverage of curriculum content. Although teachers claimed that there were no restrictions to topics covered in the classroom (even sensitive topics related to politics and the government), discussions were limited to only the positive aspects of the topics. Negative criticisms were never to be made by the teacher or the students. Topics of controversy were presented from only one perspective, that is, the one that suits the state itself. Some discussion topics introduced in the classroom show bias in the way they are presented: the occupation of Iraq, Israeli terrorism, the impact of colonialisation on the Arab world, and American dominance and control over countries of the Arab world.

Romanowski and Nasser (2012b) also found that while CT is purportedly taught, students are not encouraged to assess their own views to see if their own beliefs are shaped by any moral and cultural inconsistencies.

2.1.2 The education system in Lebanon

While Qatar exemplifies the state of education in most of the Arab world, it is fair to say that the Arab world is not homogeneous. This section examines the education system in Lebanon, another part of the Arab world. As the primary research in this current thesis takes place in Lebanon, it is essential to understand the Lebanese education system and how it is shaped by politics and religion.

Lebanon went through a devastating war, extending from 1975 to 1989, until the Taef agreement was signed. Although the civil war is over, there have been many assassinations of politicians that have affected the country. The country still suffers from political instability and unrest due to enormous conflicts among sectarian political parties that are controlled by different foreign countries. Recently, the war in Syria, a neighbouring country to Lebanon, has also affected many aspects of life in Lebanon. A report produced by UNESCO (2014) describes Lebanon as "riven by deep sectarian divisions and sharp inequality between its communities, which are further exacerbated by wider tensions across the Middle East" (p. 176). Lebanon is torn by disagreements among different religious sects that are politically manipulated by various foreign countries. The educational system is a microcosm of all those disputes that invade the country and is affected by this turmoil. The situation in Lebanon continues to be the same to the present day.

In 1993, the then Minister of Education called for an education reform that would see the introduction of CT in the school curriculum. In 1994, the Plan for Educational Reform was initiated by the Centre for Education Research and Development (CERD), a public institution under the Lebanese Ministry of Education and Higher Education. As a result of the plan, a new curriculum was implemented in 1997. Until then, state schools in Lebanon had had the same curricula since 1960. Although a bold and ambitious programme, the reform did not actually happen in the way it was planned. In many ways, this reform was only a reform in name, because much remained the same in practice. There are many reasons for this.

First, the reform was very much politically driven (Farah-Sarkis, 1999). As with most education systems in the world, the education reform was not evidence-informed. No education researcher was consulted about the reform. After numerous interviews with several members who were involved in the education reform in Lebanon, such as the

current director-general, the CERD directors, the general inspector, and the dean of the Faculty of Education, it was agreed unanimously that no education researcher was included in the reform committees. These committees included schoolteachers and university academics who were not education researchers. Education researchers in Lebanon have a very low profile, and there is little funding for educational research at the university level (Farah-Sarkis, 1999).

There is a general lack of research mentality in education in Lebanon (Farah-Sarkis, 1999). Research outcomes are not disseminated and have little, if any, impact on policy and practice. For example, two very large education projects – one conducted by CERD on the learning achievement of young school children across Lebanon and another on grade retention of low achievers in schools in Lebanon – produced very enlightening results, but their outcomes were not widely disseminated or used by policymakers.

The second reason is that there was no political consensus on what was to be taught. BouJaoude and Ghaith (2006) explained that although reform aimed to create a new educational ladder, adopting new curricula and textbooks, and offering teacher training, it had not been successful because there was no agreement on what to teach, and how teachers were to be selected and trained. According to a UNESCO (2014) report, the introduction of some of the new teaching materials was hindered by political interference, such as the case of the history textbook. The political parties that govern Lebanon could not agree on a common textbook and hence the old textbook that ended with the start of the civil war had to be kept. The report also highlights the fact that most schools are segregated based on religious faith, and historical events are interpreted based on the religious affiliations of the schools.

Despite the education reform, few of the objectives of the reform were implemented (Frayha, 2009). Books published between 1968 and 1970 are still being used in schools, and the teaching of history, for example, remained in the hands of different sects each to teach history from its own perspectives in the schools that fall under its dominance.

Thirdly, in Lebanon, both politics and religion have a very important role to play in education (Frayha, 2009). There is therefore no unified educational curriculum in Lebanon. Public schools have one curriculum, while in private schools, each has a different curriculum enforced by the religious sect that governs the school. There are few secular schools as most private schools are governed by religious sects that control

the information that is passed on to students. Although there is an enormous gap between private and public schools in terms of quality of education, the gap also exists among different private schools.

Another factor preventing the aims of the reform from being realised is the assessment system. Hilal's (2018) examination of the Lebanese Baccalaureate Programme, which has been adopted by the majority of public and private schools, shows that the Lebanese curriculum is packed with materials that mainly comprise facts to be memorised, and the assessment does not test CT. Teachers often teach to the test and, since students are not tested on their CT, teachers do not feel the need to teach such skills. In an already packed curriculum, priority is given to what is being tested. Unless the assessment is reformed to focus on CT, such skills are not likely to be taught. Therefore, although the Ministry of Education in Lebanon emphasises the importance of integrating CT in all subjects, teaching is still very much centred on lecturing and transmission of information.

Finally, the reform objectives could not be carried out because there was no training of teachers to adopt the new curriculum. Teachers were told to integrate CT into their lessons, but were not shown how to do so. None of the teachers interviewed by Hilal (2018) reported having attended workshops that facilitated the integration of CT into their teaching. No research had been conducted on the best approach to instruction in CT, nor how CT could be embedded within the curriculum. It is therefore not surprising that the education reform did not achieve what it set out to do.

To put the instruction of CT in the context of Lebanon, it is necessary to understand the Lebanese school curriculum and the way different school subjects are taught. This will also provide an insight into the challenges faced in teaching CT in Lebanon.

Although the objectives of the new science curriculum under the reform emphasises that students practice problem-solving skills in science subjects, conduct guided experiments, control variables and predict outcomes, in practice science instruction follows the same traditional teacher-centred approach as before the reform (BouJaude, 2004). BouJaude (2003) notes that in practice the scientific enquiry approach to science instruction was not apparent in schools.

The history curriculum is still archaic and not updated. For example, the history textbook covers the history of Lebanon up until the year it achieved its independence in 1943. Although there was an attempt to write a new history textbook to include the history of Lebanon after 1943, this did not happen as the authorities could not agree on the version of events (Bashshur, 2005). The history syllabus adopted after 1975 presented historical information as factual information, which students are expected to memorise and regurgitate for the exams. There is no scope for engagement in critical analysis of events in history. Controversies and conflicts that happened in the country are not presented, while coexistence among different communities in the country is emphasised and valued.

The history curriculum in Lebanon promotes a single narrative or a metanarrative that does not give room for alternative interpretations of events, and students are not encouraged to search for evidence, consider various interpretations, or find answers to big issues. Akar, Shuayb, and Hamadeh (2016) argue that it is this presentation of history as a single story that prevents a critical reconstruction of history. Students are encouraged to reproduce historical events as they are presented in the textbook.

The teaching of history in private schools is also controlled politically (Abouchedid, Nasser, & Van Blommestein, 2002). Although private schools have the freedom to adopt teaching methods that they see fit in their own schools and to include subjects that are not part of the national curriculum, they must teach "Lebanese history" using the history textbook provided by the Lebanese Ministry of Education. This applies only to the history of Lebanon. If they choose to teach the history of other countries, they may use any book that they consider suitable.

Although there is one textbook, history teachers in different types of schools representing different religious sects have different perceptions of historical events and historical figures (Abouchedid, Nasser, & Van Blommestein, 2002), and these are passed on to the students who readily accept their teacher's interpretation of history as the 'truth'. The same historical figures who are perceived as national leaders by a religious sect are considered traitors by another religious sect. Thus, instead of instilling a common national identity in students, they each promote their own versions of history and their own identity. Consequently, students' understanding of Lebanese history depends on who their teachers are.

The Lebanese curriculum also stifles CT because of its emphasis on religion. Religious education in Lebanon is very prescriptive and does not foster open-mindedness in students or an acceptance of other people's beliefs. In a comprehensive analysis of the Lebanese educational curricula, Fontana (2016) asserts that religious education in Lebanon widens the gap between the distinct religious sects and indoctrinates students into separate hostile identities. While there was an attempt to develop a unified religious textbook in which common values were emphasised and national unity and social cohesion are reinforced, this was met with strong opposition and a text for each faith was adopted as a result.

As most private schools are run by religious communities, the demographic locations of schools determine the sect of the school principals, teachers, and students. Schools are therefore highly segregated by religion. This further reinforces the sectarian division in the country and sectarian violence towards others (Baytiyeh, 2017). The initial plan in 1999 was to have a non-confessional religious education curriculum to be adopted in state schools. The plan was met with opposition and it was agreed to have different curricula for Muslims and Christians. However, the plan was not actualised. Instead, religious education in state schools remains in the hands of clergymen who are of the same sect as the students (Fontana, 2016). The divide is not simply between Christians and Muslims (the two dominant religions in Lebanon), but among the different religious sects within each religion (Frayha, 2009).

Historically, religious education was imposed in state schools after the civil war, and because of opposition from religious sects, driven by political parties, against a single textbook that presented common spiritual values, a separate textbook for each of the major religions was adopted in schools. As a result, schools only taught the religion of their school. The religious education curriculum of each type of school makes no mention of other faiths, but where they are mentioned, it is to show the superiority of their religion over others (Frayha, 2009).

The old English curriculum, which adopted a behaviourist approach to teaching language mainly depending on mechanical drilling, was replaced in 1998 by the new curriculum, which adopts international trends and modern theories in ESL/EFL instruction. CT was one of the objectives of the new curriculum. Other objectives that

can fall under the realm of CT, such as consideration for and appreciation of other cultures and positive attitudes for foreign language and culture, were also listed. However, the implementation of the new Lebanese English language curriculum was fraught with problems. Lack of resources and inadequate teacher preparation for the new curriculum were some of the challenges identified in a study by CERD. Although practitioners have raised all the challenges that they have faced during the implementation period that spanned over 15 years, no proper evaluation was carried out by either the Ministry of Education or CERD (Shaaban, 2013).

The examination system in Lebanon is another major hindrance to instruction in CT in schools. Because exams still focus on testing the recall of knowledge, CT and creativity are not given priority, regardless of the objectives of the reform. Schools attach a great deal of importance to these official exams, as the success rate of students in those exams affects the reputation of the school. So, schools and teachers often teach to get students to pass these exams. Therefore, if the education reform is serious about fostering critically thinking individuals, there needs to be a close scrutiny of the exam system, and the mode of assessment should be overhauled to reflect the objectives of the reform. Until this happens, it does not look likely that CT instruction will be a priority on the agenda of schools and higher education institutions in Lebanon.

As an example, the history exam questions require students to recite information that they have learned in the history book up to 1946 (Bashshur, 2005). None of the questions requires that students give their viewpoints, analyse events, reflect, or synthesise. The two official exams in Lebanon (the Brevet and the Baccalaureate) have also been blamed for the perpetuation of generations of non-thinking students, whose aims were solely to pass these exams (BouJaoude & Ghaith, 2006; Halloun, 2016). It is odd that under the education reform, the curriculum was revised, but the exams were not. According to the washback or backwash theory used in applied linguistics (Cheng and Curtis, 2004), when tests become the priority of teachers, they tend to encourage students to memorise the materials tested. This is negative washback. On the other hand, washback could be positive. A curriculum reform might be possible by making changes to the assessment system, which will usually necessitate a major change not only in teaching pedagogy, but also in the content. For example, if students are assessed on their ability to argue, evaluate evidence, and offer alternative explanations, these skills are more likely to be taught.

2.2 Summary

In conclusion, it can be seen that the education reform in Lebanon is faced with a number of challenges and is unlikely to achieve the objectives that it has set out to achieve for a number of reasons. The textbooks have not changed (e.g. history textbook) for decades, the curriculum is still outdated, and the exams are still focused on recall of factual information. But, more importantly, the education system in Lebanon is controlled by sectarian political parties, and religion still has an important influence on what is taught and how it is taught. An education system in such an environment is likely to perpetuate generations of students whose aim is solely to pass exams. Fostering CT in schools under such a regime is going to be difficult.

However, in higher education, there are no national or unified exams across universities for which to prepare students, so there is more freedom and potential for instruction in CT. However, the question lies in the effectiveness of teaching students to think for themselves in higher education when they have been exposed to a school education system where CT and argumentation are not encouraged.

CHAPTER 3

Major challenges in teaching critical thinking skills

There is wide, though not complete, agreement that education should not be concerned only with imparting knowledge to students. It is increasingly recognised that education also has a role to play in making students better critical thinkers who can make informed, ethical decisions and well-reasoned judgements (Dewey, 1910; Marin & Halpern, 2011; Moore, 2011a).

Teaching CT is not an easy task. There are multiple definitions and conceptions of what CT means, and educators do not necessarily agree on what they are. Second, the language proficiency and the learning capacity (cognitive load) of the individual may impede learning. Third, not all educators agree that CT can be taught, and some do not think that CT should be taught.

3.1 Multiple definitions of critical thinking

One of the major challenges in teaching CT is the difficulty in defining what CT actually is. As CT comprises a number of skills, it is a complex concept to define. A number of academics and thinkers, like Dewey (1910), Facione (1990), Paul and Elder (2009), among others, have attempted to define CT.

Critical thinking, critical reasoning, or higher-order thinking are terms that are usually used interchangeably. In his book *How we think*, Dewey (1910) adds to those terms as he refers to CT as "reflective thinking", which he defines as "Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it" (p. 6). According to Dewey reflective thinking involves a willingness to examine the grounds or the basis on which a belief rests. Dewey defines reflection as a consecutive or successive ordering of ideas. Each idea leaves a deposit that will have an effect on the next, while at the same time leaning on the idea that comes before it. Reflection, therefore, is a coherent sequence of ideas that logically build on one another with the aim of establishing the validity of a belief. Dewey explains that **reflective thinking is characterised by scepticism or the audacity to question tradition and long-standing ideas and beliefs**. It is usually triggered by disbelief or confusion about a certain situation. Suspending judgement until further inquiry is part of what characterises critical thought.

To Paul and Elder (2009), CT concerns the ability to formulate and articulate questions or hypotheses, evaluate, present alternative ideas, and communicate those ideas effectively. Like Paul and Elder, and Dewey before that, Ennis (1985) agrees that CT involves reflection, formulating hypotheses and questions in addition to examining alternatives. But he also adds designing experiments as another skill in CT.

After an extensive review of the literature, Pithers and Soden (2000) sum up CT as a set of skills comprising the ability to identify and clarify a problem, to analyse and make inferences, to understand underlying assumptions to a problem, to use deductive and inductive logic, and to evaluate the validity and reliability of information.

In Siegel's (2010) conception of CT, the emphasis lies on the examination and evaluation of reasons. In other words, CT is the ability to ascertain the validity and relevance of reasons that support or underpin one's thinking or judgement.

In summary, CT is a set of skills that includes the ability to analyse, evaluate arguments, think inductively and deductively, identify biases, make inferences, understand and question underlying assumptions, reach valid conclusions, and synthesise evidence. Many of these skills overlap or are connected to each other, as Ennis, Millman, and Tomko (2004) note. Well-known published CT tests, like the Watson–Glaser Critical Thinking Appraisal (WGCTA), the Cornell Critical Thinking Test (CCTT) and the California Critical Thinking Skills Test (CCTST), assess students on the different skills commonly associated with CT and results are often presented separately for each skill. This might suggest that the different skills can be taught and developed independently of the other skills. Although it is true that CT skills could be taught as separate skills, the aim for developing critical thinkers is that they would be able to internalise all those skills and use them all without really thinking about what skill they are using at each moment.

However, many theorists see CT as not only a set of skills but also a range of dispositions that are more important than skills alone. For example, according to Facione (1990), CT comprises dispositions like a sense of inquisitiveness, open-mindedness, fair-mindedness, and honesty in facing one's biases, in addition to others. Others argue that skills alone do not make a critical thinker (e.g. Bailin & Siegel 2003;

Siegel 2010; Davies, 2015). One might have CT skills but not be willing or inclined to use those skills. The combination of skills and dispositions is what Davies (2015) calls the "individual dimensions" of CT (p. 44), and is much needed in academia, employment, and society. Paul (1993) refers to these dispositions as intellectual traits.

One dimension of CT is the ethical and moral aspect. Paul's (1993) list of intellectual traits includes fair-mindedness which entails a sense of an ethical approach to the world. A critical thinker is expected to work for the common good and not to serve his own purposes and his vested interests. According to Ennis (1998), one of the major components of CT is caring about the dignity and value of an individual. A critical thinker therefore also considers others in their assessment, evaluations and judgements. According to this school of thought, instruction in CT not only develops skills but also entails the development of moral integrity and moral judgement (Paul, 1993).

Based on the five definitions presented by the most influential thinkers in the CT movement – Ennis, McPeck, Lipman, Paul, and Siegel – Moore (2011b) identifies three key elements of CT. First, it has to come from within the individual and is hence self-directed. Second, it always involves ethical judgements and third, the judgement has to be skilful and of quality (that is supported by objective evidence and reasoning).

Although theorists have elucidated the concept of CT and defined it as a combination of skills and dispositions, CT does not seem to be a simple term for educators and students to explain or define. In a small study, Moore (2014) interviewed 17 academics and analysed course and exam materials, and found interestingly varied understanding among the academics about what CT means. Judgement, scepticism, originality, careful and sensitive reading, rationality, ethical activism, and self-reflexivity were the various meanings of the term that emerged. Across disciplines and even within disciplines there are different conceptions of the term "critical thinking". For example, in philosophy the emphasis is on rationality, in history it is knowledge and in cultural studies it is reflexivity.

Similarly, in a pilot study examining the use of argumentation in two universities in the UK and one in the US, Andrews el al. (2006) found that there were significant differences among institutions, disciplines, and lecturers concerning practices and beliefs related to argumentation. All students acknowledged the importance of

argumentation in their disciplines - history, biology, and electronic engineering. However, they held different opinions about the meaning of argumentation and how it applies to their domain of study.

This multiplicity of meanings that the term can take on might result in confusion for students. Academics attach great importance to certain words that they consider essential to learning, such as "analysis", "argumentation", "criticalness" but often overlook the complexities of these terms in each domain and fail to explain what they mean to their students (Moore, 2014). To avoid confusion, malleability of thought should be fostered in students with an awareness of the different modes of thinking that each discipline imposes. Moore (2011a) proposes a paradisciplinary pedagogic approach or metacritique as a solution where students' attention is directed to points of divergence and convergence in different disciplines. This could help students transfer those skills across domains when they have an understanding of what CT skills signify in each domain.

In a meta-synthesis of ten studies, Webster (2016) highlights the misconception that many students have of the term, due to the multitude of meanings that the word "critical" has and its translation into other languages, which is often associated with negativity. This negativity that students attach to the term may impel teachers to think their students are lacking in CT. Adopting a questioning approach, for example, which is regarded as an important CT disposition, might not be embraced by students who come from certain cultures. Similarly, Andrews (2009) stresses the fact that the term "argument", a related term to CT, is often associated with trivial disputes and could therefore be disagreeable and discouraging for both teachers and students.

3.2 Low language proficiency as a barrier to instruction in critical thinking

Another problem in teaching and sometimes measuring CT is students' language proficiency, as language serves as a tool to express thinking. Basing his argument on personal observation, Errihani (2012) considers learners of English to be at a disadvantage, because they are required to think critically and analytically in a language that they are struggling to learn, when their main objective is to learn the language. Lack of motivation and lack of language proficiency on the part of the learner may act as an inhibitor in exhibiting any kind of CT.

Low language proficiency can affect any display of critical thought. Floyd (2011) administered a split version of the WGCTA to Asian students in an Australian university. One group took the English–Chinese version, while the other took the Chinese–English. Both groups performed better on the Chinese half of the test. The results showed that thinking in L2 (second language) is more challenging than thinking in L1 (first language). Floyd (2011) contends that there has been insufficient research on the amount of cognitive pressure that faces non-native speakers of English who study in universities where English is spoken as a first language.

In a study that measured the level of CT in native speakers of English and non-native speakers of English, Lun, Fischer, and Ward (2010) discovered that lower English language proficiency in non-English speakers accounted for the difference between the two groups. Language ability, rather than a qualitative difference in thinking styles, accounted for a difference in the level of CT. Similarly, other researchers (Floyd, 2011; Manalo & Sheppard, 2016) affirm that reading in L1 and reading in L2 require different mental processes. Thinking in L2 puts a load on learners' working memories and, therefore, impedes their cognitive abilities. Language processing puts a cognitive strain on the speaker's brain when using working memory, and this strain is heightened when thinking in L2.

What those researchers refer to is the Cognitive Load Theory, a model developed by John Sweller, which explains how learners process information. Students learning a new language, or any new type of information, undergo what Sweller calls a cognitive load. When learning new information, the individual holds the information in the working brain until it is processed well and moved to the long-term memory, which has the capacity to store extensive knowledge. As the working memory is of limited capacity, and intellectual ability depends on long-term memory, a learner faced with a great deal of information suffers from a cognitive overload. In spite of all the variations that they can have, trees, for example, can all be stored in the long-term memory as one single schema that allows an individual to recognise a tree when he sees one. Once information is processed to the long-term memory, it is stored in schemas, which are mental structures or constructs that organise and categorise information. According to the theory, schema acquisition and automation are the major learning mechanisms. The various schemas that the brain has reduce the cognitive load that is placed on the working memory. Automation of schemas occurs after extensive practice and allows

any cognitive process to occur without conscious control. Highly intellectual activities depend on potent long-term memory, limited working memory, and schema acquisition and automation. Elements of information that are to be learned can pose a cognitive load because they cannot be learned separately but have to interact with other elements for learning to happen. Complex intellectual tasks put a strain on the learner because the working memory has a limited capacity (Sweller & Chandler, 1994). Students learning a new language while simultaneouly learning how to think critically in the new language may undergo an enormous cognitive load due to the complexities that the two tasks demand.

However, the way that low language proficiency can affect critical thought, high proficiency in the language could also mask lack of logic. Paul (2012) calls into question the ability of teachers sometimes to evaluate CT when they cannot distinguish between intelligent subjectivity which is wit, articulate expression, cleverness with lack of substance and reasoned objectivity which is thoughtful, disciplined and systematic reasoning. A group of 81 teachers were asked to rate two essays and give their reasons for doing so. The supposedly poorly-reasoned essay was given a higher score (5.4 out of 8) than the well-reasoned essay (3.9 out of 8) due to the student's articulateness in addition to good language and diction used.

CT and argumentative writing are also sometimes improperly taught with much focus given to language skills and particularly to signal words. Davies (2003) criticises the practice of teaching international students the use of connecting words that signal premises and conclusions hence ingraining in students the idea that those words are the main constituents of an argument when instruction should mainly focus on logic and argumentation. In a similar vein, Andrews (2009, 2015) criticises the hollow use of connecting words to introduce arguments. Often, students use signal words to indicate an argument when, in fact, a real argument is missing. Focus on signal words without any consideration to logical thought or real argumentation does not help students become critical thinkers.

3.3 Opposition to instruction in critical thinking

Another challenge that may influence instruction in CT may be simple opposition by those who do not consider CT to be a set of skills. Atkinson (1997) believes that CT is ingrained in cultural practices and thus cannot be taught. It is the sole attribute of white,

US middle-class males. Without the least undermining the importance of CT, the writer discusses the problematic aspects of teaching CT skills to non-native speakers of English and warns against the challenges of dealing with CT in an EFL/ESL environment where culturally diverse students coexist. For Atkinson (1997), CT is not an easily definable term, especially to people who have been raised in a culture that naturally nurtures the use of CT dispositions. CT is more of a social practice, and social practices are often invisible and indiscernible to those immersed in them and thus cannot be taught.

This same view is shared by Ramanathan and Kaplan (1996) who believe that a student who is not a US citizen would not have the same understanding of democracy, for example, or any other concept as a US student would. Various areas of cultural differences make the teaching of CT a challenging task in an EFL/ESL environment. Slightly resonating with Atkinson's view, but taking a more empirical and positive approach, is that held by Moore (2011b) who, after interviewing a number of academics in different disciplines, finds that the concept of CT is elusive to academics because they have unconsciously internalised the concept. This makes it difficult for these academics to provide students with a definition of the term although they might still be unconsciously or implicitly instilling a critical spirit in their students.

3.4 Fear of teaching critical thinking

There is no unanimous agreement on the point that CT should be an educational ideal, as fundamentalists might oppose the idea of schools interfering in the education of their children and indoctrinating them into certain beliefs or poisoning their minds with certain ideas that go against their beliefs (Siegel, 1985). Bailin & Siegel (2003) argue that one of the reasons why education should foster CT in students is to reach a democratic society. Democracy can exist and prosper when citizens are capable of reasoning well about political matters, carefully examine the media, and possess both CT skills and dispositions (Bailin & Siegel, 2003). In oppressive regimes such democratic views are much feared. Davies (2015) distinguishes between the set of general skills of CT (like building and analysing arguments) and a wider perspective of CT (critical pedagogy; i.e. making radical changes in society – social and political activism). It is this wider perspective of CT that some oppressive regimes try to discourage as it is feared that it will encourage students to question and defy authority.

It is such fear that poses a resistance and opposition to the teaching of CT in some educational systems (Gieve, 1998; Hawkins, 1998; Benesch, 1999).

Although educators might consider it their responsibility to inculcate a critical spirit in their students, they might not be able to do so due to the opposition that they might face from the society.

3.5 Cultural variations

Another challenge that might face educators is the silence of students from certain cultures which might often be misinterpreted as lack of CT. The silence that the Japanese are known for, for instance, as opposed to the voice of the Americans, Long (2003) believes, should not be misinterpreted as lack of CT since this is a set of skills that entails the ability to observe closely, to suspend judgement and not jump to conclusions, and to consider multiple viewpoints. Misconceptions of the Asian learner as a passive and silent learner form a hindrance to proper instruction in CT, especially when some Western academics are unaware of different learning practices and instructional approaches that are usually adopted in various cultures (Chalmers & Volet, 1997; Stapleton, 2002; Long, 2003; Vandermensbrugghe, 2004).

Chalmers and Volet (1997) found that Asians at an Australian university refrained from asking questions in class because they considered class time as valuable time for learning, and queries about simple things could be clarified by other students after class in informal study groups. In addition to that, the fact that Asians formed a minority inhibited them from participating in class discussions. Similarly, Andrews (2007) asserts that a close examination of Chinese students' dissertations shows that, despite dominant widespread belief that Asian students often lack criticality, there is strong evidence that those dissertations have all the qualities required in argumentation and exhibit a good level of criticality. Stapleton (2002) analysed samples of work taken from 45 undergraduate Japanese students, and concluded that familiarity with the topic being discussed, not cultural differences, is a prerequisite for CT as this helps students write more critically. In the study, half the students in the sample were asked to write about a topic familiar to the Japanese culture and half were given a less familiar topic, with essays rated blindly by two instructors. Findings reveal that Japanese students are capable of writing in a critical manner about familiar topics.

In a small-scale pilot study consisting of twelve students, Richmond (2007) tries to challenge the view of the Asian learner as someone who likes to take in as much knowledge as possible without questioning. The study shows that contrary to some expectations, Asians can adjust when they move to other countries or when they are trained to learn differently, which is a disposition for CT. Richmond (2007) asserts that given proper training in giving oral presentations, solving problems, and CT, Asian students can demonstrate skills in these areas.

3.6 Summary

The purpose of this chapter was to define the term CT. As cultivating CT dispositions in students could be a lifelong endeavour and would require that educators themselves model or exemplify those virtues over a substantial period of time, the present thesis focuses on CT as a set of skills that could be introduced in any module and might be reinforced in any subsequent module.

This chapter has also highlighted the challenges that face academics in higher education in training students in CT. One challenge that confronts academics is the term itself, as many academics perceive CT in different ways. Another challenge in teaching and perhaps assessing CT skills is language proficiency and the cognitive load placed on the brain of L2 learners. Opposition to instruction in CT by some fundamentalists, and stereotypes attributed to certain cultures also hinder educators from inculcating a critical spirit in their students. In order to nurture a critical spirit in students, it is essential to understand the challenges that might hinder this task so they can be avoided. Of equal importance is an understanding of the major debates around this concept.

CHAPTER 4
Major debates around instruction in critical thinking

Even when educators have complete understanding of the concept of CT and the challenges relating to proper instruction in those skills, this does not necessarily guarantee that universities succeed in producing CT graduates who can make informed choices and well-reasoned judgment. There is mixed evidence on whether CT skills are properly taught in higher education around the world. While some critics argue that students graduate from university lacking in CT skills (Gimenez, 1989; Arum & Roska, 2011; Shim & Walczak, 2012), others assert that university experience leads to growth in students' CT skills, although the particular factors that lead to this growth cannot be determined (Huber & Kuncel, 2016). One reason for this dissent in opinion may be that there is a diverse range of universities in the world – some are more progressive and liberal, some are more traditional and conventional and some exist to meet religious or economic needs of the society. Another point of contention that relates to the role of education in fostering criticality in students is the best approach - the general versus the domain-specific - that should be adopted to reach that aim.

4.1 The debate over the role of universities in fostering students' critical thinking

Most theorists agree that education should play a role in developing graduates who can think for themselves. For Dewey (1910), the role of education should be to guard the person not only from the flawed inclinations of thinking but, more importantly, from the prejudices that the person has inherited over the ages. Prejudices are biases developed because of tradition, instruction, or imitation. Education, according to Dewey (1910), should foster in students strong methods of enquiry and proper methods of reasoning, to encourage a habit of independent enquiry. The long-term effect that education should have on the individual is to develop life-long learners with the requisite CT skills and dispositions. While society can mislead, education should lead.

Paul, Elder, and Bartell (1997) stress that the role of education is to protect human thought from biases. The authors suggest that the human mind, if left to its own natural workings, is capable of distorted and biased thinking unless it is harnessed and trained to become aware of its own prejudices. Although they do not explain how this process of harnessing may occur, it is quite clear that, according to them, individuals usually need assistance to develop a level of criticality. Paul et al. (1997) suggest that there is a

common confusion between active construction of meaning and CT. Students naturally construct meanings in their lives, many of which might lack accuracy and are diffused with biases and prejudices. To be good at building high-quality meaning, they must have the necessary CT tools to be able to assess situations and occurrences and avoid learning distorted truths and biases. Active engagement in learning does not guarantee the acquisition of CT skills but might result in deeply ingrained habits that one tends to repeat frequently without thinking logically about them, hence the need for proper education.

Although there is a general agreement among some philosophers, academics, economists and politicians that education has a role to play in instilling a critical mind in young people, there were doubts about whether this was indeed practised in reality (Gimenez, 1989; Arum & Roska, 2011; Shim & Walczak, 2012). Concerns were raised about the lack of emphasis on CT in higher education. Arum and Roksa (2011), for example, found that after two years at university, 45% of students (N = 2,300) surveyed from 24 institutions across the US showed no significant improvement in CT while 36% showed no significant improvement after four years in college.

Some blame this lack of progress on the modern curriculum, which is focused on preparing students for the job market (Vandermensbrugghe, 2004). University courses such as classical languages, history, and philosophy that traditionally require students to argue and evaluate evidence have been increasingly replaced by more practical and perhaps marketable courses. Others acknowledge that technological advances have made education a commodity to be sold to students (Blackmore, 2001). Education thus becomes driven by the need to serve the demand of the market rather than development of the intellect. Consequently, students become passive recipients of facts and their goal is simply to pass exams or to get a qualification that makes them more desirable in the job market. Education thus becomes a means to an end and is not appreciated for its own sake and its intrinsic value. Weil (1998) likens such an educational system to a fast-food restaurant whose sole responsibility is the mass production of information instead of the development of knowledge and criticality in students.

Dissatisfaction with the level of CT among students and their ability to reason and argue well led to the CT movement in the 1980s (Facione, 1990; Ennis, 1993). The CT

movement paved the way for much attention in the field of education with courses, materials, and assessment strategies being developed.

A meta-analysis of 71 cross-sectional and longitudinal studies suggests that, contrary to claims by some (e.g. Gimenez, 1989; Weil, 1998; Vandermensbrugghe, 2004; Arum & Roska, 2011; Shim & Walczak, 2012), higher education students' level of CT did improve at university with an overall effect size of 0.59 SD (Huber & Kuncel, 2016). However, the authors acknowledged that this growth could be due to the maturation effect that students would naturally experience and that cannot be controlled for since it is not ethical to randomly assign students to either attend university or not. There is no counterfactual.

An older systematic review of 27 studies dating back to the period from 1950 to 1985 (McMillan, 1987) suggests that college experience can enhance CT skills, although the influencing factors could not be determined. The author concludes that for a more definitive answer more robust evaluation is needed that controls for some confounding variables.

In a cross-sectional study involving 4315 students from 18 universities across the US, Roohr, Olivera-Aguilar, Ling and Rikoon (2019) examined whether third/fourth year students had higher scores than first-year students. Special characteristics of the educational institution, such as selectivity of the institution and its ability to retain its students, in addition to individual characteristics such as prior academic scores and students' engagement in clubs were examined in the study. After controlling for college admission scores, students in third/fourth year at university had slight performance difference than first year students. This difference varied across institutions. Although there were no highly selective institutions in the sample, first-year students reported better scores than their third-fourth year peers in institutions that had less than 60% of students admitted as measured by the HEIghten Critical Thinking assessment. The authors believe that institutions that are more selective than others accept students who are already better prepared and therefore there is less chance for improvement on their part.

Evidence from these studies cannot show the effect of universities on students' CT skills as they do not involve a counterfactual (i.e. what happens if the students did not

go to university). Any improvements in students' CT over time could be due to natural maturation, interaction with peers and faculty members or simply due to the new experience. These changes cannot be solely attributed to the quality of instruction at university. Similarly, studies that compare first year and third or fourth year students are simply comparing different groups of students, which may be inherently different anyway since the quality of students can vary from one cohort to another.

4.2 The debate over the general and the domain-specific approaches

Another point of contention that relates to instruction in CT is whether one approach to teaching CT skills is superior to another. The general approach regards CT as a set of skills that can be taught independently of any domain or subject of study and may thus transfer across domains, so students do not need deep understanding of a specific subject. The explicit approach and the general approach to instruction in CT are often used interchangeably when instruction happens in a separate module that does not focus on a specific subject of study. The domain-specific approach considers instruction in CT to be dependent on the subject being taught. The content of a biology module, for example, will be taught by urging students to think critically about the content of the module.

Although the debate is mainly about the general versus the domain-specific approach, Ennis's (1989) theory is that there are four approaches to teaching CT: the general, infusion, immersion, and mixed approach. The general approach can take place within a separate course, regardless of content, or as a separate thread within a course. The infusion approach requires deep and thoughtful understanding of the subject matter with general CT principles, along with dispositions and abilities made explicit. The immersion approach requires that students become immersed in the subject matter, but general CT principles are not made explicit. The mixed approach is a combination of the general approach with either the infusion or the immersion.

Many theorists suggest that the general approach is not very effective, and that CT has to be taught within a context (McPeck, 1984). McPeck (1984) theorises that the term "reasoning ability" cannot be used to mean "critical thinking" as the term "ability" is problematic by itself since it denotes one general skill. Similarly, Bailin et al. (1999) and Moore (2014) do not see CT as a generic skill that is transferable to other disciplines. They argue that CT should be taught within specific domains or subjects.

Moore (2011b) criticises the general approach and in particular CT tests for their assumption that CT consists of a general ability and an individual's level of CT that can be measured regardless of their field of specialisation.

A major problem with the view of those who support the domain-specific approach is the concept of domain itself. Ennis (1997) argues that the concept of domain seems to be problematic. It is obvious that literature and physics belong to two different domains; the problem lies in whether physics and statics constitute separate domains or both belong to the domain of physics. Moore (2011b) draws upon the interdisciplinary nature of many subjects, such as the philosophy of history or the history of philosophy, to highlight the boundaries that are set around disciplines, which can pose a restriction to the malleability of CT. Each discipline forms, at times, a certain unique discourse that may not be shared by other disciplines. Basing his view on interviews done with academics in three different disciplines, Moore (2011b) argues that in order to gain entry into a particular discipline and think critically in it, students have to comprehend the relevant discourse of that discipline as key words are shaped by the users of that discipline. The meaning that CT takes on in each discipline makes the gap among disciplines of considerable width. A paradisciplinary pedagogic approach, Moore (2011b) stresses, should be encouraged in higher education where students' attention should be directed to points of divergence and convergence in various disciplines.

Ennis (1987) advocates the general approach to teaching CT arguing that there are general principles that act as bridges among subjects or that apply to various subjects. For example, a conflict of interest, a straw man, and denial of the consequent are examples of principles that can apply to any subject. Although the principle of denial of the consequent would certainly require some background knowledge, it has wide application in many subjects. Some principles are less domain-specific than others and are widely applicable to different domains.

There is some empirical evidence, though not conclusive, on the effectiveness of the general or the explicit approach (Abrami et al., 2008; Behar-Horenstein & Niu, 2011; Marin & Halpern, 2011). Marin and Halpern (2011) conducted two small-scale experimental studies. In the first study, 70 high-school students were randomised to three groups: one group receiving explicit instruction in CT using general topics, another receiving instruction in CT embedded in a psychology course, and the third

group acting as a wait-list control. Both experimental groups showed a gain from pre-test to post-test, but the group with general instruction experienced a greater gain. The second study (Marin & Halpern, 2011), including 108 participants, consisted of two experimental groups – one received general instruction in CT skills while the second received embedded instruction within a psychology module – and a wait-list control group. Both experimental groups showed a gain from pre-test to post-test, but the group with general instruction experienced a greater gain than the implicit group.

Dyer and Hall (2018) evaluated the effectiveness of explicit instruction in CT in a large-scale quasi-experiment involving 806 students. Full data for only 590 students were obtained due to the usual dropping and adding of students that happens each term. The experimental students were enrolled in a module that examines unwarranted beliefs in pseudoscience, extraordinary life forms and the paranormal with another group of students enrolled in a research methods course and a comparison group. The pre-test and post-test used consisted of a researcher-developed test that addresses issues of pseudoscience in addition to other types of unwarranted beliefs. The authors admit that because students were not randomised, there is selection bias so students who chose to enrol in the CT course might be more sceptical than those who did not. Still students in the experimental group did show greater improvement than students in the other groups although there is less room for improvement for those students who already have a sense of scepticism. Also the test is intervention-related, favouring the experimental group who were exposed to issues tested.

Abrami et al. (2008) reviewed 17 studies involving 20,698 participants above the age of six in which the instructional approaches used were based on Robert Ennis' categories. Interventions including explicit or general instruction in CT in classes where it had a clear objective, had the greatest effect, as opposed to interventions where CT was considered a by-product of instruction and was taught implicitly (the immersion method), whether in a separate course or within the subject. However, it was not clear in this meta-analysis whether the studies that tested the explicit approach to instruction in CT used experimental designs. The authors lumped together all the studies with the same approach taking no account of the type of design, which could affect the strength of the evidence. The evidence of effect therefore needs to be ascertained.

Similarly, Behar-Horenstein and Niu (2011) carried out a review of 42 empirical studies (from 1994 to 2009) in which interventions to develop CT skills were used. All the studies used one of three published tests: the CCTT, the WGCTA, and the CCTST. A large number of studies adopted the immersion approach (52%, n = 22), but reported the lowest percentage of growth in CT skills. However, one of the limitations that the authors of the review acknowledge is that only three studies (7%) used a true experimental design, so the evidence is not strong.

Tiruneh, Verburgh, and Elen (2014) conducted a systematic review of 33 intervention studies using Ennis's instructional approaches. Most of the studies that used the general approach reported significant gains in CT (n = 4; 80%). The immersion approach showed bigger effects among second-year students than first-year students. However, the evidence is inconclusive due to the limited number of studies that employed the general and mixed approaches in comparison with the infusion and immersion approaches.

Stronger evidence for the general approach is evident in programmes that target children at a very young age. For example, Gorard, Siddiqui, and See (2017) tested the effectiveness of Philosophy for Children, (an educational approach developed by Mathew Lipman in 1970), in a year-long intervention where 48 volunteer schools were randomised to experimental and control groups. Philosophy for Children had a positive effect on children's attainment at Key Stage 2 (ages between 7 and 11) in reading and maths, equivalent to two months' progress in just one academic year and a much higher gain in writing and maths for disadvantaged children.

Another general approach used in primary school classroom is dialogic teaching. A dialogic teaching approach encourages pupils to reason, discuss, and argue in order to develop higher-order thinking. A large scale clustered RCT funded by the Education Endowment Foundation evaluated the effect of dialogic teaching on pupils in Year 5 in 76 schools (Jay et al., 2017). Pupils made two additional months' progress in science and English and one additional month's progress in maths. There is, therefore, empirical evidence that even children at a very young age can be trained to think critically.

Some argue that the general approach and the domain-specific approach are not necessarily mutually exclusive. They could complement each other. For example,

Andrews (2015) suggests that an effective approach to be adopted in higher education is to offer students short modules in argumentation, a closely related skill to CT, at the beginning and at the end of their studies, in addition to more exposure to those skills in their major modules.

The general approach does not always entail explicit teaching, so another side of the debate is whether the general or subject-specific approach is more effective when taught implicitly or explicitly. Abrami et al. (2015) conducted a series of studies testing different approaches. Their meta-analysis, which included experimental and quasi-experimental studies, suggests that the most promising approach is the mixed method approach, which might include either explicit or implicit instruction. In an earlier meta-analysis (Abrami et al., 2008), the direct and explicit approach resulted in significant development of students' CT skills.

These studies provide some evidence that the explicit approach may be the way forward, but the question is not whether the general approach or the domain-specific approach is better, but a combination of direct or explicit instruction either as a general or subject-specific approach. And whatever the combination, the length of exposure (at least 12 weeks) is also an important factor for the intervention to work. For example, regardless of what approach is being used, Niu, Behar-Horenstein, and Garvan's (2013) meta-analysis found that interventions lasting more than 12 weeks reported a bigger gain than those lasting less than 12 weeks, suggesting that for any effect to be realised students have to be exposed to the intervention for at least three months.

4.3 Summary

The major debates around CT instruction are whether universities have a role to play in inculcating CT skills; whether CT instruction should be subject-specific or general and whether it should be taught in an explicit and direct manner or embedded within the curriculum. Previous studies suggest that these approaches can be complementary and that a mixed approach combining explicit instruction with either the general or subject-specific can be equally effective. However, much of the evidence from previous studies are based on meta-analysis of studies using different research designs. Summarising evidence from experimental and quasi-experimental studies as though they were all of the same quality and taking no account of the limitations of each of these studies mean that the findings can be misleading. Therefore, the jury is still out as to which is the

most effective method of instruction. These studies also fail to consider the effects of the different methods of instruction on different populations and students in different phases of education. Some approaches may be more appropriate or effective for primary school children, some are more relevant to higher education students. Similarly, certain strategies may work better for native English speakers while others may be more effective for foreign English language learners. In contrast to the general approach, the domain-specific approach makes it difficult to teach CT in the foreign language classroom, where students do not have complete mastery of the language and often do not have in-depth knowledge of a particular subject. More robust evaluations are needed that differentiate the effects for different groups of learners.

PART II
RESEARCH DESIGN AND METHODS

CT skills have been considered as essential for the development of independent thinkers. The objective of the thesis is to establish the evidence of the effectiveness of CT instruction on CT skills of ELL in higher education within an education system and culture where such skills are not promoted and encouraged.

To establish whether instruction in CT can help develop CT skills in ELL in higher education and to identify the most effective strategy for teaching CT, a systematic review synthesising evidence from existing empirical research was conducted. Chapter 5 describes the methods used in the systematic review.

To determine whether instruction in CT is feasible in an education system that promotes memorisation, a RCT was conducted in a private higher education institution in Lebanon. Chapter 6 describes the design, development and conduct of the RCT. Chapter 7 presents the methods of primary data analysis.

CHAPTER 5

The conduct of the systematic review

Prior studies have suggested that instruction in CT can help develop CT abilities of students (McMillan, 1987; Huber & Kuncel, 2016). Most of these studies are conducted in Western countries and with students whose first language is English. These studies also tended to claim that certain instructional approaches are more effective. However, there is no consolidated robust evidence that such instruction can benefit students in higher education whose first language is not English. And the evidence for the most effective approach is unclear.

The systematic review aims to synthesise empirical evidence of the effectiveness of such instruction for ELL students in higher education. And if found to be effective, to identify the most promising approach to teaching CT. This chapter describes the methods involved in conducting the systematic review. It details the steps used in the systematic review from the formulation of the key words, database search, and screening to the appraisal and synthesis of research reports.

5.1 Aim of the present review

The aim of the systematic review is to review and synthesise empirical research to establish whether there is any evidence that instruction in CT can help develop CT skills of EFL/ESL students in post-16 classroom. This age is chosen because students who are studying English as a second or a foreign language will generally have reached an acceptable level of proficiency in English, and so be able to access the instruction in the teaching modules in English.

5.2 Rationale for a systematic review

A systematic review synthesises research evidence based on a clearly pre-defined eligibility criteria and a set protocol. It comprehensively explores the field of research and includes all existing studies that fall within the eligibility criteria in order to answer a research question. As such it minimises the potential for selection bias and publication bias. A systematic review synthesises evidence from previous research already conducted and is particularly useful in areas where the evidence from existing studies is yet unclear (Torgerson, 2003; Petticrew & Roberts, 2006; HM Treasury, 2011). It is

also useful in scoping research in a field. For this reason, the thesis starts with a systematic review to look at the existing evidence.

The systematic review in this thesis starts with a protocol which made explicit the research question, the objectives of the review, the inclusion and exclusion criteria, the search and screening strategy, the quality appraisal and synthesis of evidence. A comprehensive search of relevant databases, in addition to a comprehensive hand search, is done in order to make sure not to exclude any studies that might be of relevance to the research question. The steps involved are explicit, transparent and replicable to ensure that a non-biased and objective assessment of the evidence is presented. Quality appraisal of each included study is an important aspect of a systematic review. This is to ensure that the evidence synthesised from the review is valid and credible. Lumping studies of different designs and different quality as though they were all of the same can lead to misleading results. In this study the criteria for judging each piece of work are clearly spelt out and the process is made transparent to allow for replication (Torgerson, 2003).

5.3 Research questions

The review aims to answer the following research questions:

RQ 1   Is there evidence that instruction in CT can help develop CT skills of ELL in higher education?

RQ2   What is/are the most promising approach(es) to teaching CT skills to ELL in higher education?

5.4 The search strategy

The search strategy involved searching 12 electronic databases and handsearches. This also included following up known studies. The first search was done in October 2014. In order to update this systematic review, another search of each database previously searched was done again in August 2016 and again in November 2018. Some studies that were found in the first search in some databases did not emerge in the second search. A specific search for those studies showed that they were no longer available in the databases where they were originally found.

The search was limited to the following:

- Date: After 1989

- Source type: Conference Paper & Proceedings; Dissertations & Theses; Government & Official Publications; Scholarly Journals

- Document type: Article; Conference Paper; Conference Proceeding;

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Dissertation/Thesis; Government & Official Document

- Language: English

Following an initial review to test the sensitivity of the search terms, a standard and very inclusive statement of search terms was used for each database (adjusted to suit the idiosyncrasies of each). Many search iterations of the syntax were run with different search options and limiters to make sure no relevant studies were missed. This statement of search terms was tested, adjusted and retested iteratively to ensure that as little as possible of relevance was missed. In summary, the search was for any materials published or unpublished that mentioned CT skills (or synonym) as outcomes plus any causal term (or synonym) or any research design (such as randomised controlled trial, experiment or regression discontinuity) that would be appropriate for testing a causal model. A key element of the search was to gather grey literature as well, wherever possible to avoid publication bias. The search 'syntax' for each database is provided in Table 5.1.

Table 5.1 Search syntax used in each database

Name of database	Search words
ASSIA (Applied Social Sciences Index and Abstracts) • British Periodicals • Social Science Database • ERIC • International Bibliography of the Social Sciences (IBSS) • Periodicals Archive Online • ProQuest Dissertations & Theses: UK & Ireland • ProQuest Dissertations & Theses Global • Education Database	"critical thinking" OR "critical reasoning" OR "higher-order thinking" OR "rational thinking" OR "analytical thinking" OR "cognitive skills" OR argument* OR debate* OR "thinking skills" OR criticality OR "thinking skills" in [Document title - TI] AND "language teaching" OR "language learning" OR "foreign language" OR L2 OR L1 OR "second language" OR ESL OR EFL OR "target language" OR "English language" OR "language skills" in [Anywhere] AND intervention OR experiment* OR "quasi-experiment*" OR "difference in differences" OR study OR "randomised controlled trial" OR "regression discontinuity" OR "factorial" OR "controlled study" in [Anywhere]
PsychINFO • British Education Index	"critical thinking" OR "critical reasoning" OR "higher-order thinking" OR "rational thinking" OR "analytical thinking" OR "cognitive skills" OR argument* OR debate* OR "thinking skills" OR criticality OR "thinking skills" [TI Title] AND "language teaching" OR "language learning" OR "foreign language" OR L2 OR L1 OR "second language" OR ESL OR EFL OR "target language" OR "English language" OR "language skills" [TX All Text] AND intervention OR experiment* OR "quasi-experiment*" OR "difference in differences" OR study OR "randomised controlled trial" OR "regression discontinuity" OR "factorial" OR "controlled study" [TX All Text]

Web of Science	"critical thinking" OR "critical reasoning" OR "higher-order thinking" OR "rational thinking" OR "analytical thinking" OR "cognitive skills" OR argument* OR debate* OR "thinking skills" OR criticality OR "thinking skills" [Title] AND "language teaching" OR "language learning" OR "foreign language" OR L2 OR L1 OR "second language" OR ESL OR EFL OR "target language" OR "English language" OR "language skills" [Topic] AND intervention OR experiment* OR "quasi-experiment*" OR "difference in differences" OR study OR "randomised controlled trial" OR "regression discontinuity" OR "factorial" OR "controlled study" [Topic]
JSTOR	"critical thinking" OR "critical reasoning" OR "higher-order thinking" OR "rational thinking" OR "analytical thinking" OR "cognitive skills" OR argument* OR debate* OR "thinking skills" OR criticality OR "thinking skills" (item title) AND "language teaching" OR "language learning" OR "foreign language" OR L2 OR L1 OR "second language" OR ESL OR EFL OR "target language" OR "English language" OR "language skills" (full-text) AND intervention OR experiment* OR "quasi-experiment*" OR "difference in differences" OR study OR "randomised controlled trial" OR "regression discontinuity" OR "factorial" OR "controlled study" (full-text)

Other searches

In addition a comprehensive and thorough search using Google and Google Scholar was conducted. The search included a combination of the same search terms used in the databases. However, handsearching could not be done in the same systematic way that was done in the databases, so various combinations of search terms were done in order to be able to find as many articles as possible. In addition, reference sections of studies were also examined for more titles.

All relevant records from the electronic database searches were exported to Zotero (a free, open source reference manager software). Research reports from hand searches were then added to the records in Zotero.

5.5 Screening

Once relevant studies were identified, they were screened for duplicates and relevance first by titles and abstracts. This was done by applying a pre-set inclusion and exclusion criteria. Only studies that were of an experimental nature were included because the aim of the systematic review was to identify approaches that can improve CT skills. Therefore, only studies that can establish causation were considered. These would be randomised controlled trials, quasi-experiments using matched comparison design, regression discontinuity, propensity score matching, difference in difference or similar.

Inclusion criteria

Included studies must:

- Be concerned with instruction in CT
- Test CT skills as an outcome
- Be concerned with courses related to ESL (English as a second language) or EFL (English as a foreign language)
- Be conducted in post-16 education setting
- Be empirical (i.e. not opinion pieces or promotional literature)
- Use experimental or quasi-experimental designs (e.g. randomised control trials, quasi-experiments using matched comparison design, regression discontinuity, propensity score matching, difference in difference or similar)
- Be published between 1990 and 2018
- Be published or reported in English

Exclusion criteria

The focus of this review is on courses where English is used as a foreign or second language.

Studies were excluded if they were:

- Not empirical research (i.e. opinion pieces, instructional manuals/guidance about how to teach CT or promotional literature about CT or about the theory of CT)
- Not related to teaching English as a foreign or a second language
- About teaching English for Academic Purposes (EAP)
- About the teaching of grammar and phonology
- About teaching literature
- Related to computers, technology, and the internet as learning tools
- About testing English language skills, such as Test of English as a Foreign Language (TOEFL) and the International English Language Testing System (IELTS)
- Related to primary and middle school students (under 16 years old)
- Related specifically to students with learning disability such as dyslexia
- Related to gifted students
- Related to metacognitive skills
- Simply about assessment of CT skills
- Very short intervention lasting less than a month

  Short intervention spanning less than one month were excluded because instruction in CT is not a simple task and it requires time for students to get exposure to various skills and to absorb those skills. A meta-analysis by Niu, Behar-Horenstein, and Garvan (2013) shows that interventions that lasted more than 12 weeks reported a bigger gain than those that lasted less than 12 weeks. Also, interventions that lasted less than a month suggest that the pre- and post-tests would be very close. This might introduce practice effect and render the results less valid.

5.6 Data extraction

When all the studies retrieved have been screened for relevance and duplicates have been removed, the full paper/research report was read and relevant information was extracted.

The criteria are based on general guidelines for conducting systematic reviews (Torgerson, 2003; See, n.d.). They provide detailed guidance in the evaluation of each step of the research process. Detailed information about each study is provided in Appendix 2.

Data extraction involved noting information about all aspects of the research design which include matters pertaining to the sampling strategy, the randomisation process, and the instrument used to assess the outcome measure.

Research design

Since the review question is a causal one, it is essential that only studies that use experimental or quasi-experimental studies are analysed. To extract data about the research design, the following guiding questions were used:

- Is it experimental or quasi-experimental research?
- Are groups randomised or matched?
- How is randomisation carried out? Is randomisation done at the individual or group level?
- If randomisation is done at group level, are there enough subgroups in the control and experimental groups?
- Is there a control and an experimental group?
- Is there a pre-test and a post-test?
- In case of essays or tests requiring open-ended answers, are raters blinded to ensure objectivity of results?
- What is the duration of the intervention?

Sample

Examination of the sample involved extracting data about the sampling strategy, balance between the groups, and attrition rate using the following questions:

- What is the sampling strategy (how was the sample identified; were they students from the researchers' own class; were participants volunteers)?
- What is the sample size?
- What is the number in each group?
- Is there attrition? What is the number of participants who dropped out from each group?

- In the case of nonrandom allocation, is there any attempt at ensuring that the two groups are equivalent at baseline?

Outcome measures

Data was also extracted regarding the outcome measured and the instrument used to measure the outcome using the questions below:

- What are the outcomes? How are they measured?
- Are participants assessed using teacher-developed tests, researcher-developed tests, intervention-related tests or commercially produced tests?

Information was also extracted to establish the rigor with which the study was conducted, whether data was appropriately analysed, and whether the conclusions were warranted.

Rigor of the study

The rigor of the study is judged based on the following:

- Is the research question clearly stated?
- Is the choice of research design appropriate for the research question(s)?
- In case of randomisation, is the procedure clearly explained?
- Is the conclusion reached warranted by the evidence?
- Do the research methods used eliminate any simpler alternative explanations for the findings of the study?

Is analysis appropriate?

Data was also extracted about the kind of analyses used and whether they were appropriate and if there is any evidence of data dredging. This helped to assess the trustworthiness of the study. In extracting the data about analysis the following questions were asked:

- How is the data analysed?
- Is the statistical analysis appropriate to the research design? Does the statistical analysis help answer the research question(s)?
- Is there a pre-test and post-test comparison or is baseline equivalence established?
- How are scores of experimental and control groups calculated?

- Is there evidence of data dredging (i.e. exhaustively searching for combinations of variables to explain a correlation which can lead to biased or false results)?
- Is effect size calculated? If not, are means and standard deviations presented to allow for calculation of effect size?)

Results

The findings in each study were examined based on the following questions:
- What are the major findings regarding development of CT skills?
- Are all the results presented or are only favourable ones presented?
- Are they logical and convincing?

Comments and limitations of the studies

Data extraction also involved any comments that the two assessors found to affect the validity of the study. Comments were written on aspects of the study that might affect the internal and external validity of the experiment including sample size, level of dropout, blinding, and confounding variables. Comments were guided by the following question:

Were threats to validity, such as demoralisation, Hawthorne effect, regression to the mean, bias in treatment, experimenter effect, teacher effect, conflict of interests, or diffusion of treatment dealt with properly?

5.7 Judging the quality of studies

Assessment of the quality of studies is essential in judging the trustworthiness of the findings of the study. The data extracted in the previous steps facilitate this judgement. In this review, the ratings were completed by two raters (myself and my supervisor). We both rated all the 36 studies individually and then compared our ratings. Where there was a disparity we explained our ratings and an agreement was reached.

Each of the included studies is rated to judge the strength of its evidence using a set of criteria based on the design of the study, sample size, attrition, how outcomes are measured and threats to validity. This is done using the "Sieve" proposed by Gorard (2014). This ignores the source of any publication or the status of its author or funder as any guarantee of research quality. Instead the quality of evidence for each of the

included studies is judged by applying the "Sieve". This step is essential since much of education policy so far has been based on incorrect, misleading or incomplete evidence.

The "Sieve" works by judging the study first by its design (see Table 5.2) and rating moves from left to right and from top to bottom. For example, a study with a good design will drop one star (from 4* to 3*) if the sample is small (e.g. under 50 in each arm). Or if a RCT starts with a large number but attrition is over 25% then it will drop from 4* to 2*. There is no magic number as to what the minimal attrition or sample size should be. It is based on judgement. For example, it is clear that a study with 100 participants individually randomised will be stronger than one with 20 children in two randomised classes (the number of cases here is 2 and not 100). Similarly attrition at 25% is more likely to affect the results of the study than an attrition of under 5%. Therefore, the "Sieve", as Gorard, See, and Siddiqui (2017) contend, is left vague on purpose so that the reviewer would make a sensible judgement about the study being reviewed. The "Sieve" was used in this review as it is a simple and transparent way to judge the trustworthiness of research while allowing some flexibility to detect any evidence of bias in the study under examination.

Table 5.2 The "Sieve" to assist judging the trustworthiness of single research reports

Design	Scale	Dropout	Outcomes	Fidelity	Validity	Rating
Fair design for comparison	Large number of cases per comparison group	Minimal attrition, no evidence of impact on findings	Standardised pre-specified independent outcome	Clear intervention, uniform delivery	No evidence of diffusion or other threat	4★
Balanced comparison	Medium number of cases per comparison group	Some initial imbalance or attrition	Pre-specified outcome, not standardised or not independent	Clear intervention, unintended variation in delivery	Little evidence of diffusion or other threat	3★
Matched comparison	Small number of cases per comparison group	Initial imbalance or moderate attrition	Not pre-specified but valid outcome	Unclear intervention, with variation in delivery	Evidence of experimenter effect, diffusion or other threat	2★
Comparison with poor or no	Very small number of cases per	Substantial imbalance and/or high	Outcome with issues of validity or	Poorly specified intervention	Strong indication of experimenter	1★

equivalence	comparison group	attrition	appropriateness		effect, diffusion or other threat	
No report of comparator	A trivial scale of study, or N unclear	Attrition not reported or too high for any comparison	Too many outcomes, weak measures, or poor reliability	No clearly defined intervention	No consideration of threats to validity	0

Source: Gorard et al., 2017

The "Sieve" is based on six criteria. The design of a study is the most important to determine whether the findings are trustworthy or not and whether the research design fits the research question. Gorard (2013a) cautions that research design is not to be confused with methods of data collection and analysis. It is a way of planning a research project from beginning to end in order to reach a warranted conclusion that answers the research question. In this systematic review, the use of a RCT or a cluster randomised trial is the strongest design to identify what works and what does not work, with unbiased groups. Pre-experimental research cannot really test whether a programme works as there is no comparison group or counterfactual, so any improvement in scores could be attributed to various reasons other than the treatment (i.e. it could happen anyway in the absence of the treatment). In quasi-experimental research, the two groups are not randomised and hence might not be balanced. Therefore, a well-designed and well-conducted RCT provides the best chance of drawing causal conclusions although it is not the only design to establish a causal effect relationship. There are other causal designs such as the difference-in-difference approach, interrupted time-series, instrumental variables and propensity match scoring, but these tend to be weaker because of their inability to control for all possible confounding variables. In the absence of RCTs these causal studies present the best bet.

The second criterion in the "Sieve" is the scale of the experiment, by which is meant the number of participants recruited for the study. A large sample is preferred especially in educational experiments where students and teachers are heterogeneous (Torgerson & Torgerson, 2001; Robson, 2014). A large sample increases the power of detecting small effects. In social science research where it is common to have subgroups analyses (e.g. comparing boys and girls, free school meals children with non-free school meals children or ethnic groups), samples need to be large. Large samples also ensure that any

random variations between groups are cancelled out (Gorard, 2003). Studies with small sample sizes are more likely to produce exaggerated effect sizes. In a systematic review of 185 large-scale and small-scale studies, Slavin and Smith (2009) found that there was a big difference in effect size between large and small experiments. Studies consisting of less than 250 participants reported an effect size which was two to three times larger than studies with smaller sample sizes. Therefore, a big sample is necessary in order to avoid biased results and an inflated effect size that does not reflect the true outcome.

It is also important to consider the level of dropout or missing values as non-response or dropout bias the results since dropout is never random. People may drop out of a trial because they do not find the intervention suitable for them, or they fail to take the test because of difficulties accessing it. See, Gorard and Siddiqui (2017) found that in some trials schools routinely excluded students with learning difficulties and severe emotional and behavioural difficulties from tests. Missing cases are also likely to be different from those who stayed on in the programme. For example, they could be the long term sick, transient population from migrant community and "school refusers" (pupils who refused to attend schools). Post-allocation demoralisation, for example, can happen in any trial and bias the results. Therefore, studies that do not report attrition or fail to explain how they dealt with attrition would be given a lower rating since any attrition is likely to affect the validity of findings as participants who have dropped out are likely to be different from those who continued till the end. In any case dropout after allocation would render the sample non-random, and thus bias the results (Gorard, See, & Siddiqui, 2017). For example, if all those who dropped out from the treatment group are less likely to do well for various reasons, then this is likely to overestimate the effects.

The fourth column in the "Sieve" is about how the outcomes of interest are measured. Outcomes that are based on participants' self-report are less reliable as test of impact as it is often the case that participants report impact even though the data shows no effect (de Boer, Donker, & van der Werf, 2014). Medical research suggests that there is very low correlation between patients' report of symptoms and the seriousness of their conditions (Garcia & Gustavson, 1997). Direct measurements or tests should be objective and standardised as they provide more reliable and valid results (de Boer et al., 2014; Lorencová, Jarošová, Avgitidou, & Dimitriadou, 2019). In their meta-analysis investigating the effect of two types of attributes in 95 educational interventions – attributes relating to the implementation of interventions and those relating to the

method to determine the effect of interventions, de Boer et al. (2014), found that studies in which unstandardised tests were used resulted in a more inflated effect size than the effect size reported in studies using standardised tests. An added advantage of using a standardised test is that findings could be compared to other findings where the same standardised tests have been used (Duran, 1986; Anaya, 1999). In addition, the use of standardised tests reduces the chance of the teacher teaching to the test (Gorard, See, & Siddiqui, 2017).

In judging the trustworthiness of research it is also essential to ensure that the intervention is delivered as planned across all classes that have been assigned to the experimental group. This is known as fidelity to treatment. This is important as it helps explain the results, such as whether other factors could have contributed to the outcome. For example, if the intervention was not delivered as intended or the minimum amount of dosage was not achieved, this could dampen the impact of the intervention (Murphy & Gutman, 2012). This helps readers judge the validity of the findings. Fidelity to treatment also ensures that implementation of the treatment is standardised through training sessions at the beginning of the trial and throughout. A uniform delivery of the treatment would ensure that any difference between the control and the experimental group is due to the treatment itself and not to a method of teaching that a teacher uses or to the effect of a particular teacher.

The last criterion in the "Sieve", *validity*, could include a myriad of biases that may influence the strength of the evidence. These could be diffusion of treatment (e.g. when control group is also exposed to the treatment), teacher effect, short duration of intervention, type of test used (published, researcher-developed or intervention-related tests). The duration of the intervention is seldom considered when assessing the quality of studies, but is no less important because the short duration means that the interval between the pre- and post-tests may be too close and this may lead to familiarity of tests leading to practice effect. Studies (e.g. Niu, Behar-Horenstein, & Garvan, 2013) have also shown that CT needs time to develop, so a short trial may not produce the effect expected as it does not have time for effects (if any) to show.

It is worth mentioning that this process of evaluating the quality or strength of evidence of the studies involves a certain degree of subjective judgement and common sense, but

it provides a more objective and consistent or standardised method of appraising studies than one that is based primarily on authors' report of success.

5.8 Synthesis of evidence

The included studies were read and classified by methods of instruction or approaches. A summary of each of the studies reviewed was presented in a table. For each study, relevant information about the evidence rating, the approach used, effect size, sample size, size of the smaller cell and the number of counterfactual cases needed to disturb the finding (NNTD) was provided to facilitate judgement about the most promising approaches. Approaches with the most number of positive studies rated most highly on quality of evidence are considered to have the most promise. This means that although some approaches may have more positive studies than others, they may not be deemed promising if these studies were all rated low on quality.

5.9 Summary

This chapter has outlined in detail the steps involved in the systematic literature review in an explicit and transparent manner to enable replication. It described how each study is quality appraised to ensure that the findings are based on the most reliable and robust evidence where available.

CHAPTER 6
Research design and methods of the trial

This chapter describes the randomised controlled trial, the sampling strategy, the randomisation process, the development of the intervention, the materials used, the training of teachers, and the conduct of the process evaluation.

6.1 The aim of the present trial

To aim of the trial is first to establish whether teaching CT skills to higher education students who are learning English as a foreign language in Lebanon can improve their CT skills. Secondly, it aims to test whether instruction in CT is feasible in a culture where CT is not explicitly promoted. Thirdly, it tests whether explicit teaching using the general approach (i.e. where CT instruction does not require in-depth knowledge of a particular subject or domain) is effective in developing CT skills of higher education students in Lebanon.

The trial therefore aims to answer the following research questions:

RQ 3   Can general CT skills be taught to ELL in higher education in Lebanon within the regular curriculum?

RQ 4a Is it feasible to teach CT skills in an education system which does not generally promote independent thinking and argumentation?

RQ 4b Is it feasible to teach CT skills in a culture where the curriculum is heavily dictated by religion and politics?

RQ 5   Do students' characteristics (e.g. gender, subject major, exposure to a foreign culture, job experience) affect their receptivity to CT skills?

These are causal questions and thus an experimental design in the form of a RCT was deemed the most appropriate for this investigation.

6.2 Rationale for a randomised controlled trial

A RCT involves comparing the outcome of one group which receives the treatment or intervention with a control group. The control group provides a counterfactual by indicating what would have happened to the experimental group had they not received the treatment. The use of a control group to which participants have been properly and fairly randomised can help rule out any alternative explanations for the findings and any

threats to internal validity (Shadish, Cook, & Campbell, 2002; Bryman, 2012). Internal validity refers to the confidence with which experimental research can draw causal conclusions (Bryman, 2012). The validity of a trial largely depends on the ability of the researcher to ascertain that any difference between the two groups is due to the treatment itself and nothing else (Gorard, 2003), hence the use of a control group is necessary to ensure this.

An advantage of a RCT is its ability to counter a variety of threats in the research design (Cook, 2002) as whatever affects the experimental group, other than the treatment itself, is likely to affect the control group too. Random assignment to groups also ensures that there is no selection bias.

While individual randomisation increases the power of detecting effect sizes, cluster randomisation is sometimes necessary in cases where it is not possible to randomise individuals. In this study a cluster RCT was employed where groups by teachers were randomised because the students were allocated by university administration to classes and some teachers teach more than one class (so randomisation by class was not feasible). Cluster randomisation was therefore necessary to prevent contamination (Torgerson & Torgerson, 2001). In cluster randomisation each cluster is considered one case and therefore the more clusters there are the better to be able to detect any noticeable differences between the two groups that are being compared (Torgerson et al., 2010).

6.3 The intervention

The trial was conducted over two terms with two different cohorts of students in the same university. One was conducted in the Spring term and the other in the Fall. The duration of the intervention is one term consisting of seventy sessions in which 11 lessons were used for teaching CT for the treatment group. These lessons were spread over 14 sessions of 50 minutes each. Students in both the control and experimental groups received the same number of sessions. While the control group had lessons based on their regular curriculum in that term, treatment classes had some lessons on CT concepts using materials developed by the researcher which substituted for some of the materials that were part of the regular curriculum and were integrated into the module. Otherwise, course materials and instruction were the same for both groups

This section describes the intervention using the TIDieR (Template for Intervention Description and Replication) checklist (Hoffmann et al., 2014).

Name of intervention

A generic approach to explicit instruction in critical thinking

The rationale for the intervention

The belief is that explicit instruction in CT concepts following the general approach could improve students' CT in the language classroom in higher education. As students in the language classroom must read texts, have discussions, and write essays, there are many opportunities to nurture their CT skills simultaneously with their language skills.

People involved in the intervention

The intervention was designed by the researcher who also provided informal training to the teachers who taught the experimental classes. Participants were students in the English 102 module and their teachers.

The teaching resources used in the intervention

Each CT lesson was prepared on a handout consisting of two to three pages maximum. The answer key to each activity was prepared on a separate document and given to experimental teachers. All the lessons consisted of handouts except for one where students had to watch a short video of around 20 minutes. The video was kept in the language lab which was reserved for the experimental classes to watch. Students were also given a handout to answer some questions while watching and to discuss them afterwards.

Photocopies of the lessons for all experimental students were made available to the teachers a couple of days before the lesson. Teachers received the handouts with the answer key around three days ahead of the time assigned for each lesson.

As students in this trial had no previous exposure to CT, only basic CT concepts were introduced. The lessons revolved around concepts in CT, and the teaching resources were developed by the researcher using and adapting materials from textbooks, newspapers, academic books and websites. Some of the materials were adapted to suit the reading ability and interests of the students.

The lessons that formed part of the intervention and that were given to students as handouts are provided in Appendix 4. The answer key that was given to teachers can also be found in Appendix 4 at the end of each lesson.

The themes covered were a general introduction to logical fallacies, difference between causation and correlation, assumptions and stereotypes, reliability of sources, counter argumentation, in addition to a brief introduction to validity of research and an introduction to biases in surveys and statistics.

It is important to note that focus was on general CT skills and not on the skills that are emphasised in the CCTT, Level Z. The aim of the researcher was not to teach to the test but rather to explore whether CT can be taught.

Lesson One

The first lesson was an introduction to logical fallacies where students were introduced to common fallacies such as hasty generalisation, either-or fallacy and circular reasoning. Students were given a handout with sentences that had weaknesses in reasoning, and then they had to find out and explain why the reasoning in the sentence was flawed. Students were not required to know the names of fallacies. Fifteen sentences with flawed reasoning were included in the handout in the first lesson. Students were first given time to think about the sentences, and then they discussed the possible answers with their class teacher.

Lessons Two and Three

The next two lessons focused on the difference between causation and correlation. Although the difference between causation and correlation was briefly introduced in the first lesson on logical fallacies, a more detailed explanation was provided in these two lessons. In order for students to understand the difference between causation and correlation, students were given two different texts from newspapers forming two different lessons. The first newspaper article (to which two sessions were devoted) was about the link between Facebook and divorce and the second lesson (also done in two sessions) focused on the link between living by the sea and good health. As the focus of English 102 (the regular syllabus) is on writing summaries and paraphrasing parts of a text, students in the experimental group used the two texts on causation versus correlation in order to practice the skill of summarising, paraphrasing, and quoting.

Therefore, both groups, the experimental and the control, practised the same skill but the difference was the type of text given.

Lesson Four

Lesson Four was about assumptions and stereotypes. Students in the experimental classes were given a newspaper article about stereotyping female drivers and its negative effect on the driving performance of women. They started the lesson by having a class discussion on what assumptions and stereotypes mean. Just like the previous lesson, they had to summarise the text and paraphrase some parts, skills that have to be introduced and reinforced in the regular syllabus.

Lesson Five

The fifth lesson took a slightly different form from the customary as it involved a TED (Technology Education Design) talk video on assumptions and stereotypes. A Nigerian lady discusses her experience with stereotyping and being stereotyped. Students were given a task sheet with questions so that they stay focused on the video, and then a class discussion followed.

Lessons Six and Seven

Lessons Six and Seven examined the reliability of sources. The aim of the lessons was to make students aware that there is often a hidden agenda behind a claim. They were also taught how to look at the source of information to determine its credibility. Short excerpts taken from various sources were given to students to examine and determine the reliability of their claims. The second lesson on reliability of sources was about KFC. Two short texts, one from a newspaper and one from a website that confirms or debunks questionable stories that go viral on the internet, were given to students to read and examine. Students then had to determine which text was more convincing and they had to provide reasons for their answers in a class discussion.

Lesson Eight

In Lesson Eight, students had to think of counterarguments for short texts. The texts were about vending machines and obesity in children, the usefulness or not of homework, and college attendance policies. Students were asked to think of counterarguments to certain sentences in the texts.

Lessons Nine and Ten

Lessons Nine and Ten focused on studies and surveys. The focus of Lesson Nine was on the validity of a study and the hidden factors that might affect the conclusion in a study. Lesson Ten was on surveys and focused mainly on biases in surveys and in the way questions could be asked.

Lesson Eleven

The last lesson consolidated all the lessons that students had taken. Students were given a text in which the writer defends cheating. Students were asked to identify the writer's argument and the reasons. Then they were asked to examine if there were any logical fallacies in the text. This lesson provided the opportunity for students to evaluate a piece of writing and to engage in critical reading.

Table 6.1 summarises the lessons introduced during the trial and the number of hours spent on each lesson.

Table 6.1 Lessons and number of sessions

Lesson	Number of lessons	Number of sessions
Logical fallacies	1	1
Correlation versus causation	2	4
Stereotypes and assumptions	2	3
Reliability of sources	2	2
Counter argumentation	1	1
An introduction to studies and surveys (linked to reliability of sources)	2	2
Reading critically (a text including logical fallacies, assumptions, and other related themes)	1	1
	Total: 11 lessons	**Total: 14 sessions**

Procedures used in the intervention

On the day of the CT lesson, the class teacher would hand each student a handout of the CT lesson. Teachers were instructed to encourage class discussions and to encourage

students to voice their opinions as much as possible during the lessons. The number of students in each class ranged between eight to sixteen students. Students would keep the handout with them at the end of the lesson.

Location of the intervention

Classes were held as usual in the classrooms allocated by the Registrar's office. Some classes were next to each other and some others were in different buildings. The university where this intervention took place is a private university in the north of Lebanon.

Duration of the intervention

The intervention first took place in Spring 2014-15 over one term extending from February 4 to May 27 (16 teaching weeks). Then it was repeated with another group of students in Fall 2015-16 over one term extending from September 2 to December 10 (16 teaching weeks). The eleven CT lessons (14 sessions of 50 minutes each) were scheduled to fit in within the term. An average of one or two sessions of CT were given each week (the duration of the term is approximately four months).

Monitoring of the intervention

The intervention was monitored by observing the delivery of the lessons. This was to check for fidelity of implementation (i.e. if the lessons were conducted as planned) and to identify potential barriers to delivery. The researcher was able to observe the lessons of only two experimental teachers each time a new lesson was introduced. As the researcher had her own experimental classes, it was not possible to observe the classes of the other two experimental teachers. Details about the process evaluation are presented in Chapter 10.

6.4 The sample

The trial was conducted with a group of 413 students forming 29 clusters. The trial was first run with a group of 226 university students forming 16 clusters in Spring 2014-15 over one term extending from February 4 to May 27 (16 teaching weeks). The same trial was repeated on another cohort of 187 students forming 13 clusters in Fall 2015-16 over one term extending from September 2 to December 10 (16 teaching weeks). The reason for repeating the trial over two terms was to increase the sample size.

The sample for this study included all students enrolled in the English 102 module. English 102, is a Freshman module - a transitory module between school and university in a private university in Lebanon that follows the American system where the language of instruction is English. Students usually take this module in their first year of undergraduate study or sometimes in their second year depending on their proficiency in the English language. It is a university requirement for students who score between 570 and 597 on the Test of English as a Foreign Language (TOEFL) (paper-based), 440 and 489 on the Scholastic Aptitude Test (SAT), or 7 on the International English Language Testing System (IELTS). Most students in English 102 come straight from school. However, there are some who have come from English 101, which is a lower Freshman module, so this is their second term. Other students include those who have passed the Intensive English module (lower than English 101) and have moved from English 101 to English 102, so this is their second year in the university. To some, English is a second language while to others it is a third language as their second language is French. All students are native speakers of Arabic.

The researcher, who has taught this module for about eight years, has chosen this module to experiment on because a considerable number of students are supposed to have had substantial exposure to English by the time they reach this module. Therefore, students at this level do not have to struggle with the difficulty of learning a completely new language. Students are expected to be proficient in English; however, they do not all have the same level of proficiency in all the language skills. Some students are better writers than others, for example, while others are more fluent in speaking. Classes are somewhat heterogeneous.

Students that formed part of the study are undergraduates from various majors like Engineering, Architecture, Nursing, Biology, Tourism and Hotel Management etc. Students were mostly Lebanese with a few who were born overseas or held foreign citizenship. Students' ages ranged between 17 and 27 with the majority being 19 years old in both experimental and control.

6.4.1 Description of the regular module lessons (control group activity)
The module aims at developing students' language skills in order for them to successfully participate in academic studies at the university level. Special emphasis is

placed on essay writing skills. Students are expected to learn how to write a documented argumentative essay and a research paper using references. The class meets 5 days a week for a 50-minute session every day. Although the module focuses on argumentation and class discussion may be encouraged, not enough time is devoted to teaching CT concepts. Students, for example, are not taught logical fallacies. Nor are they taught to read critically or to question arguments with a critical eye.

The focus of the module is on the writing skill with reading and speaking having a secondary role. The module starts by preparing students for a debate. This usually takes about a week and a half in which students come up with arguments and search for references on the internet to back up their arguments. After the debate, they are taught how to write a three-body paragraph argumentative essay. This is usually covered in about three weeks and no references are provided at this stage. Simple topics are usually given to students like whether students should work part-time or not, whether students should study abroad or in their own country, whether life in a city is better than life in a village, etc. Students are then taught how to summarise, paraphrase, and quote from texts. They are also taught how to cite their sources. Many short newspaper articles from The Independent, The Daily Star, The Guardian, etc., are provided in their handbook for this purpose. The topics are simple topics that students can understand and identify with like the health hazards of energy drinks, the danger of third-hand smoking, advertising to children, children's addiction to McDonald's, etc. Students are usually asked to read an article, summarise it, then paraphrase a part of it, and quote a sentence using a proper reporting verb. This is usually covered in about three weeks.

Then students are introduced to the process of writing a documented essay based on references provided by the teacher. They are also taught how to write a reference list in addition to properly citing the references in the text. This takes about two to three weeks. In the last part of the course, each student has to choose a debatable topic, take a position, and write a short research paper in which they incorporate references to back up their positions. Students are usually encouraged to use newspaper articles and websites for organisations. They bring in their references to class and write the paper in class. In all the three major writing assignments, the argumentative essay, the documented essay and the short research paper, students are usually required to write two drafts. Students do a second draft for each of the three graded assignments after

getting written and oral feedback from their teachers that covers language, mechanics, sentence structure, word choice, ideas, unity and coherence.

Although the English 102 syllabus requires students to use CT skills, whether this is taught or not and how it is taught is left to the discretion of the class teacher. Although one could argue that writing a documented essay or a research paper requires the use of CT, students in this module do not get enough training in thinking critically and evaluating claims and sources. Based on the observation of the researcher and many informal discussions with colleagues, students by the end of the module usually learn how to write a research paper but their writing in general lacks criticality. For example, for the short research paper students are required to find references to back up their claims, but they usually find difficulty distinguishing between reliable sources on the internet and untrusted sources like blogs written by students and commercial companies.

6.5 Randomisation

Randomisation was at the teacher level as it was not possible to individually randomise students to classes since students were allocated to classes by the Registrar's office. Students usually choose the time slot that best suits their schedule and then it is the Registrar's office which fills one class after another when there is more than one class running in parallel. There is no specific pattern that the Registrar's office uses for filling in classes except for the time of the day that students choose for their classes to be.

Teachers in the university where this study is conducted are usually assigned to teach English 102 or any other course by the Head of the English Department. The researcher is usually given three classes of English 102 each term, and this has been the case for the past three or four years. Therefore, the researcher did not have the choice of the teachers who would be teaching English 102 classes.

A meeting was held at the beginning of the Spring (the first trial) to ask teachers who have been assigned by the Head of the English Department to teach English 102 if they would like to take part in the study. General information about the study was given. However, in order to avoid contamination, the researcher could not give detailed explanation about the intervention. The only explanation provided to teachers prior to randomisation was that they had to fit in eleven extra lessons in their classes if they

were randomly assigned to the experimental group; however, no explanation of what the lessons involved was given. In the Spring, all teachers volunteered to take part in the study and agreed to be randomised to either experimental or control groups except for one teacher who was teaching the module for the first time and had taught in this university for only one year. This teacher agreed to take part in the study but preferred to be assigned to the control group in order to avoid coping with the stress of dealing with new materials in addition to the stress of a new module that she had to prepare for. As the researcher was assigned three classes of English 102 by the Head of Department, her three classes were treated as experimental since one teacher cannot teach both control and experimental classes at the same time to avoid diffusion of treatment. As a result, nine teachers were randomised to either control or experimental. In the case when the same teacher taught two or three classes, all the classes taught by that teacher would be in the same treatment group.

Randomisation in the Spring term was done in the 3rd week of the term on February 16. Similarly randomisation in the Fall term took place in the 3rd week of the term. The third week of the term was chosen for randomisation to make sure that no more students would be enrolled in English 102, and no classes would be closed due to low enrolment. In the Spring, random assignment was done with two cups and folded paper with the names of teachers in them. One cup had scraps of folded paper in which names of teachers were written and the other cup had scraps of paper on which the words "experimental" and "control" were written. The draw took place in a meeting room in the presence of four teachers who volunteered to be with the researcher to ensure that the draw was fair and transparent. The result was that 14 classes were randomised to the experimental group and 15 classes to the control group) with an equal number of participants in each group (206 students in the experimental group and 207 students in the control group).

The draw in the Spring resulted in the following distribution of teachers between control and experimental groups:

Table 6.2 Randomisation of classes to experimental and control groups in the Spring

Experimental classes		Control classes	
Class teacher (class number	Number of students	Class teacher (class number	Number of students
Researcher (Class 1)	15	Teacher 1 (Class 17)	8
Researcher (Class 6)	16	Teacher 5 (Class 2)	15
Researcher (Class 7)	15	Teacher 6 (Class 4)	16
Teacher 2 (Class 3)	15	Teacher 6 (Class 5)	16
Teacher 2 (Class 8)	15	Teacher 7 (Class 10)	16
Teacher 3 (Class 9)	14	Teacher 9 (Class 11)	15
Teacher 4 (Class 12)	13	Teacher 9 (Class 15)	13
Teacher 8 (Class 16)	11	Teacher 10 (Class 14)	13

*Note: Classes 1, 6 and 7 were assigned to the experimental group as they were taken by the researcher, so were not entered into the randomisation.

To avoid diffusion, the same experimental teachers who taught in the Spring were kept as experimental teachers. There were a few minor staff changes in the Fall. One of the previous experimental teachers was not assigned a class in the Fall by the Head of the English Department. Another experimental group teacher who taught two classes in the Spring was assigned only one class in the Fall. Therefore, it was necessary to include one more experimental teacher to maintain an equal number of students in the control and experimental groups. A meeting was held on September 15 to ask if any teacher who was assigned English 102 would like to volunteer to be in the experimental group. Two teachers volunteered. The names of the two teachers were written on a piece of paper each, and it was agreed that whoever has their name drawn will be the experimental teacher.

The draw in the Fall resulted in the following distribution of teachers between control and experimental groups:

Table 6.3 Randomisation of classes to experimental and control groups in the Fall

Experimental classes		Control classes	
Class teacher (class number	Number of students	Class teacher (class number	Number of students
Researcher (Class 1)	15	Teacher 11 (Class 8)	15
Researcher (Class 3)	15	Teacher 1 (Class 9)	14
Researcher (Class 7)	15	Teacher 9 (Class 10)	15
Teacher 2 (Class 2)	16	Teacher 9 (Class 15)	13
Teacher 3 (Class 4)	16	Teacher 10 (Class 11)	15
Teacher 14 (Class 6)	15	Teacher 12 (Class 14)	8
		Teacher 13 (Class 5)	15

*Note: Classes 1, 3 and 7 were assigned to the experimental group as they were taken by the researcher, so were not entered into the randomisation.

In summary, there were 29 clusters including 413 students with 206 students in the experimental group and 207 students in the control group. The number of clusters is therefore above the five to seven which is usually recommended. This increases power in detecting any effect, if there is one (Torgerson, Torgerson, & Taylor, 2010).

6.6 Outcome measures

Primary outcome

The primary outcome was CT ability. This was measured using the CCTT, Level Z. The same version of the CCTT was used for the pre-test and the post-test as it was deemed to be the most appropriate for the level of the students in this study. The possibility of using other tests was also explored, such as the CCTST and WGCTA, but these were found to be not suitable for the students.

The CCTT was developed by Robert Ennis and underwent various stages of refinement with constant feedback from Ennis' colleagues at both Cornell University and The University of Illinois. The test was developed based on Ennis' widely-known definition of CT: "Critical thinking is reasonable and reflective thinking focused on deciding what to believe or do" (Ennis, Millman, & Tomko, 2004). In the manual, Ennis et al. (2004) describe the test as a CT ability test aimed at college and graduate students, as well as

adults in general. It consists of 52 items in the form of multiple choice questions requiring 50 minutes to be answered. The CCTT is a general-content multi-aspect test. This means that the test draws on topics from everyday life and various subject-matter areas and is not specific to one particular topic that requires in-depth knowledge of the subject. It measures different aspects of CT. Therefore the subject-matter covered is expected to be familiar to the target population of the test.

Level Z assesses five aspects of CT: induction, deduction, credibility (of statements made by others), assumption identification, and meaning (including definition, sensitivity to meaning, and ability to handle ambiguity in meaning). Although the test assesses various aspects of CT skills, Ennis et al. (2004) admit that many skills overlap and are interdependent. The following table shows the number of items in the test that assess the different skills.

Table 6.4 Skills assessed by the Cornell Critical Thinking Test with corresponding item numbers

Skills assessed in The Cornell Critical Thinking Test Level Z	Item numbers
Induction	17, 26-42
Deduction	1-10, 39-52
Credibility	22-25
Assumption	43-52
Meaning	11-21, 43-46

With regards to validity, the CCTT has been tested against seven other CT tests like the WGCTA and the correlation was around .50, which is an acceptable degree of relationship. Ennis et al. (2004) strongly assert that the CCTT has content-related evidence of validity because the test is based on a satisfactory conception of CT which is adequately represented in the test. The test is also a reliable instrument in that it produces results that are stable and consistent when repeated many times. In terms of reliability CCTT has been tested for consistency (reliability) across 42 groups, and reliability is estimated to be between .49 to .87.

Other data

Data on students' demographic characteristics such as gender, nationality, cultural exposure, job experience, previous school education, and current university faculty were

also collected via a questionnaire for subgroup analyses. This is to examine whether CT instruction benefits different groups of students differently (See Appendix 8a).

All other demographic data about both experimental and control students are presented in the table below.

Table 6.5 Demographic data of students

	Experimental group (N = 206 students)	Control group (N = 207 students)
Male	144	122
Female	62	85
Lebanese	149	150
Lebanese +	42	26
Foreign	10	11
Unknown	5	20
Cultural exposure	116	116
No cultural exposure	85	71
Unknown	5	20
Job experience	71	54
No job experience	130	133
Unknown	5	20
Humanities	11	12
General science	84	61
Life science	54	51
Socioeconomics	38	56
Unknown	19	27
FASS	19	27
ALBA	6	43
FBM	41	31
FE	103	64
FHS	6	10
FS	31	31
Unknown	0	1

* Lebanese + refers to students who have a dual citizenship. They might have been born in a foreign country or they might have a foreign parent.

The following codes are used in Table 6.5 to refer to the names of the faculties in the university:

Faculty of Arts and Social Sciences: FASS

Académie Libanaise des Beaux-Arts: ALBA

Faculty of Business and Management: FBM

Faculty of Engineering: FE

Faculty of Health Sciences: FHS

Faculty of Sciences: FS

As the table shows, male students outnumbered female students in both groups. The two groups (the experimental and the control groups) are somewhat balanced in terms of nationality. Lebanese + in the chart refers to those students who have a dual citizenship. They might have been born in a foreign country or they might have a foreign parent. The majority of students in both groups are Lebanese, with the experimental group having 72.3% and the control having 72.5%. Other students either had two nationalities (Lebanese with another nationality) while others were foreigners, mainly from Syria, a country neighbouring Lebanon and also located in the Middle East. Concerning cultural exposure, the two groups seem to be balanced. The two groups are similar in terms of job experience with the majority of students in both groups having no job experience. While the two groups are similar in most characteristics, the experimental group seems to have almost twice as many Engineering students as the control group. The control group, on the other hand, has proportionately more Arts and Arts & Social Science students.

Data on teacher characteristics were also collected via a short questionnaire (see Appendix 8b). Teacher characteristics include the length of teaching experience, educational and professional qualifications and participation in continuing professional development/training.

6.7 Test administration

Although the recommended duration of the test was 50 minutes, in this study, the pre-test and post-test were given 60 minutes each since English was not the first language of the students. Tests were administered under exam conditions and proctored by class teachers in the presence of the lab supervisor and/or the researcher.

6.7.1 The pre-test

In the Spring, the pre-test was administered to students between February 10 to February 13 in a computer lab before any instruction in CT took place in the experimental classes and prior to randomisation. This was to reduce the likelihood that knowledge of group allocation might unconsciously affect teachers' behaviour with their students in the test, e.g. giving them preferential treatment. In the Fall, the pre-test was done between September 9 and September 14. In both terms, the pre-test was administered in the presence of the class teacher, the researcher (when available), and

the lab supervisor. The lab supervisor helped in distributing user names and passwords to students and was ready in case of any technical errors.

The CCTT software was downloaded in one lab that could accommodate only 20 students, so each class took the test alone based on a timetable that the researcher prepared. Students were given numbers and passwords generated by The CCTT, so they did not have to use their names or family names to do the test.

6.7.2 The post-test

For the Spring cohort the post-test was taken towards the end of the term between May 18 and May 22. Students who missed the post-test were asked to do it between May 23 and 25. The Fall cohort took the post-test in the week before the final week in the term between November 30 and December 3. Students who missed the post-test were asked to do it between December 4 and 6. Twelve teaching weeks separated the pre-test from the post-test.

To minimise attrition (which could threaten the internal validity) and thus bias results, attempts were made to get students who missed the post-test to complete the test in their free time. In some cases, support was sought from the class teachers to ask them to send students who missed the post-test to the lab during class time. The lab assistant was enlisted to help administer the test to these students who missed the test in the first round.

6.8 Blinding

Ideally teachers should be blinded to treatment assignment to avoid unconscious bias and teacher expectation. Knowledge of group assignment can introduce an experimenter-bias effect or demand characteristics effect where the teacher knows that they are being evaluated and will change their behaviour to 'beat' the experiment to improve students' test scores (Orne, 1962). On the other hand, control teachers, knowing that they are in the control group, may see themselves as being in competition with the experimental group and change their behaviour. This is also known as the John Henry effect (Saretsky, 1972). Therefore, the process evaluation was essential to observe for such effects.

Nevertheless, experimenter effect was minimised as experimental students were not aware that they were receiving instruction in CT skills or doing anything different from the control classes, so Hawthorne effect has been controlled for and there is no way that the result of the intervention is due to students' inclination to study and work harder because they know that they are taking part in a trial.

6.9 The pilot

Prior to the main trial a pilot study was conducted to test the teaching materials. This was to ensure that the materials used were of an appropriate difficulty level and that the language was accessible to the students. It also aimed to determine how students would respond to the CT lessons as well as the length of time needed for each activity. In a way the pilot provided an opportunity to rehearse for the main trial, from randomisation to delivery and analyses.

The pilot was carried out on three of the researchers' classes in the term before the trial took place. Following feedback from the pilot, modifications were made to the lessons which students found challenging, or too easy or not engaging enough.

6.10 Conducting the process evaluation

The purpose of the process evaluation was to check for fidelity to implementation. This helps to identify resistance to the intervention and any departure from the intervention, which might provide an explanation if the trial did not show positive effects (Siddiqui, Gorard & See, 2018). It also helps identify barriers and challenges faced in the delivery of the lessons. The process evaluation is essentially a monitoring procedure which checks for any likelihood of diffusion (e.g. control teachers using materials meant for the experimental group), experimenter-bias effect (teachers changing their behaviour upon knowing that they are being evaluated) or John Henry effect (control teachers putting in extra effort so their students outperform the experimental group).

The process evaluation involved collecting information about how teachers were trained, observations of lesson delivery and interviews with experimental teachers and students. In addition, feedback was collected from experimental teachers after each lesson using a simple six-item feedback form (see Appendix 9). This provided an opportunity for the researcher to have an informal chat with the teachers when they handed in the feedback form after each lesson. The feedback form collected teachers'

opinions on the lesson and their appraisal of their own lesson. They also evaluated students' responses to the lesson.

6.10.1 Teacher preparation

Teacher preparation was done informally as there was no common time to have the experimental teachers all meet on a regular basis. After randomisation, all experimental teachers attended a one-hour training session conducted by the researcher to prepare them to deliver the intervention. The training session covered the objectives of the study, what it entailed, and how lessons were to be delivered. Teachers were told that 11 of the lessons in the syllabus would be devoted to CT spread over 14 sessions. Specifically, teachers were asked to allow students to have class discussions and to express their opinions.

As it was difficult to find common time to have regular meetings with the experimental teachers, teachers were invited to discuss any issues pertaining to the intervention with the researcher at any time in her office, by mail, or on the phone. Feedback was collected from teachers after they introduced a CT lesson. This helps monitor and support teachers throughout the trial. Informal conversations were also held with teachers to find out how they felt about each lesson and to give suggestions or advice where necessary. Throughout the trial the researcher made sure she was available on campus the whole day to support the teachers.

Training of teachers also included observations of researcher's lessons. The researcher's lessons were planned to be one or two lessons ahead so that teachers had the opportunity to observe her lessons before they delivered their own. The researcher modelled the strategies to use in teaching CT and how the material could be utilised in supporting the lessons.

The researcher provided support to teachers throughout the trial via emails allowing teachers to discuss the lessons before delivery. Experimental teachers were given each CT lesson three or four days before the lesson to allow teachers time to prepare the lesson, familiarise themselves with the teaching materials and also to consult the researcher in case of any ambiguity or confusion. In addition, the researcher also had informal follow-up discussions with individual experimental teachers either face to face at the university or by telephone.

6.10.2 Observation of experimental and control classes

On the days the researcher observed the classes, she arrived on time with the class teacher and sat quietly in the back. The researcher made sure that her presence was as minimally disruptive as possible to the students and the teacher.

Observation of experimental classes focused on whether the teacher explained concepts related to CT well, how students responded to the lessons, and whether they were given the opportunity to express their opinions and share their ideas with the other students in class.

As the researcher was teaching three classes in the Spring, it was not possible for her to attend all the experimental classes. So only two experimental classes were observed throughout the trial (i.e. 11 lessons each spread over 14 sessions).

In addition, the researcher observed three control classes to make sure that there was no explicit teaching of CT by some teachers who might unintentionally foster those skills in their students. Each of the three control teachers was observed twice, once towards the beginning and another time towards the end of the term.

6.10.3 Interviews with experimental teachers and students

In order to obtain a better insight into both students' and teachers' views of the materials used in the trial and their perception of CT in general, interviews were conducted with both teachers and students at the end of the term after all students had taken the post-test to avoid the ensuing discussion having any influence on teachers' use of the teaching materials (e.g. teaching to the test). In addition, an interview with one experimental teacher who taught in the second term was also conducted. Both teachers and students were asked to evaluate the materials that formed part of the trial and to suggest ways for improvement. They were also asked whether they had previous experience or exposure to those skills. Students were asked whether they believed CT is relevant to their lives and domains of study. Data collected from the process evaluation were synthesised and presented in Chapter 10 as factors that facilitate or hinder instruction in CT.

All the interviews with students and teachers were conducted in English. As it was not possible to interview all experimental students only half of the students in each

experimental class were selected systematically by choosing every other name on the class list. The exception was with the smaller class (n = 11) where all the students were interviewed. Gorard (2003) and O'Leary (2014) recommend systematic sampling, as long as there is no particular order in which names are set.

The interviews also aimed to gather information about the delivery of the lessons (e.g. if the lessons were delivered as planned) and to identify challenges or barriers in the implementation of the intervention.

All the interviews were recorded and transcribed verbatim to identify recurrent themes. Consents were sought from teachers and students for the interviews to be recorded. None of the teachers or students refused to be recorded. All interview responses were anonymised using number codes rather than names. Details about the interview transcripts are provided in Appendix 11.

Group interviews with students
In total 13 group interviews were conducted with 83 experimental students who were systematically selected based on the class lists provided by the Registrar's Office. The number of students in each ranged from 4 to 8 students with the majority having 7 students. These interviews consisted of eight main questions. Each interview lasted between 7 to 31 minutes.

Interviews with students were conducted at the end of the class session in the same classroom or an empty classroom. Students were asked to provide their names before they speak so that the researcher would be able to identify the students when transcribing the interviews.

Interviews with teachers
One group interview was conducted with the three experimental teachers in the first term and one interview was conducted with the new experimental teacher in the second term. The interviews took place in the Faculty Lounge. The purpose of the interviews with teachers was to get insight into their opinion of the CT handouts and how they could be improved, to have teachers' opinions on whether CT should be integrated in all courses or in a separate course, and to have teachers' opinions on the challenges, if any, faced in the implementation process. Teachers were also asked if they had had any

previous experience with teaching CT, whether they attach any importance to it in their teaching, and how they viewed students' receptivity of the CT materials taught in the term. The interviews consisted of eight questions.

Although there were only three experimental teachers in the first term and they could have been interviewed separately, it was preferable to examine the interaction among them in a group interview. The group interview provided an excellent opportunity to observe the divergent views of the three teachers.

Teacher group interviews were carried in an informal setting with very little interference on the part of the researcher who only asked questions. The group interview lasted 50 minutes while the interview with the experimental teacher in the second term lasted 16 minutes.

6.11 Ethical issues

An ethical approval was obtained from the School of Education Ethics Committee at Durham University (Appendix 5).

Another ethical approval (given verbally) was also obtained in October 2014 from the Dean of the Faculty of Arts and Social Sciences at the university where the study took place. This was necessary to allow the researcher to allocate half the English 102 classes to the experimental group that would receive lessons in CT skills and to administer the pre-test and post-test to all English 102 students.

Students were not informed about the intervention, so there is little likelihood of discussions or sharing of materials. This was also monitored in the process evaluation

After all students had taken the pre-test, they were asked to sign a consent form so that the researcher could have access to their pre-test and post-test scores. The consent form is provided in Appendix 6. Both control and experimental teachers were also asked to sign a memorandum of understanding in which their responsibilities in taking part in the study were explained. In the memorandum of understanding, the researcher explained to the experimental teachers that they were not supposed to share the CT materials with control teachers. The signing of this memorandum was done after randomisation took

place. Both memoranda of understanding for experimental and control teachers can be found in Appendix 7.

In order to ensure anonymity and confidentiality, the same codes were used to replace students' names in the pre-test and post-test, the questionnaires, and the interviews. Codes were also used in the teachers' questionnaires and interviews.

Although a wait-list design is the most ethical option for the control group to receive the treatment after the experimental group does, it was not possible for the researcher to opt for this alternative. This was because students usually finish English 102 and then move on to the next English level, English 203.

6.12 Summary

This chapter has detailed the steps in conducting the cluster randomised controlled trial. Detailed description of the materials that formed part of the intervention was also presented in addition to the steps in conducting the process evaluation.

CHAPTER 7
Analyses

This chapter describes the methods used in the primary data analysis (the RCT).

7.1 Intention-to-treat-analyses

The primary outcomes were analysed using intention-to-treat analysis (ITT), which compares the main outcome measure (CCTT scores) between the treatment and the control groups. This means that all students that were initially randomised would be included in the analyses whether they complied with the treatment or not. The argument for using ITT is that it maintains the sample size, thus increases statistical power and reduces the probability of Type II error (the error of accepting a false hypothesis) (Wertz, 1995). Some researchers have also argued that results on compliant participants only reduces generalisability since most people would not be compliant in the absence of the trial (Armitage, 1979; Haynes & Dantes, 1987) and those who complied might be different in many ways from those who did not (Jadad & Enkin, 2007; Hutchison & Styles, 2010; Torgerson, Torgerson & Taylor, 2010; Gupta, 2011).

The results are presented as Hedge's g 'effect' sizes by dividing the difference in the means of the gain scores made between pre-test and post-test (using the compare means option in SPSS) of the treatment and control groups by the overall standard deviation of the test scores. Effect size using the post-test scores only was also calculated in order to avoid the bias of the additional measurement error in pre- and post-test designs as suggested by Gorard (2013a).

The effect size measures the size of the difference between groups (Coe, 2002). It is a way to standardise the size of a difference between two groups on a scale which could be understood by everyone. A pooled standard deviation was used in this study to calculate effect size. Coe (2002) suggests that it is often best to use a pooled estimate of standard deviation, which is the average of the standard deviations of both the experimental and the control groups.

Significance testing is not appropriate for use in this trial as there is no complete random sample. Although there was random allocation to groups, the sample was not randomly drawn from a big population but rather conveniently selected. In addition, it is

not a complete sample as attrition affects the completeness of the sample. Confidence intervals share the same problems as significance tests. Confidence intervals, just like significance tests, do not reveal anything about the quality and robustness of the study and cannot compensate for missing data. Gorard, See and Siddiqui (2017) suggest that a well-designed trial with a big sample size, a simple comparative analysis would suffice and complex statistical analysis, which is usually used with lower quality datasets from passive designs, is not needed.

Even if there was full and complete randomisation, significant testing is also not relevant because it does not give the answer that the researcher wants. What significance tests tell us is: Assuming there is no difference between the groups, how likely are we to get results as extreme as we have? But the answer that we really want to know is: Given the data that we have, how likely is the difference between the groups due to chance or random sampling? Significance tests cannot answer this second question. A significance test estimates the likelihood that the data for different samples drawn randomly from a population are compatible with the parameters of that population if the parameters of that population are known (Colquoun, 2016; Pharoah, Jones, & Kar, 2017). This is not the situation here, and so even if the data had been a complete random sample, significance testing would still not have been appropriate.

7.2 Dealing with attrition

In any trial attrition or missing values can affect the results. Dong and Lipsey (2011) demonstrated that any missing values can create bias, even if attrition is balanced between comparator groups. And where such attrition is not random (as is most often the case) it can bias the estimate of the treatment effect, and the bias can still be large even when advanced statistical methods like multiple imputations are used (Foster & Fang, 2004; Puma et al., 2009). Such bias can distort the results and threaten the validity of any conclusion reached (Campbell & Stanley, 1963; Little & Rubin, 1987; Shadish, Cook & Campbell, 2002).

Gorard and Gorard (2015) suggest that instead of significant tests and test of confidence, which are not relevant, but traditionally used as a test of sensitivity, a better alternative would be to calculate the number of counterfactual cases needed to disturb the finding (NNTD). It is calculated by multiplying the effect size by the number of cases in the smaller cell. The larger the NNTD compared to the number of missing

cases, the more secure is the result because it means it will take many more cases with opposite results to change the findings (Gorard, See, & Siddiqui, 2017).

To check if the results are not affected by student dropout, the pre-test scores of students who dropped out was compared to those who complied. As in any trial, teacher withdrawal could also happen. Intention-to-treat analysis (ITT) is a statistical approach that is of great importance in experimental research. It entails that participants are analysed the same way they were randomised whether they complied with the treatment or withdrew. Researchers who support ITT believe that bias might result if analysis of results is done on only participants who complied as those who complied might be different in many ways from those who did not (Jadad & Enkin, 2007; Hutchison & Styles, 2010; Torgerson, Torgerson & Taylor, 2010; Gupta, 2011).

7.3 Other analyses

Subgroup analyses were performed with student contextual/demographic variables (gender, nationality, cultural exposure, job experience, school major and university major) to find out if any context variable was related to students' level of receptivity to the CT lessons.

As the CCTT produces results for each skill as well as the overall score, it was possible to determine if students in the experimental group did better on a particular skill because they had more exposure to that skill. Analysis of scores by skill is also presented.

Some teachers taught more than one group in one term or over two terms. Therefore, it was also important to check for any consistency or pattern in test scores for each teacher. In addition, scores of high achievers and low achievers were also compared.

These were all presented as Hedge's g effect sizes.

7.4 Summary

This chapter has described the methods of statistical data analysis for the cluster randomised controlled trial.

PART III
RESULTS

This section presents the findings from the systematic review and the randomised controlled trial.

CHAPTER 8
The systematic review

This chapter answers the following research questions:

RQ 1   Is there evidence that instruction in CT can help develop CT skills of ELL in higher education?

RQ 2   What is/are the most promising approach(es) to teaching CT skills to ELL in higher education?

8.1 The results

A total of 1,830 research reports were initially screened. 794 research reports were picked up from the electronic database searches. In addition, 1,036 records appeared in the Google/Google Scholar searches.

Each identified study was then screened to remove the duplicates. The rest of the studies were then screened for relevance first by title and abstracts. Pre-defined inclusion and exclusion criteria were applied to screen for relevant studies. A total of 1,540 were excluded in this first stage of screening. Most of these studies were excluded because they were not empirical, or were related to school-aged students, or the outcome did not relate to CT. When abstracts did not provide enough information on the article, the article itself was skimmed. Empirical studies that did not have an experimental design or were not related to English language learners in higher education were also excluded. In order to be relevant to this review, a report had to link instructional strategies to CT outcome, so what is being measured is CT. Studies that depended on self-reported growth of students or perceptions of teachers about students' development without the use of an accurate measure were also excluded as they do not precisely reflect the real growth of students' level of CT.

The full texts of the 154 studies were accessed. After reading the full texts a further 118 were removed. A number were excluded at this stage because the quality of reporting was so poor or lacking in detail that it was not possible to evaluate the research. Some were excluded when it became clear that CT was not the outcome measure. Forty-six studies that were deemed relevant at first were reviewed by two assessors and then 10 were excluded as the outcome measure was not CT but rather language skills. Appendix

1 provides a list of excluded articles with detailed explanation of the reasons for their exclusion. These successive steps reduced the number of included studies to 36.

The following flow chart is based on the PRISMA flow diagram by Moher et al. (2009). It shows the numbers of records identified and the number of included and excluded studies. There were many reasons for exclusion. For example, many studies were excluded because they were not primary research or the outcome measure was a language skill and not CT. Others depended on self-reported evaluation, had incomprehensible language or inadequate reporting, or were of an extremely short duration. Other reasons for exclusion are presented in detail in Appendix 1.

Flowchart 8.1 PRISMA flowchart

```
┌─────────────────────┐        ┌─────────────────────┐
│  Records identified │        │ Records identified on│
│  through database   │        │ Google and Google   │
│      searching      │        │  Scholar (n = 1036) │
│     (n = 794)       │        │                     │
└─────────┬───────────┘        └──────────┬──────────┘
          │                               │
          └───────────────┬───────────────┘
                          ▼
          ┌───────────────────────────────┐
          │      Records screened         │
          │        (n = 1830)             │
          └───────────────┬───────────────┘
                          ▼
          ┌───────────────────────────────┐       ┌─────────────────────┐
          │ Full-text articles assessed for│──────▶│  Full-text articles │
          │     eligibility (n = 154)      │       │ excluded with reasons│
          └───────────────┬───────────────┘       │     (n = 118)       │
                          ▼                        └─────────────────────┘
          ┌───────────────────────────────┐
          │      Studies included in       │
          │      systematic review         │
          │         (n = 36)               │
          └───────────────────────────────┘
```
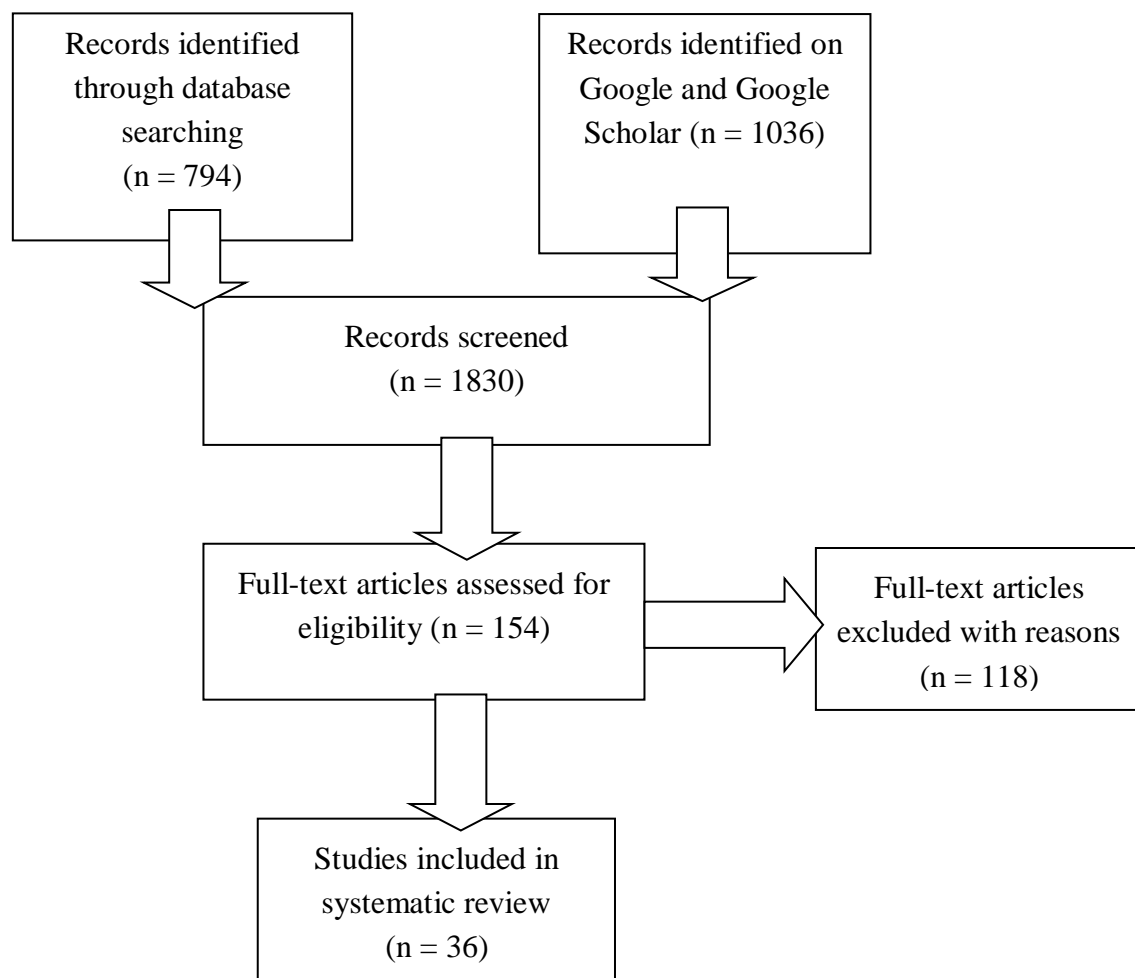
Therefore, only 36 studies were deemed relevant to this review. The following table shows the number of articles from databases and from Google and Google Scholar:

Table 8.1 Number of included studies retrieved from each of the databases

Name of database	Applied Social Sciences Index and Abstracts (ASSIA)	PsychINFO	Web of Science	JSTOR	Handsearches
Number of studies	15 studies	1 studies	6 studies	1 study	13 studies

Total: 36 studies

Of the 36 studies, a total of 17 studies were conducted in Iran, seven in the U.S., two in Japan, two in China and one in each of the following countries: Thailand, Malaysia, Latvia and France, Turkey, Egypt, Colombia, and the U.K. One of the studies did not report the country in which it was conducted, but it could be deduced from the context that it took place in Saudi Arabia.

8.2 Quality of included studies

None of the studies were rated above 2*. All had serious methodological flaws in the design like lack of randomisation, different threats to internal validity, small sample size, high attrition rate, or unclear reporting. Of the 36 studies that have met the inclusion criteria, only five were rated 2* (Gomez, 2010; Kusumoto, 2018; Mazer, Hunt, & Kuznekoff, 2007; McCarthy-Tucker, 1995; Salmani Nodoushan, 2016). One study was awarded 1.5* (Tous et al., 2015). Half a star was dropped due to the very short duration of the programme. Interventions with very short durations can affect validity due to the short interval between tests. For this reason, the rating was lowered. Another 17 were rated 1* as they had more serious compromises to the design and 13 were rated zero as they either had no comparison group, involved non-random assignment and/or had very a small sample size (under 20 in each arm). One study (Tous & Haghighi, 2016) was so badly reported that it was impossible to assess its quality. Hence it was given a zero rating.

Table 8.2 Summary of quality rating of studies

	2*	1.5*	1*	0
General CT skills	4		5	4
Literary and narrative texts			2	4
Assessment techniques			4	1
Debate		1	1	1

Active learning strategies	1		1	1
Brainstorming techniques			2	
Journal writing			1	1
Scaffolding			1	1
Total	5	1	17	13

Almost all the studies (n = 29) reported a positive outcome. This is not surprising as positive results are more likely to be published.

Two studies (Hurte, 2004; Zelizer, 2013) reported a negative outcome but each evaluated two different instructional approaches to teaching CT, so the results do not necessarily imply that instruction in CT is ineffective, but rather that one approach could be better than the other. One study (Tous & Haghighi, 2016) also reported a negative outcome, but the comparison was between males and females and not CT and no CT.

The table provides information to enable assessment of the quality of each of the studies. However, assessment should be made along other matters that relate to the design of each study. For example, although the sample size is larger than some other studies and the effect size is large, Fatemi (n.d.) has a low rating because it is a quasi-experiment involving only two clusters that are not even balanced. Gomez (2010) and Kusumoto (2018) both have a small NNTD which means that the results are unstable; however, Gomez (2010) started with a strong design as students were individually randomised while Kusumoto (2018) started with a relatively large sample. A summary of quality rating of studies is provided in Appendix 3.

Table 8.3 Summary of all reviewed studies

Study	Rating	Approach	Sample size	Attrition	Effect size	Smallest cell	NNTD
Gomez (2010)	2*	General CT skills	83	18% (15)	0.08 (calculated by reviewers)	40	3
Kusumoto (2018)	2*	Active learning strategies	162	17.7% (29)	0.03 (calculated by reviewers)	62	1.86

Mazer, Hunt, & Kuznekoff (2007)	2*	General CT skills	324	Not reported	0.34 (calculated by reviewers)	155	53
McCarthy-Tucker (1995)	2*	General CT skills	189	38.8% (120)	0.33 (calculated by reviewers)	57	19
Salmani Nodoushan (2016)	2*	General CT skills	894	1.34% (12)	0.01 (calculated by reviewers) – essay 35.6 (calculated by reviewers) –The Cornell Critical Thinking Test, Form Z	Not specified	-
Tous, Tahriri, & Haghighi (2015)	1.5*	Debate	88	Not reported	1.01 (calculated by reviewers)	44	44
Akbari, Seifoori, & Ahour (2017)	1*	General CT skills	50	Not reported	Not enough data provided	25	_
Daud, Gilmore & Mayo (2013)	1*	Assessment techniques	99	Not reported	Not enough data provided	24	_
Davidson & Dunham (1997)	1*	General CT skills	36	14% (5)	Not enough data provided	17	_
Dong (2017)	1*	General CT skills	44	Not reported	1.89 (calculated by reviewers)	22	-
Fatemi (n.d.)	1*	Literary and narrative texts	105	Not reported	0.99 (calculated by reviewers)	47	47
Ghabanchi & Behrooznia (2014)	1*	Brainstorming techniques	54	Not reported	0.75 (calculated by reviewers)	25	19
Jafari & Yavari (2014)	1*	Assessment techniques	60	Not reported	0.72 (calculated by reviewers)	30	22
Jafari, Yavari,	1*	Assessment	50	Not	0.59	25	15

& Ahmadi (2015)		techniques		reported	(calculated by reviewers)		
Kahrizi, Farahian, & Rajabi (2014)	1*	Assessment techniques	40	Not reported	0.34 (calculated by reviewers)	20	7
Khatib & Alizadeh (2012)	1*	Literary and narrative texts	34	Not reported	Not enough data provided	17	_
Khatib, Marefat, & Ahmadi (2012)	1*	Journal writing	33	Not reported	Not enough data provided	9	_
Khodadady & Ghanizadeh (2011)	1*	Brainstorming techniques	36	Not reported	1.21 (calculated by reviewers)	18	22
Rashtchi (2007)	1*	Active learning strategies	74	Not reported	Not enough data provided	36	_
Ruff (2005)	1*	General CT skills	39	Not reported	Not enough data provided	19	_
Sokol, Oget, Sonntag, & Khomenko (2008)	1*	Scaffolding	81	Not reported	Not enough data provided	27	_
Yang & Gamble (2013)	1*	Debate	68	Not reported	0.74 (calculated by study authors)	31	23
Zelizer (2013)	1*	General CT skills	171	8% (14)	-0.08 (calculated by reviewers)	79	0
Arslan & Yildiz (2012)	0	Literary and narrative texts	34	Not reported	Not applicable *	Not applicable	_
Chason, Loyet, Sorenson, & Stoops (2017)	0	General CT skills	37	Not reported	Not applicable *	Not applicable	_
Fahim & Mirzaii (2013)	0	Active learning strategies	43	Not reported	1.24 (calculated by reviewers)	21	26
Hurte (2004)	0	Scaffolding	36	Not reported	Not applicable *	18	_
Iraji, Enayat, & Momeni (2016)	0	Assessment techniques	36	Not reported	1.88 (calculated by	18	34

					reviewers)		
Khamkhong (2018)	0	Literary and narrative texts	36	0%	Not applicable *	Not applicable	
Khatib & Janpour (2012)	0	Literary and narrative texts	30	Not reported	0.99 (calculated by reviewers)	15	15
Manning (1997)	0	General CT skills	31	Not reported	-0.89 (calculated by reviewers)	15	_
Moore (1995)	0	General CT skills	60	Not reported	Not applicable *	Not applicable	_
Pashangzadeh, Ahmadian, & Yazdani (2016)	0	Literary and narrative texts	54	Not reported	0.89 (calculated by reviewers)	27	24
Shaarawy (2014)	0	Journal writing	23	Not reported	Not enough data provided	7	_
Tous & Haghighi (2016)	0	Debate	88	Not reported	Not applicable *	Not applicable	_
Turuk Kuek (2011)	0	General CT skills	20	47% (7)	Not enough data provided	9	_

* single-group design – no comparison of gain scores

8.3 Approaches used in teaching critical thinking

The 36 studies examined in this review have used a variety of approaches for CT instruction. There were broadly eight distinct types of approaches. The most common instructional approach found in this review concerns teaching general CT skills (n = 13 studies), followed by the use of literary and narrative texts (n = 6) and assessment techniques (n = 5) like peer-review, teacher evaluation, and self-evaluation. Other approaches include the use of debates, brainstorming techniques, journal writing, scaffolding, collaborative writing, dialogic thinking.

Teaching general CT skills involves training students to define arguments, evaluate reliability of sources, identify fallacies and assumptions, using inductive and deductive logic, synthesising information, making inferences, etc. The use of literary and narrative texts refers to the use of fiction to teach CT in class. As for assessment techniques as a strategy to enhance students' CT skills, they include a variety of strategies like

conferencing provided by the teacher, peer-evaluation, and self-evaluation. The use of debate as an instructional approach involves searching for reliable references, finding valid support, listening carefully to and finding faulty reasoning in one's opponent team, and refuting arguments. Active learning strategies identified in this review include the use of collaborative writing where students work in groups to finish in-class assignments and dialogic thinking where teachers try to engage students in dialogue instead of lecturing them. Brainstorming is a technique to help students generate ideas and relate ideas to each other. This includes a strategy called concept mapping. The use of journal writing as a technique requires that students keep a written or an audiotaped journal. Scaffolding as a strategy to enhance CT skills refers to the gradual support provided by the teacher for learners to construct meaning. Studies that have evaluated each approach are presented in table 8.4.

Table 8.4 Studies that evaluated the different approaches in critical thinking instruction

General CT skills	Literary and narrative texts	Assessment techniques	Debate	Active learning strategies	Brainstorming techniques	Journal writing	Scaffolding
Manning (1997)	Arslan & Yildiz (2012)	Daud, Gilmore & Mayo (2013)	Tous & Haghighi (2016)	Rashtchi (2007)	Ghabanchi & Behrooznia (2014)	Shaarawy (2014)	Hurte (2004)
Moore (1995)	Khatib & Janpour (2012)	Iraji, Enayat, & Momeni (2016)	Yang & Gamble (2013)	Fahim & Mirzaii (2013)	Khodadady & Ghanizadeh (2011)	Khatib, Marefat, & Ahmadi (2012)	Sokol, Oget, Sonntag, & Khomenko (2008)
Davidson & Dunham (1997)	Pashangzadeh, Ahmadian, & Yazdani (2016)	Jafari & Yavari (2014)	Tous, Tahriri, & Haghighi (2015)	Kusumoto (2018)			
McCarthy-Tucker (1995)	Fatemi (n.d.)	Jafari, Yavari, & Ahmadi (2015)					
Ruff (2005)	Khatib & Alizadeh (2012)	Kahrizi, Farahian, & Rajabi (2014)					
Turuk Kuek (2011)	Khamkhong (2018)						
Gomez (2010)							
Mazer, Hunt, & Kuznekoff (2007)							
Zelizer (2013)							
Salmani Nodoushan (2016)							
Dong (2017)							
Akbari, Seifoori, & Ahour (2017)							
Chason, Loyet, Sorenson, & Stoops (2017)							
13 studies	**6 studies**	**5 studies**	**3 studies**	**3 studies**	**2 studies**	**2 studies**	**2 studies**

8.4 What approach(es) is/are the most promising to teach CT to ELL in higher education

This section describes the most promising approach to teaching CT skills. No studies were found to be of good quality or even of medium quality due to serious flaws in their design. Therefore, there is no strong evidence that any instructional approach for teaching CT skills works. However, instruction in general CT skills, looks potentially promising as it has been examined by a bigger number of studies than other approaches and all the higher quality studies reported positive effects. In addition, the approach itself seems plausible enough to maybe lead to some growth in CT.

8.4.1 General CT skills

This approach has been evaluated in the most number of studies, and all, but two reported positive effects (Table 8.3). Although two studies reported negative effects **(Zelizer 2013; Manning 1997)**, their evidence is very weak. Zelizer's (2013) study, for example, did not evaluate the effectiveness of CT instruction. Instead it compared two different approaches to teaching CT (mixed instructional approach with an immersion approach). Also some of the lessons were taught by the same instructor, which might have resulted in diffusion of treatment. Participants who did not complete the post-test were excluded from analysis. This meant that the results are unreliable as participants who dropped out from the study could be different from those who complied. Manning (1997) compared two groups of very different students on campuses 30 miles apart. The experimental students were mature students and many with family and work responsibilities. The comparisons groups were therefore not equivalent to begin with. We can therefore safely discount their evidence.

Of the eleven studies that reported positive effects, four were given a rating of 2* - the highest rating in this review. No studies were rated above 2*. In the first study (**Gomez 2010),** 86 first year university students were individually randomised to receive the intervention or business-as-usual. Students in the control groups were taught with emphasis on basic reading comprehension skills and adhered to the activities that are in the textbook whereas students in the experimental groups had more expansion activities that included analysis, application, evaluation, and synthesis of the materials. Outcomes were measured using the translated version of the standardised CCTST. A small positive effect (ES = +0.08) was observed after one term lasting 15 weeks. The small effect could be because the test was in Spanish while the instruction was in English.

This might have worked against the students as students might have become used to thinking in a particular language in the classroom, so they could not transfer what they had learned using a particular language to the test which is administered in another language. This problem of transfer from one language to another is particularly problematic for students who are novice critical thinkers. Although this was a well-designed study and could have been a 4*, the poor choice of instrument, the relatively high level of attrition (18%) coupled with the small sample size meant that the highest rating could only be 2*. The NNTD is only 3 as opposed to an attrition rate of 15 participants. The evidence is therefore weak, but the results are promising.

The second positive study rated 2*, conducted by **Mazer, Hunt, and Kuznekoff (2007)**, was also a RCT where 18 clusters of 324 university students ranging from age 18 to 26 were randomly assigned to treatment conditions. Experimental students were explicitly taught CT skills. The control students followed the routine course structure. Outcomes were measured using a bespoke CT test developed by the researchers. Experimental students made bigger gains than control students. This study could be rated more highly but because the outcome was measured using a researcher-developed test, it is possible that the teacher/researcher could have taught to the test, or the test could be intervention-related. Attrition was also not reported. All this lowers the credibility of the study and hence the 2*.

Another cluster randomised trial with a 2* rating also reported positive effects. In this study **McCarthy-Tucker (1995)** allocated 9 clusters of students (N = 309) to two groups to examine whether instruction in formal logic can improve students' CT in English and maths. Outcomes were measured using the Raven's Standard Progressive Matrices (RSPM) and Test of Logical Thinking (TOLT) and the Content-Specific Test of Logic (CSTL). Although the study design is strong, the high attrition of nearly 40% meant that the findings are no longer reliable. The study was therefore given a 2* rating. Only the scores of students who took the pre-test and post-test and attended at least 85% of the instruction were included in the analysis. An intention-to-treat analysis and a compliance analysis could have been conducted to see if those who dropped out differed in any way from those who did not. The NNTD is 19 compared with 120 missing cases. Therefore, the findings have to be considered with caution.

The fourth was a RCT involving 894 students from different universities in Iran (**Salmani Nodoushan, 2016**). Students were randomly assigned to either treatment or control group in each of the four language proficiency groups (limited English proficiency, lower intermediate, upper intermediate and advanced). Only 12 students dropped out. Experimental students were offered a 3-week workshop in their mother tongue, Persian, to raise participants' awareness of CT strategies and in particular fallacious argumentation. The rationale behind using the mother tongue of the participants was to avoid the extra support that the experimental group would get in writing that the control group would not receive, which might affect the performance of the experimental group in writing. Students were given the post-test after a two-week interval. The Cornell Critical Thinking Test was given in Persian. This is the only study in which the use of students' native language is justified as the researcher's aim is to investigate whether L1 mediated learning that aims at enhancing students' CT skills would improve their argumentative writing.

This was rated 4* initially for its scale and design, but dropped a star to 3* because the intervention materials were identical to the items used in the Cornell Test. Effectively, the researcher was teaching to the test. Another problem with the study is that raters of the essays were not blinded, which might have skewed the results in favour of a particular group due to teacher expectation. A further star was dropped bringing the rating to 2*. The impact of the intervention (measured by the Cornell Critical Thinking Test) was estimated as having an effect size of +35.6, which is extremely unlikely – something that has never been seen before in any trials. This immediately puts suspicion on the reliability of the findings. As Bob Slavin says: "the chances of finding effect sizes of more than +1.00 are the same as the chances of finding a 10-foot man", assuming that the test was not a test of the intervention materials which the control group had no access to (Slavin, 2018).

Two other positive studies were rated 1* as they were weaker in design being quasi-experiments. The first study (**Davidson & Dunham, 1997**) was a two-group post-test only design. The study, spanning over a year, compared 17 students enrolled on an intensive academic programme with a group of 19 volunteers who served as the control. Experimental students received training in CT skills. Outcomes were measured using the Ennis-Weir Critical Thinking Essay Test. Results showed that the experimental students did better than the control but without a pre-test it was difficult to say which

group had made bigger progress. It is possible that the experimental students who signed up for the course may have higher scores to begin with. But this was not measured. The lack of data, unclear reporting about the allocation process and the very small sample size meant that the reported findings have to be treated with caution and hence the 1*.

In another quasi-experimental study, **Ruff (2005)** compared students enrolled in a transitions course in which CT was taught (n = 20) with students who were enrolled in the same course but did not receive instruction in CT (n = 19). The groups were not randomly allocated. Different textbooks were used for the two groups but the course was taught by the same teacher. There is therefore a possibility of diffusion. Experimental students were given activities that involved analysis, interpretation, evaluation, and synthesis while the control group did not have any exposure to CT skills. Students were tested before and after the intervention using the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Dispositions Inventory (CCTDI). These are standardised tests of CT. Although the author reported positive effects, no effect size was calculated and there was no enough data reported for any effect size to be calculated. There was also no report of attrition. This study was therefore rated a 1*.

The three studies that received a rating of 0 are Moore (1995), Turuk Kuek (2011), and Manning (1997). In a study adopting a single-group design, **Moore (1995)** explored the effect of a course in CT on 60 pre-university level students selected to participate in a one-year programme in the U.S. that prepares them to get admitted in American top-ranking universities. The course was specially-designed for Malaysian students studying in an American university in order to improve their thinking skills. The students were selected based on their English proficiency level. The relationship between CT and other variables such as language proficiency, writing, and academic development was also explored. A major flaw with this study, other than its small sample size, is the lack of a control group, so any changes happening to the group might be due to maturation especially that those are Malaysian students moving to the U.S., which is a completely new experience to them. The researcher does not include a comparison group in order to determine the effect of the treatment. The new experience of living in a new culture, and not the intervention alone, might have had a substantial effect on their CT. Another explanation might be natural maturation. In addition, those students were selected out of

thousands because they had scored highly on the Malaysian Certificate of Education and were highly proficient in English. The gain they showed in CT can be attributed to their being high-achievers and not to the treatment itself. The study can be rated of extremely low quality.

Turuk Kuek (2011) examined if ESL students' reasoning and CT as manifested in their writing improves as a result of an integrative approach to teaching reading and writing supported by collaboration and scaffolding. 30 students were randomly selected from 120 students. Only 27 students did the pre-test, so 3 were excluded from the study. 15 were randomly assigned to the experimental group (11 students remained) and 12 to the control group (9 students remained). A delayed test a month after the intervention was given to ensure that students maintained the skills that they learned. Only 16 students did the delayed test. The study has major flaws. In addition to the small sample size, there was a high level of attrition after the pre-test and during the intervention resulting in an even smaller sample from which it is hard to draw any conclusions. Students who drop out are likely to be different from those who comply till the end. One student in the experimental group admitted that he dropped out because he found the materials challenging. The author considers the study to be a RCT where in fact it is very hard to randomise such a small number and have two equivalent groups. Students' tests were graded by two raters but they were not blinded, which might have affected the results of the study. This study is therefore rated low because of the very small sample, high attrition and the short interval between pre- and post-test.

In addition to measuring improvement in CT skills, **Manning (1997)** tried to determine the relationship between students' CT and their attitudes to reading. The trial was carried out on 31 students (15 in the treatment group and 16 in the control group) taken from two campuses of the same university. They were taught by the same instructor. Students were all enrolled in the same developmental studies reading course. In the control section, a traditional method of involving lectures and student participation was used while in the experimental group, instruction in CT strategies was added to the lectures and student participation. No significant correlation was reported between attitude to reading and CT in both the control and treatment groups. Besides the small sample (n = 31), there is evidence that the two groups were not equivalent. Although students were from the same university the control and treatment groups were on two different campuses which were 30 miles apart in different counties. The author admits

that students in the treatment group were mature students who had family responsibilities and hence had no time to mingle with other students after class and benefit from the university experience which, in the author's opinion, can significantly contribute to the development of CT. The two groups were therefore not balanced at the outset. This is likely to bias the results.

Even though a pre-treatment assessment was given to both groups, there could have been other factors that might have interfered in the results of the trial since the two groups were not equal in terms of involvement in campus life and they were not randomised. What caused the growth in students' CT in the control group might be, according to the researcher, their interaction with peers and professors on campus and not the intervention alone. The researcher also mentioned that in one group, students came straight from high school, but it was not the case in the other group. The researcher does not mention the attrition rate but states that "Only data from students who completed the course were included in the results of the study" (p. 28). This means that the researcher eliminated students who dropped out without taking into consideration the fact that they might be different from students who did comply. This study was rated low on quality.

Chason, Loyet, Sorenson, and Stoops (2017) used a pre-experimental approach to test the effectiveness of the TBSIR (topic, bridge, support, interpretation, return) framework on students' paragraph writing. As there is no comparison group, there is no way to be sure that the growth that students experienced is the result of the intervention or any other confounding variable that the researchers might not have thought of. A study with a pre-experimental design cannot establish a causal-effect relationship as there are different variables that would account for any change in students like normal maturation, other courses that they are taking, etc. Attrition was not reported. The study was given a rating of 0.

In summary, there is indicative evidence that explicit teaching of general CT skills can improve English language learners' CT skills. Although the evidence is not strong due to the small sample and attrition, it is the most promising approach with the most number of 2* studies indicating positive effects. The prevalence of so many poor quality studies in this field, with many having no proper comparison groups, no random

assignment of participants and high attrition, suggests an urgent need for well-designed randomised controlled trials where attrition is minimised.

8.5 Approaches that have little evidence of effectiveness

Besides general CT skills instruction, all the other approaches showed little or no evidence of effectiveness despite almost all claiming positive results. These include strategies such as debate, use of self/peer assessment and feedback, use of literary and narrative texts, brainstorming techniques, scaffolding and other active learning strategies (e.g. collaborative writing, journal writing, and dialogic thinking). However, this does not mean that they do not work in practice. It is just that there are few studies conducted on these approaches and almost all were not robustly evaluated. There is therefore no evidence as yet if any of them work. The absence of evidence should not be confused with evidence of absence.

8.5.1 Debate

There is very weak evidence in this review that debate as a teaching strategy to develop students' CT is effective. The studies that evaluated the use of debate are of poor quality due to major design problems like randomisation of only two clusters in addition to short duration of the interventions and poor reporting of the studies. In general, the use of debate as an approach to foster students' CT could be a plausible approach. However, in both studies that evaluated this approach there was no clear description of what the intervention involved and whether it involved those skills. Therefore, there is inconclusive evidence in this review that debate could develop students' CT.

The evidence for debate as a teaching strategy to develop students' CT is weak. Only three studies evaluated the use of debate as an instructional strategy for English language learners in higher education. Of the three, two showed positive effects, and the best study was rated 1.5* (Tous, Tahriri & Haghighi, 2015). A third study by the same authors (Tous & Haghighi, 2016) showed no effects but it compared the results for males and females and so was not relevant to the review question. All were rated low in strength of evidence.

Tous, Tahriri and Haghighi (2015) examined the effect of debate training on the reading comprehension of 88 students. This was a quasi-experiment where 88 participants were selected by convenience sampling and "grouped" (authors' term) into

control and experimental groups. It is not clear if allocation was randomised but since it was not described as such we assume that it was not. The experimental group was trained using the Meeting-House Debate Strategy where they were taught skills in presenting arguments and challenging flaws in the opponents' arguments. The control group received the usual instruction based on the traditional lecturing technique. Teaching was in English. CT skills were assessed before and after the intervention using the Read Theory Critical Reading Comprehension Test (RTCRCT) and the Persian version of the CCTST test. The study reported strong positive effects on both the CCTST and the RTCRCT tests, but this was an analysis of correlation rather than a comparison of gain scores. The analysis was not clearly explained and it was also unclear how groups were assigned. There was no report of attrition or missing data. Also the study spanned over only one month, so there is the threat of students becoming familiar with the test, and it is questionable whether the short duration would result in such a big gain. Due to the ambiguity in reporting and the short duration of the intervention, the study was rated 1.5*.

Yang and Gamble (2013) reported a huge effect of integrating debate in the EFL curriculum on students' level of CT. This was a cluster randomised trial of only two intact classes consisting of 68 students. Since there were only two classes, allocating one class at random to treatment condition cannot be considered technically as randomisation. Effectively the sample size is only two clusters. Clusters usually have inherent qualities so students in each cluster might be similar to each other but different from the students in the other cluster. The two groups were taught by the researcher in the study. There is therefore a possibility of teacher expectation, which could bias the results in favour of the experimental group. It is also not mentioned whether the two raters who graded the essays were blinded. If the raters knew which group the students belonged to there is a likelihood of bias. There was also no report of missing data or attrition. Given the short duration of the intervention (8 weeks), there is a possibility that students may become familiar with the test. This is especially so if the treatment students have been exposed to similar elements in the intervention as those in the test.

In a study having a pre-experimental design, **Tous and Haghighi (2016)** examine the effect of instruction in debate on males' and females' CT skills. The Oxford Placement Test was administered first to 120 students, and then students whose scores fell between 1 standard deviation above or below the mean were selected. The test showed that males

and females were homogeneous. 44 males and 44 females were selected for the study. The major problem in this study is the poor reporting of the steps followed, which makes the study lack transparency. The researchers do not explain whether male and female students were split into separate groups or were mixed. It is not clear whether the 88 students were all placed in one class or split into many classes and whether they were taught by one or more teachers. The researchers used the Persian version of the CCTST when they are examining students' CT skills in an EFL/ESL context. The study can be rated of extremely poor quality.

The evidence for debate as an approach to foster CT of English language learners is not strong largely because of the small number of studies (so lack of replication), the very small sample and the inadequate reporting of key information.

8.5.2 Assessment techniques as an instructional approach

A total of five studies evaluated the use of assessment techniques on students' CT skills, and all five reported a positive outcome.

All three used standardised tests of CT. Two of the studies used the WGCTA as a pre-test and a post-test, one used the CCTST, another used the Cornell Critical Thinking Test, and one also used an argumentative essay.

All the studies were rated poor due to major flaws in design, such as using intact groups and no control of confounding variables. Thus there is very little evidence that this strategy as used in the studies in this review works in improving CT. None of the studies involved random allocation of participants into treatment conditions, and none reported attrition. All were very small scale.

In a quasi-experiment, **Daud, Gilmore, and Mayo (2013)** examined the use of peer review, self-evaluation and peer evaluation on the development of students' CT skills and writing ability. Students forming 4 intact groups (n = 99) enrolled in an English for Academic Writing course participated in the study with one group serving as control and three as experimental with one focusing on peer review, one on self-evaluation, and one on peer evaluation. With only 99 students divided into 4 groups, there could only be about 20 in each. Since the students were not randomly allocated inherent differences between groups can still exist. For example they may differ by age or prior attainment.

Impact was measured by correlating the CCTT-X post-test scores with their final term paper scores. The researchers did not provide information on how the final term papers were graded and whether raters were blinded. Not blinding raters could bias the results. It is not clear why a simple analysis comparing the gains from pre- and post-tests was not employed. The authors reported significant correlations between CT skills and academic writing ability for the peer review and peer evaluation groups, suggesting that these two assessment techniques were more effective than self-evaluation and self-review. However, comparing scores on the CT test with the performance on the term papers does not provide a credible measure of effectiveness since students who score highly on CT are likely to also write well. Data analyses were presented with no standard deviation, making it impossible to calculate the effect size. The study received a 1* rating.

Jafari and Yavari (2014) examined the effect of conferencing, which the authors regard as different from other forms of assessment in that they focus directly on learning processes and strategies, on students' CT using a pre-test and post-test design on two groups of learners (n = 60). However, no more information was provided on what the intervention consisted of. A lapse of only seven weeks between the pre-test and the post-test might have resulted in students becoming familiar with the test, which might have biased the results in favour of the treatment group as they have just been exposed to the rubrics of CT in the pre-test, which closely aligns with the intervention. The participants were in two classes and one class was "selected" to receive the intervention. Participants were clearly not individually randomised. This means that the number of cases would effectively be two. Although a pre-test was taken to establish equivalence, unobservable differences may still exist between the classes, for example, in terms of teacher quality. The paper was very sparse in information. We do not know if the two classes were taught by different teachers or not. The authors claimed that because "None of the candidates knew that they were part of a research project", it was a "kind of randomization" (p. 154). The outcomes were measured using the Persian version of the WGCTA although instruction was in English. There was also little information about the intervention. All we know is that treatment students were given time to speak about their problems and then they were given feedback by their teacher in the conferences. It is not clear what kind of feedback was given to students in the conference sessions or the number of sessions delivered. The authors mentioned that while the experimental group got feedback, the control students had to write essays but

were not given any kind of oral or written feedback from the teacher or their peers. This is equivalent to withdrawal of teaching for the control students. It is often the case that if you teach someone more of something they know more about that thing. The control students are therefore disadvantaged as there is no support for learning for them. The study reported a huge impact but this could be attributed to the small sample size (n = 60). Results for each of the subsection of the post-test were presented, but for the pre-test only a composite score was given.

A later report by two of the authors in the previous study (**Jafari, Yavari, & Ahmadi, 2015**) suggested that self-assessment had a positive effect (ES = +0.59) on the CT and language proficiency of students. The study involved 50 students from two intact classes. One class practiced self-assessment while the other class served as the control. As the participants were not randomly assigned to treatment conditions, the groups could be different from the outset. For example, one class could be taught by a more effective teacher (not clear if the two classes were taught by the same teacher or not), or could be different in terms of prior attainment. As before, the authors argued that because the candidates did not know that they were part of a research project, this meant that they were in random groups (p.146). There was little information about what the intervention was and what the control students did. It is also not clear whether students in the experimental group assessed themselves orally or in written form, and whether they assessed the essay structure, logic, or language. It is possible that in these two studies by Jafari and Javari, teachers may be teaching to the test. If the control group was not given any support for learning and left to their own devices, this is tantamount to withdrawal of instruction. Therefore any comparisons between the two groups would be unfair. The poor reporting, small sample and lack of random allocation to treatment conditions all meant that the findings of the study are not reliable.

Another study which evaluated the impact of self-assessment (**Kahrizi, Farahian, & Rajabi, 2014**) also reported a big effect. Participants were 40 students from three classes selected based on a TOEFL test. The self-assessment group was given a checklist focusing on organisation, content, vocabulary, language use, and mechanics. In addition to the small number of cases, the process of randomisation was not explained clearly, and attrition was not reported. It is not clear whether individuals or groups were randomised.

As the art of writing argumentative essays is one of the skills that CT comprises, a study done by **Iraji, Enayat, and Momeni (2016)** is included. The authors used a convenience sample of 54 students and then 45 students based on their Oxford Quick Placement Test scores were given a pre-test. Based on the results of the pre-test, 36 intermediate EFL (English as a Foreign Language) students were randomly assigned to an experimental and a control group. The sample size is very small. The authors believe that homogenising students on their English proficiency level and writing ability would ensure balance between the groups, but they seem to forget that there might be other factors that can always affect the results of the study. The authors did not mention whether they randomised individuals or groups. The authors asked students to write an essay as a pre-test and a post-test, but nothing was mentioned about blinding the raters. When the pre-test and the post-test entail that students write an essay or a paragraph, their writing should be graded by two raters who are blinded to which each group belongs. In addition, it is not clear what the duration of the intervention was, or how many essays were students asked to write and evaluate. Effect size was not calculated. The study can be rated of extremely poor quality.

In summary, there is no evidence that assessment techniques as an approach to enhance students' CT is effective despite huge effect sizes cited. All the studies that evaluated this approach were small in scale and did not involve randomising individuals. Randomly picking one class to receive an intervention is not proper randomisation, and comparing groups who receive instruction on CT while withdrawing instruction and support for learning for the control group cannot be seen as a fair comparison.

8.5.3 Literary and narrative texts

Another instructional approach is the use of literary and narrative texts to enhance students' CT skills. There is no evidence that this approach is effective either. Six studies examined this approach with four receiving a rating of 0 due to their weak designs and poor reporting and two receiving a rating of 1*. All reported positive outcomes.

Fatemi (n.d.) examined the impact of literary narratives using a quasi-experiment. A total of 105 EFL (English as a Foreign Language) university students from two different universities were selected for the trial. Students from one university taught by the researcher formed the experimental group, while those in the other university formed

the control. Outcomes were measured using the Persian version of WGCTA. Students in the experimental group were asked questions that encouraged the use of CT skills while reading narrative texts in class, and the control group had essays to read. Although the author states that the two groups are balanced in language proficiency, background, age, and CT, the two groups are from two different universities, so maybe different in other unobservable characteristics. The experimental group was taught by the researcher but nothing was mentioned about the teacher who taught the control group. It is possible that the researcher could be teaching to the test (especially if they knew the contents of the test). The huge effect size cited (ES = +0.99) could be due to the small sample size or, more likely the result of teaching to the test. There was also no report of attrition or missing values.

Another study that examined the effect of using literary texts (**Khatib & Alizadeh, 2012**) was a two group pre-test post-test design using the WGCTA as the test instrument. Thirty-four students (out of 46) were selected based on the results of the pre-test and divided into two groups. Both groups were taught CT lessons, but the experimental group used literary texts while the control group used non-literary texts usually found in academic textbooks. Although the author claimed that the participants were "randomly assigned" to two groups, it is not clear how this was carried out as they also stated that they wanted to have equal numbers of male and females in each group. Was it stratified or was it proportional randomisation, or was it ad hoc? It appears that many researchers confused ad hoc allocation with randomisation. It is also not clear if the two groups were taught by the same instructor. The analyses were so badly reported that it was hard to make out what the effect size would be. Instead significant tests (t-tests) were used, which are inappropriate.

The three studies that received a rating of 0 are Arslan & Yildiz (2012), Khatib & Janpour (2012), and Pashangzadeh, Ahmadian, & Yazdani (2016). A one-group design study done by **Arslan and Yildiz (2012)** examined the application of a literature-based CT programme on students' CT skills. Students were 31 females and three males enrolled in a Literary Criticism course. Therefore, the sample is very small. Students were taught the materials with emphasis on CT skills, a student-centred approach, pair-work, and group-work. No attrition was reported. The authors used a very weak design as there was no control group, so any gain in CT could be attributed to other variables that the researchers did not foresee. Students' higher scores on the post-test could be the

result of their familiarity with the test especially that the duration of the intervention was very short. Since the study has a one-group design, there could have been other factors that might have caused students to do better on the post-test such as other courses taken by students. The authors did not control for those confounding variables. Taking opinions of students and the course instructor concerning the effect of the class activities is not an accurate way to measure the effect of the course on students' thinking skills. The study can be rated of extremely low quality.

Khatib and Janpour (2012) investigated the effect of literary texts on the development of students' CT. Students were all female. Students were matched based on their scores in English in a previous term, and then they were randomised. Students in the control group were given readings from their textbook while students in the experimental group were given short stories in addition to their textbook. The authors did not provide any information whether the same teacher taught the two groups and how they randomised the two groups. Since randomisation is done on two groups after researchers matched students, there is no guarantee that the two groups will be similar in all other variables even if they are homogeneous in terms of English language proficiency. There might be other hidden and unknown variables that might make the two groups different. The sample size is small. Attrition rate was not reported. It is not clear whether one or two teachers taught the two groups. The study is of low quality.

In a small-scale study, **Pashangzadeh, Ahmadian, and Yazdani (2016)** examine the impact of narrative texts on students' CT. 59 male and female students were given the Oxford Placement Test. Then they were given the CCTST. 54 students whose scores fell within the range of approximately one standard deviation on either side of the mean score were chosen to participate in the study. They were two intact groups: one experimental and the other control. Both groups were asked CT questions, and the only difference between the two groups was the type of texts introduced. As they were two intact groups and there was no randomisation, this means that the two groups are not initially balanced. The researchers do not state whether the two groups were taught by the same teacher or two different teachers. Teacher effect, if there were two teachers, could have produced the positive outcome in the experimental students. It is not the genre of text that can prompt students to think critically, but rather it is the type of questions that the teacher asks and the type of information which is in the text that can push students to think critically. As in other studies in this review, the type of treatment

is not convincing to have produced a big impact on students' level of CT. The sample size is very small, especially that the researchers have used two intact groups, which reduces the sample size to 2 clusters that might not have been balanced in the first place. The study can be rated of extremely low quality.

Khamkhong (2018) used a pre-experimental design to test the effectiveness of the PISA reading literacy framework on students' level of CT. As there is no comparator group, it is not clear whether students' growth in CT is the result of the intervention or some other factor like maturation. A pre-experimental approach might be useful for a researcher who would like to pilot the materials before a large trial; however, it cannot establish a cause-effect relationship. The instrument used as a pre-test and post-test is researcher-developed, which could imply that the teacher who is the researcher in this case could have taught to the test. The study was given a rating of 0.

Given the very weak studies so far, there is little evidence that literary and narrative texts are an effective way to enhance CT skills of English language learners.

8.5.4 Brainstorming techniques

Another strategy that has been tested is brainstorming techniques. The two studies that evaluated this approach both reported a positive outcome. Both used the WGTCA, but one compared two groups of students (which could be different at the outset), and the second study privileged the treatment group by giving them additional support. Both were given a rating of 1*.

In **Ghabanchi and Behrooznia's (2014)** study, 54 university students from two intact groups on a reading course were involved in the trial. This was a two-group, pre-test post-test quasi-experimental study. Participants were not randomised to treatment conditions but conveniently assigned. Therefore the number of cases is not 54 but 2 clusters. The two groups were taught by the same teacher, who was also the researcher, using the same materials with the only exception that brainstorming was practised in the treatment group. There is therefore a threat of selection bias as the two clusters might be completely different from each other, and students forming each cluster might share similar qualities. As with most other studies there was no report of attrition or missing values. The study reported a huge effect (ES = +0.75). The analyses were badly presented. For example, the mean pre-test and post-test scores for the two groups were

not presented in the tables, but instead the results of significant tests were used to show that the two groups were different. This was despite having no random samples.

Another study looked at the effect of concept mapping (a brainstorming technique) on 36 EFL students' CT (**Khodadady & Ghanizadeh, 2011**). The TOEFL was administered to all students to ensure that they had the same proficiency level. The groups were assigned to treatment conditions based on their pre-test. In other words, allocation was not random even though the authors claimed that the students were randomly assigned to the two groups. The intervention was delivered in 22 two-hour sessions. In each session, students in the experimental group were given a reading passage and were asked to construct a concept map at home using the software C-map tools. The maps were then discussed in class the following day. The control group was not assigned any homework. The same instructor taught the two groups. As the experimental students were required to do the concept maps at home other variables could have affected the study. For example, students could be given extra help from parents, siblings, or friends or do additional reading up. It is therefore not possible to rule out the influence of other extraneous factors. This could be controlled if the activities were completed in class. There is also a possibility of a Hawthorne effect as the use of the software for generating concept maps is a novel idea. Attrition rate was not reported.

Although brainstorming as a technique to teach logic and CT might be a useful strategy to help students generate ideas, the evidence of its effectiveness is weak. There were only two studies that evaluated this approach, but both were small scale and involved unclear randomisation.

8.5.5 Journal writing

Journal writing is another approach used to develop CT skills of English language learners. Two studies were identified using this approach and both reported a positive outcome. One was rated 0 and the other given a 1*.

Khatib, Marefat, and Ahmadi (2012) examined the effect of keeping audiotaped and written dialogue journals on students' CT. Students from three intact classes were included in the study (two experimental classes and one control class). The two experimental groups were instructed to keep journals, with one group keeping written

journals (n = 19) while the other group kept audiotaped journals of 5 to 10 minutes (n = 9). Students were encouraged to reflect on any topic of their choice in their journal on a weekly basis over 19 sessions. The instructor provided feedback on their journal entries. The control group (n = 12) had regular class activities with no special tasks. All three groups were taught by the same instructor introducing the possibility of diffusion. CT was assessed using the Persian version of the WGCTA although instruction was given in English. The authors concluded that students using journal keeping (both written and audiotaped) performed better than the control and there was no difference between written and audiotaped journal keeping in terms of effectiveness. This study was rated 1* because of the very small sample (under 50), unclear reporting of attrition rate and the misuse of significant testing in comparing effects. We do not know how many students were there at the beginning, but only that all the 33 students who completed the WGCTA were included in the final analysis. As before no standardised effect size was calculated. ANOVA and t-tests based on significant testing were used to compare the results of the three groups even though the samples were clearly not randomised. The authors explained that the students were placed in the three classes based on their oral and written placement tests, suggesting that the three groups were already different at the outset.

Shaarawy's (2014) study was a quasi-experiment involving 56 first year university students (33 in the experimental group and 23 in the control group). It was not clear how the groups were formed, but very likely they were in two intact classes on the same course. Both groups were taught the same syllabus by the same teacher who was also the researcher. The only difference was that the intervention group was given an additional weekly journal writing exercise where writing prompts were given based on Bloom's taxonomy of cognitive skills. CT was measured using a researcher-developed tool based on Bloom's taxonomy of cognitive skills. As the test is related to the intervention, which was not given to the control group, it cannot be considered a fair test. Also, as in most other studies in this review, the impact of the intervention was calculated using t-tests despite no randomisation. Final analyses were conducted on only 16 experimental students who had completed all the seven journal writing exercises and who had pre- and post-tests scores. Only seven of the control students with pre- and post-test scores were included in the final analyses. This represents an attrition of 55%. Students who completed all the writing exercises may be different in

terms of motivation and prior skills compared to those who did not. This is thus a bias in the selection of intervention students.

8.5.6 Scaffolding

One was given a rating of 1* (**Sokol et al., 2008**) and reported a positive outcome and one was given a rating of 0 (**Hurte, 2004**) and reported no effects because it was not a test of the effectiveness of the scaffolding strategy, but a comparison of scaffolding with the Cognitive Enrichment Advantage (CEA) approach. Both groups registered a decline between pre- and post-test, with the scaffolding group showing a bigger decrease. This suggests that the scaffolding strategy is less effective than the CEA approach. Participants were first year university students who were matched in pairs and randomly assigned to treatment conditions. Given that there were only 36 students, the matched pair assignment meant that the number of cases was effectively only 18. Moreover both groups received two weeks of direct instruction in CT. The absence of a control group, the lack of individual randomisation and the fact that the instructor was also the researcher all weaken the evidence.

The other study by Sokol et al. (2008) was a quasi-experiment comparing 54 students from one school (4 classes) with 27 students from another school (2 classes). The intervention, known as the Thinking Approach integrates inventive thinking skills instruction in foreign language teaching. The teacher's role was to scaffold learners who had to build models by responding to certain specific tasks. The experimental students had five hours of English per week while the control group received only 3 hours per week. The two groups were from two different schools, one in the capital city and one in a town, which might have also resulted in biased results. As the groups were not randomly allocated to conditions there may be systematic differences between them. It is therefore not possible to rule out other confounding effects. The authors acknowledged that the groups also differed in terms of proficiency level and teacher expertise. All these pose threats to the internal validity of the study. Outcomes were measured using an inventive thinking test which is closely aligned with the intervention. Moreover the test was graded by only one rater who was not blinded. Attrition was not reported nor was the effect size. Instead a comparison of groups using t-test was conducted. This is an inappropriate analysis as participants were not randomised. Significant tests cannot be used for non-random samples. All these rendered the results untenable.

Therefore, we can conclude that there is no evidence that scaffolding is effective in developing CT skills in English language learners.

8.5.7 Active learning strategies

Only three studies were found that examined those strategies, and all reported a positive outcome.

In a quasi-experiment involving 162 participants, **Kusumoto (2018)** examined the use of active learning on students' level of CT over a period of two semesters. Two classes taught by two different teachers were compared. This reduces the credibility of its findings since the two classes may be inherently different and any difference between groups cannot be attributed to the intervention. Some students were also enrolled in English courses in the same year, which might have contributed to students' growth in CT. The researcher excluded 29 students with missing scores from the analysis. Students who comply till the end might be different from students who miss the test, so the researcher should have presented the pre-test scores of those missing students to make sure that they are not any different from those who complied. The number needed to disturb the finding is 1.86 which would be rounded to 2. This means that 2 counterfactual cases would be needed in order to change the findings. The number is low compared with 29 missing cases. The effect size as calculated by the authors of this review is 0.03 which is considered a very small effect size, indicating that there is no difference between groups. Therefore, the study does not provide strong evidence that active learning strategies could enhance students' level of CT. The study was given a rating of 2*.

Rashtchi (2007) examined the effect of collaborative writing. Participants were 74 students from an Islamic university in Tehran who scored ±1 standard deviation of the mean score in the Comprehensive English Language Test (CELT), with 38 in the experimental and 36 in the control group. Interestingly these students were pre-randomised before the test from a total of 90. This meant that sixteen students were excluded after randomisation, representing an attrition of 18% even before the trial started. Experimental students received 14 sessions of cooperative writing while students in the control group wrote individually with the instructor giving feedback to both groups at the end of each session. The researcher was the instructor of both groups. This means that there is a possibility of bias even if unintended. CT was assessed using

WGCTA. The very small sample size (n = 4 clusters), the very high attrition after randomisation, the very poor reporting, misuse of significant test and the fact that the researcher was also the instructor meant that the evidence is untenable. The study was rated 1*.

Fahim and Mirzaii (2013) evaluated the use of dialogic thinking where the experimental students received dialogic CT training in addition to argumentative writing instruction. Control students were trained only in argumentative writing. Participants were 43 male EFL learners (out of 48) from four classes who scored ±1 standard deviation of the mean score in an argumentative essay. Two classes were randomly assigned to experimental condition (n = 21) and two to control (n = 22). Post-test analysis included only 42 students. It is not clear what happened to the 43rd student. The study showed a huge gain between pre- and post-test on a researcher-developed English written test (ES = 1.45 calculated by the reviewers). It is unclear whether the researchers were also the teachers teaching the experimental classes and whether they marked the tests as well. If so, then there could be a teacher expectation effect. This study was rated 0 due to the poor reporting, small sample size (n = 4 clusters), the use of a researcher-developed test, and lack of blinding of markers.

8.6 Summary

Several strategies for developing CT skills have been tested, and almost all claimed positive effects. No studies reported negative effects of teaching CT. Therefore, we could not identify any approaches that were not effective. It is possible that this could be due to publication bias where positive results are more likely to be published or where researchers are more likely to publish if they found positive effects. It may also be the case where researchers are so keen to find positive results that they report only the positive results.

Almost all the studies in this review are very small-scale and have serious methodological flaws. Of the 36 studies that were synthesised, thirteen of them were given a 0 rating. Seventeen were given a rating of 1*. The best studies in this review were rated 2* (n = 5) and 1.5* (n = 1). No studies were rated above 2*. Therefore there is little evidence that any of the approaches actually work. Similar conclusions were made in other reviews (e.g. Behar-Horenstein & Niu, 2011; Torgerson, Andrews, Robinson, & See, 2006). All previous reviews concluded that there was a need for a

large well-designed and well-reported RCT to be conducted in higher education in order to test the effectiveness of one or more of the seemingly promising strategies

The finding of this review suggests that there is indicative evidence that the approach involving instruction in general CT skills might work for ELL students in higher education. More large-scale and robust evidence would be needed to confirm its effect. This approach has been evaluated by the biggest number of studies with the highest number of studies rated 2* (the best rating in this review). Overall the evidence is weak due to the quality of the studies. There is no evidence that the other approaches (debate, assessment, use of narrative and literary texts and other active learning strategies) work in raising CT skills among ELL students in higher education. This is largely because there are few studies conducted on these approaches and almost all were of very low quality.

8.6.1 Common problems identified in this review

No study in this review was rated above 2*, suggesting that research in this area is still rather premature. 1,036 studies were found via handsearching Google Scholar mostly in journals that are not international in scope and are invariably of poor quality. Almost all were very small scale, conducted by researchers who were themselves the instructors using students in their own institution or classes. Most of the approaches were evaluated by fewer than three studies. The small-scale and the lack of replication meant that it is not possible to say for sure which approach is really effective.

Also a large number of studies involved ad hoc randomisation or pseudo-randomisation where two classes were "randomly" picked to receive the intervention. It is also the case that in a large number of studies the experimental group was given additional support (in addition to the regular lessons), while control students were not, and in some cases instruction was even withdrawn from the control group. Comparing students who were given extra help with those who had no help at all is not a fair comparison.

Many studies used standardised tests that were translated into the native language of the students even though the intervention was delivered in English. CT requires the ability to make arguments, understand logical fallacies, question assumptions, make warranted conclusions and offer alternative explanations. How closely these skills can be translated in another language is questionable. Some common words like evidence,

reliable/unreliable, take for granted, prediction, unstated assumption in the Cornell Critical Thinking Test and the WGCTA might be an obstacle if students do not know their equivalence in their own native language. It makes sense that if the study was conducted in an ESL/EFL context and the intervention was delivered in English the test instrument should be English. The argument often put forward for using the translated version is that standardized tests are culturally biased. But translating the test into another language may remove some of the subtle nuances which are particularly relevant in CT.

Many studies in this review have reported the short duration of intervention as a main barrier to students' growth in CT. This suggests that a longer period may be needed for effects to be realised as CT skills require time to develop.

Another issue faced in this review is the absence of a single agreed-upon definition for CT, which makes comparison of studies difficult as different studies may be measuring different things. Although the majority of studies used standardised tests like the WGCTA, CCTST and the Cornell Critical Thinking Test (Cornell CTT), a few other studies used bespoke or adapted versions of the test or researcher-developed writing tests.

Another prevalent practice is the misuse or misinterpretation of significant tests. Significant tests are not appropriate for quasi-experimental studies using convenient samples, or matched groups with no random samples. Even when there is proper randomisation, any missing data or attrition would have rendered the sample non-random as missing cases are rarely random. In some studies, students who did not complete the post-test were excluded from the analysis. Significant tests are based on the premise that there is complete randomisation. And even if there is complete randomisation significant tests are still not appropriate because null hypothesis significant testing (NHST) states that assuming there is no difference between groups how likely are we to obtain data as extreme as observed. The answer that most researchers want is: given the data how likely is there a difference between groups. Unfortunately, significant tests do not and cannot answer this question. All this shows that there is much still to be done in research in this area.

CHAPTER 9
Impact evaluation

This chapter details the results of the cluster randomised controlled trial and answers the following research questions:

RQ 3   Can general CT skills be taught to ELL in higher education in Lebanon within the regular curriculum?

RQ 4a Is it feasible to teach CT skills in an education system which does not generally promote independent thinking and argumentation?

RQ 4b Is it feasible to teach CT skills in a culture where the curriculum is heavily dictated by religion and politics?

RQ 5   Do students' characteristics (e.g. gender, subject major, exposure to a foreign culture, job experience) affect their receptivity to CT skills?

9.1 The achieved sample

The trial started with a total number of 29 clusters consisting of 413 students with 206 students in the experimental group and 207 students in the control group. A total of 30 students in both the experimental and the control groups missed the post-test. In the Spring (1st trial), 15 students did not do the post-test and in the Fall (2nd trial), 15 students also did not do the post-test. These 30 students were absent on the day the post-test was administered and the researcher could not get hold of the absent students on any other day although many attempts were made. The researcher kept reminding class teachers to send students who did not do the post-test to the lab, yet there were students who could not do the post-test due to their tight schedules or other commitments. Out of the 30 students, 26 dropped out of the module before the end of term, so it was impossible to track them. Part of the attrition is also attributed to the fact that some students were dropped by their teachers either because of the number of absences they accumulated in the term or because of a case of cheating on a major assignment. This could happen at any time in the term and it has nothing to do with the intervention as it is related to the module itself. The rules at the university where the study was conducted require that teachers drop students who miss more than 12 sessions in the term. Also, in case students are caught cheating, they receive a grade of zero on the assignment and they eventually drop the module before the end of the term as it becomes hard for them to pass having received a grade of zero on a major assignment. The majority of students (26 out of 30 students) who did not do the post-test dropped out of the whole

programme or from the university and not from the present study, so it was impossible for the researcher to contact them and ask them to do the post-test because they would not be interested in coming to the university just for the test. As for the other four students, many attempts were made in vain to encourage them to come to the lab to do the post-test. Although attrition in the two groups, the experimental and the control, is not balanced, it is important to note that attrition happened at random and has nothing to do with the treatment itself. Flowchart 9.1 shows the number of experimental and control students in the two terms combined.

Flowchart 9.1 Dropout in the two terms
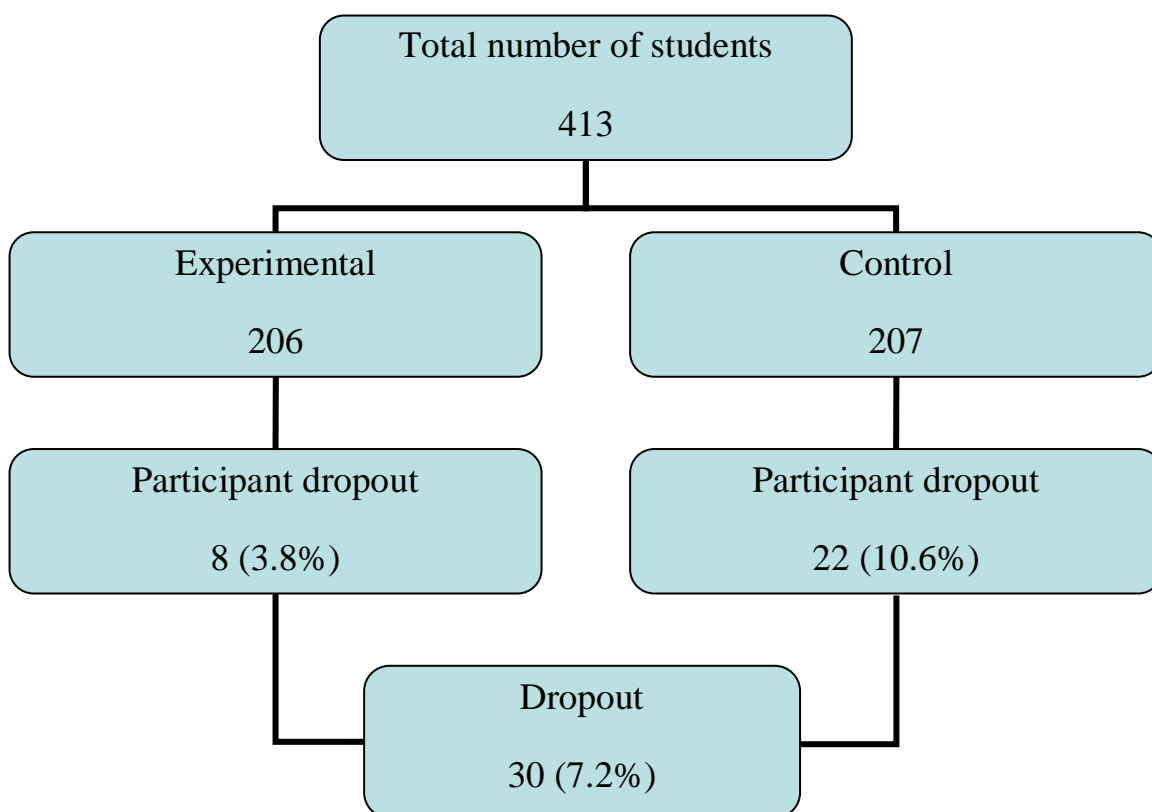
As the flowchart shows, the study included a total of 206 students in the experimental group and 207 students in the control group. 413 students did the pre-test and 383 students did the post-test. The total attrition rate in the two groups combined is 30 students (7.3%), with 8 students (3.8%) in the experimental and 22 students (10.6%) in the control. Students in both the experimental and control groups were not aware that they had slightly different materials, so there is no way to argue that attrition is due to any feature in the study. It is unlikely that students in the control group who did not do the post-test missed the test due to resentful demoralisation.

Flowchart 9.2 shows the number of students who did the pre-test and the post-test and the number of students who dropped out in each of the two terms.

Flowchart 9.2 Number of students who did the pre-test and number of students who did the post-test in each term
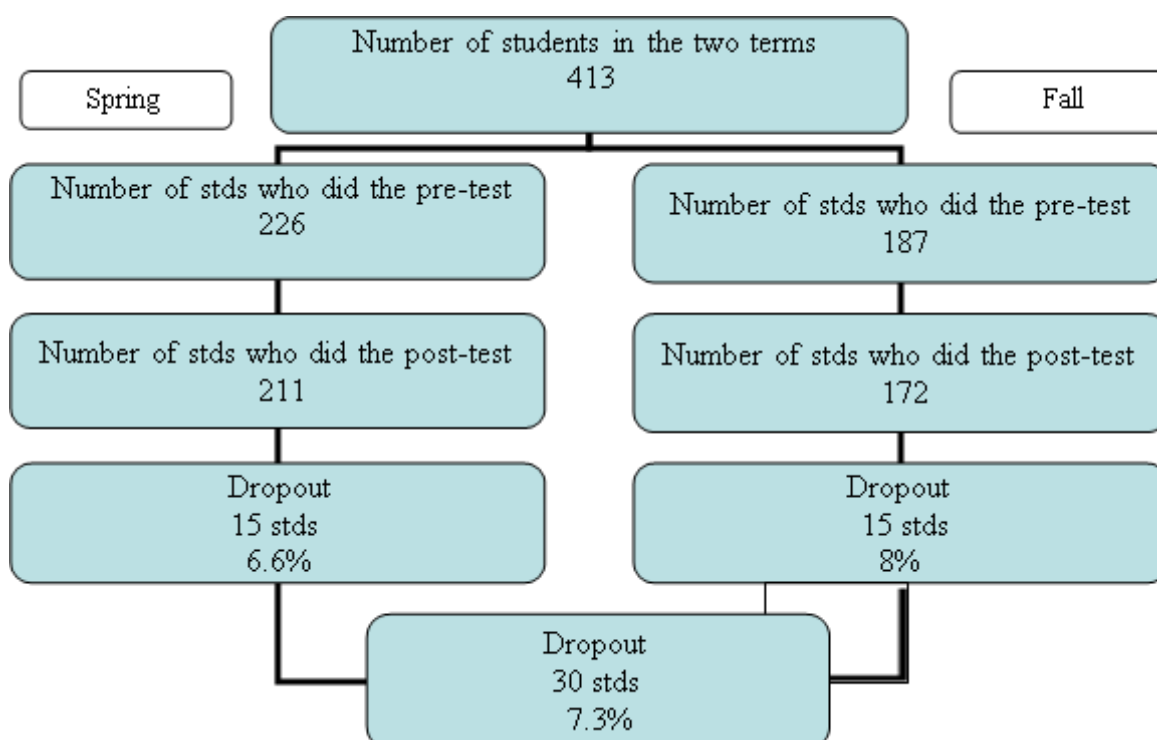
As Flowchart 9.2 shows, the rate of dropout is equal in the two terms, Spring 2014-15 and Fall 2015-16.

Teacher 4, decided to withdraw from the experimental group after the second lesson claiming that there was no time to cover both the syllabus in addition to the CT materials. The teacher did not mind that students do the post-test at the end of term. Class 12S taught by Teacher 4 therefore did not receive the full course of the intervention, but provided data for both the pre-test and the post-test. Intention-to-treat (ITT) analysis was used to avoid the bias of teacher withdrawal, which means that the data for Class 12S was analysed as it was originally assigned to the experimental group although the teacher did not comply till the end.

The following diagram - based on CONSORT 2010 by Moher et al. (2010) - provides detailed information about the number of students that were followed up in each step in the trial.

Flowchart 9.3 CONSORT 2010 Flow Diagram
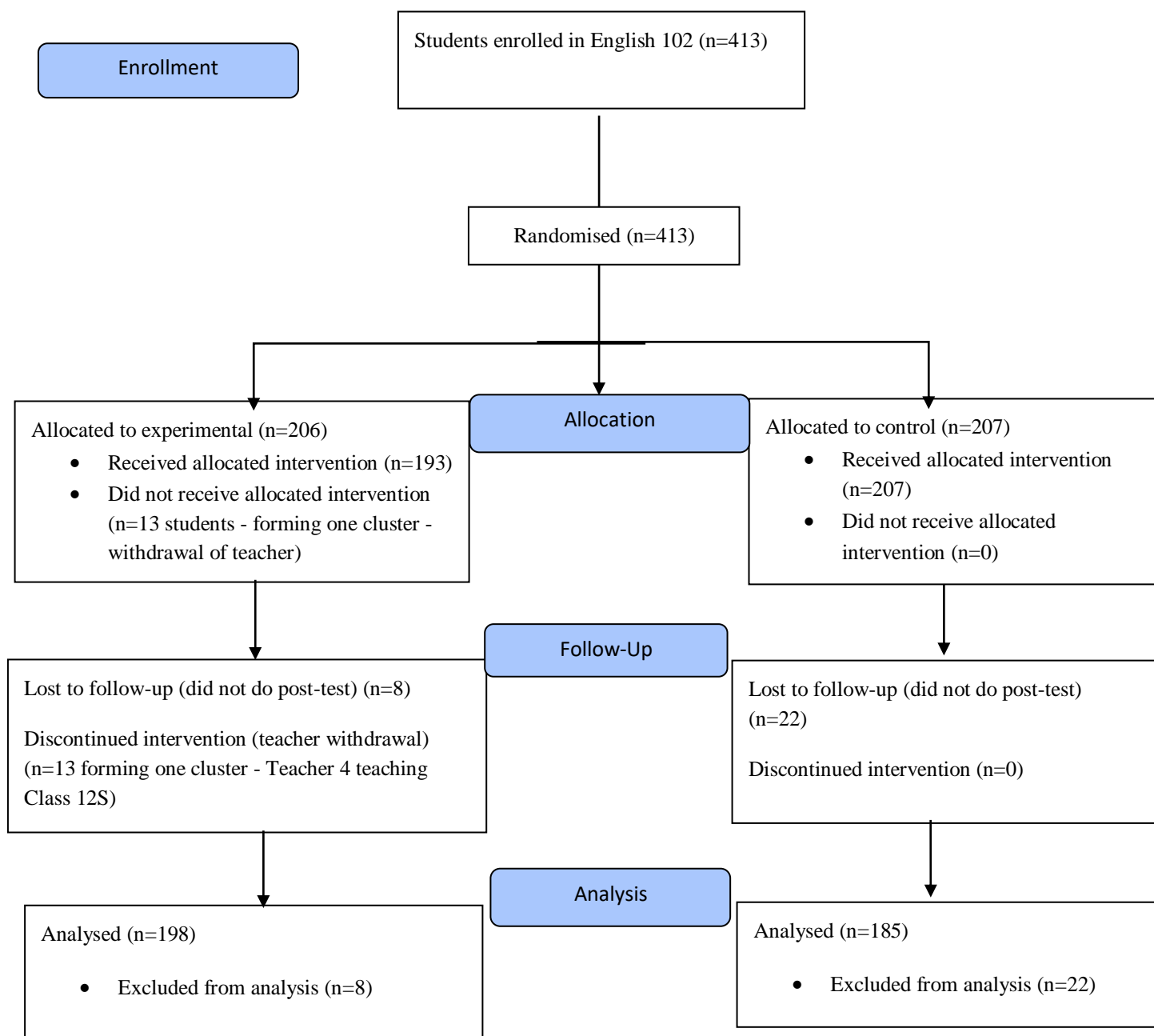
9.2 Does explicit teaching of critical thinking via a general approach improve students' level of critical thinking?

In order to determine whether any of the two groups showed progress from pre-test to post-test and in order to compare the performance of the two groups, gain score and effect size were calculated.

Table 9.1 Comparison of progress in critical thinking by treatment groups (overall, combining results from both cohorts)

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental	198	41.98	9.08	42.96	9.70	1.01	10.40	
Control	185	41.74	7.48	39.95	8.89	-1.79	10.08	
Overall	383	41.86	8.28	41.45	9.29	-0.39	10.24	0.3

The experimental and control groups are balanced at the outset with both scoring the same at pre-test. So a comparison of post-test would suffice, but to avoid measurement errors in pre-post designs (explained in Chapter 7) comparisons were also made with the post-test only. Table 9.1 shows that the experimental group experienced a slight improvement in the post-test (+1.01) while the control group showed a decline (-1.79). The effect size is +0.3. This indicates that 62% of students in the control group are below the average students in the experimental group (Coe, 2002). Put another way, an effect size of +0.3 means that there is a 58% probability that the score of a student chosen at random from the experimental group would be higher than that of a student also chosen at random from the control group. This is equivalent to 4 months' additional progress (Coe, 2013). Coe (2002) believes that although an effect size of +0.3 can be considered relatively low, an effect size of as little as +0.1 is important in education if it can improve academic achievement with the use of an inexpensive intervention, or if the achievement can affect all students evenly, and most importantly if the effect is cumulative over time. Gorard (2006) asserts that an effect size of +0.1 can be considered large if "the variability, the costs and the errors in producing it are low, while the benefits are high" (p. 75). All in all, the results look promising and positive.

As the trial was repeated over two terms with a different group of students, the same analysis is presented separately in Table 9.2 (Spring cohort) and Table 9.3 (Fall cohort). This allows for comparison of the two cohorts (Spring and Fall cohorts).

Table 9.2 Comparison of progress in critical thinking for the Spring 2014-15 cohort

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental	109	40.61	8.78	40.02	9.62	-0.59	11.33	
Control	102	41.00	7.59	37.01	8.07	-3.99	10.18	0.34
Overall	211	40.80	8.18	38.51	8.84	-2.29	10.75	

Table 9.3 Comparison of progress in critical thinking for the Fall 2015-16 cohort

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental	89	43.66	9.20	46.56	8.56	2.98	8.81	
Control	83	42.65	7.27	43.55	8.56	0.90	9.31	0.35
Overall	172	43.15	8.23	45	8.56	1.94	9.06	

Tables 9.2 and 9.3 show that although the two cohorts of students were taught by the same teachers using the same CT lessons, there was some difference in their performance. It is interesting to note that both groups in the Spring cohort made negative progress from pre- to post-test, but the decline for the control students was much bigger (-3.99) than for the experimental students (-0.59). Overall, the experimental group was ahead compared to the control students (ES = +0.34). However, both groups in the Fall cohort made positive gains between pre- and post-test, but the experimental students made bigger gains than control students representing a gain of +0.35 effect size.

The same instrument was used in both cohorts, so the explanation cannot be the test. It is possible that the two cohorts of students differed in terms of their attitude. Students in the Fall come straight from school and it is their first term at university. They might be more keen, curious and motivated to learn and accept the new teaching as part of university pedagogy, whereas those in the Spring term had already been in university for a term. They might be more sceptical of the new approach to teaching, and

familiarity with their teachers might make them less receptive to the lessons. They might be less enthusiastic having been at university for a term. This is especially so as English is not their major subject, but something they had to do.

Could it also be that the teachers in the Fall had more experience in teaching CT having taught it for one term? This argument does not look likely because if we look at the performance at pre-test, it suggests that the Spring cohort was weaker to begin with. Most of the students in the Fall cohort had higher levels of English when they arrived compared to the Spring cohort. This is a plausible explanation. Of course, it is also likely that the difference between the two groups of students could be due to chance.

Although gain score varied between the two terms, the effect size was the same in both terms. This means that the magnitude of the effect was the same in both terms and the gain experienced by the students in the two different terms was the same.

Overall, the results show that the general and explicit teaching of CT has a positive impact on ELL students' CT skills.

9.3 Sensitivity analysis

How secure is the finding?

Missing cases and missing values can bias the results leading to false positive effects. This can threaten the security of the findings. To test how secure the findings are, the number of counterfactual cases needed to disturb the finding (NNTD) is calculated (refer to section 7.2 for a fuller explanation). This calculation is to determine if the findings would be reversed if all the missing cases had the opposite results. In other words, assuming that all the missing cases made negative progress, would including them reverse the positive effects.

Table 9.4 NNTD

Smaller cell	Number of missing cases	Effect size	NNTD
206	30	0.3	**62**

Table 9.4 shows that the NNTD in this trial is 62. This means that it would take 62 counterfactual cases with the opposite results to alter the findings. The number of cases, on the other hand is only 30. So even if all the 30 missing cases had negative effects, it would not be enough to change the overall results. Therefore, we can conclude that the

findings in the present trial are not affected by missing data and are thus very stable or secure.

As explained in Chapter 7, students who did not take the post-test may be systematically different to those who did. This could bias the results. In order to determine whether the thirty students who missed the post-test differed in any way from those who did the post-test, the mean and standard deviation of their pre-test scores were computed. Their pre-test scores are examined against the overall mean and standard deviation of other students' pre-test scores.

Table 9.5 Comparison of the pre-test scores of students missing post-test

	N	Pre-test of those missing post-test	SD	Pre-test of those who had post-test scores	SD
Experimental	8	41.12	9.56	41.98	9.08
Control	22	40.13	9.52	41.74	7.48
Overall	30	40.12	9.54	41.86	8.28

Table 9.5 shows that the pre-test scores of experimental students who missed the post-test did not differ much from those who did the post-test. Those missing post-test scores tended to be weaker with lower test scores at pre-test. The mean of the pre-test of experimental students who missed the post-test was 41.12 as opposed to a mean of 41.98 for all other experimental students who did the post-test (see Table 9.1). However, the mean of the pre-test of control students who missed the post-test was 40.13 as opposed to 41.74 for control students who had post-test scores. This suggests that if the 22 control students had taken the post-test, there is a chance that they could have lowered the overall mean of control students even more. This is also the case with the experimental group, but the pre-test of experimental students missing post-test was higher than those in the control group. Including them in the post-test would not have changed the results. Therefore, missing post-test scores could not have biased or inflated the results of the present study.

One teacher (Class 12S) withdrew from the trial mid-way. This means that the students in Class 12S did not receive the full dosage of the intervention. Including these students in the intention-to-treat analysis may not be fair as they did not have the full dose of the

intervention. If we assume that these students were in the control group (i.e. they did not receive the intervention), would the results be different? For this reason, the same analysis that was conducted using intention-to-treat analysis was repeated but with Class 12S placed in the control group. This increases the number in the control group to 198 and reduces the number in the experimental group to 185.

Table 9.6 Comparing the results of students who received the intervention with those who did not

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental	185	41.98	9.05	43.24	9.76	1.25	10.33	
Control	198	41.56	7.81	39.88	8.83	-1.83	10.13	
Overall	383	41.77	8.43	41.56	9.29	-0.29	10.23	0.36

The results show a slight increase in the effect size to +0,36, suggesting again that receipt of the intervention had benefited the students because including these students in the experimental group (as in Table 9.1) even though they had not received the intervention had dampened the effects.

9.4 Does CT instruction affect different subgroups of students differently?

Many researchers suggest that some demographic characteristics could have an effect on students' level of receptivity of CT skills. For example, in a quasi-experiment Dyer and Hall (2018) found that Latino and Asian students made bigger improvements from pre-test to post-test than White students when trained to view conspiracy theories with scepticism. A survey of 244 participants by Lobato and Zimmerman (2018) shows that people's political views (liberal or conservative) are strongly correlated with their level of agreement or disagreement with unwarranted claims in science.

In this trial, analyses were performed to compare the impact of CT on sub groups of students: gender, nationality, job experience, cultural exposure, subject major that students had previously chosen at school, and university major that they are currently enrolled in. Only students who provided information were included in the analyses.

9.4.1 Impact of CT by gender

Gain score and effect size were calculated to determine if gender had any effect on students' receptivity to CT skills.

Table 9.7 Impact of CT on males and females

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental *males*	136	42.09	9.20	42.38	10.28	0.29	10.26	
Control *males*	105	41.34	8.27	39.58	8.86	-2.20	9.59	0.25
Experimental *females*	62	41.63	8.83	44.23	8.24	2.6	10.62	
Control *females*	80	41.89	6.86	40.43	8.97	-1.46	10.71	0.38

Table 9.7 shows that the CT instruction approach used in this study had a bigger impact on girls than boys. While girls in the experimental group improved by 2.6 points between pre- and post-test, the boys in the experimental group improved by only 0.29.

9.4.2 Impact by nationality

Most of the students in the trial were Lebanese, or Lebanese with a foreign nationality (Lebanese +). A few were foreigners (i.e. not Lebanese citizens). It is really interesting to see that CT training had the most impact on foreigners (Table 9.8) while Lebanese did not seem to benefit from the explicit, general approach to CT. However, the results have to be read with caution because of the small numbers in each cell. Small sample sizes are prone to volatility as small changes can make a difference to the overall results.

Table 9.8 Analysis by nationality

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental *Lebanese*	147	41.07	8.79	43.26	9.72	2.19	10.64	

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Control *Lebanese*	148	42.17	7.84	39.95	8.86	-2.22	10.02	0.42
Experimental *Lebanese +*	41	45.14	9.29	42.05	9.92	-3.09	9.44	
Control *Lebanese +*	24	39.65	6.91	39.88	10.28	0.23	11.95	-0.31
Experimental *Foreign*	9	40.40	11.30	43.44	8.96	3.04	4.51	
Control *Foreign*	11	42.45	5.68	41.36	6.69	-1.09	7.17	0.70

Lebanese + refers to Lebanese with another nationality

Three students did not provide data concerning nationality. The number of foreign students is very small and the effect might be exaggerated because of the small number. Therefore, one would be cautious about drawing any conclusions or interpretations here.

9.4.3 Impact by cultural exposure

It is hypothesised that students who have different cultural exposure, such as having lived in a foreign country for more than six months or have parents who are not Lebanese may have different attitudes or predisposition to CT. To see if CT instruction would benefit these groups differently, analysis was also conducted by cultural exposure.

Table 9.9 Analysis by cultural exposure

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental *With exposure*	114	42.94	9.50	42.44	9.91	-0.5	10.17	
Control *With exposure*	114	41.38	7.85	39.67	8.89	-1.7	9.73	0.12
Experimental *Without*	83	40.46	8.46	43.81	9.39	3.35	10.26	

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
exposure								
Control *Without exposure*	69	42.58	7.23	40.61	8.95	-1.97	10.81	0.13

To determine whether students had any exposure to a culture different from their own, students were asked in the questionnaire whether they had a foreign parent or whether they had travelled to any country and stayed there for more than 6 months. Three students did not provide data on cultural exposure. The results show that both groups have the same effect size.

9.4.4 Impact by job experience

It is speculated that students who have a part-time job could be more open to the world, might be more receptive to the CT lessons and would show a bigger gain.

Table 9.10 Analysis by job experience

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental *With experience*	70	42.99	7.96	42.61	10.54	-0.38	10.11	
Control *With experience*	53	41.15	7.86	41.98	8.37	0.83	10.62	-0.11
Experimental *Without experience*	127	41.29	9.69	43.24	9.23	1.92	10.51	
Control *Without experience*	130	42.11	7.54	39.22	9.02	-2.89	9.74	0.47

Three students did not provide data on job experience. Students without job experience reported a higher effect size (0.47) than those with job experience (-0.11). The exaggerated effect size could be due to the small numbers that the subdivision has resulted in.

9.4.5 Impact by students' subject major at school

This study also wants to find out whether CT instruction is more effective for students in certain disciplines. For this reason, students were also asked about their subject majors at school. These were categorised broadly as: Humanities, General Science, Life Science, and Socioeconomics. Students are assigned to those school tracks based on their grades in the previous years. Although Life Science students might be exposed to different subjects if, for example, they are assigned to Life Science, most of the teaching sessions that they receive would be in biology. The same applies to the other tracks.

The purpose was to test whether students who come from certain disciplines are more receptive to CT instruction than others. Table 9.11 shows that Life Science students were the most receptive to CT instruction making the most progress compared to other students (ES = +0.46). CT instruction does not appear to have any effect on Humanities students. Perhaps Life Science is a discipline that lends itself well to CT, whereas in Humanities students are generally taught to memorise and regurgitate facts.

Table 9.11 Analysis by school major

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental *Humanities*	11	45.91	11.79	40	11.49	-5.91	11.44	-0.36
Control *Humanities*	12	40.42	7.63	38.58	7.90	-1.84	10.98	
Experimental *General science*	90	42.39	9.04	43.89	9.39	1.5	9.53	0.3
Control *General science*	64	42.38	6.32	40.63	8.28	-1.75	9.40	
Experimental *Life science*	54	40.91	7.60	43.59	9.09	2.68	9.87	0.42
Control *Life science*	49	42.12	8.65	40.39	9.96	-1.73	11.14	

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental *Socioeconomics*	37	39.79	9.81	40.73	10.53	0.94	12.34	
Control *Socioeconomics*	56	41.30	7.97	39.29	8.95	-2.01	9.95	0.26

*Ten students did not provide information on school major

9.4.6 Impact by university major

Next, the study also wanted to see if students also differ by their university major. This is determined by the faculty they are in. Table 9.12 shows CT instruction had the biggest effect on Engineering students (ES= +0.38). Arts and Social Sciences students appear to be the least responsive to CT instruction (ES = -0.60). Again, this perhaps reflects Arts and Social Science discipline where teaching traditionally emphasises rote memorisation.

Table 9.12 Analysis by faculty

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental *Arts & Social Sciences*	19	45.95	10.49	41	11.18	-4.95	10.44	
Control *Arts & Social Sciences*	23	41.52	7.24	40.30	9.10	-1.22	10.13	-0.60
Experimental *Arts*	6	41	7.84	40	13.49	-1	18.88	
Control *Arts*	40	42.77	7.33	39.75	9.70	-3	10.01	0.13
Experimental *Business & Management*	38	39.34	9.28	41.24	10.06	1.9	11.39	
Control *Business & Management*	25	38.74	8.26	36.96	7.41	-1.78	10.36	0.33
Experimental *Engineering*	98	41.70	8.30	43.47	9.46	1.77	9.60	

Control *Engineering*	58	41.44	7.24	39.50	7.64	-1.94	9.74	0.38
Experimental *Health Sciences*	6	43.50	8.75	42.67	8.57	-0.8	6.64	-0.29
Control *Health Sciences*	8	39.40	9.08	41	9	1.6	9.63	
Experimental *Sciences*	31	43.68	10.05	45.29	8.49	1.61	9.58	0.21
Control *Sciences*	31	43.48	8.14	42.90	10.52	-0.58	10.92	

The very small numbers in each cell and the uneven numbers in each intervention group, as well as the fact that this was carried out only in one institution, means that the results cannot be reliable. A larger trial involving more and different types of institutions would be needed to provide a more reliable answer. Future trials could also consider using stratified random sampling to ensure even spread of students in different faculties in the two intervention groups.

9.4.7 How do students perform on the CT subskills?

The CCTT includes a number of CT skills, including induction, deduction, assumptions, credibility and meaning. To see if the general approach to explicit CT instruction was particularly effective in developing certain CT skills, analysis was also performed comparing impact by subskills. The control group made negative progress on almost all the subskills apart from Assumptions (see Table 9.13). This suggests that the CT instruction used in this study had been fairly successful in developing all the CT skills. However, although experimental students improved in their skills on Assumptions, the progress was less than that of the control group.

Table 9.13 Comparing performance in each critical thinking skill by treatment groups

		Pre-test mean	Post-test mean	Gain score	SD of gain score	Effect size

Experimental	Induction	44.78	44.79	0.01	17.52	0.17
	Deduction	44.56	46.85	2.29	15.05	0.27
	Assumptions	35.92	38.38	2.46	23.20	-0.01
	Credibility	36.68	42.42	5.74	33.88	0.17
	Meaning	34.06	35.11	1.05	16.87	0.07
Control	Induction	43.72	40.71	-3.01	16.43	
	Deduction	45.07	43.17	-1.91	15.78	
	Assumptions	31.16	34.05	2.89	24.06	
	Credibility	38.16	38.00	-0.16	32.34	
	Meaning	33.38	33.08	-0.3	17.05	

Of note is students' progress in assessing "credibility". The experimental group made huge gains between pre- and post-test (a gain of 5.74 points) whereas the control students actually made negative gain (-0.16 points). This suggests that the CT instruction used in this trial was particularly effective in developing students' skills in assessing the credibility of information. Credibility of sources was a major recurring theme in the interviews with students; many students referred to the issue of reliability and credibility of sources. A great number of experimental students mentioned in the interviews that they used to believe everything and never question ideas, but the CT lessons have taught them to look with a critical eye at everything they read and not to believe everything that they find on the internet. It so happened that many of the lessons in the module were about understanding the credibility of sources and this was much emphasised in the lectures. This may indicate that CT skills can be taught.

9.4. Do teachers make a difference to students' critical thinking?

Although the trial investigates the impact of a particular approach to CT instruction on the development of students' CT skills, how students perform may also be influenced by individual teachers. Some teachers might be better at fostering those skills in their students.

In order to determine if any teacher had any particular effect on students, analysis by teacher was also conducted. Since some teachers take more than one class, looking at

the performance of the class(es) taken by each teacher could shed some light on the influence of teachers.

Data were collected to ensure that teachers in the two groups were similar in terms of background characteristics. All teachers in both groups were non-native speakers of English, so English was either their second language or third language. All teachers had extensive experience in teaching English as a foreign language, have attended continuing professional development (CPD). All teachers had at least a Master's degree in either English Language and/or Literature or in Languages and Translation. The number of years of teaching experience in both groups ranged from five to twenty years.

Teachers in both groups are also similar in their educational attainment. The experimental group consisted of six teachers including the researcher. One teacher was doing a PhD in Education and one teacher had an EdD in Educational Leadership. Five teachers in the experimental group have attended CPD on various subjects like Active Learning and Course Design, Teaching Foreign Languages, Testing on the Oral Proficiency Interview, Teaching Pedagogies, Teaching and Writing in Higher Education, Educational Leadership, Education and Digital Trends, and Professional Development. One teacher in the experimental group had a Certificate in Teaching English to Speakers of Other Languages (CELTA).

The control group consisted of nine teachers. In the control group, one teacher had a PhD in Education, one had an EdD in Educational Leadership, one was doing a PhD in Education, and another was doing a PhD in Literature. Their years of experience ranged between 5 years and 15 years. Some teachers in the control group have attended CPD on subjects like Educational Leadership, Education and Digital Trends, Writing in Higher Education, and Teacher Professional Development. Two teachers in the control group also had CELTA qualification. Table 9.14 summarises the demographic data of teachers in the trial.

Table 9.14 Demographic data of teachers

	Experimental teachers (n = 6)	Control teachers (n = 9)
Female	5	8
Male	1	1
Years of experience	Mean = 13	Mean = 12

PhD/EdD candidate	1	2
PhD/EdD holder	1	2
CELTA	1	2
Attended professional training	5	8

Tables 9.15 and 9.16 show the results of individual classes and the teachers taking them.

Table 9.15 Experimental teachers

Class teacher	Class number	Pre-test	SD	Post-test	SD	Gain score	SD
Researcher	Class 1S	41.27	10.36	42.67	11.37	1.4	11.58
Researcher	Class 6S	42.44	8.62	43.06	8.79	0.6	10.50
Researcher	Class 7S	39.87	10.14	44.85	8.21	4.9	9.88
Researcher	Class 1F	45.33	9.36	48.43	7.86	3.1	6.85
Researcher	Class 3F	46.53	9.61	51.07	7.00	4.54	7.93
Researcher	Class 7F	43.33	7.82	47.87	6.30	4.54	7.65
Teacher 2	Class 3S	36.87	7.99	36.57	5.28	-0.3	10.75
Teacher 2	Class 8S	38.33	8.861	41.93	8.408	-3.6	11.21
Teacher 2	Class 2F	43.88	10.35	43.40	8.94	-0.48	9.49
Teacher 3	Class 9S	41.86	7.86	40.21	10.60	-1.65	7.53
Teacher 3	Class 4F	41.38	7.79	38.80	8.56	-2.58	9.50
Teacher 4	Class 12S	41.46	9.70	39.00	8.21	-2.46	11.26
Teacher 8	Class 16S	43.64	6.37	28.10	7.20	-15.54	9.28
Teacher 14	Class 6F	41.40	9.70	49.93	6.85	8.53	7.53

Table 9.16 Control teachers

Class teacher	Class number	Pre-test	SD	Post-test	SD	Gain score	SD
Teacher 1	Class 17S	38.38	10.08	37.67	8.52	-0.71	13.06
Teacher 1	Class 9F	39.86	8.43	45.27	8.39	5.41	8.94
Teacher 6	Class 4S	38.06	7.34	37.25	5.55	-0.81	8.61
Teacher 6	Class 5S	41.06	7.53	33.93	6.05	-7.13	9.12
Teacher 7	Class 10S	41.94	9.24	35.33	12.29	-6.61	11.22
Teacher 9	Class 11S	39.60	7.33	37.38	4.19	-2.22	8.53
Teacher 9	Class 15S	44.69	4.82	37.89	11.08	-6.8	10.60
Teacher 9	Class 10F	42.73	8.46	44.83	9.71	2.1	8.85
Teacher 9	Class 15F	42.31	9.04	44.73	7.90	2.1	8.30
Teacher 5	Class 2S	42.67	5.21	35.27	6.44	-7.4	7.79
Teacher 11	Class 8F	43.73	8.84	42.67	7.98	-1.06	9.12
Teacher 10	Class 14S	40.08	7.64	42.92	7.41	2.84	11.27
Teacher 10	Class 11F	42.27	7.64	44.21	9.77	1.94	12.29
Teacher 12	Class 14F	42.25	5.62	38.83	6.55	-3.42	4.40
Teacher 13	Class 5F	43.20	7.26	42.50	9.03	-0.7	8.47

As the two tables show, there is no specific pattern for teachers who had more than one class. Looking at the outcome of different classes taught by the same teacher in both experimental and control groups, there is no consistent pattern that can be attributed to teacher effect, although the researcher's classes seem to perform much better than the other classes in general.

It is possible that receptivity to CT instruction is more a function of student characteristics than that of the teachers'. Not all students have the same predisposition or motivation to learn those skills and not all students perceive the importance of those skills similarly. For example, all the six classes taught by the researcher showed quite different performance. While Class 6S progressed by only 0.6 points, Class 7S also taught by the researcher made a gain of 4.9 points.

Based on the researcher's observation and informal discussions with colleagues, the student composition in different classes sometimes varies. It is normal in any given term to notice that one class consists of a cluster of highly-motivated and hard-working students and another consisting of less motivated and mediocre students.. This issue was highlighted by several teachers in informal discussions.

9.4.9 Comparing the effects on high achievers and low achievers
In order to determine whether high achievers benefitted more from the intervention than low achievers or vice versa, the performance of the two groups were compared separately for the experimental and control groups.

As the mean for all students in both experimental group and control group is 42, this score was considered the cut-off grade to mark the difference between high achievers and low achievers. All students who scored 42 and above on the pre-test were classified as high achievers while any student who scored below 42 on the pre-test was classified as a low achiever. Table 9.17 shows the performance of the high achievers and Table 9.18 shows the performance of low achievers. The results show that high achievers experienced a bigger gain than low achievers.

Table 9.17 High achievers

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental	102	48.80	5.85	45.55	10.04	-2.95	9.21	
Control	101	47.37	4.79	40.71	8.65	-6.66	8.08	0.43

Table 9.18 Low achievers

	N	Pre-test	SD	Post-test	SD	Gain score	SD	Effect size
Experimental	96	34.41	5.16	40.21	8.55	5.8	9.58	
Control	84	34.99	4.38	39.02	9.13	4.03	9.28	0.18

9.5 Summary

Results of the trial indicate that the generic explicit approach to CT instruction can help improve CT skills of students in general. Sensitivity tests suggest that this finding is fairly secure and is not affected by missing data or attrition. The findings suggest no evidence of teacher effects. The approach to CT used in this trial appears to be particularly effective in teaching students to assess the credibility of sources. Subgroup analyses suggest that some students are more responsive to CT instruction than others. For example, girls, Life science students, students in the Engineering faculty, and those who reported not to be Lebanese citizens appear to respond more positively to CT instruction. However, the results from the subgroup analyses are not secure due to the small numbers in each subgroup and the uneven distribution of numbers in each group. In other words, this trial is unable to show conclusively if the CT approach is more effective for any one group of students. A larger trial involving more and different types of institutions may be needed for more conclusive results.

CHAPTER 10
Results of the process evaluation

Educational interventions are complex; a number of factors (individual, personal and organisational) can interfere with the intervention and enhance or dampen the effects of the intervention. Process evaluations of RCTs are therefore useful, if not necessary, to understand the causal mechanisms and the influence of contextual factors. For example, if the intervention is shown not to be effective process evaluations can help explain whether this was due to the failure of the intervention or the failure of the implementation process. For this reason, teacher preparation sessions, observations of teacher, and interviews were carried out as part of the process evaluation. The process evaluation checks for fidelity to treatment; that is, whether the teachers deliver the lesson and use the teaching resources as they had been trained. However, the main aim of the process evaluation is to identify the main facilitating and hampering factors in the implementation process.

As mentioned earlier, a total of 13 group interviews with 83 experimental students were conducted. One group interview with three experimental teachers was conducted in the first term and one interview with one experimental teacher was conducted in the second term. Four control teachers were each observed twice and two experimental teachers were each observed 14 times.

10.1 Fidelity of implementation
Observations of lessons suggest that all the teachers delivered the lessons as they had been trained. Lesson materials were used effectively. The experimental teachers were able to integrate the CT lessons as prepared by the researchers quite easily into their teaching. Students seemed engaged with the activities and the teachers were able to clearly explain the new concepts. The teachers did not encounter any difficulties. They seemed very confident and relaxed in the way they explained the CT lessons. Classes were very interactive and teachers allowed enough time for students to express their opinions. Students were encouraged to give examples to illustrate new concepts and to relate the CT concepts to their own lives.

Lesson observations of both control and experimental classes suggest no evidence of diffusion. There were no instances where control teachers had access to or used the CT

instruction materials. There is also little likelihood that students shared materials. Interviews with students revealed that students were not aware that they had different worksheets from students in other classes.

In the control classes it was observed that teachers adhered very closely to the texts. Even when there were opportunities for further discussions, these were not taken up. In general, teachers were focused on getting students to understand the texts that they were reading. They did not ask students whether they agreed or disagreed with the text, whether there was anything illogical in the text, or whether they can relate the ideas in the text to their own context. Texts were mainly used to teach students how to summarise and paraphrase (which were the lesson objectives) and students were not encouraged to respond to any ideas presented in the texts. Although the teaching strategies used by the control teachers, like encouraging peer-editing, encouraging class discussions, prompting students to speak in class might foster CT skills in students, no new concepts relating to CT such as determining the assumptions of the writer or detecting fallacies were introduced. There were opportunities for teachers to get students to respond to the texts, detect biases, evaluate reliability of sources, identify fallacies in reasoning, but these opportunities were missed. Students were simply asked to find the main idea, write a summary or paraphrase parts of the text. A more detailed report of the observation of control teachers is provided in Appendix 10.

10.2 Students' views of the CT lessons

The majority of students (n=30) reported that they had never been exposed to CT concepts before. Although a few reported that they had been introduced to some of the CT concepts, it was not as comprehensive. For example, one student who did the French Baccalaureate in school explained that they were introduced to the concept of stereotyping before, but it was not covered in depth. Another student mentioned that they had been introduced to the difference between causation and correlation in a psychology module when she was in the U.S. but the materials were not that developed.

Most of the students (n = 42) liked the fact that the lessons were integrated within the curriculum. They explained that if it is integrated at all levels it will be reinforced and that it will have practical relevance to what they are learning. For example:

I believe it should be integrated in all lessons in all levels because as I said before I've been through critical thinking lessons in school but it's also always a good way to revise to practice more because practice makes perfect.

Student 429 - Lebanese female – Arts and Social Sciences

Uhh because you can't teach critical thinking alone. Critical thinking needs examples on why this doesn't work, why this should be this way, why and how, so when you integrate it in other courses you can actually implement the teachings of the critical thinking in the course itself which you gave to students.

Student 319 - Male with dual citizenship - Sciences

Although the majority argued for integration within the module, there was a small minority who felt that it should be tailored to the requirements of the course they are studying.

But it shouldn't be the same for all the faculties because the need of an engineer isn't the same as the one who is doing literature, so it would be like specific for

Student 430 – Female Lebanese - Engineering

Students were generally positive about the lessons. Comments from students demonstrate that CT skills are very much appreciated and there was no sense of resistance to the idea.

It was good, beneficial like I really, things that we learned it was really new to me like reliability and the statistics and things like that I used to believe them right away but now no I have another opinion.

Student 275 - Lebanese male - Arts and Social Sciences

For me, I enjoyed really like looking at sources. Before I used to believe everything that I read but now when seeing stuff I think twice before just saying that it could be reliable, so I'm better at this now.

Student 275 - Lebanese male - Arts and Social Sciences

It helped us a lot. Many sources we used to read on the Internet, we used to believe anything. Now we know what sources to believe and what sources not to.

Like to succeed you have to be able to think critically. If anyone tells you something you have to know why or if he's lying. He tells you a fact you have to be able to believe if it's a fact, you have to be able understand a fact, analyse it.

Student 319 - Male with dual citizenship - Sciences

Although students were not asked to define CT, their answers provided a definition of what CT is. Their views of CT mainly revolved around the idea of scepticism and that they should be able to think for themselves without following the crowd.

If you don't have critical thinking and you're just a sheep you don't have opinions, you don't have anything, you have to think for yourself, you don't have to accept other people's opinions.

Student 349 - Lebanese female - Arts and Social Sciences

It made us realize that not everything we read on the net is true like even things we read in newspapers, for example, not everything they write is true like we can search for the original source or we can think more critically. People do lie just to gain for example wealth or money, so it definitely did help me in everything. It also helped me in my essay like I now write much better than I used to.

Student 319 – Male with dual citizenship - Sciences

Some topics helped us to know information that we didn't know and also it helped us to know what to trust and what not to trust. The information that we read, not all the information that we read are correct.

Student 438 – Lebanese male - Engineering

For me like I learned even sources that are very popular like Daily Mail or anything, they could also write something that is subjective and you never can trust sources without making sure it's true.

Student 322 - Lebanese male - Académie Libanaise des Beaux-Arts

When someone, when we see a thing on TV or something we should make sure that what they say is the truth and they don't play on hidden factors on our emotions to just said.

We should take into consideration the way they are showing everything. We don't believe just what they say.

<p align="right">*Student 120 - Lebanese male - Engineering*</p>

Many gave specific examples of lessons that they found useful. Below are examples of their responses:

The statistics uhhh we should know about statistics all the conditions related to do this kind of study or research uhhh for example the time, the place, the category of people we're asking, and the type of question we're asking. We did a lesson about the type of question which can be emotional, contain emotions or not. It should be an objective question, not a subjective question.

<p align="right">*Student 356 - Lebanese female - Engineering*</p>

Some students recalled the lesson on causation and correlation:

And the correlation and causation it happens with us like every day but we always link stuff to each other. They are related in some way but not necessarily causation. That helped me a lot to know, to know the difference between correlation and causation.

<p align="right">*Student 356 - Lebanese female - Engineering*</p>

Now we can also think about hidden factors like maybe we didn't really think about it when somebody just state a reason of why a specific thing happened so now we can think like maybe it's not the cause there are like other hidden factors.

<p align="right">*Student 5- Female with dual citizenship - Arts and Social Sciences*</p>

It makes me think like I like sociology so I'm trying to check on certain groups and I was thinking about them if it was correlation or an effect like people who are addicted to heavy drugs is there any correlation between their being in the streets and using heavy drugs like people say they are overemotional and stuff so that's why they use drugs to run away from the world or just uhhh uhhh.

<p align="right">*Student 349 - Lebanese female - Arts and Social Sciences*</p>

We learned a very important lesson for our life that not every two things that happen at the same time can be related and might have, one causes the other, they might happen in two different, for two different reasons that are not related in any way.

<p align="right">*Student 120 - Lebanese male - Engineering*</p>

Students were also able to relate CT skills thinking skills to politics in Lebanon:

Student 443: Yes. We will be brainwashed.

Interviewer: Ah Student 443 you will be brainwashed if you don't have critical thinking?

Student 443: Yeah especially in Lebanon. For example, if I go to a website for a specific political party, uhhh, they will put the information on a specific purpose to bring us their idea and not the real idea so if I don't have this critical thinking I will believe it and think like them without using any sense, any common sense or any reflection.

Students were generally positive about the teaching material and the content, and liked the examples provided. For example:

About the advertisement, numbers, so we should concentrate more about the numbers, the difference like 80% and 100% we shouldn't believe like sometimes it's false research there is a difference, there's a big difference between percentages in advertisements like 90% of women tried this but actually they are 9 who tried this it's not 90%.

<p align="right">*Student 115 - Lebanese female - Sciences*</p>

Yeah I remember you gave us, I think, a paper with multiple websites on them so we had to read each one and evaluate so it really helped a lot uhhh uhhh I think we had to read it and evaluate if it's true or false uhhh based on knowledge and common sense so it really helped and I think the material was more than enough to help us advance in critical level.

<p align="right">*Student 309 - Male foreigner – Arts and Social Sciences*</p>

However, a number of students suggested presenting the materials in more varied media, for example as video, audio clips or in visual forms. They explained that most students learn better if they see a scenario presented visually rather than as written text.

10.3 Teachers' views of CT instruction

All the four teachers interviewed said they had never taught explicit CT although one mentioned that they had previously taught it implicitly and on an ad hoc basis and quite superficially. They thought the module used in the trial was more structured and comprehensive. They felt that this trial gave them the opportunity to consolidate the concepts.

I think it was good as an introduction too because in the end they hadn't been exposed to it before so I think as kind of a way to get them more informed and aware of it I think eleven lessons were good.

Teacher 3

All teachers agreed that teaching CT this time was different from their previous experience as they invested more time in it. There was more focus than their previous experience. One lesson that they thought could be reinforced at all levels was logical fallacies. One teacher talked about putting on a particular teaching hat on the days when they had CT lesson because teaching CT required a different persona.

I had to be in that persona I had to remind myself 'OK today is a different lesson'

Teacher 8

Another teacher mentioned that on those days she tried to 'fish' more out of them, to get them to think more deeply about issues. One teacher felt that the experience was rewarding because it made them reflect on issues that they themselves perhaps would not have thought about. All agreed that it was a rewarding experience because it made them as teachers more aware of things that they take for granted.

Teachers were also in favour of embedding CT into the module as it is seen as part of the module rather than as an add-on. They commented on how well the CT lessons in the trial were embedded within the syllabus that students were not aware that they were doing anything different from the control classes. They argued that CT should be integrated in all modules in higher education and not only in English classes because if it was taught in a separate module it might give students the idea CT is only relevant in English and not applicable in learning in other fields.

However, they thought that CT should be introduced much earlier in the students' education. They also thought that more time should be devoted to teaching CT to allow for more practice and consolidation of CT concepts.

Teachers also found the teaching materials easy to use as they were generally self-explanatory. The fact that answer keys were provided also helped to allay any apprehension that teachers may have. However, teachers felt that some of the activities may be too difficult for some students. They all agreed that there were lessons which were more challenging than others.

All the teachers interviewed were of the opinion that to encourage students to take CT seriously, it should be assessed. One teacher mentioned that students were constantly asking whether the activities that they did in class were graded, and whether they could help them get better grades in the exam. Teachers believed that if CT is an important transferable skill, a certain percentage of the module grade should be allocated to assessing CT skills.

Some teachers questioned about whether students would be able to transfer the skills learnt in the module to other aspects of learning and in life in general.

One teacher summed up the experience thus:

And it's more tiring for the teacher but for me I thought it was more exciting because it was, like Teacher 3 said, it reminded me of those things that I usually disregard not intentionally because they're not my focus. Yeah it kind of forces you to elevate yourself and your students.

Teacher 8

10.4 Factors that facilitate teaching and learning critical thinking

The process evaluation has identified some key factors that could support the teaching and learning of CT. These include:

Training and support of teachers

An essential factor in supporting the successful delivery of CT is the training of teachers. To teach CT the teachers themselves must be able to think critically. If

teachers themselves do not understand the concepts of CT, it will be really challenging for them to teach it. Training of teachers is therefore necessary for effective delivery of the intervention.

Teachers need to be shown how to use the resources and ask questions. It is crucial that teachers allow time for students to express their opinions. Teachers were told to encourage students to give examples to illustrate new concepts and to relate the CT concepts to their own lives. The researcher provided a lot of support for teachers and also monitored the lessons. All these supported the delivery of the programme.

Availability of teaching resources
The teachers were all very receptive of the intervention largely because the teaching materials were prepared for them. The exercises included many examples of the different concepts of CT. Teachers did not have to source the materials themselves. The materials also explain what the different concepts of CT are. All this together with answer keys gave teachers the confidence and allayed any apprehension they may have about teaching a concept they may not be familiar with.

Embedding lessons in the module
Another factor that contributed to the successful implementation was the fact that CT was embedded within the module. Teachers were receptive as it was seen as part of the curriculum. Teachers commented on how well the CT lessons in the trial were embedded within the syllabus that students were not aware that they were doing anything different from the control classes. Many students accepted it as part of the regular curriculum. In fact, in the group interviews with students the researcher found it quite difficult to ask students to talk about only the CT lessons. They tended to talk about the whole module in general. Experimental teachers appreciated the fact that CT was part of the syllabus and not something they had to do in addition to their regular lessons. All this facilitated the implementation of the intervention. Students also supported the idea of embedding CT in the regular lessons.

Longer duration of instruction
A longer duration of instruction over more than a term is needed for more effective delivery, as CT is a complex skill and requires time to develop. This allows time for teachers and students to reinforce concepts. In the interviews some teachers suggested

that to be more effective CT should ideally be introduced early in a child's education so that such thinking becomes habitual and forms a natural part of the students' thinking.

Teachers' attitude

The support and cooperation of teachers is essential for successful and effective delivery of CT lessons. Teachers need to see the value of these lessons. If the teachers do not see the benefits of CT or are averse to the idea of teaching students to think independently, they will not be able to carry out the lessons as intended. One teacher withdrew from the trial because they wanted to devote more time to cover the syllabus, probably because completing the syllabus was prioritized over teaching CT.

For successful delivery teachers need to be able to engage students, provide opportunities for students to express their opinions and to participate in class discussions. Students said they liked the fact that their teachers asked for their opinions and encouraged discussion in class, and they generally enjoyed participating in class debates and discussions.

CT skills should be assessed

All the teachers thought that CT skills should be assessed in order to encourage students to see its relevance. Only if they are assessed will students take them seriously. One teacher mentioned that students were constantly asking whether the activities that they did in class were graded, and how those materials could help them get better grades in the exam. For this reason, teachers believed that a certain percentage of the module grade should be devoted to instruction in CT.

10.5 Barriers to effective delivery of CT strategies in the classroom

Observation of control teachers along with group interviews with both experimental teachers and students has helped identify the main barriers that are usually faced in teaching CT skills.

Students' attitude

One of the biggest challenges in teaching CT is the negative attitude of the students. Some students showed aversion to the lessons as they did not think the CT materials were relevant to their course of study. For example:

Because I plan on majoring in mechanical engineering and I don't find critical thinking relevant to my topic.

<div align="right">*Student 338 - Male with dual citizenship - Sciences*</div>

Same major [mechanical engineering] so I don't think it's gonna help me a lot.

<div align="right">*Student 335 - Male with dual citizenship - Sciences*</div>

I'm ehhhh. My major is mechanical engineering so I don't need.

<div align="right">*Student 276 - Lebanese male - Engineering*</div>

All four teachers expressed frustration in getting some students to be engaged in the lesson. There were also students who would never engage whatever the lesson. One teacher raised concern about whether the lessons benefited the silent students at all.

One reason for the lack of interest in CT lessons could be students' negative attitude that they have towards English. This is especially true of Engineering students. The lack of previous exposure to CT may be another reason why some students find it difficult to understand CT concepts. For example, one teacher explained that students appear to understand cultural stereotypes better than causation and correlation because, as the teacher explained, it is in the culture of the Lebanese to stereotype and categorise people. However, distinguishing between causation and correlation was not something familiar in their experience. The teacher was keen to stress that despite the initial difficulties students were able to understand the concepts at the end of the lesson.

Students' low level of language proficiency and lack of general knowledge
Another barrier to learning CT, as one teacher explained, was students' limited language proficiency and lack of general knowledge. All the teachers agreed that students' lack of general knowledge and their dislike for reading could be barriers to learning CT. Teachers felt that generally students do not like to read written texts and would prefer the materials to be presented in more interesting ways, such as visuals. One teacher mentioned that this would also encourage students to transfer their CT skills because they will realise that they can think critically about a text that they read, a speech that they listen to, and a video that they watch.

10.3 Summary

Observation of classes and focus group interviews with experimental teachers and students suggest that the biggest challenge to the implementation of CT instruction was students' attitude towards CT. A small number of students were resistant to learning CT as they did not perceive it as relevant to their course. Students' lack of general knowledge, current affairs, dislike for reading and low English proficiency may also pose a barrier to their learning CT. A few teachers also thought the teaching materials may be above the level of some students. Perhaps simpler examples could be used in the future to facilitate assimilation of concepts. One aspect of CT that students were particularly weak in was testing assumptions. This could be partly a cultural thing as Lebanese rarely question assumptions. Quiet and passive students were less responsive to CT instruction as they found it difficult to engage in discussions. Teachers and students also suggested that the teaching resources could be presented in more interesting ways using varied media, such as via videos, audio recordings or visual pictures rather than just texts. It was felt that the texts could put off those who struggle with reading.

Generally, staff and students agreed that embedding CT in their course module rather than having a standalone module worked well. Overall, both staff and students found the materials useful and CT instruction was beneficial in helping students to detect bias and assess credibility of information.

The only thing they thought could further support the teaching and learning of CT was additional time for more reinforcement of concepts. A concern expressed by most teachers was whether the skills students learnt in the module could be sustained over time and whether they could transfer the skills to learning in general and to real life situations.

The process evaluation supports the findings of the trial suggesting that it is feasible to teach CT in an education system where students and teachers have little exposure to learning and teaching CT, and where CT and argumentation are not usually encouraged. Interestingly, there was no resistance from teachers and students towards CT. In fact they all thought the skills were useful. The findings also indicate that CT can be effectively and easily embedded within the course module.

PART IV
CONCLUSIONS

This thesis combines two strands of the research: a systematic review to identify promising approaches to teaching CT to ELL in higher education; and a RCT to test the impact of the generic approach to explicit instruction of CT. This concluding section pulls together the findings of the two strands, summarises the barriers/challenges to teaching CT to ELL students in higher education and the limitations in the conduct of the systematic review and the trial. It is hoped that lessons can be learned from these findings. Therefore, the thesis concludes with recommendations for policy and practice and for future research in this field.

CHAPTER 11
Limitations of the study

As with every study no matter how well designed and conducted there are compromises that might be due to time or resource constraints or events beyond the control of the researcher. This study is no different. This chapter discusses the limitations of the systematic review and the randomised controlled trial.

11.1 Limitations of the systematic literature review

As with all reviews it is possible that some studies may have been missed. For example, the parameters set for the search included only articles published in English, from 1990 to 2018. This may have excluded relevant materials that were outside these parameters. The key issue is whether including those studies would have altered the findings. This review searched specifically for studies about teaching CT to English language learners in higher education. Therefore, studies about effective approaches to teaching CT skills for English native speakers were not included. These could shed light on some of the more effective approaches, and could be explored in a future review. Nevertheless, this review can be considered fairly comprehensive involving a search of 12 educational, psychological and sociological databases. Unlike previous reviews, this review also assessed the quality of individual studies thus ensuring that the evidence presented is the best it can be.

11.2 Limitations of the trial

The main limitation in this cluster RCT is that randomisation could not be done at the individual level but was done at the group level. This resulted in a smaller number of cases, which reduces the power of detecting an effect. In retrospect stratified random sampling could be used to ensure a more balanced distribution of students across subject majors.

This study spanned over only one term, so it was difficult to incorporate more instruction in CT in the experimental classes. As CT comprises many skills, there was not enough time to cover all skills and provide enough reinforcement of all skills. CT skills might take time to develop, so the short duration means that any effects may not be manifested in the short time.

The withdrawal of one teacher/class and the attrition of some students could also be considered a limitation because cases who drop out may be inherently different from cases who comply. In the case of the withdrawal of the teacher, this has been countered by using intention-to-treat analysis. The attrition of students from different classes (n = 30), which is a relatively small number, was also dealt with in the analysis by comparing the results of students who dropped out with those who complied.

Ideally the trial could have also tested students' performance in English language. However, due to time constraint and to avoid over testing students this was not evaluated. It would be interesting to see if improvement in CT also feeds in to development of English language skills.

One major limitation of this trial was that the researcher was also the developer of the intervention. Although conscious efforts were made to remain neutral and objective throughout, one cannot rule out unconscious bias. For example, the researcher may unintentionally give the impression that they want the intervention to show positive results. On the other hand, teachers (being aware that the trial was the researcher's intervention) may be less forthcoming in their feedback. Ideally, the trial could have been conducted by an independent evaluator, but this being the researcher's PhD thesis, it was not possible to be independent.

The short duration of the trial also meant that it was not possible to test for intervention decay (a situation where the intervention is abandoned after the trial), the sustained effects of the intervention (whether the effects are maintained over time) and the transference of the skills to other aspects of learning and practice. The trial lasted only one term, so the long term effect of the intervention on students also could not be assessed.

11.3 Summary

As in any study, a number of limitations were faced. Attempts were made to address some of these where possible, and where limitations were outside the control of the researcher these were made transparent so that readers can judge the strength of the evidence from this piece of research.

CHAPTER 12
Summary of the findings

This chapter summarises the findings from the two strands of the study to answer the research questions posed at the start of this thesis.

12.1 Is there evidence that instruction in CT can help develop CT skills of ELL (those whose first language is not English) in higher education?

The findings from the review suggest indicative evidence that teaching CT to ELL in higher education can help develop their CT skills. However, because of weak research design and methodological flaws in all the studies, the evidence is not conclusive. But the small-scale RCT suggests that explicit instruction in CT can improve the CT skills of ELL in higher education.

12.2 What is/are the most promising approach(es) to teaching CT skills to ELL in higher education?

The review synthesised evidence from 36 studies that evaluated different approaches to teaching CT skills in higher education language classrooms. Of all the strategies examined, explicit instruction in CT skills appears to be the most promising. It has been evaluated by a bigger number of studies than other approaches (like debate, assessment techniques, journal writing, etc.) and all the higher quality studies reported positive results. There is no evidence as yet that other approaches such as debates, use of literary and narrative texts, brainstorming and scaffolding are beneficial even though all the studies claimed positive effects. This is largely because few studies were found that evaluated these approaches with ELL in higher education settings. So it is not possible to confirm if positive results could be replicated. Also all these studies were very weak in design, therefore no conclusive statements can be made either way. But this does not mean that these approaches do not work in practice. Debates and similar approaches, for example, have been found to be effective in promoting CT among school children (e.g. Gorard, Siddiqui & See, 2017). It just means that there is not enough evidence to support the claim of positive effect.

12.3 Is it feasible to teach CT skills in the Lebanese context?

It is hypothesised that in Lebanon, where the education system does not encourage independent thinking, and where there is resistance to CT instruction due to political

and religious interference in the education curriculum, it may not be feasible to introduce CT in the classroom.

The results of the RCT suggest that contrary to common perceptions there is evidence that CT can be taught in the Lebanese context. The intervention was generally well received by teachers and students. There were no objections or resistance to the intervention. Overall staff and students responded well to the teaching module and the teaching resources. Feedback was generally positive. Students reported that they have benefited from the instruction and that it had helped them to assess credibility of sources and information. They found these skills useful and relevant not only in their studies, but also in real life application. All in all, the participants welcomed such instruction and were appreciative. This suggests that there is a role for CT instruction in higher education in Lebanon.

This study also demonstrates that CT can be easily introduced into the regular curriculum and no elaborate formal training is needed.

12.4 Does instruction in CT improve the CT skills of ELL students in a higher education institution in Lebanon?

Both the systematic review and the trial indicate that instruction in CT has the potential to develop ELL students' CT. A subsidiary question is whether the teaching of CT can be effectively and easily embedded within the regular curriculum in higher education in Lebanon. And if so, does it help to develop the CT skills of students. For this reason, the trial examined the effectiveness of the general and explicit approach to teaching CT.

The results of the trial suggest that instruction in CT could raise the levels of CT skills of undergraduate students even if they had no previous exposure to CT instruction in school. Despite criticisms of the general approach by many theorists (McPeck, 1984; Bailin et al., 1999; Moore, 2014), the findings of this trial provide evidence that CT instruction can be easily integrated into existing curriculum and the general approach could work well in a language classroom. But there is no reason why it cannot be used in history, geography or science classes. A little bit of creativity and innovation may be needed on the part of the teachers.

The trial also shows that effects could be realised in just one term. But feedback from teachers questioned the sustainability of the effects, and the transference of skills to other areas of students' life. There is also the question of whether teachers will continue using the teaching materials or develop their own teaching materials after the trial.

12.5 Does the impact of CT instruction differ for different groups of students?

The trial also tries to find out if the instructional approach used is equally effective for all groups of students. The findings showed that girls, foreign students, students who do not work part-time, students coming from Life Science background in school, and students majoring in Engineering at university made the biggest progress between pre- and post-tests.

However, the findings should be read with caution as the subgroup contained only a small number of students. Small samples are particularly vulnerable to volatility of small changes.

Performance on each subskill was also examined. The analyses show that students performed particularly well on questions about 'credibility', whereas they performed less well compared to control students on test of Assumptions. However, the very small number of questions per subskill and the fact that many of the skills overlap, make it difficult to accurately assess this.

12.6 What are barriers/challenges to the successful implementation of CT strategies in the classroom?

The systematic review and the trial revealed a number of potential challenges and barriers to successful implementation of CT strategies. These can be summarised as follows:

Short exposure to CT instruction

The short duration of the intervention is cited in a number of studies reviewed as a barrier to successful implementation. The experimental teachers that were interviewed in the trial also raised this same issue. As CT comprises a set of complex skills, which are often not familiar to EFL/ESL learners, constant reinforcement and application of those skills is needed. Therefore, we suggest that evaluations of CT skills approaches should be conducted over at least one term for effects (if any) to be realised.

Student attitude

The process evaluation in the trial revealed that some students were resistant to the idea of learning CT as they did not perceive it as relevant to their course. This potentially could be a barrier to successful implementation of the intervention.

Students' background knowledge

Feedback from teachers suggests that teaching CT can be challenging because of students' lack of general knowledge, their low level of English proficiency and their dislike for reading. A lot of prior work may be needed to prepare students to receive CT instruction.

Appropriate and interesting teaching materials

Students and teachers fed back about the need to present the teaching materials in a wider range of media to suit students' learning styles. Suggestions included video clips, audio recordings and visual images. Some of the examples used in the trial were also found to be above the level of the students. These could affect students' interest and their responsiveness to the intervention.

12.7 Factors that facilitate the teaching of critical thinking

The findings of this study highlight some factors that may be necessary for effective delivery of CT instruction in a second language classroom.

Training and support of teachers

Training of teachers is essential for effective delivery of CT instruction. Teachers do not necessarily have the CT skills themselves. Asking teachers to teach CT without training may create resentment and resistance. In this study, the researcher modelled the teaching strategies and provided regular support by making herself available for consultations. This has helped allay any apprehension that teachers may have.

Availability of teaching resources

The provision of ready-made teaching materials and the structured module used in this study also facilitated the delivery of the lessons. For effective delivery of the intervention, such teaching resources are very useful. It saves teachers time in preparing for the lesson and to source for relevant and appropriate materials.

Longer duration of instruction

For effective implementation it was suggested that CT instruction should be taught over more than a term to allow for the concepts to be reinforced and time to practise them.

Integration into the regular curriculum

Another factor that could facilitate implementation is the integration of CT within the regular curriculum so that teachers and students see its relevance within the course. Teachers are also more likely to be receptive to the idea if it is seen as part of the curriculum and not something additional that they have to do.

Teachers' attitude

The attitude of the teachers towards CT is another factor that needs to be considered. If the teachers do not believe in the usefulness of CT or the need to teach CT, it can jeopardise the successful implementation of the intervention.

12.8 Implications for future research

The trial in this study was a small-scale feasibility study. Moving from this small study a larger and well-funded study could be commissioned to evaluate the generic explicit approach to CT more widely to include a range of higher education institutions and faculties. This study could be extended to other Arab countries to test if it also works in other similar jurisdictions. The small sample size in this current trial did not allow for subgroup analysis. Perhaps future larger-scale studies could evaluate the impact of the approach on different subgroups.

Because of the short duration of the study it was not possible to test the long-term retention of CT skills and the transfer of skills to other areas. A longer trial could be conducted to determine the long-term effects on CT instruction, and whether the skills learnt could be transferred to other contexts or subjects.

12.9 Recommendations for policy and practice

This study indicates that it is feasible to teach CT in Lebanon and that instruction in CT even to students who have had little prior exposure to such concepts can help develop their critical ability. Just one term of instruction can bring about some changes. Therefore, if the government is serious about fostering CT among its citizens, conscious efforts must be made to teach CT. This study has shown that it can be done, and that CT

can be easily and cheaply integrated into the regular curriculum. There is no need for new textbooks or expensive teaching resources. The course resources are relatively low cost (cost of photocopying) and can be easily produced. Everyday resources like newspaper articles and internet materials can be easily adapted to teach CT. The course materials may be updated periodically with more current materials.

The findings in this thesis also have implications for initial teacher training and teachers' professional training. Preservice teacher training on the integration of CT in the curriculum and continual professional development workshops may be considered as part of the reform to prepare teachers for the new curriculum.

For the reform in Lebanon to achieve its objectives, education policy therefore should be free from the dominance of political parties and religious sects, which are currently key hindrances to progress in education. CT should not be left to an independent initiative advanced only by some teachers. It should be a national initiative mandated by the government. Different CT programmes could be piloted and evaluated as part of the reform. The assessment system also needs to be revamped to test higher order thinking skills rather than simple recall of information. Only if and when such changes take place, no real reform can happen.

In the long-term education reform in Lebanon should also consider improving the quality of research and research skills of its researchers. Training researchers and teachers to judge the quality of research and to read research reports critically is useful. Such skills can be cascaded to training of students in schools and colleges. Similar initiatives like the Q-step in the UK that offers a range of training modules, programmes of study, seminars, studentships, and conferences could be introduced.

12.10 Recommendations for improving research in this field

The systematic review revealed that current empirical research relating to CT in the English language classroom in higher education is rather immature and particularly weak. Similar weaknesses were also highlighted in other systematic reviews (Ten Dam & Volman, 2004; Torgerson at al., 2006; Behar-Horenstein & Niu, 2011).

Almost all the studies reviewed in this thesis were small scale involving participants in one institution and conducted by the researchers themselves, using researcher or

intervention-related measures. Where standardised test instruments were used they tended to be modified by the researchers, for example, translating the instrument to the language of the students rather than the language of instruction or selecting certain items.

A common problem encountered in this review is lack of adequate reporting in most studies making it difficult for the reader to judge the credibility and trustworthiness of the evidence. For example, not enough detail was provided as to how groups were identified, if and how they were randomised, what the intervention consisted of, how fidelity to treatment was ensured, or how diffusion of treatment was countered. Almost all did not report attrition.

Given the large number of small-scale studies in the review, often carried out by researchers themselves involving their own students, what is now needed for clearer evidence is well-designed, large-scale, independently evaluated randomised controlled trials using standardised tests of CT in the language of instruction.

Therefore, to improve future research in this field the following recommendations are suggested:

- Well-designed, large-scale evaluations, should be conducted ideally by independent evaluators.
- Studies of less evaluated approaches should be replicated.
- Assessments should be conducted by independent assessors who are blind to treatment allocation.
- The licensed version of the test instrument in the language of instruction should be used to avoid the problem of language transference. This also minimises the possibility of researchers teaching to the test if an adapted or modified version is used.
- Where approaches involve the use of unconventional strategies such as computer software or video recording (as in the concept map approach), an alternative innovative treatment could be used to ensure that any impact is not due to the novelty effect.
- All use of significance tests and variants can be avoided. They can be misleading giving invalid and therefore potentially damaging research outcomes (Cohen,

1994; Trafimow & Rice, 2009; Colquoun, 2014, 2016; Perezgonzalez, 2015; Gorard, 2016). The irony is that teachers/researchers of CT themselves fall for the common fallacies of significance tests. Instead, calculation of effect size is recommended. Data analyses should include basic information like the mean pre-test scores and the mean post-test scores of the two groups being compared as well as the standard deviation.

- Research reports should include any missing data, missing values and attrition. Missing specific variables or missing data in a dataset, as well as attrition, should be handled with caution as they could affect the validity and generalizability of findings. Gorard (2013b) warns that missing data cannot be considered random as participants who drop out from a study or whose data are missing could be different from those who comply. Therefore, attrition or missing data should be clearly reported.

- Where there is missing data, attrition or non-compliance, both intention-to-treat and compliance average causal effect analysis are recommended.

- Process evaluations should form part of the evaluation especially in complex interventions so that if the programme works we can identify the mechanism that brings about change, or factors that are necessary for successful implementation. And if the programme fails, process evaluation is useful in identifying those factors that may have hindered effective implementation.

- Clear, complete and transparent reporting is necessary if research in this field is to advance.

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APPENDIX 1 - Articles excluded from the systematic review with reasons

The following articles were excluded from the systematic review after thorough examination of abstracts and in some cases after a quick reading of the article when the abstract was not clear.

- Related to science, physics, chemistry, business and economics
  Aoki (2018)
  Grieco (2016)
  Bahmani (2016)
  Djiwandono (2013)
  Grussendorf & Rogol (2018)
  McGuirl-Hadley (2005)
  Parkinson (2011)
  McNeill & Krajcik (2009)
  Zohar (2006)
  Liaw (2007)

- Related to psychology, health and nursing
  Colletti (2011)
  Alshraideh (2009)
  Haberyan (2003)
  Shehab (2011)
  Marin & Halpern (2011)

- Related to technology
  Belland, Glazewski, & Richardson (2011)
  Burkhart (2006)
  Marshall (2001)
  High (1991)
  Merriënboer, Jelsma, & Paas (1992)

- Related to sentence structure, rhetoric, semantics, and translation
  Biria & Karimi (2015)
  Nemeth & Kormos (2001)
  Su-Yuen & Rubin (2000), Yoshimura (2002)
  Brown (2009)
  Ramos (2013)
  Barton (1993)
  Brown (2009)
  Hays, Brandt & Chantry (1988)
  Parsons (1995)
  Pullum & Rawlins (2007)
  Roeper (1987)
  Seng (1971)
  Traugott & Smith (1993)
  Alagozlu (2007)

- Case study, correlational, action, and survey research
  Black (2017)
  Dimmitt (2017)
  Chala Bejarano & Chapetón (2013)

Koch (2017)
Petek and Bedir (2018)
Çakici (2018)
Rezaee & Mubarak (2018)
Stapleton (2002)
Hassan & Madhum (2007)
Terenzini, Springer, Pascarella & Nora (1995)
Abdul Rashid & Hashim (2008)
Alnofaie (2013)

- Research based on perceptions and self-reported growth
  Campos (2017)
  Spencer (2007)
  Jabr (2003)
  Tosuncuoglu (2018)
  Abaslou & Langroudi (2015)
  Tsui (1999)
  Wallen, Shirts, & Shirts (1966)
  Ashraf (2011)
  Saeed & Rousta, (2013)
  Tabatabaei & Parsafar (2012)
  Wondifraw (n.d.)

- Related to learners below the age of 16
  Haria (2010)
  Irby, Quiros, Lara-Alecio, Rodriguez, & Mathes (2008)
  Johns (2002)
  Kaplan (1997)
  Lynch (2017)
  Reznitskya (2002)
  Suarez (2011)
  O'Hallaron (2014)
  Iman (2017)
  Kuhn, Zillmer, Crowell & Zavala (2013)
  Yeh (1998)

- Lacking clarity in reporting
  Jackson-Baptiste (2007)
  Moradpour, Jahandar & Khodabandehlou (2015)
  Sadeghi (2012)
  Sanavi & Tarighat (2014)
  Minakova (2014)
  Ali Sheir, Abdel, & El Nabawy (n.d. a)
  Ali Sheir, Abdel, & El Nabawy (n.d. b)
  Jafari, Assadi, & Zoghi (2014)
  Assadi, Davatgar, & Jafari (2013)
  Naderi (2014)
  Rafi (n.d.)

- Related to standardised tests
  Khodashenas & Farahani (2014)
  Khodadady, Shirmohammadi, & Talebi (2011)

- Related to disadvantaged and special needs learners
  Rosfeld (2017)

- Studies of very short duration (less than a month)
  Sineath (2014)
  Song (2012)
  Sineath (2014)
  Etemadzadeh, Seifi, & Far (2013)
  Arman & Fahim (2012),
  Fahim & Hashtroodi (2012)
  Lihong, Ning, & Wenshuang (2012)

- Related to critical literacy, critical language awareness, and critical discourse analysis
  Sultan, A., Rofiuddin, N., & Endah, T. P. (2017)
  Hashemi and Ghanizadeh (2012)

- Related to teacher training
  Mustapha (1997)

- Do not measure critical thinking
  Alizamani, Khodabandehlou, & Mobashernia (2013)
  Fahim, Barjesteh, & Vaseghi (2012)
  Khodabakhsh, Jahandar, & Khodabandehlou (2013)
  Liu & Stapleton (2014)
  Mall-Amiri, & Sheikhy (2014)
  Malmir & Shoorcheh (2012)
  McLendon (2008)
  Shahini & Riazi (2011)
  Wang & Liao (2014)

- Not primary research (presenting a framework, a model or a theory)
  Askay (1997)
  Bado-Aleman (2009)
  Thomas & Walker (1997)
  Liu (2018)
  Wang & Zheng (2016)
  Abdallah & Mohammad (2016)
  Chen (2016)
  Yang (2003)
  Alnofaie (2013)
  Dumteeb (2009)
  Qin & Karabacak (2010)
  Şeker & Kömür (2008)
  VanDerHeide & Newell (2013)
  Atkinson (1997)
  Atkinson (1998)
  Benesch (1993)
  Davidson (1998)
  Gieve (1998)
  Hansen (1982)

Johns (1993)
Johns (1994)
Kragness (1945)
Reynolds (1993)
Tsui (2003)
Whimbey (1977)
Butler (2011)
Dersley & Wootton (2001)
Elizabeth, Anderson, Snow, & Selman (2012)
Goldman (1982)
Grant & Sleeter (1986)
Horn (2008)
Wu & Rubin (2000)
Larson (1988)
Thompson (2001)
You (2010)
Halpern (1998)
Lu (2013)
Mohd Zin, Eng, & Rafik-Galea (n.d.)
Nikoopour, Farsani, & Nasiri (2011)
Rahimi & Soryani (2014)
Tufan (2008)

APPENDIX 2 - Data extraction table

Studies with 2* rating

Author(s) + Year + Country + Database	Aim	Teaching strategy	Research design as stated by researcher(s)	Sample size + Instrumentation	Level + Age group + Duration of intervention	Major findings + Outcome	Major limitations mentioned by the author(s)	Quality judgment based on the "Sieve" (see Section 2.5)
Gomez (2010) Colombia Handsearch	To examine the effect of structured reading lessons on the development of students' critical thinking skills	CT skills: analysis, application, evaluation and synthesis of information	Experimental (experimental and control) Pre-test post-test	83 students (43 in experimental and 40 in control – 8 classes) Pre-test and post-test (California Critical Thinking Test – Spanish version)	First-year university students (18 to 23 years old) 1 semester (15 weeks -2 sessions per week – 2 hours each)	No significant difference in scores between control groups and experimental groups *No effect*	Short duration of the intervention Inadequacy of the test to the context or culture	Strong design (random assignment of stds to 8 groups) 4* Attrition rate 0% in experimental group and 18% in control group due to schedule change (drops to 2*) **Low 2***

| Kusumoto (2018)

Japan

Web of Science | To examine the effect of active learning | Active learning | Quasi-experimental (two groups) | 162 students

Cornell Critical Thinking Test (CCTT) Level Z as pre-test and post-test | University students

2 semesters | Experimental group showed improvement

No effect | Lack of control over other English courses that students were taking | No randomisation 3*

No control over other English courses that students were taking (drops to 2.5*)

Missing scores were eliminated from the analysis (drops to 2*)

Low 2* |
|---|---|---|---|---|---|---|---|---|
| Mazer, Hunt, & Kuznekoff (2007)

U.S.

JSTOR | To examine the effectiveness of a critical thinking instructional model in a communication course | Critical thinking skills: defining arguments, evaluating sources, identifying fallacies | Not specified by the researchers

(random assignment of 18 clusters) | 324 students (random assignment classes - 169 students in the control group and 155 students in the experimental group)

Pre-test and post-test (researcher- | University students (18 to 26 years old) (43% male and 57% female in experimental - 42% male and 58% female in | Students in the experimental group did better on the CT test than students in the control group

Positive effect | A longer period of instruction needed

No comparison of students' final course grades with their CT | Randomisation of 18 clusters 4*

Researcher-developed test (drops to 2*)

Attrition was not reported (drops to 1*) |

				developed with Kuder-Richardson, KR-20, reliability estimates of .84 for the pretest and .85 for the posttest)	control) 1 semester (16 weeks)		grades	**Low 2***
McCarthy-Tucker (1995) U.S. ASSIA	To examine whether instruction in formal logic can improve students' performance on both standardized and content-specific assessment of critical thinking, along with increased self-perception of critical thinking	Instruction in logic	Quasi-experimental (non-equivalent group design – pre-test post-test – cluster randomisation)	189 students (9 sections) (62 students in the experimental group - 57 students in the second experimental group – 70 students in the control group) Pre-tests and post-tests: Raven's Standard Progressive Matrices (RSPM) + Test of Logical Thinking (TOLT), Content-Specific + Test of Logic (CSTL) researcher-	Freshman and sophomore high school students (96 male students and 93 female students) 8 months	Experimental group outperformed control group on assessment of logic, assessment of thinking ability, and self-ratings of thinking skills *Positive effect*	Various threats to the internal validity of the study	Random assignment of 9 clusters 4* Attrition rate 38.8% (drops to 1*) **Low 2***

				developed				
Salmani Nodoushan (2016) Iran ERIC	To investigate whether L1 mediated learning that aims at enhancing students' critical thinking skills would improve their argumentative writing	General critical thinking skills	Experimental with pre-test and post-test	894 students Argumentative essay The Cornell Critical Thinking Test, Form Z	3 weeks (three 2-hour sessions per week)	No difference in scores in essay writing between experimental and control Students in the experimental scored much higher than the control on the Cornell Critical Thinking Test – with students in higher proficiency levels scoring higher than those in low proficiency level	None	Randomisation of clusters to experimental and control groups – big number of cases 4* Not clear how many clusters were formed and who taught them 3* Two raters graded the essays but they were not blinded 3* Evidence of

								teaching the experimental group to the test (drops to 2*)
						Positive effect		
								Low 2*

Studies with rating of 1.5*

Author(s) + Year + Country + Database	Aim	Teaching strategy	Research design as stated by researcher(s)	Sample size + Instrumentation	Level + Age group + Duration of intervention	Major findings + Outcome /reported effects	Major limitations mentioned by the author(s)	Quality judgment based on the "Sieve" (see Section 2.5)
Tous, Tahriri, & Haghighi (2015) Iran ASSIA	To examine the effect of debate training on male and female reading comprehension	Debate	Experimental (2 groups – pre- and post-test design)	88 students (random assignment - 44 in 2 experimental groups and 44 in 2 control groups) Pre-test and post-test (Read Theory	High-school students 1 month and a half	Debate has a statistically significant effect on students' reading comprehension	Duration of the study	Random assignment of stds to groups 4* Small number of cases (drops to 2*)

				Critical Reading Comprehension Test + California Critical Thinking Skills Test – Persian version)		No difference between males and females *Positive effect*		Intervention is of short duration (1 month and a half) - short lapse between pre- and post-test (drops to 1.5*) **1.5***

Studies with rating of 1*

Author(s) + Year + Country + Database	Aim	Teaching strategy	Research design as stated by researcher(s)	Sample size + Instrumentation	Level + Age group + Duration of intervention	Major findings + Outcome	Major limitations mentioned by the author(s)	Quality judgment based on the "Sieve" (see Section 2.5)

| Akbari, Seifoori, & Ahour (2017)

Iran

Web of Science | To examine the effect of critical reading instruction on students' CT level | Critical reading skills like inferences, implications, probability | Random assignment of two intact classes | 50 students

Writing composition | Postgraduate students majoring in English (21 to 45 years old)

11 sessions of a 16 session course, each session lasting 90 minutes | Explicit CT awareness-raising is effective in enhancing experimental students' argumentative writing

Positive effect | Short duration of the intervention | Random assignment of only 2 intact classes 3*

Small number of cases – 2 clusters with 50 stds (drops to 2*)

Essays were scored by 2 raters but they were not blinded + attrition was not reported (drops to 1*)

Extremely low 1* |

Daud, Gilmore & Mayo (2013) Malaysia Handsearch	To examine the usefulness of peer review, self-evaluation and peer evaluation on the development of students' critical thinking skills and writing ability To examine if a correlation exists between students' critical thinking skills and academic writing ability	Peer review, self-evaluation and peer evaluation	Quasi-experimental (non-equivalent pre-test post-test design – 4 intact groups – 3 experimental groups and 1 control group)	99 students Pre-test and post-test (Cornell Critical Thinking Test - Level X) A final term paper	Tertiary level university students 7 weeks	The peer-review group scored higher than other groups *Positive effect*	Time constraint for the peer evaluation group as there were more activities to be covered	No randomisation 3* Short duration between pre- and post-test may result in familiarity of stds with post-test (drops to 2*) No reporting of attrition (drops to 1*) **Extremely low 1***
Davidson & Dunham (1997) Japan	To examine whether training in critical thinking enhances EFL learners' critical thinking level	CT skills: logical fallacies, source credibility, inductive	Quasi-experimental (two-group post-test design)	36 students (17 experimental and 19 control) Post-test (Ennis-Weir Critical	First-year college students 1 year (13 hours of English per week)	Students in the experimental group outperformed those in the control group	None	Not clear what the researcher means by "semi-lottery" randomisation 3*

Handsearch	To test the suitability of a CT test developed by native speakers on non-native speakers	reasoning, informal deductive logic, and assumption-identification		Thinking Essay Test)	Some class hours (number not clear) lost due to an earthquake	*Positive effect*		Control group consisted of volunteers so they maybe they did not take the post-test seriously because it does not affect them in any way (drops to 2*) Very small number of cases (drops to 1*) **Extremely low 1***
Dong (2017) China Web of Science	To examine the effect of CT instruction on students' CT level	CT skills to guide writing	Experimental (two clusters) Pre-test post-test	44 students (22 in experimental and 22 in control) Essay	English major sophomore (22 years old) One semester	Improvement of CT level of the experimental group	None	Random assignment of only 2 intact classes 3* Small number

						Positive effect		of cases – 2 clusters with 44 stds (drops to 2*) Essays were scored by 2 raters but they were not blinded + attrition was not reported (drops to 1*) **Extremely low 1***
Fatemi (n.d.) Iran Handsearch	To examine whether critical thinking skills can be taught to students by exposing them to literary narratives and "The Awareness of Consequences	Narrative texts	Quasi-experimental (pretest–posttest intact group design)	105 students (58 in experimental and 47 in control) Watson-Glaser Critical Thinking Appraisal (WGCTA) – Form A (Persian version)	EFL university students in their second semester (average age of 20) 1 semester (17 weeks – 2 sessions per week)	A significant improvement in critical thinking skills was shown in the experimental group *Positive effect*	None	Very weak design for RQ – unbalanced groups (no randomisation) 1* **Extremely low 1***

	Technique"							
Ghabanchi & Behrooznia (2014) Iran Handsearch	To examine the impact of brainstorming on students' reading comprehension and critical thinking	Brainstorming	Experimental (intact group design – pre-test post-test)	54 students (25 in experimental and 29 in control) Pre-test and post-test (the reading section of the TOEFL - and Watson-Glaser Critical Thinking Appraisal – Persian version)	University students in a reading course (30 females and 24 males) 16 sessions (90 minutess each)	Scores on the post-test show that brainstorming had a significant effect on reading comprehension ability and critical thinking *Positive effect*	None	No randomisation – 2 intact groups) 3* Small sample size (drops to 2*) attrition not reported (drops to 1) **Extremely low 1***
Jafari & Yavari (2014) Iran ASSIA	To investigate the effect of conferencing on students' critical thinking	Conferencing	Not specified by authors (2 groups with pre- and post-test design)	60 students (random assignment to 30 in experimental and 30 control) Pre-test and post-	Elementary adult EFL students 1 semester	The experimental group outperformed the control group *Positive effect*	None	Random assignment to groups 4* Small number of cases (drops to 3*)

				test (The Watson-Glaser test- Form A - Persian version)				No clear description of what the treatment consisted of (drops to 1*) **Extremely low 1***
Jafari, Yavari, & Ahmadi (2015) Iran ASSIA	To investigate the effect of self-assessment on students' critical thinking and language proficiency	Self-assessment	Not specified by authors (2 groups with pre- and post-test design)	50 students (random assignment to 25 in experimental and 25 in control) Pre-test and post-test (The Watson-Glaser test- Form A - Persian version)	Intermediate adult learners 24 sessions	The experimental group outperformed the control group on both the critical thinking test and the English test *Positive effect*	None	Random assignment to groups 4* Small number of cases (drops to 3*) No clear description of what the treatment consisted of (drops to 1*)

								Extremely low 1*
Kahrizi, Farahian, & Rajabi (2014) Iran ASSIA	To investigate the effect of self-assessment on students' self-regulation and critical thinking	Self-assessment	Not specified by authors (2 groups with pre- and post-test design)	40 students (random assignment to 20 in experimental and 20 in control) Pre-test and post-test (The California Critical Thinking Skills Test)	EFL learners from 3 different language schools (18 to 23 years old) 6 weeks	The experimental group made a significant gain in critical thinking *Positive effect*	None	Randomisation is not clearly described 4* Small number of cases (drops to 3*) Short duration between pre- and post-test may result in familiarity of stds with post-test (drops to 2*) Attrition rate was not reported (drops to 1*

								Extremely low 1*
Khatib & Alizadeh (2012) Iran Handsearch	To examine the effect of using literary texts on students' critical thinking skills To examine the effect of teaching critical thinking skills regardless of materials	Literary texts	Not specified by the authors (experimental and control groups– pre-test and post-test)	34 students (17 in experimental and 17 in control) Pre-test and post-test (Watson-Glaser Critical Thinking Appraisal -WGCTA and a test of reading comprehension - The 2005 TOFEL Test)	Advanced language learners at a private language institute Twice a week –70 days	Although both groups showed development in critical thinking and reading comprehension, the experimental group outperformed the control group. *Positive effect*	Not an equal number of males and females in the two groups	Randomisation is not clearly described 3* Very small number of cases (drops to 1*) **Extremely low 1***
Khatib, Marefat, & Ahmadi (2012) Iran Handsearch	To examine the effect of keeping audiotaped and written dialogue journals on EFL students' critical thinking	Journal writing	Quasi-experimental (intact groups based on oral and written placement tests)	33 students (19 in the 1st experimental; 9 in the 2nd experimental; 12 in the control) Pre-test and post-test (Watson-	Female advanced EFL learners at an institute (19 to 33 years old) 1 semester (45 days – 6 hours per week)	Students in the two experimental groups outperformed their counterparts in the control group No difference in	Small sample size	No randomisation 3* Very small sample size (drops to 1*) **Extremely low**

				Glaser Critical Thinking Appraisal - Form A – written in the Farsi language)		performance between the two experimental groups *Positive effect*		**1***
Khodadady & Ghanizadeh (2011) Iran Handsearch	To examine whether concept mapping used as a post-reading strategy had an effect on EFL students' critical thinking ability	Concept mapping	Not specified by the authors (pre-test post-test intact group design)	36 students (18 in experimental and 18 in control) Pre-test and post-test (Watson-Glaser Critical Thinking Appraisal – Form A)	Intermediate and advanced EFL learners (31 females and 5 males) in a language center 22 two-hour sessions	Students in the experimental group outperformed those in the control group *Positive effect*	The sample is not representative in terms of age and gender	Randomisation of stds to two groups 4* Very small number of cases (drops to 1*) **Extremely low 1***
Rashtchi (2007) Iran Handsearch	To investigate whether collaborative writing enhances critical thinking skills	Cooperative writing	Not specified by the author (random assignment to two groups)	74 students (38 in experimental and 36 in control) Pre-test and post-test (The Watson-Glaser Critical Thinking Appraisal, Form A	English translation university students (20 males and 70 females) 1 semester (14 sessions)	Students in the experimental group outperformed those in the control group *Positive effect*	None	Random assignment of stds to 2 groups 4* Medium number of cases (drops to 3*)

				(WGCTQ) + an essay graded by two raters)				Not clear whether the raters of the writing test were blinded (drops to 2*) Attrition rate is not reported (drops to 1) **Extremely low 1***
Ruff (2005) U.S. ASSIA	To examine whether students who are enrolled in a transitions course in which critical thinking skills and dispositions are taught do better than students who are enrolled in the same course but do not receive	Critical thinking skills	Quasi-experimental (pre-test and post-test with no randomisation)	39 students (20 students in the experimental group and 19 in the control group) Pre-test and post-test The California Critical Thinking Skills Test (CCTST) and the	University students 1 semester	Students in the experimental group scored higher than students in the control group regardless of gender *Positive effect*	No single agreed-upon definition for CT and no single agreed-upon strategy for teaching and testing CT in the literature Small non-	No randomisation 3* Small number of cases (drops to 2*) Diffusion of treatment: stds were taught by the same

instruction in critical thinking			California Critical Thinking Dispositions Inventory (CCTDI)				random sample	teacher (drops to 1) **Extremely low 1***
Sokol, Oget, Sonntag, & Khomenko (2008) Latvia and France ASSIA	To explore the effect of integrating inventive thinking skills instruction (The Thinking Approach) in foreign language teaching	Thinking Approach (TA) to language teaching and learning (Scaffolding)	Quasi-experimental (pre-test and post-test - no randomisation)	81 students (54 students in the experimental group and 27 in the control group) pre-test and post-test (researcher-developed test)	Upper secondary students (15 to 16 years old) 1 academic year	Students in the experimental group showed a significant increase in thinking skills compared to the control group *Positive effect*	Contact hours were not the same for the groups Different level of language proficiency between control group and experimental group Students in the experimental group took the test more seriously	No randomisation 3* Unbalanced groups in terms of language competency – from two schools (drops to 2*) Other threats: experimental stds had 5 hours of instruction per week while control stds had 3 hours per week +

								researcher-developed marked by the researcher who was not blinded + attrition is not reported (drops to 1*) **Extremely low 1***
Yang & Gamble (2013) China PsychINFO	To investigate if CT integration in the EFL curriculum can result in higher English proficiency and higher level of critical thinking	Argumentative writing and debating	Experimental (two intact groups – pre- and post-test)	68 students (random assignment of intact classes: 31 in experimental and 37 in control) The General English Proficiency Test (high-intermediate level) (reading and listening sections)	Freshman English Reading and Listening students (EFL learners) 1 semester (8 weeks)	Students in the experimental group did better on the post-test in terms of language proficiency, critical thinking, and academic achievement than students in the control group *Positive effect*	None	Random assignment of only 2 intact classes 3* Small number of cases – 2 clusters with 68 stds (drops to 2*) Essays were scored by 2 raters but they

| | | | | An essay scored with the Holistic Critical Thinking Scoring Rubric

A content-based achievement test (researcher-developed) | | | | were not blinded + attrition was not reported (drops to 1*)

Extremely low 1* |
|---|---|---|---|---|---|---|---|---|
| Zelizer (2013)

U.S.

ASSIA | To compare the effect of a mixed instructional approach (experimental) to critical thinking compared to an immersion approach (control) on students' development of critical thinking

To analyse the extent to which | Mixed instructional approach to teaching critical thinking | Quasi-experimental (nonequivalent group design – no randomisation - convenience sampling pre-post-test design) | 171 students (experimental group = 92 - control group = 79 – 4 classes)

Pre-test and post-test (The Watson Glaser Critical Thinking Appraisal – Forms A and B) | Senior-year university students (19 to 47 years old)

1 semester | No difference in pre-test and post-test scores between experimental and control groups

Negative effect | The results of a convenience sample cannot be generalizable | No randomisation – 4 intact classes 3*

The intervention consisted of materials taken from the test – threat of teaching to the test (drops to 2*) |

							Other weaknesses: Unbalanced dropout + Exclusion of withdrawn participants from the analysis + Same teacher teaching all 4 classes which might have resulted in diffusion of treatment (drops to 1*)
	students can transfer critical thinking skills learned in one course to another course in the same semester						
							Extremely low 1*

Studies with the rating of 0

Author(s) + Year + Country + Database	Aim	Teaching strategy	Research design as stated by researcher(s)	Sample size + Instrumentation	Level + Age group + Duration of intervention	Major findings + Outcome	Major limitations mentioned by the author(s)	Quality judgment based on the "Sieve" (see Section 2.5)
Arslan & Yildiz (2012) Turkey Handsearch	To examine the application of a literature-based critical thinking programme on students' critical thinking skills To examine the beliefs of both students' and teachers' about literature instruction	Literature-based critical thinking program	Quasi-experimental (one-group pre-test post-test design)	34 students Pre-test and post-test (Cornell Critical Thinking Test - Level Z)	Undergraduate fourth-year university students (31 females and 3 males) 7 weeks (13 sessions- 39 hours)	Students scored higher on the post-test than they did on the pre-test *Positive effect*	None	Very weak design for RQ – no comparison group 1* More weaknesses: no reporting of attrition + short duration between pre- and post-test (same test) may result in familiarity of stds with post-test (drops to 0)

								Rating 0
Chason, Loyet, Sorenson, & Stoops (2017)

It is not clear where the study was conducted as this was not reported, but it is deduced from the participants that the study took place in Saudi Arabia

Web of Science | To examine whether the TBSIR (topic, bridge, support, interpretation, return) framework has an effect on students' paragraph writing | General critical thinking skills: the TBSIR (topic, bridge, support, interpretatio n, return) framework in paragraph writing | Pre-experimental | 37 students | Intermediate to advanced students enrolled in an 8-week course | Students made progress with this approach

Positive effect | No control group to compare results with | Very weak design for RQ: No control group 1*

Attrition was not reported (drops to 0)

Short duration of intervention – 8 weeks

Rating 0 |
| Fahim & Mirzaii (2013)

Iran | To examine the effect of dialogic critical thinking on the writing performance of | Dialogic critical thinking tasks | Quasi-experimental (randomised clusters experimental | 43 students (4 classes - 21 in experimental and 22 in control) | Upper-intermediate EFL male learners at an institute (17 to 41 years | Although both groups showed improvement in argumentative writing, the | The study included only males

The study was | Randomisation of only 4 clusters – very small number of cases 2* |

Handsearch	students		and control)	Pre-test and post-test (in-class 180-word four-paragraph argumentative essay – two different topics in pre and post)	old) 1 semester (5 weeks – 21 sessions)	experimental group exhibited superior performance *Positive effect*	about written production and could not include oral production	No reporting of attrition (drops to 1* Researcher-developed test (possibility of teaching to the test) – no mention of blinding raters (drops to 0) **Rating 0**
Hurte (2004) U.S. ASSIA	To compare the effectiveness of two approaches (a Scaffolding approach and a modified, condensed version of the Cognitive Enrichment Advantage, CEA, approach) in	Scaffolding approach and a student-centered approach	Quasi-experimental (Pre-test post-test comparison group design – matched pairs to 2 experimental groups – based on the	36 students (random assignment of matched pairs to 2 experimental groups with no control group) Pre-test and post-test (Watson-Glaser Critical Thinking Appraisal – Forms	First-year university Freshman students 1 semester (16 weeks) Intervention phase: five weekly 40-minute	No significant change in CT in the CEA group based on the two assessment tools No significant change in the Scaffolding group based on CT performance	Short duration of the study Diffusion of treatment Lack of a control group Researcher acting as	No comparison group 1* Very small number of cases (drops to 0) Short duration of intervention

			WGCTA)	A & B and the critical thinking performance assessment)	teaching sessions	assessment and a decline based on the W-GCTA *Negative effect* **Rating 0**	instructor	to result in any change – 5 sessions only (drops to 0)
Iraji, Enayat, & Momeni (2016) Iran ASSIA	To examine the effect of self-assessment and peer-assessment on students' argumentative writing	Assessment techniques	Not specified by authors (Pre-test and post-test – 2 groups)	36 students (random assignment to experimental and control groups) Pre-test and post-test (an argumentative essay)	Intermediate EFL students (18 to 25 years old) Not stated	The experimental group outperformed the control group *Positive effect*	None	Random assignment to groups 4* Very small number of cases (drops to 1*) Other threats: no mentioning of number of raters and whether they were blinded + duration of intervention not mentioned + researcher developed test

								which might result in teaching to the test (drops to 0) **Rating 0**
Khamkhong (2018) Thailand Web of Science	To test the effectiveness of the PISA reading literacy framework on students' level of critical thinking	Literary texts: The PISA reading literacy framework	Pre-experimental	36 students	Third-year English majors 16 weeks	Students made progress with this approach *Positive effect*	None	Very weak design for RQ: No control group 1* Researcher-developed test (drops to 0) **Rating 0**
Khatib & Janpour (2012) Iran Handsearch	To investigate the effect of literary texts on the development of students' critical thinking	Literary texts	Experimental	30 students (15 students in experimental and 15 in control) Pre-test and post-test (Watson-Glaser Critical Thinking Appraisal	Advanced students (19 to 27 years old) 20 sessions	Students in the experimental group performed better in the post-test than students in the control group *Positive effect*	None	Students were matched and then randomised 3* Very small number of cases (drops to 1*)

				questionnaire)				Attrition rate was not reported (drops to 0) No control over confounds – did the texts or the questions effect a change in students' critical thinking **Rating 0**
Manning (1997) U.S. ASSIA	To determine the relationship between students' critical thinking and their attitudes to reading To determine the effect of critical thinking instruction on	Critical thinking skills: perceiving, classification, concept formation, identification patterns and relationships, and problem solving	Not specified (non-equivalent group design – no randomisation)	31 students (15 in the experimental and 16 in the control taught by the same instructor) Pre-test and post-test (The Cornell Critical Thinking Test, Level X) Rhody Secondary	University students 1 semester (5 weeks)	No significant correlation between attitude to reading and critical thinking in both the control and treatment groups A significant difference in critical thinking in	Teacher taught both groups Short duration of the study Small sample size	Very weak design for RQ: no randomisation 3* Completely unbalanced groups from 2 different campuses – researcher

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	students' critical thinking			Reading Attitude Assessment		pre-test and post-test scores in both groups (higher in control) *Negative effect*		admits that the 2 groups are different (drops to 2*) Other weaknesses: very small number of cases + diffusion of treatment – same instructor teaching both groups +attrition rate was not reported (drops to 0) **Rating 0**
Moore (1995) U.S. ASSIA	To examine the relationship between critical thinking skills and language	Critical thinking skills: identifying issues,	Pre-experimental (single group design - pre-test and post-	60 students Pre-test and post-test (The Ennis-	Pre-university students in a critical thinking course	Significant gains in critical thinking between pre-test and post-test	Small sample size No control group	Very weak design for RQ – no comparison group 1*

	proficiency, writing, and academic development To examine the effect of critical thinking instruction on students' scores on a CT test	conclusions, reasons, assumptions, errors in reasoning, etc.	test)	Weir Critical Thinking Essay Test – essay form)	1 semester (16 weeks)	Language proficiency has a significant relationship with CT Writing ability and academic development in English have no significant relationship with CT *Positive effect*	Students selected for the study are top-quality Malaysian students	Maturation threat: sample consisted of high-achievers who were selected to move from Malaysia to the U.S. – can't be sure if moving to the U.S or the intervention resulted in this growth (drops to 0) **Rating 0**
Pashangzadeh, Ahmadian, & Yazdani (2016) Iran Handsearch	To investigate the effect of narrative texts on students' critical thinking	Narratives	Not specified by authors (two intact groups – pre- and post-test)	54 students (27 in each group) Pre-test and post-test (California Critical Thinking Skills Test)	Undergraduate EFL learners majoring in translation 12 treatment sessions	Students in the experimental group outperformed those in the control group *Positive effect*	None	No randomisation – 2 intact groups) 3* Small number of cases (drops to 2*)

								Not clear what the control group did (the non-narrative group) – it might be that they did not do anything useful in class (drops to 1*) Not clear who taught the two groups (drops to 0) Attrition rate not reported **Rating 0**
Shaarawy (2014) Egypt ASSIA	To examine the effect of weekly academic journal writing on students' critical thinking	Journal writing	Quasi-experiment (pre- and post-test)	23 students (16 in experimental and 7 in control) Pre- and post-test (researcher-	First year university students in their 2nd semester 1 semester (7	Students in the experimental group outperformed students in the control group	Small sample size Short duration of intervention	No randomisation 3* Very small number of

				developed based on Bloom's taxonomy)	weeks)	*Positive effect*		cases (drops to 1*) Exclusion of participants who dropped from the final analysis of results instead of using intention-to-treat analysis (drops to 0) Researcher-developed test marked by the researcher who was not blinded **Rating 0**
Tous & Haghighi (2016) Iran	To investigate whether there is any difference between males and females in critical	Debate	(1 group - pre-test and post-test)	88 students Pre-test and post (California Critical Thinking Skills Test	High school students (17 years old) 1 month	No difference between males and females *Negative effect*	Duration of the study	Poor reporting (not clear whether they were all placed in one group or

| Web of Science | thinking after instruction in debate | | | – Form B - Persian version) | | | | split – if split, not clear whether groups consisted of both males and females and who taught the groups) 1*

Intervention is of short duration (1 month) - short lapse between pre- and post-test so threat of stds becom ing familiar with the post-test (drops to 0)

Rating 0 |
| Turuk Kuek (2011)

United Kingdom | To find out if ESL students' reasoning and critical thinking as | Critical thinking skills and collaboration | Experimental - Randomised controlled trial | 20 students (randomly assigned to 11 in the experimental group | First-year university students from the Faculty of | Students in the experimental group scored much higher on | Students' weaknesses in the language had to be | Random assignment of stds to groups 4* |

ASSIA	manifested in their writing improves as a result of an integrative approach to teaching reading and writing supported by collaboration and scaffolding	: identification of author's viewpoint in a written text, the reason(s) offered to support the viewpoint, etc.		and 9 in the control group taught by the same instructor) Pre-test and post-test (written composition test graded based on the following rubrics: Stapleton's (2001) model of assessing critical thinking in writing and Connor & Lauer's (1985) and Connor's (1990) scale of the persuasiveness of rational, credibility and affective appeals	Medicine at the Schools of Medicine and Nursing (17 to 34 years old) 12 weeks	their writing than those in the control group *Positive effect*	ignored in the scoring process The influence of reading on writing was investigated but the influence of writing on reading was not Short duration of the study	Very small number of cases (drops to 1*) Attrition rate was high – 27 did the pre-test – 47% + exclusion of scores of stds who dropped instead of using intention-to-treat analysis + researcher-developed test – 2 raters but not blinded (drops to 0) **Rating 0**

APPENDIX 3 - Summary of study ratings and teaching approaches

Rating 2*	Rating 1.5*	Rating 1*	Rating 0
Gomez (2010) *General critical thinking skills*	Tous, Tahriri, & Haghighi (2015) *Debate*	Daud, Gilmore & Mayo (2013) *Assessment techniques*	Arslan & Yildiz (2012) *Literary and narrative texts*
Mazer, Hunt, & Kuznekoff (2007) *General critical thinking skills*		Davidson & Dunham (1997) *General critical thinking skills*	Fahim & Mirzaii (2013) *Active learning strategies*
McCarthy-Tucker (1995) *General critical thinking skills*		Fatemi (n.d.) *Literary and narrative texts*	Hurte (2004) *Scaffolding*
Kusumoto (2018) *Active learning strategies*		Ghabanchi & Behrooznia (2014) *Brainstorming techniques*	Iraji, Enayat, & Momeni (2016) *Assessment techniques*
Salmani Nodoushan (2016) *General critical thinking skills*		Jafari & Yavari (2014) *Assessment techniques*	Khatib & Janpour (2012) *Literary and narrative texts*
		Jafari, Yavari, & Ahmadi (2015) *Assessment techniques*	Manning (1997) *General critical thinking skills*
		Kahrizi, Farahian, & Rajabi (2014) *Assessment techniques*	Moore (1995) *General critical thinking skills*
		Khatib & Alizadeh (2012) *Literary and narrative texts*	Pashangzadeh, Ahmadian, & Yazdani (2016) *Literary and narrative texts*
		Khatib, Marefat, & Ahmadi (2012) *Journal writing*	Shaarawy (2014) *Journal writing*
		Khodadady & Ghanizadeh (2011) *Brainstorming techniques*	Tous & Haghighi (2016) *Debate*
		Rashtchi (2007) *Active learning strategies*	Turuk Kuek (2011) *General critical thinking skills*
		Ruff (2005) *General critical thinking skills*	Chason, Loyet, Sorenson, & Stoops (2017) *General critical thinking skills*
		Sokol, Oget, Sonntag, & Khomenko (2008) *Scaffolding*	Khamkhong (2018) *Literary and narrative texts*
		Yang & Gamble (2013) *Debate*	
		Zelizer (2013) *General critical thinking skills*	
		Akbari, Seifoori, & Ahour (2017) *General critical thinking skills*	
		Dong (2017) *General critical thinking skills*	

APPENDIX 4 - Critical thinking materials used in the trial

LOGICAL FALLACIES

Activity 1
Duration: 50 minutes (1 session)

Some Types of Logical Fallacies

Logical fallacies are examples of faulty or weak reasoning that one encounters very often when reading texts or listening to people speaking.

What are some examples of weak reasoning? Give some examples of weak reasoning to your classmates.

Read the following examples of weak reasoning. In pairs, discuss the weakness in each.

1. My dentist thinks that Italy is the best place to visit, so I think it should be.

_____

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2. I'm sure someone with your vast experience can see that plan B is better than plan A.

_____

_____

3. I've never seen an alien, so it can't be that they exist.

_____

_____

4. Everyone cheats on their income taxes, so it must be all right if I cheat too.

_____

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5. Don't listen to Becky's opinion on welfare; she just opposes it because she's from a rich family.

_____

_____

6. George Bush is a good communicator because he speaks effectively.

_____

_____

7. All the parts of the engine are lightweight, so the engine should be lightweight.

_____

_____

8. There was a full moon the night I had my car accident, so driving again under a full moon causes car accidents.

_____

_____

9. Europe has great museums, so every country in Europe must have great museums.

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10. The sign by the pond said, "Fine for Swimming," so I dove right in.

_____

_____

11. We can either stop using cars or destroy the earth.

_____

_____

12. I liked the last Chinese restaurant I went to, so I'm sure that all Chinese restaurants in the world are good.

_____

_____

13. The criminal won't say where he was on the night of the crime, but he does remember being abused repeatedly as an innocent child.

_____

_____

14. If I give you a free ticket, then I'll have to give everyone a free ticket. Then my boss will get mad and fire me, and I will become homeless. So giving you a free ticket will make me homeless.

_____

_____

15. People from Quebec want to secede from Canada to get their own currency. Don't they realize money isn't everything?

_____

_____

Materials taken from
https://owl.english.purdue.edu/owl/resource/659/03/
Utah Valley State College Writing Center

Some Types of Logical Fallacies
Answer Key

1. Accepting someone's argument because of his or her authority in a field unrelated to the argument, rather than evaluating the person's argument on its own merits.

2. Exploiting the audience's feelings to convert them to a particular viewpoint. Appeals to fear, flattery, ridicule, pity, or spite are among the most common forms this fallacy takes. In some circumstances, appealing to emotion may be appropriate, but writers should avoid appeals to emotion when reason and logic are expected or needed.

3. Basing a conclusion solely on the absence of knowledge.

4. Claiming that a position is true because most people believe it is.

5. Discrediting an argument by attacking the person who makes it, rather than the argument itself.

6. Using a premise to prove a conclusion when the premise itself assumes the conclusion is true.

to another.

7. Assuming that because parts have certain properties, the whole does as well.

8. Concluding that because two things occur at the same time, one has caused the other.

9. Assuming that because a large body has certain properties, its parts do as well.

10. Applying the same term but using differing meanings.

11. Suggesting only two solutions to a problem when other options are also available.

12. When a writer arrives at a conclusion based on inadequate evidence or a sample that is too small.

13. Shifting the reader's attention from the real issue to a different argument that might be valid, but is unrelated to the first.

14. Assuming a chain of cause-effect relationships with very suspect connections.

15. Attacking one of the opposition's unimportant or small arguments, while ignoring the opposition's best argument.

Materials taken from
https://owl.english.purdue.edu/owl/resource/659/03/
Utah Valley State College Writing Center

Activity 2
Duration: 100 minutes (2 sessions)

Correlation and Causation

<u>Pre-reading questions for class discussion</u>

1. A study on elementary school children shows that there is a strong link between shoe size and reading ability. Children with bigger shoe sizes scored higher on their reading tests. Do big feet help people read better?

2. Houses with swimming pools use 85% more energy than other houses. Are swimming pools the cause for this energy use?

Time

Don't Blame Facebook For Your Divorce

Eliana Dockterman
July 21, 2014
http://time.com/3012692/facebook-divorce-cheating-marriage/

Understanding the flaws in a new study that says time spent on Facebook is related to the divorce rate

A new study suggests that there is a relationship between increased Facebook use and divorce. But don't delete your Facebook account yet: the researchers themselves admit that they have found a correlation between the two, not causation.

The researchers, who published the study in the July 2014 edition of Computers in Human Behavior, first looked at the rise of Facebook use and the rate of divorce in individual states. They found that a 20% increase in the number of Facebook users in a given state is associated with a 4% increase in the divorce rate the following year. However, the researchers could not identify who exactly was creating new Facebook accounts: it could have been young teens allowed to log on to the site for the first time or older people finally catching on to the trend. The people increasing their Facebook use were not necessarily the same people who were getting divorced.

The researchers also looked at survey information from individuals across the country aged 18 to 39. They found a weak relationship between marriage quality and social media use: those who spent more time on Facebook, Twitter and other sites were more likely to be unhappy with their marriage and thinking about ending it. However, an easy explanation for this correlation absolves Facebook: rather than social media sites causing people to be unhappy with their marriages, people who are unhappy (whether with their spouse or their life in general) could be turning to Facebook and other social media as an outlet. Individuals use Facebook to talk to friends, connect with old acquaintances and browse news and information—all of which can be used as a distraction from the less pleasant realities of life.

As the researchers conclude: "The study does not establish a cause-and-effect relationship because that would require longitudinal and/or experimental data."

Sure, the Internet has made it easier to find mistresses and simpler to track a spouse's cheating. But in the end, the individual has agency. Being exposed to exes, old friends or strangers online perhaps makes cheating more tempting, but it doesn't encourage cheating. Similarly, a person may be inclined to monitor their partner's activity, but that person can also choose to trust his or her significant other. In short, if a cheater is going to cheat, he doesn't need Facebook (or even the Internet) to accomplish that goal.

Note:

A longitudinal study is a study in which a group of participants are studied over a long period of time with data being collected at different intervals.

An experimental study is a study that tries to determine whether a program or an intervention has a causal effect on participants. Three components of experimental studies: pre-test and post-test, control group and experimental group, random assignment of participants to groups.

Answer the following questions in your own words.

Why did the researchers try to know who was creating new Facebook accounts?

_____

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What is the researchers' explanation for the correlation between Facebook use and marriage dissatisfaction?

_____

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What is the difference between correlation and causation?

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After carefully reading the article, summarize it on the lines provided below.

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Correlation and Causation
Answers to the pre-reading questions

1. The hidden factor here is age. Children will usually read better when they grow older. Older kids usually have larger feet than younger kids.

2. The hidden factor here is the size of houses with swimming pools. Houses with swimming pools are usually larger and have more occupants in them.

▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬

Activity 3
Duration: 100 minutes (2 sessions)

Correlation

<u>Pre-reading questions for class discussion</u>

Does living near the sea lead to good health? If yes, how can you be sure?

People Living Near the Sea May Be Healthier

Rachael Rettner, MyHealthNewsDaily Staff Writer | July 17, 2012
http://www.livescience.com/21637-coastal-living-health.html

Living near the beach may come with an extra perk: better health.

A new study analyzed information from more than 48 million people in England and found that the nearer they lived to the coast, the more likely people were to report good health within the past year.

The results held even after the researchers took into account possible health factors such as age, sex, socioeconomic status, and whether they lived near parks or other green spaces.

The difference from living near the coast was relatively small. About 1 percent more of the people living within half a mile of the sea reported good health than did the people more than 30 miles from the sea.

But a small effect, when applied to an entire population, can have a substantial impact on public health, said study researcher Ben Wheeler of Peninsula College of Medicine and Dentistry in Exeter, England.

Living near the coast may be associated with better health because the seaside environment reduces stress, the researchers said. They pointed to another British study that found that people who took trips to the coast experienced more feelings of calmness and relaxation than those who visited urban parks or the countryside.

However, it's too soon to advise people to hit the beach to improve health, Wheeler said. The study only found an association, not a cause-effect link, and it's possible other factors could explain the results.

For instance, it could be that people who are wealthier, and therefore healthier, are more able to move to desired locations such as the coast, Wheeler said, a phenomenon known as the migrant effect.

But the study did find that the association between coastal living and better health was strongest for those living in the most deprived areas, which perhaps indicates that wealth cannot explain the results, Wheeler said.

Because the study looked at only England — an island country in which everyone lives within 72 miles of the coast — it's not clear whether the findings would apply to other populations.

Far from England, a health expert not involved in the study said that while the British research certainly doesn't prove that people's health and the place they live are linked, it's possible that "proximity to the seas … does something for our bodies."

Dr. David Katz, director of the Prevention Research Center at Yale University School of Medicine, said: "I know I find the smell of the ocean and the sound of the surf a wonderful tonic."

If future studies confirm the results, the next step would be to find out what it is about coastal environments that benefits health. Wheeler said it may then be possible to bring those benefits to people living in other areas, through virtual environments, for instance.

Answer the following questions in your own words.

Why couldn't the researchers draw a conclusion about the effect of living near the sea on health?

_____

_____

_____

Why couldn't the study establish a cause-effect relationship between living near the coast and having good health?

_____

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_____

How is the issue of wealth related to coastal living and good health according to Wheeler?

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Summarize the article. Start your summary by stating the main idea of the article.

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Assumptions

Activity 4
Duration: 100 minutes (2 sessions)

Stereotypes and Assumptions

<u>Pre-reading questions for class discussion</u>

Are men better drivers than women?

What is a stereotype?

What is an assumption?

What is a self-fulfilling prophecy?

Read the following article about stereotyping and then answer the questions that follow.

ABC Science

Stereotype stuffs up women's driving

Fran Molloy
Monday, 24 March 2008
http://www.abc.net.au/science/articles/2008/03/24/2197632.htm

Back-seat drivers who comment on women's ability to park a car are making things worse, new research suggests.

Calling women lousy drivers may be a self-fulfilling prophecy because it disrupts their focus and makes them more likely to run over pedestrians, new research suggests.

An Australian study found that women who are told that men are better drivers are more than twice as likely to collide with jaywalking pedestrians as other women in a similar test.

Dr Courtney von Hippel from the School of Psychology at the University of Queensland and team publish their study in the journal *Accident Analysis and Prevention*.

"When people are confronted with negative stereotypes about themselves they seem to experience an additional cognitive load, which can decrease their performance on a task," says von Hippel.

"There can be subtle things happening in the environment while a woman is driving, like a male driver shaking his head when she tries to reverse park a car."

There have been hundreds of studies about the 'stereotype threat' effect since the idea was first discussed in psychology in the mid 1990s.

But most have focused on verbal and written tests rather than an applied task. This one shows how stereotyping can undermine women's performance during a driving simulation study.

The researchers recruited 168 female university students. Half the participants in one experiment heard that the study would investigate why men are better drivers than women and were told that the simulation would test the gender difference in driving abilities.

The control group heard no mention of gender differences but were told that the driving task would investigate the mental processes involved in driving.

Nearly half of the drivers in the 'stereotype threat' group hit a jaywalking pedestrian who unexpectedly appeared in the simulation.

Another experiment used the same driving simulation to show that participants who were distracted by a grammatical test were also twice as likely to hit the jaywalker.

"For safety reasons, our stereotype threat manipulation had to be quite contrived," says von Hippel.

"But it shows that it would be worth doing a more thorough investigation, perhaps an observational study, to discover what is going on here."

Questions

Explain in your own words what von Hippel states about negatively stereotyping women.

_____

_____

_____

_____

Explain in your own words the difference between von Hippel's study and previous research on the 'stereotype threat' effect.

_____

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After carefully reading the article, summarize it on the lines provided below.

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Class discussion questions

Are stereotypes always negative?

In what other forms in society does stereotyping prevail?

How are stereotypes and assumptions related?

Activity 5
Duration: 50 minutes (1 session)

The Danger of a Single Story

https://www.youtube.com/watch?v=D9Ihs241zeg

You will watch a Nigerian lady, Chimamanda Adichie, talking about her experience. Before you watch the video, try to anticipate what she will talk about. Discuss your ideas with the person sitting next to you.

As you watch the video, answer the following questions.

What was the danger or the unintended consequence for Adichie of reading only foreign books?

_____

_____

How did African books help her?

_____

_____

What assumption did she have about Fide's family? Explain.

_____

_____

What different assumptions did her roommate make about her?

_____

_____

What assumptions about Africa can one find in Western literature?

_____

_____

What was the criticism she received about the characters in her novels? Explain.

_____

_____

How did she get her single story of Mexicans? What was it?

_____

_____

How does power relate to her notion of the single story?

_____

_____

Why does Adichie advise that people engage with different stories of a person or a place rather than one story? What is the danger of engaging with one single story?

_____

_____

Activity 6
Duration: 50 minutes (1 session)
Reliability of Sources

You will have a short class discussion after you read the following text on the reliability of sources.

Where does the information come from?

When evaluating a media message about science, the source is one of the first things to consider:

• What is the source of this message? Is it a sensational article in *Cosmopolitan*, a report from the *New York Times*, a feature in a science publication aimed at the general public like *Discover*, or an original journal article? Each of these sources will provide you with a different level of information—and probably, a different level of fidelity to the original science. So if you are reading a short summary in your local newspaper, don't assume that you've got the whole story!

• Does that source have an agenda or goal? All media messages have goals, which can affect the information presented. For example, scientific messages that appear in advertising (e.g., "Clinically proven to reduce wrinkles") are aimed at selling a product and are unlikely to give the full story. Some publications are aimed at rallying readers around particular issues, like environmental activism, anti-environmentalism, or health issues, and so may present a skewed view of the science. If you really want the whole scoop on a scientific issue, it's best to look for a source whose main goal is to explain the science involved. Science publications aimed at the general public provide this sort of information. Scientists strive to be unbiased in their scientific work, but occasionally the media's interpretation of this work introduces bias.

An original piece of scientific research may be interpreted many times over before it reaches you. First, the researchers will write up the research for a scientific journal article, which may then be adapted into a simplified press release, which will be read by reporters and translated yet again into a newspaper, magazine, or internet article - and so on. Just as in a game of telephone, errors and exaggerations can sneak in with each adaptation.

GETTING IT WRONG EVERY WHICH WAY

In 2004, an international group of researchers modeled the effect of predicted climate change over the next 50 years, and reported that this amount of change might *eventually* cause 15-37% of a select group of terrestrial species to go extinct. It was simple, straightforward science. However, much of the press coverage that followed was both sensational and inaccurate. For example, the *Guardian* ran the headline:

An unnatural disaster:
• Global warming to kill off 1m species
• Scientists shocked by results of research
• 1 in 10 animals and plants extinct by 2050

In fact, most newspaper reports got it wrong, frequently suggesting that over a million species would go extinct by 2050 - and not, as the science implied, that over a million species would be sentenced to extinction by 2050 and would actually die off afterwards. In addition, many websites picked up the story, and as one might expect, conservation-oriented websites tended to run more sensationalized versions of the story, and websites with an anti-environmental bent tended to dismiss the story. In this case, it's clear that the media source of the story made a big difference in the information offered to readers.

Materials taken from
http://undsci.berkeley.edu/article/0_0_0/sciencetoolkit_03

In pairs examine each of the following pieces of information. Decide whether the information is reliable or not basing your judgment on the source of information. Explain why it might or might not be reliable. If the information is not highly reliable, explain why and how you can check its reliability.

1. *Omega 30+ Fish Oil*
"Marine fish oils are rich in Omega-3 Fatty Acids such as DHA and EPA. Omega 3 oils promote a healthy cardiovascular system, immune system, and reproductive system. DHA promotes mental focus."
Source: *The Herbalist*
Manufacturing Herbal Medicine Since 1984
http://store.theherbalist.com

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2. "Daily doses of vitamin C do little to protect people from the common cold, scientists revealed today. In a survey of scientific studies spanning more than two decades and including more than 11,000 people, those who took 200mg of vitamin C daily had almost as many colds as those who took no supplements. The study was led by Harri Hemilä at Helsinki University"
Source: *Guardian*
http://www.theguardian.com

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3. *Cilantrol Oil*
"Oil of Cilantro is formulated with cilantro plus coriander seed to create an immensely useful tonic for digestion and liver support. Our mountain grown wild oil of cilantro is the only type containing both cilantro leaf and coriander seed oil, providing optimal strength and essence."
Source: *Buy Herbs*
http://www.buyherbs.com

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4. "Many studies have suggested that increasing consumption of plant foods like cilantro decreases the risk of obesity, overall mortality, diabetes and heart disease while promoting a healthy skin and hair, increased energy and overall lower weight."
Source: *Medical News Today*
http://www.medicalnewstoday.com

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5. "A recent study found e-cigarettes are less addictive than cigarettes for former smokers, researchers have proved."
Source: *Daily Mail*
www.dailymail.co.uk

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6. "This review summarizes evidence for the effectiveness of technology use in foreign language (FL) learning and teaching, with a focus on studies that compare the use of newer technologies with more traditional methods or materials. The review of over 350 studies

revealed that, in spite of an abundance of publications available on the topic of technology use in FL learning and teaching, evidence of efficacy is limited."
Source: *Computer Assisted Language Learning*
A peer-reviewed scholarly journal
http://www.tandfonline.com/doi/abs/10.1080/09588221.2012.700315#.VJbmxP84KA

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_____

7. "The location of the hotel near the central station and the simple but very comfortable rooms plus the varied and tasty breakfast are the reasons why Hotel Europa Life is everything else but a usual hotel."
Source: Hotel Europa Life
http://www.hoteleuropa-frankfurt.de

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8. "For 7 euros I would have hoped for more. To be perfectly honest, I felt the Boboli gardens were a bit of a disappointment. I had hoped for more water features."
Source: Virtual Tourist
Jim Ellison (a tourist)
http://www.virtualtourist.com

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9. "It is very important that you do NOT take your Actonel Once a Week tablet with food or drinks (other than plain water) so that it can work properly. In particular do not take this medicine at the same time as dairy products (such as milk) as they contain calcium."
Source: Actonel Once a Week
Package Leaflet: Information for the patient
http://www.medicines.org.uk/emc/PIL.11592.latest.pdf

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_____

Reliability of Sources
Answer Key

1. This is a commercial site, so the information in it is not accurate as the aim of the website is to sell and make a profit.

2. The information seems to be reliable as the study has reviewed a lot of studies and involved a big number of people. In order to check for reliability, one can refer to the original study that has been published in a scholarly journal.

3. This is a commercial site, so the information in it is not accurate as the aim of the website is to sell and make a profit.

4. The website does not give information about the studies or the researchers. Besides, the website does not specify the amount of cilantro that should be consumed. More research needs to be done to check the reliability of the information.

5. No information is given about the study or about the date of the study. More research is needed to check the reliability of the source.

6. The information seems to be reliable as it is from a peer-reviewed journal and is a review of 350 studies.

7. The information comes from a website for a hotel, so the aim is to attract as many tourists as possible.

8. The information is not reliable since it reflects the opinion of a tourist.

9. The information comes from a leaflet for a medication. It is reliable.

Activity 7
Duration: 50 minutes (1 session)

Reliability of Sources
The KFC Case

Read the following excerpt from "Frankenchicken Puts KFC On Defensive Again".
Bill White
January 22, 2000
The Morning Call

Did you know this about KFC???

KFC has been a part of our American traditions for many years. Many people, day in and day out, eat at KFC religiously. Do they really know what they are eating?

During a recent study of KFC done at the University of New Hampshire, they found some very upsetting facts.

First of all, has anybody noticed that just recently, the company has changed their name? Kentucky Fried Chicken has become KFC. Does anybody know why? We thought the real reason was because of the "FRIED" food issue. It's not.

The reason why they call it KFC is because they cannot use the word chicken anymore. Why?

KFC does not use real chickens. They actually use genetically manipulated organisms. These so-called `chickens' are kept alive by tubes inserted into their bodies to pump blood and nutrients throughout their structure. They have no beaks, no feathers, and no feet. Their bone structure is dramatically shrunk to get more meat out of them. This is great for KFC because they do not have to pay so much for their production costs. There is no more plucking of the feathers or the removal of the beaks and feet.

The government has told them to change all of their menus so they do not say chicken anywhere. If you look closely you will notice this. Listen to their commercials, I guarantee you will not see or hear the word chicken. I find this matter to be very disturbing. I hope people will start to realize this and let other people know.

Retrieved from http://articles.mcall.com/2000-01-22/news/3297949_1_kfc-kentucky-fried-chicken-urban-legends

In pairs, discuss the following questions and write your answers in the space provided.

1. What is KFC using instead of chicken?

_____

_____

2. Why is KFC not using chicken?

_____

_____

3. Is the information concerning KFC changing its name supported by evidence?

_____

_____

4. Do you think that the information about KFC is true and logical? Why or why not?

_____

_____

5. What are some ways to make sure that the information is true?

_____

_____

Now read a short excerpt about KFC from Snopes.com, a site also known as the Urban Legends Reference Pages. The website is run by Barbara and David Mikkelson. The site aims to either confirm or debunk questionable stories that are circulated on the Internet.

Kentucky Fried Chicken decided to change its name to KFC in 1991 for several reasons, none of which had anything to do with governmental regulations about mutant animals:

- A move to de-emphasize "chicken" because KFC planned to offer a varied menu that included other types of food. (The Boston Chicken corporation took the same approach for the same reason, changing the name of its retail food outlets to Boston Market.)

- A desire to eliminate the word "fried," which had negative connotations to the increasingly health-conscious consumer market.

- A trend towards the abbreviation of long commercial titles as demonstrated by other companies' employing shortened forms of their names.

Links on KFC's web site (such as the About KFC page) clearly describe its product as "chicken" numerous times, something it could hardly get away with if the government were prohibiting the company from using that word. And the KFC web site can also be reached through the domain name kentuckyfriedchicken.com.

Retrieved from www.snopes.com

Discuss the following questions in class.

6. Which of the two excerpts sounds more logical? Why?

_____

_____

7. Who do you think created this rumor about KFC? Why was it created?

_____

_____

Reliability of Sources

The KFC Case
Answer Key

1. KFC is using genetically modified organisms that have no beaks, feathers, or feet. There is more meat in them than bones.

2. Genetically modified organisms will cut production cost as they do not require workers to pluck feathers or remove beaks and feet.

3. Yes, the writer refers to a recent study done at the University of New Hampshire.

4. The information might be true as a lot of companies are trying to seek profit these days without caring about the health of the consumer.

5. One can google the study done at the University of New Hampshire and check what it says. Another thing one can do is to search for more information on this topic on the Internet.

6. The second excerpt sounds more convincing as it gives logical reasons why this is not the truth. Besides, it suggest to the reader to check the site for KFC to see if the word "chicken" is used or not.

7. Other fast food restaurants who can be the competitors of KFC might have created this rumor so that they can attract KFC's customers. It might be someone who just started it as a joke and people believed it.

━━━

Activity 8
Duration: 50 minutes (1 session)

Providing Counterarguments

I. Play the devil's advocate and think of counterarguments for the statements in bold.

Vending machines stocked with soda or candy should be removed from all public schools. a. **The majority of these foods contribute nothing to a child's daily nutrition and often only provide empty calories and high amounts of sugar and sodium.** b. **According to numerous health sources, obesity rates in children have doubled in the last 20 years.** Vending machines contribute to this problem. They should be replaced with foods that are healthier choices. c. **Replacing juices and soda with water and candy and pastries with fruits and vegetables is an excellent way to encourage students to choose better snacks.** Currently, there is legislation being presented to Congress that may give the USDA more authority to set standards for any food or beverage sold on school property.

Materials taken from
Chesla, E. (2010). *Reasoning skills success in 20 minutes a day*. New York: Learning Express.

a.

_____

_____

b.

_____

_____

c.

_____

_____

_____

II. Read the following article about the worthlessness of homework and try to think of counterarguments for the claims that are in bold.

Don't Bother, Homework Is Pointless
Sara Bennett
November 12, 2014
http://www.nytimes.com/roomfordebate

Almost all research shows that elementary school homework is pointless. a. **If families understood that, they would be thrilled to lose that nightly routine where the adults cajole and bribe, and the kids cry and throw tantrums.**

I would love to see a one-week experiment where all parents agree not to say a word to their elementary school children about homework: not ask whether they have it, not lay out the supplies, not set aside the time, not read the instructions. I bet that most kids would not think about their homework at all. b. **And, at the end of that week, educators would have to acknowledge that homework actually sets up a pattern of dependence that continues throughout the school years, rather than instilling responsibility and self-discipline as they claim.**

What if parents stopped asking about or helping with homework through middle, high school, and even college years, too? Teachers would finally see the true quality of students' work. And parents would stop having crazy conversations like the one I once had with a middle

school English teacher when I remarked on the differences between essays written at home and in school. The teacher believed that, at home, students had time to focus on grammar, sentence structure, vocabulary and ideas, and that explained why their essays were so much more developed than their in-class work. c. **I tried to tell him that he was actually seeing the work of parents or tutors, but he refused to see the obvious.**

a.

_____

 _____

b.

_____

_____

c.

_____

_____

III. Read the following article about college attendance policies and try to think of counterarguments for the claims that are in bold.

College instructors should not be permitted to set restrictive attendance policies; they should be made to treat students as responsible adults, leaving each student free to decide his or her attendance behavior. a. **Students know their own strengths and weaknesses better than anyone else does and are mature enough to decide which classes they need to attend.** Some courses will be new and challenging to them. b. **Others will merely duplicate prior learning.** Some instructors will add to the students' store of information and challenge their intellect. c. **Others will merely read the textbook aloud.** Left to exercise their own judgment, students can use their time wisely, attending the classes of the good, interesting, dedicated teachers and avoiding those of the dullards and deadbeats.

Materials taken from
Ruggiero, V. R. (2009). *Beyond feelings: A guide to critical thinking*. Boston: McGraw-Hill.

a.

_____

_____

b.

_____

_____

c.

_____

_____

Providing Counterarguments
Answer Key

I. Possible answers

a. There might be healthy choices in vending machines such as granola bars, multi-cereal bars, yogurt or sugar-free juice.

b. It is true that the obesity rate has gone up but there are many other reasons than the occasional vending machine snack. Children rarely exercise or walk nowadays.

c. Kids can buy their candy from other sources.

II. Possible answers

a. Some children are independent learners at a very young age and they don't cause trouble to their parents when they have to do their homework.

b. When children know that doing their homework will help them do well in exams, they will take responsibility for their own homework.

c. Even when children get some help from their parents or tutors, they can be learning a lot in the process.

III. Possible answers

a. Most students who are only 18 and 19 years old do not know their benefit and might skip classes due to peer pressure.

b. Courses that duplicate prior learning can be important as well as they reinforce learning and cannot be considered a waste of time.

c. Students are not mature enough to evaluate whether learning is happening or not when instructors read the textbook in class.

Activity 9
Duration: 50 minutes (1 session)

Understanding Studies
The Size of the Plate

Read the following study and discuss the questions that follow with your classmates.

A group of researchers at the Center of Childhood Obesity in the U.S. conducted a study to investigate the effectiveness of using smaller plates on children's food consumption. The researchers observed a group of 32 students whose ages ranged between 9 and 11 over a period of 10 days. The children were asked to serve themselves from a buffet. The same menu was offered on each of the 10 days: chicken nuggets, French fries, pizza slices, fried mozzarella sticks, sautéed vegetables, and salads.

On the first 5 days (the 1st week), children were given plates that were 19 cms in diameter to serve themselves from the buffet. On the next 5 days (the 2nd week), they were given plates that were 25 cms in diameter. The plates were weighed every day before and after children ate.

Children piled more food in bigger plates.

The researchers concluded that bigger plates are the only culprit for overeating in children.

From this experiment the researchers were able to draw the following conclusion:

Children eat more than usual when they use bigger plates.

Materials adapted from
Rochman, B. (2013, April 8). Size matters: Smaller dishes could cut childhood obesity. *Time: Health and Family.* Retrieved from http://healthland.time.com

I. Examine the conclusion that the researchers drew from the study. Do you think the conclusion is logical? Do you think that the researchers took into consideration all possible factors that could have affected their conclusion?

_____

_____

II. What can be the hidden factors that the researchers did not take into consideration? Put a tick next to the possible factors that could have biased the conclusion of the study.

1. _____ The weather was not the same during the two weeks of the study.

2. _____ The school hired a very bad cook in the second week of the study.

3. _____ Children piled more food on the last five days but they did not eat it.

4. _____ Children had physical education classes on the days they were given bigger plates.

III. Suppose the following conclusion that the researchers drew is true:

"**Children eat more than usual when they use bigger plates.**"

In pairs, examine each of the following statements. Decide whether the statement supports the conclusion, contradicts it, or neither. Explain your answers. Consider each statement independently from the others.

1. The exact same experiment was repeated with the same children after 2 months with 5 TV sets installed around the canteen. Children ate the same amount of food on all the 10 days.

_____

_____

2. The experiment was repeated with 58 children in France. The children were given bigger plates on the last day only. On that day, the buffet had mainly a variety of healthy food like sautéed vegetables with a very small amount of nuggets, pizza, and fries. Children ate the same amount of food as they ate on the previous 9 days.

_____

_____

3. The experiment was repeated in a school in Spain with new dishes added to the buffet every day. The number of students was 105. Children ate more when they had bigger plates.

_____

_____

IV. Examine each of the following statements. Write **yes** if the researchers in the original study described in the text intended to prove the statement and **no** if not.

_____ 1. Controlling the eating habits of children is much easier than controlling those of adults.

_____ 2. Plate size can help reduce the amount of food eaten by children and adults.

_____ 3. Children enjoy drinking sugary beverages.

_____ 4. A bigger plate can push children between the age of 9 and 11 to eat more.

Understanding Studies
The Size of the Plate
Answer Key

I. The researchers did not look at other factors that could have biased their conclusion. Possible factors will be listed in exercise II

II.

1. This can be a possible factor. If the weather was much colder in the second week, students might have eaten more because of the weather and not the bigger plate.

2. This is not a possible factor as it contradicts the conclusion of the study.

3. This can be a possible factor. The researchers did not state anything about whether children ate the food or just piled more in their plates.

4. This can be a possible factor. Students ate more because they burned more than usual while exercising.

III.

1. Contradicts

2. Neither

3. Supports

IV.

1. No

2. No

3. No

4. Yes

Activity 10
Duration: 50 minutes (1 session)

Studies and Surveys

An essential skill nowadays is to have a thorough understanding of how research is conducted. Sometimes one has the tendency to believe all the information presented in studies or surveys assuming that numbers are always trustworthy. However, one should look

at all studies and surveys with a sceptical eye. Researchers might mislead readers intentionally at certain times. Other times, researches might present unreliable findings out of pure ignorance or neglect.

Read the following text and answer the questions that follow.

A Little Bias is a Big Problem

Liana Epstein
07/24/13
https://www.surveymonkey.com/blog/en/blog/2013/07/24/a-little-bias-is-a-big-problem/

Susan and Walter are getting ready for their big summer barbecue party. Susan agrees to be the barbecue grill master if Walter buys all the ingredients. Not sure how many hamburgers to buy, Susan sends out a survey to all of the guests. When Walter checks the survey, he's shocked. 0% of people want hamburgers?! Then he reads Susan's survey question:

Do you want to have someone kill a defenseless animal, skin it, grab some of it, add preservatives to it, and force me to inhale its death fumes while I cry silently because it reminds me of all my animal farm friends from when I was a child?

Walter shakes his head and sighs, "Do I have to do everything myself?" He writes a new survey question and sends it out to their friends:

Do you want to support local American farmers in these troubled economic times by grilling up a traditional American juicy burger?

"There," he thinks, "that's better."

The moral of the story–When it comes to survey writing, keep your opinions to yourself and your own biases quiet. It's better for your data and for your image.

As for Susan and Walter's party guests? Well, we support your barbecue item of choice, whether it be hamburgers or veggie burgers. We're fair and balanced like that.

Answer the following questions in your own words.

What was wrong with the way that Susan wrote the question?

_____

_____

What was wrong with the way that Walter wrote the question?

_____

_____

How could have both Susan and Walter written the question in a better and unbiased way?

_____

_____

Evaluate the following studies and surveys. Examine the source of information (the organization that has conducted the research) and the findings of the research. Explain any flaws that you can find in them.

1. A study done by the Heart and Home Baby Food Company shows that five of six babies grow faster on formula milk than on breastmilk.

2. National Geographic has recently announced that approximately 35 percent of the world's species are near extinction.

3. In a recent survey, 90% of the respondents said that they prefer to have a baby girl to a baby boy.

4. A survey done by the Centers for Disease Control indicates that 75,000 adults, more than a third (35 percent), suffer from an inability to sleep at night.

5. A survey done by Mc Donald's shows that fast food does not increase body fat.

6. According to a survey done by Oncology Nursing Society, the average death rate from colon cancer across the U.S. is 18.9 per 100,000 people.

7. Eighty five percent of all Canadians think that there is too much violence on television.

Materials adapted from
Chesla, E. (2010). *Reasoning skills success in 20 minutes a day*. New York: Learning Express.

Studies and Surveys
Answer Key

1. A baby food company might have a personal interest if parents choose formula milk because the company will make more money.

2. The National Geographic is a reputable resource that has no interest in threatened species so this statistic can most likely be trusted.

3. The number of respondents is not stated; therefore, only 10 people might have been asked about their opinions. Besides, the source is not provided, so the reader does not know who did the survey.

4. There is nothing wrong with the study.

5. The study is biased since it is done by McDonald's and the aim of the restaurant is to sell fast food.

6. There is nothing wrong with the survey.

7. There is no source mentioned.

Activity 11
Duration: 50 minutes (1 session)

In Defense of Cheating
Joe Kribs

Read the following text about cheating and answer the questions that follow.

Most people, if they're honest, admit that they do sometimes cheat. According to the Educational Testing Service Web site, while about 20 percent of college students admitted to cheating in high school during the 1940s, today between 75 and 98 percent of college students report having cheated in high school.

Nobody likes cheating. Cheating is never good, but sometimes it is morally justified.

Times have changed a lot since the 1940s. Today, many students are maxed out with all the demands of sports, work, after-school activities, community service, and homework. Sometimes there just aren't enough hours in the day to get all one's schoolwork done.

Also, a much higher percentage of high school students go to college today than was the case in the 1940s. Good grades are more important now than ever. Competition is intense for scholarships, admission to top colleges, and for the highest-paying jobs. Given the rampant amount of cheating today, students who don't cheat put themselves at an unfair advantage against those who do.

Cheating is not something anyone feels proud about. But a lot of the classes students are forced to take, especially in high school, are just pointless. I mean, unless you are going to be an American History teacher, why do you need to memorise the details of the Smoot-Hawley Tariff Act? Many students cheat on busy work because they feel, rightly, that the effort is not

worth their time. And some teachers are so incompetent or so ridiculously hard that it's impossible to get a good grade if you don't cheat. They don't care, so why should their students?

Let's face it, it's a dog-eat-dog world out there. Every day we hear about some business scandal or some top athlete caught doping. Most adults cheat on their taxes, so what's the big deal if students sometimes cheat on a test? Does anybody really get hurt?

Of course, it would be dumb to cheat if you knew you were likely to get caught. However, that is rarely the case. In a recent poll conducted by *Who's Who Among American High School Students,* 95 percent of confessed academic cheaters said they had never been caught. And most teachers understand the pressures on students to cheat. Rarely are the penalties for getting caught severe. The prevailing attitude of both students and teachers is that cheating is not that big a deal.

One other thing has changed since the 1940s. We live in a globalized and increasingly competitive world. In today's world, nice guys not only finish last—they go broke. So let's stop kicking ourselves about a lost age of academic innocence. Times have changed, and students have changed with them. America has always been about success. As long as the American Dream remains alive, students will do what it takes to get ahead.

Materials taken from
Bassham, G., Irwin, W., Nardone, H., & Wallace, J. M. (2011). *Critical thinking: A student's introduction* (4th ed.). Boston: McGraw Hill.

The following questions will guide through the text in order to see the weaknesses that the writer has in his arguments. In some instances, there are no specific answers. The questions are only to draw attention to weak reasoning.

Issue and conclusion

1. What is the issue that is being discussed?

_____

_____

2. What is the conclusion? What is the writer trying to prove?

_____

_____

Reasons

3. What are the reasons that the writer gives to support his conclusion?

_____

_____

_____

_____

Definition of terms

4. Kribs states that "Cheating is never good, but sometimes it is morally justified". However, throughout the whole article, he does not specify what he means by cheating. What are the different forms of cheating? How would defining the term "cheating" change the impact of his conclusion on the reader?

_____

_____

_____

_____

_____

_____

Logical fallacies

5. Identify any logical fallacies that the writer makes. You do not have to know their names. Just explain the weakness in reasoning.

_____

_____

_____

_____

Assumptions

6. What does the writer assume about the future of the students who cheat?

_____

_____

_____

In Defense of Cheating
Answer Key

Issue and conclusion

1. Is cheating in college justifiable?
2. In spite of being a repulsive act, cheating is sometimes justifiable and permissible.

Reasons

3. The rate of cheating is on the rise.
 Students have extracurricular activities and they are put under pressure to achieve well.
 Some materials that students have to learn and memorize is just pointless, so they shouldn't bother.
 Students see people around them cheat in their daily lives
 Students are not caught cheating, and if they are, the punishment is not usually severe.
 Students who are good and innocent will be left behind.
Definition of terms

4. Cheating can take on different forms. Students might plan to cheat ahead of exams by preparing crib sheets. They might also buy research papers and hand them in as their own work. In some cases, students might get stuck in exams and copy one word from their classmates. This last form is not as bad as the first two forms.
If the writer means by cheating copying a word from a classmate, the reader might accept the writer's conclusion that cheating can be justifiable sometimes. However, if cheating means plagiarizing and bringing in cheat sheets into exam halls, then the reader might not accept the writer's conclusion at all.

Logical fallacies

5. Appeal to popularity (bandwagon fallacy): Because everybody cheats, it is acceptable for a student to cheat.
 Two wrongs make a right: Because some teachers are incompetent, or they assign a lot of work, it is acceptable for students to cheat.
 Generalization: A lot of classes that students have to take are pointless.
 Generalization: Teachers do not punish cheaters harshly.

Assumptions

6. The writer assumes that students who cheat will be hired and have good jobs. However, he does not take into consideration the fact that their lack of a good college education might expose them when they start working. He assumes that if students do not cheat, they might not reach good positions.

APPENDIX 5 - Ethical approval

Durham University
School of Education

Shaped by the past, creating the future

7 October 2014

Nada El-Soufi
PhD Education

n.k.el-soufi@durham.ac.uk

Dear Nada

I am pleased to inform you that your application for ethical approval in respect of 'An exploration of the effects of teaching critical thinking skills to undergraduate English language learners in Lebanon on their critical reading skills: A randomised controlled trial' has been approved by the School of Education Ethics Committee.

May we take this opportunity to wish you good luck with your research

Dr. J. Beckmann
Chair of School of Education Ethics Committee

APPENDIX 6 - Consent form

Participant Information Sheet

Title:

You are invited to take part in a research study of critical thinking. Please read this form carefully and ask any questions you may have before agreeing to be in the study.

The study is conducted by Ms. Nada El-Soufi as part of her PG studies at Durham University. This research project is supervised by Dr. Beng Huat See and Professor Stephen Gorard from the School of Education at Durham University.

The purpose of this study is to examine the effect of teaching critical thinking skills.

If you agree to be in this study, you will be asked to do a pre-test and a post test.

Your participation in this study will take 120 minutes.

You are free to decide whether or not to participate. If you decide to participate, you are free to withdraw at any time without any negative consequences for you.

All responses you give or other data collected will be kept confidential. The records of this study will be kept secure and private. All files containing any information you give are password protected. In any research report that may be published, no information will be included that will make it possible to identify you individually. There will be no way to connect your name to your responses at any time during or after the study.

If you have any questions, requests or concerns regarding this research, please contact me via email at n.k.el-soufi@durham.ac.uk or telephone at 00961 3 332118

This study has been reviewed and approved by the School of Education Ethics Sub-Committee at Durham University (date of approval: 07/10/2014)

Nada El-Soufi

APPENDIX 7 – Memoranda of understanding

Memorandum of understanding for the control teachers

Name of researcher: Nada El-Soufi

Date:

Please note that all data about participating teachers will remain confidential. No individual participant or their organisation will be identified in any report from this research. All participants will be sent a copy of the overall results after the study

is completed.

Name of participant: _____

I have agreed to take part in a study and I will be in the control group. It is my responsibility to do the following:

I will allow the researcher to attend my classes.

I will not withdraw at any time in the semester after I sign the memorandum of understanding sheet.

Signature of participant: _____

Date: _____

Memorandum of understanding for the experimental teachers

Name of researcher: Nada El-Soufi

Date:

Please note that all data about participating teachers will remain confidential. No individual participant or their organisation will be identified in any report from this research. All participants will be sent a copy of the overall results after the study is completed.

Name of participant: _____

I have agreed to take part in a study whose purpose is to examine the effect of teaching critical thinking skills. I will be in the experimental group. It is my responsibility to do the following:

I will not share or discuss any lessons or any materials that I will be given by the researcher with other teachers who are in the control group.

I will teach the materials given by the researcher and devote the time specified for each lesson.

I will observe as many lessons as possible given by the researcher.

I will allow the researcher to attend my classes.

I will attend the meetings that the researcher will call for.

I will not withdraw at any time in the semester after I sign the memorandum of understanding sheet.

Signature of participant: _____

Date: _____

APPENDIX 8a - Student Questionnaire

This questionnaire is part of a study investigating the effects of teaching critical thinking skills conducted by Ms. Nada El-Soufi as part of her PG studies at Durham University. This questionnaire will not be used to evaluate any students. All the information that you provide will be treated as strictly confidential and will be accessible only to the researcher.

Please take 10 minutes to complete the following questionnaire.

1. Year of birth: _____

2. Gender:

☐ Male ☐ Female

3. Nationality or nationalities _____ _____

4. *Please tick (√) the most suitable choice(s).*
 Have you had exposure to another culture through the following?

☐ Staying in a foreign country for more than one month

☐ Studying in a foreign country

☐ Having a foreign parent

5. At the levels shown below, was your education state education (free education) or paid education? *Please put a tick (√) in the relevant boxes.*

	State education (free education)	Paid education
Elementary school		
Middle school (Intermediate)		

Secondary school		

6. *Please tick (√) the most suitable choice.*

If you have graduated from school, what subject did you choose to study for your official exam (your school exit exam)?

☐ General science (chemistry, physics, maths)

☐ Life science (biology)

☐ Arts (literary)

☐ Socio-economics

☐ Other Please specify _____

7. If you are a Freshman student, what major have you chosen? *Please tick (√) the most suitable*

choice.

☐ Arts

☐ Science

☐ Other Please specify _____

9. Have you ever had a job? Please tick (√) the appropriate box.

☐ Yes ☐No

If yes, what was your job? _____

How long have you had your job? _____

APPENDIX 8b - Teacher Questionnaire

This questionnaire is part of a study investigating the effects of teaching critical thinking skills conducted by Ms. Nada El-Soufi as part of her PG studies at Durham University. All the information that you provide will be treated as strictly confidential and will be accessible only to the researcher.
Please take 10 minutes to complete the following questionnaire.

Education

	Degree	Institution	Major area of study
1			
2			
3			
4			

	Professional development courses attended (training sessions, certificates, etc)	Institution	Major area of study	Duration
1				
2				
3				

Work experience

	Institution	Position	Number of years
1			
2			
3			
4			
5			
6			

APPENDIX 9 - Sample teacher feedback form

Teacher Feedback Sheet

Experimental study on 102 classes in Spring 2015

Theme of the session: Distinguishing different fallacies

The session's objective:

1. Raising awareness of different insensible conclusions

2. Improving argumentation skills

Name of teacher: _____

ENGL 102 Section _____

Lesson number _____

Date _____

Absent students

_____

How did you feel about the material itself? Tick the option that best describes how you, as a teacher, felt about the material.

The material is clear.				
☐ Strongly agree	☐ Agree	☐ Undecided	☐ Disagree	☐ Strongly disagree

The material is motivating.				
☐ Strongly agree	☐ Agree	☐ Undecided	☐ Disagree	☐ Strongly disagree

The material fosters the development of critical thinking skills.

☐ Strongly agree	☐ Agree	☐ Undecided	☐ Disagree	☐ Strongly disagree

How did you feel about the way students interacted during the lesson. Tick the best option.

The majority of students were motivated.				
☐ Strongly agree	☐ Agree	☐ Undecided	☐ Disagree	☐Strongly disagree

The majority of students felt the material was boring.				
☐ Strongly agree	☐ Agree	☐ Undecided	☐ Disagree	☐Strongly disagree

The majority of students felt the material was too easy.				
☐ Strongly agree	☐ Agree	☐ Undecided	☐ Disagree	☐ Strongly disagree

Comments

_____

_____

_____

_____

APPENDIX 10 - Observation of control classes

Observation of control classes in the Spring

First observation

The first time the researcher observed, teachers were teaching students how to summarise and paraphrase.

Teacher 10 (Class 14) March 5

The teacher was teaching summary writing. The teacher asked students to do peer-review of their summaries and then asked for a volunteer to write his summary on the board.

There was no sign of critical thinking being introduced in the lesson other than distinguishing between main ideas and details which is part of the syllabus. The teacher asked students questions and involved all students, but the objectives of the module which are summary and paraphrase seemed to direct the lesson. Teaching strategies of questioning students were a way to prompt students to think for themselves but only about summary writing and not about the content of the texts.

Teacher 9 (Class 11) March 9

The teacher asked students a lot of questions to make them use their thinking skills. She tried to engage students by giving them time to think and find answers to her questions.

The teacher emphasised the importance of understanding the writer's purpose before students write a summary. Content materials of the module, as is obvious, take precedence over any teaching of critical thinking skills.

Teacher 7 (Class 10) March 10

The teacher asked students questions to engage them. However, the teacher focused on content materials and did not deviate from the objectives of the course. The main focus was meeting the objectives of the module and preparing students for the following graded activity. Students were asked to read and summarise or paraphrase without analysing the text. The focus of the lesson was mainly comprehension of the text in order for students to be able to master the skills of summarizing and paraphrasing.

Although the text was a fertile ground for discussion as it presented different views on gender stereotyping (female taxi drivers), the teacher did not initiate any discussion on the topic but focused on the comprehension of the text.

Second observation

The second time the researcher observed the three control classes, teachers were teaching counter argumentation and rebuttal.

Teacher 10 (Class 14) April 30

The focus of the lesson was on the organization of the argumentative essay. The teacher introduced some useful expressions that students could use to introduce the counterargument and then the rebuttal in their essays. The teacher did not encourage any discussion concerning the logic of counterarguments and rebuttals. It was all introduced in a mechanical way with strong emphasis on signal words and phrases to be used in the essay.

Teacher 9 (Class 11) April 28

The focus of the lesson was on the techniques and expressions to present the counterargument and rebuttal in an argumentative essay.

Teacher 7 (Class 10) April 27

The teacher focused on how to introduce the counterargument and the rebuttal in the essay. The focus of the lesson was on techniques and signal phrases used in the argumentation essay. The teacher did not discuss with students that ideas have to be logical.

It is important to note after observing control teachers that teachers are most of the time driven by the syllabus and they never deviate from it. They see their role as teaching what will be tested and nothing more. Even when texts form a fertile ground for the teaching of logic or for valuable discussions in the classroom, they are afraid to lose a minute on something that will not be directly tested.

Observation of control teachers in the Fall

Due to time constraints, only one control teacher was observed twice in the Fall.
Teacher 11 (Class 8) October 6

The objective of the lessons was to introduce students to the skills of summarizing, paraphrasing, and quoting. The teacher asked students a lot of questions. The class was interactive and the students seemed engaged. The teacher used the technique of questioning to engage students and prompt them to think about the materials. The strategies used in the class prompted students to think.

Teacher 11 (Class 8) November 19

The teacher asked students to brainstorm ideas in pairs. The teacher challenged students to generate ideas about why tourists would choose to come to Lebanon.

The teacher mentioned a very important idea about how the Lebanese are being given a created identity through the media. The idea lends itself to a great deal of critical thinking but it was only mentioned at the end of the session and it was not given enough time for discussion.

APPENDIX 11 - Interview transcripts

Group interview - Class 1

Date : May 22, 2015 - Duration: 26 minutes 14 seconds

Interviewer – Student 13 – Student 5 – Student 11 – Student 8 – Student 16 – Student 14 – Student 7

The interview was done towards the end of the session. The researcher dismissed the other students 10 minutes earlier and the interview went on a bit after class time.

Researcher: First of all thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Your responses will be kept anonymous and will not affect your English 102 grade in any way.

My first question to you is: What do you think of the critical thinking lessons that you have received his term in terms of content? The material itself, what's in the lessons.

Student 11: The subject?

I: Yeah

Student 11: Yes they were interesting.

I: Yes Student 11 can you please explain a little bit. Try, if possible, to give specific examples, if possible, If you remember something in particular like if you're saying they are interesting.

Student 11: They are interesting with the subject. They are not boring. We read stuff that we see every day. We can think about them in a good way. It's not something we haven't seen before and we're just talking about it and just for no reason. We can see it. It made us think about stuff we never think about before so it's great.

I: This is Student 7.

Student 7: It made us relate things together easier, to know the cause and the effect of something.

Student 16: It changed our thoughts

I: Yes Student 16?

Student 16: It changed our thoughts towards subjects we look at them in different ways to see if they're truth, we ask questions, we don't accept any any any fact without asking questions or yeah.

I: OK

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Student 5: Now we can also think about hidden factors like maybe we didn't really think about it when somebody just state a reason of why a specific thing happened so now we can think like maybe it's not the cause there like other hidden factors.

I: Yes thank you Student 5. Who would like to add something? You've got anything else to add to this? To disagree maybe with them?

OK what do you think - My next question is: What do you think of the critical thinking material that you have received this term in terms of amount of material? The number of handouts you had, OK? Was it like too much, was it too little? Do you think you needed more? Yes Student 11?

Student 11: It was enough. It wasn't too long to be boring and it wasn't too short to. We had the exact material that we need.

Student 16: For certain people maybe they needed more maybe he's talking only in his case. I found it enough also but maybe other people needed more.

I: OK? Yes Student 7?

Student 7: I think that learning has no limit so we should always want more.

I: Yes Student 13?

I found it too long. We took so many articles to read. Some articles were useless.

I: Which articles? I'm talking about the activities. I'm not talking about the course, the documented essay you wrote. I'm talking about the handouts.

Student 13: Yes about the handouts. Maybe there's more sheets than we need. We finished the material and we were still taking them.

I: So you felt it got boring at the end. OK.

Student 11: It was repeating itself.

I: OK

Student11: We had first second example but after it was the same stuff

I: The same stuff repeated? Like can your remember something that repeated itself. Do you remember something that was boring because it was a repetition of something you took before?

Student 11: Not the subject is a repetition but the idea. We know now that we have to think that there is something hidden, as the hidden factor or there is something. It's obvious to us that we're taking the article and we're gonna to see the hidden factor in the stuff.

Student 13: In the same activity, we take about three articles for example.

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Student 16: Yeah practice makes perfect. That's a reason.

Student 7: Yeah practice makes perfect.

I: Which articles are you talking about? Because I'm still confused here. Are you talking about the articles that you took in order to write a research paper?

Student 13: No. The activities.

I: Like what was an article that you took and it took 3 articles or something?

Student 13: There were so many articles.

Student 7: I think we need practice to improve our skills.

I: What is it? You need?

Student 7: I think we need practice.

I: Practice. OK. Yeah.

Student 11: In my case, maybe I found it like that. Other people didn't think like me.

I: Yeah. Fine. Anyone else on this question?

Now, do you think the material has helped you in any way?

Student 13: Yes.

Student 11: Yes.

Student 16: Yes.

I: Ok, if you're saying yes, how and why did it help you? In what context, in what I mean situation, now do you feel that this can help you?

Maybe it has helped you and maybe it's going to help you in the future, but how?

Yes Student 7, you want to say something?

Student 7: From the test we made at the first, at the beginning of the semester and now we repeated it, like I felt better than before about things we discussed and I finished it in less time. Before like the answers were confusing, they seemed but now no.

I: Yeah Yes Student 16.

Student 16: I think Student 7 realized it in the computer test. I found it easier than the first time. Reading and the questions I understood more. I knew how to think when reading the paragraphs.

I: The second time was easier?

Student 16: Yes. Yeah it was easier.

I: Ok. Yes this is Student 14.

Student 14: I think it helped us in speaking because of the presentations we did and we practiced a lot on them.

I: OK

Student 14: and how to stand in front of crowd and how to talk, not to stop.

I: So this is about the oral presentations you took which are related to this. Ok. Fine. Anything about the material? How do you think the material has helped you or will help you? So far you mentioned the test. Is the test important?

Student 13: Yes

Student 11: Yes

I: Why?

Student 13: It improved my writing skills.

I: It improved your writing skills? OK. Yeah the one in the lab.

Student 13: Not this test. The test we did.

I: I'm talking about the test you did. Can you please just try to understand that in the course there were certain handouts given to you related to critical thinking and this is what I am evaluating now. Did you get it? OK. So how did the material, if you feel that the material has helped you. Do you all believe that the material has helped you?

Student13: Yes

I: OK how did it help you or how will it help you in the future? Now you mentioned it made you do better on the test you took in the lab, which tests your critical thinking skills.

Student 13: Yes

Student 11: Yes.

I: OK. How else did the material, OK, help you?

Student 16: In searching for articles on the Internet.

I: How is that Student 16?

Student 16: Like now we can look at authors and see if, to see if an article is true or not or if it's

I: Yeah. Reliable?

Student 16: If it's reliable. Now we know how to see if it's good or no.

I: because you took one handout on reliability of sources. What's the intention of the writer, what's his purpsose, what's his hidden agenda, if you remember, right? So now you can tell whether the source is reliable or not. Somebody else? Good. Now. Someone else has something? Yes Student 5?

Student 5: It also helped in my research paper because like I knew what to look for and what I would be reading the articles it's like now we know what to accept and what not to accept from it.

I: Very good. OK.

Student 5: To see if the study is actually true or not, not just to say a study was conducted. There must be like an author, or a researcher or something.

I: OK? Student 8, would you like to say anything?

Student 8: You taught us how ..

I: Yes? Raise your voice please.

Student 8: to think in a different way beside the subject to get more ….

I: To expand your … or to widen your horizons or something?

Student 8: Yes

I: OK. Anyone else?

Student 11: Yes I found it developed our thinking skills.

I: OK?

Student 11: But for me in the test, it took me longer time.

I: Why is that? That's interesting.

Student 11: Because I was thinking of the question more. I was looking at the question in a different way than the first time that I did the test.

I: OK. So you were more careful?

Student 11: Yeah.

I: That's why.

Student 16: More thorough.

I: OK. Yeah. Any Anything else you would like to add? How the material has helped you? Like anything to do with your everyday life, your social life?

Student 16: I can catch people lying more often.

I: Student 16 you can catch people lying more now? How is that? That's interesting.

Student 16: When they give me not a lot of reasons

I: Reasons? Reasons for their arguments?

Student 16: Yes I don't believe them.

I: OK. Interesting.

Student 8: I don't believe everything without knowing more about the topic.

I: OK. So this is what you learned now? That you shouldn't accept everything Simon right? OK. Yes Student 16.

Student 16: And we're taught to look at our surroundings if they differ from test to test, I mean, not in tests in school, in cases and facts, to see if studies have been done (who the doctors that are doing them are – said in Arabic by the student)

I: OK. Fine. Anyone else wants to add? Yes Student 14 sorry Student 7?

Student 7: I think we became more social, like we participate in discussions like politics and so on you give your opinion and like if they say that resulted to - you say no maybe there is a hidden factor.

I: OK. Yeah. Yes Student 11?

Student 11: Like Student 7 is saying. We used to see stuff like we say in black and white. Now we're looking at another colour and different.

I: OK. That's interesting.

Student 11: Maybe it helped in my case I talk about correlation and causation. It's the main stuff that helped me.

I: OK.

Student 11: I see the stuff this does not cause this, maybe it didn't cause this.

Student 16: It's correlation not causation.

Student 11: Yeah maybe that's the thing that came to my mind.

I: Yeah. Anyone else would like to add anything on this question?

Have you ever used something similar to this? Have you ever taken something similar to this previously maybe in other courses maybe in school maybe, I don't know, maybe your parents told you about these things, maybe you read?

Student 16: No

I: Was the material new to you or was it something you've seen before? If yes, where? Yes Student 14?

Student 14: It was new.

Student 11: New.

I: It was new to you?

Student 16: Yes.

I: All of you? Even Student 16?

Student 16: Yes.

I: Student 11, was that new to you?

Student 11: Yeah.

I: Was it? OK.

Student 11: This type of activity is new.

I: It was new?

Student 16: Causation and correlation was the first time.

Student 14: Stereotyping.

I: Stereotyping. OK. Logical fallacies at the beginning of the semester if you remember? Assumptions and stereotypes?

Student 13: They didn't teach us.

I: They never taught this?

Student 16: Not in school, not in 101.

I: Not in school and not in 101. Yes Student 11?

Student 11: I took the French Baccalaureate and the last year we took stereotyping and the stuff. It wasn't developed as this.

I: OK so you took something similar, OK, in the French Baccalaureate, OK, very good, but it wasn't that much developed, so they were, like they focused a bit on stereotypes?

Student 11: Yes.

I: OK? Anyone else has seen this because you were living in the United States. OK?

Student 11: Over here in my psychology course we were taking about causation / correlation like when we were reading some of the studies that were conducted so would like say that no this isn't the reason. There were like other hidden factors.

I: So that was a psychology course that you took at the university, right?

Student 11: Yeah.

I: So it taught you a bit of causation/correlation. Yeah. OK. Anybody else would like to add other than Student 11. No? OK now. Generally how satisfied are you with the lessons? How satisfied are you with the lessons? Are you satisfied, not satisfied?

Student 16: Satisfied.

I: You're satisfied Student 16. Anyone else?

Student 11: It's more than enough.

I: To you it's more than enough. What do you mean by this Student 11?

Student 11: We're satisfied and we're so satisfied.

[Students laughing]

I: OK. Yes Student 8?

Student 8: I learned something new.

I: You learned something new? So you enjoy like learning something new?

Student 8: More beneficial.

I: More beneficial than just the regular stuff?

Student 13: I'm satisfied because it's the first time that I learn English in that way, in a way that you can get profit of.

I: Yeah?

Student 13: When we used to learn English, it was stuff that we don't see in real life.

I: OK?

Student 13: So it was boring.

I: So you felt that, Student 13, like this is the first time you learned English where You're using something useful in your everyday life.

Student 11: We benefit from what we learned. It's not just ….

I: Yes Student 11?

Student 11: We are benefitting of what we're learning. For us it's more important to do this stuff than do grammar and other stuff.

I: So you're trying to relate this to English because you're taking all this in an English course?

Student 11: Actually I found that the stuff that we did, activities, I enjoyed them more than the course.

I: OK. Yeah. Do you think they can be improved? Maybe you're happy with them, you're satisfied but still you feel that …

Student 16: Everything can be improved.

I: OK very good Student 16. Everything can be improved. Now in what way can they be improved?

Student 16: We need more time, that's it. We took advantage of all the time we had. We did everything we can in this time period. If we had more time, yes of course we can do more exercises, go deeper into every case study. We can do everything else but we need more time.

I: OK.

Student 16: With the time we had we did perfect. I understood everything. More practice makes perfect. I have a good idea toward …

I: Yeah. Yes anyone else other than Student 16 who would like to say how this material can be improved?

Student 11: They can be more interactive activities and something on the board.

I: Yeah. What do you mean by interactive activities?

Student 11: Activities, projection, multiple choice. Maybe for students that are maybe weaker. When they see it in front of them, they will understand.

I: Like PowerPoint, OK, maybe using PowerPoint for them to see something.

Student 11: Usually because now all students go for visual.

I: Visual. They're visual. People are mainly, OK, visual.

Student 11: When you see a text, it's longer. When you see it on PowerPoint it's interesting.

I: Anyone else would like to add, anything how to improve the material? Or this is it? OK do you think the instructor's teaching style matters in the delivery of the content? My teaching style because I'm the teacher here. Did that affect, OK, the delivery of the material? It can be negative, it can be positive, and you can say whatever comes to your mind.

Student 11: Yes in any case the teacher affects students.

I: Yeah what about the teacher in this case? Did the teacher affect, OK, the delivery of the content.

Student 11: In my opinion, it wasn't boring. We were not just attending here and stuff and

In your character, you're interactive. OK sometimes you get mad at us and stuff yeah

I: I was expecting to hear this, OK?

[Students laughing]

Student 11: It's normal. It's not boring. I go there are some courses the teachers just stand there and start talking. It's too boring.

I: OK

Student 7: You give us a chance to participate.

Student 11: Yes

Student 16: Yes

I: So participation for Student 7, participation was important to give your opinion and express your opinions. Someone else wants to comment on this?

Student 11: I agree with Student 7 because if we do not participate we will feel bored.

I: OK?

Student 11: We need to participate especially it's a class at 8 o'clock.

Student 7: Daydream.

[Students laughing]

Student 8: You kept us active.

I: Yes Student 8? I kept you active in a way?

Student 8: In the morning yes.

Student 16: You kept always we want to work.

I: Yeah, so my enthusiasm was like, it affected you ..

Student 16: To think

I: to think right, to work?

Student 7: Students always take English for granted. Now I felt it is an important course just as the others.

I: Yeah. Anyone else on this? OK now do you think the teaching of critical thinking skills should be taught explicitly as a separate course, like you take a course in critical thinking, or do you think it should be integrated in all lessons as a generic skill in higher education? Like it should be included like for example this course, I tried to include it in the course OK? So like it should be included at all levels or should it be taught separately in a course by itself? And of course I would like you to give your opinions on this and why do you think so, to support your opinion in a way. Yes Student 8?

Student 8: By itself it will be boring.

I: OK?

Student 8: To always have activities about critical thinking. When you include it in other courses …

Student 14: it will be interesting.

I: It will be interesting. Yes Student 16?

Student 16: It needs multiple stages. If you start from 101 and 102 and 203 then every student will have perfect critical thinking, I think. It's enough you can understand in one course, but if you start it in a low base in 101 like small, don't give it a lot of time but to put the students in his …Then in 102 expand and 203 you can expand as much as you want.

I: Yeah so it's reinforced in all stages.

Student 16: Yes it's reinforced and like I said practice makes perfect so every student will be. Here of course there are one or two students in our class that didn't get it as much as we did I think but if they started from 101 and continued to 203 it will be perfect. Everyone will be the same. Everyone will have perfect, good critical thinking.

I: OK? Do you think, OK, I'll get back to this in a minute. Ok anybody else would say something on this? Yes Student 13?

Student 13: Maybe it should be integrated in the courses but for me I like the critical thinking so I don't care if I take it in a separate course.

I: So you would like, you don't mind taking it but do you think it should also be integrated in all courses at all levels? Student 5?

Student 5: I think if it's just like a course by itself maybe like some of the students might get bored of it because it's the same thing every time but if it were like other courses you can give them the material indirectly without them even like noticing and then after you can just tell them like

I: OK. Yeah. Good point. Someone else? Yes Student 11?

Student 11: I think that it should be integrated.

I: It should be integrated?

Student 11: Yes because if we take it as a course we won't see the application so now we took it in an English course and we used it as Student 5 said before in the research paper, in the stuff, stuff related not to this activity, to others. So we related everything, and we didn't feel that we're doing something, we thought this is the course.

I: Ok. Anyone else on this? Do you think that it's something that you could learn? As I understand you said that you have never seen this before and you were able to learn I guess? Do you think that this is something that can be learned and learned really well like mastered OK if it's reinforced at all levels because this is what Student 16 meant, if you integrate it at all levels the student will be able to master these critical thinking skills. What do you think of this? Student 13? You have something to say?

Student 13: Yes it can be mastered if it is in all levels.

I: OK.

Student 13: And it should be.

I: It should be. OK. Someone else might say something here?

Student 16: It's important for everyday life so if it's a course I urge people to go and take it. If it's integrated in 101, 102, and 203 it's better for everyone, so whatever is taught …

I: Because everybody will pass through those courses so everybody will basically take the material?

Student 16: If it's by itself if it's not elective yes everyone is gonna take but not everyone is gonna like it.

I: So are you saying Student 16 that this is important in your everyday life?

Student 16: Yes of course critical thinking.

I: And who is responsible for teaching you this? The university you think is responsible?

Student 16: I don't know actually because no one taught me before this class. I didn't know.

Student 13: I think the school should be responsible.

I: The school should be responsible for teaching you this?

Student 16: The school it's still a small level. It's higher level, it's college level.

I: Yeah

Student 16: School, enough for school. I think it should be integrated in 101, 102, and 203 because in 101 I didn't find important that much. Only reading and speaking. Reading and speaking should be done in school, not in 101. Critical thinking should be integrated, not on a higher scale, on a lower scale, and as you go up you higher the level.

Student 11: If you practice it more, you get more results.

I: More results, better results.

Student 16: Three courses is not enough.

I: Yeah. Anyone else would like to say something?

Student 11: Yes I found it it's beneficial for the course and for the students, for the two. Students will think in good way, in a better way, and the course will be more active, it won't be boring. Usually English is a course that no one likes, so when we add to it activities that are, it makes students think and enjoy and participate, it makes it more interesting, and mainly it's these stuff that will stay in our mind after the course more than the course.

I: Yeah. OK for participating.

Group interview - Class 3

Date : May 26, 2015 - Duration: 12 minutes 55 seconds

Interviewer – Student 41- Student 45 – Student 46 – Student 49 – Student 51 – Student 48 – Student 50 – Student 39

The interview was done after class.

I: First of all I would like to thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking activities that you did this semester. Your responses will be kept anonymous and will not affect your English 102 grade in any way. OK? Yeah so relax.

Now what do you think of the critical thinking lessons that you have received this term in terms of content, of the material itself, if you were to evaluate? How do you think, ,OK, the material was?

Student 48: It improved our knowledge.

I: OK. Can you please support, explain? This is Student 48. Yes Student 48?

Student 48: It improved our knowledge and ….. [pause]. It improved my language skills.

I: OK?

Student 48: and it was more than enough for us.

I: OK?

Student 39: It was beneficial.

I: Student 39? Yes. It was beneficial.

Student 39: We learned a lot and we had different kinds of information. It improved our writing skills, oral skills.

I: OK. Anyone else? Who wants to add to this? Student 46? Do you have any bright ideas here?

Student 46: I agree with Student 39.

I: Yeah?

Student 46: ehhhh the information were new

I: Yeah?

Student 46: ehhhh it was fresh and really important to discuss because we don't see it every day.

I: OK. Yeah. OK. How do you think, OK, of the material in terms of the number of handouts, of the amount? Was it too much?

Student ?: Too much.

I: Too little?

Student 46: It was sufficient enough.

I: Sufficient enough? That was?

[Somebody interrupts to tell that we had to move to another room]

[I: We're going to move to the Lounge quickly. Do you know where that is?]

I: Can you please come closer? So I was basically asking you about the number of activities and I think Student 46 was saying something? What do you think basically about the amount of material you got?

Student 46: It was sufficient enough to understand the topic, or the main point.

I: Yeah. Anyone else wants to add to this? OK. Do you think that the material has helped you? The first question is whether it helped you or it did not help.

Student 39: Yes it did.

I: Was it helpful to you in any way?

Student 39: In several ways.

I: In several ways? Would you like, so this is Student 39, would you like to tell us how it has helped you?

Student 39: ehhh …..

I: Maybe now, maybe in the future it might help you I don't know.

Student 39: It was … They were full of rich information and as I said before it helped me in my oral skills when we communicate during the class hours and that's it.

I: Anybody would like to, Student 46, do you have any ideas how it has helped you if you feel it has helped you? Maybe you're saying it didn't help me, you might say.

Student 46: It helped us to know to write in different types of essays ehhhh …

I: OK. Rememebr wait wait wait remember I'm evaluating the material you took related to critical thinking skills the handouts OK?

Student 46: Yes.

I: So it's not basically the course. It's not the whole course.

Student 46: Yes it helped us to know how to think when we are reading any article

I: OK.

Student 46: and like Student 39 said it helped us through several presentation to know how to make our way to to to find the solution to any problem

I: OK? You can refer to specific activities if you want. You might refer to very specific activities that you did if you want to support your opinion. So anybody would like to add to this? [Pause] Like can it help you in the future for example? Maybe you cannot really feel the benefit now maybe in the future would it be of any benefit to you in any way?

[Pause - Silence]

I: No comments! OK. Have you used such handouts, OK, something similar to this before?

Student 39: [interrupting] No.

I: or it was completely new to you or have you seen this before?

Student 39: No it was new.

I: It's the first time you see something like this?

Student 39: Yes yes.

I: Student 46?

Student 46: Yes. Can we open the window?

I: Yes please you can open the window.

Student 45: Maybe we saw something similar in school but this time it was more developed.

I: OK. Your name please again?

Student 45: Student 45.

I: So you're saying you've seen maybe something similar?

Student 45: in school but this time it's more developed and we worded more on it.

I: OK. So it was like more concentrated focused. OK. Yeah. Anyone else?

[Pause – Silence]

I: OK. Now how satisfied, in general how satisfied are you with the material?

Student ?: In what way?

I: Ehhh was it satisfactory, the material was satisfactory? You feel like it was boring? I don't know? I mean your opinion on that? What's your opinion on the material?

Student 45: Satisfactory.

I: OK?

Student 45: I was interesting but too much work.

I: Too much work. Where? The work was in class or outside the classroom?

Student 46: Both.

Student 45: Outside the classroom.

I: Outside the classroom? Like what did you have to do outside the classroom?

Student 45: We had to prepare before we come.

I: OK? Any other ideas? O. How do you think that the material can be improved?

[Pause – Silence]

I: If you feel it needs improvement, OK, how would you improve the material? What suggestions would you give me to improve the material?

[Pause – Silence]

Student 39: Not to have a lot of

I: Yes Student 39?

Student 39: howework to do and tasks ehhh. That's the most thing that bothers me

I: Eh?

Student 39: Just that. Only the high number of assignments given to us

I: Eh?

Student 39: That's it.

I: That's it.

Student ?: I will add that the the the number of paragraphs that we have to write every sessions have to be limited.

I: OK?

Student ?: Not four paragraphs every session, every day, we have four paragraphs to write in 30 minutes essay.

I: OK? OK. Now do you think the teacher's teaching style matter in the delivery of the material?

Student ?: Of course.

I: OK? and what would you say about, basically, how the teacher helped you understand the material? Did the teacher play a role in helping you understand the material?

[Pause – Silence]

I: How would you evaluate the teacher's teaching style?

Student 39: She was helpful.

I: Yes Student 39. Student 45?

Student 45: The class wasn't boring.

I: OK. The class was not boring because the teacher was very enthusiastic? OK?

Student 39: Full of energy.

I: Yeah. So you enjoyed having somebody, OK, active in class?

Student 39: She listens to our questions and she tries to answer us in a specific and simple way.

I: OK yes Student 39?

Student 39: She always take our opinion into consideration.

I: OK so you were given the chance to speak in class, to give your opinions?

Student ?: Yes.

I: Anyone else would like to add?

[Pause – Silence]

I: Now do think that the teaching of critical thinking should be taught explicitly as a separate thinking at every level you take, in every course you take? Or should there be one course a separate course for critical thinking?

Student 46: No it should be integrated in different courses.

Student 45: Yes.

Student 46: and increasing the part of teaching this in this course not giving it all for one course dividing it into parts to be better in it, to become

I: Why? Would that become easier for you? It would be easier for you?

Student 46: It would be more easy.

I: Why is that?

Student 46: Because we have to deal with a small part of critical thinking and not all of it

Student 45: In general.

I: Yes Student 46. Anyone else on this? How would you like to be taught critical thinking skills? Like you feel it should be integrated or taught separately?

Student 45: Integrated.

I: Integrated?

Student ?: I agree.

I: You agree?

Student ?: Yes.

I: OK. Do you think that what you've learned this semester, OK, when I say this semester it's the handouts we gave you the critical thinking handouts, do you think this will help you in any way in the future?

Student 39: In other majors.

Yeah. Like what? Can you please elaborate Student 39 on this?

Student 39: Ok ehhhh. If other doctors gave us handouts we would be more ehh capable of understanding the articles given to us, ehhh, and …. this would help us a lot.

I: OK.

Student 45: We'll be more comfortable.

I: Yes Student 45?

Student 45: We'll be more comfortable because we saw something similar already.

I: OK so it will be grasped

Student 45: Easily.

I: Easily. Yeah. Anyone else on this?

[Pause – Silence]

I: That's it? OK. Thank you for taking part in this.

Student 45: Thank you.

Group interview - Class 6

Date : May 21, 2015 - Duration: 16 minutes 3 seconds

Interviewer – Student 95 – Student 102 – Student 98 – Student 96 – Student 100 – Student 99 – Student 106

The interview was done towards the end of the session. The researcher dismissed the other students 10 mins earlier and the interview went on a bit after class time.

I: OK now. First of all I would like to thank you for participating in this group interview. The aim of this interview is to hear your opinions on the lessons that we did this semester concerning critical thinking skills. Your responses will be kept anonymous and this will not

affect your grades in this semester, Ok, and I would just like you to answer honestly, OK, concerning the questions I'm going to ask.

Now my first question is: What do you think of the critical thinking lessons that you have received this term in terms of content, in terms of material, like the material itself? How do you feel about it?

Student 96: There were some topics that were so interesting.

I: Ok?

Student 96: We liked sharing in class. We liked such topics like ummmm….

I: Can you specify? Like do you remember certain things you did?

Student 96: For example there was the one about women and the way they drive. It was so interesting. It's like what are living. We liked the topic

I: OK? You can always add to what she is saying or ….

Student 98: Each topic is taking too much time to end.

I: What do you mean by this? Can you explain more?

Student 98: We have been working on that paper for 2 months.

I: I'm talking about the critical thinking lessons. If you remember there were certain activities that I gave you, we did, OK, in class and they were about 11, if you remember that well?

Student ?: Some questions were hard.

Student ?: It was a little bit hard.

I: It was a little bit hard, OK?

Student 100: They taught us not to believe everything we read and they improved our logical skills as examples I guess they were good logic.

I: OK? Can you specify something?

Student 100: When we talked about KFC, KFC and the chicken problem.

I: Exactly.Yeah?

Student 100: Yeah we didn't, like if a normal reader would read this article he can believe directly what he reads but after logical practice we should realize that we should look for the sources and then the goal, the purpose of the article. Logically they were good.

I: Ok. Anyone would like to add anything to this question? Ok. What do you think of the critical thinking lessons that you have received this term in terms of the amount of material?

Like all in all there were eleven handouts that you got. Do you think that that was too much, or do you think that….

Student 95: We did not finish on time.

I: It was too much? What do you mean by we didn't finish on time Student 95?

Student 95: We didn't finish the questions on time.

I: Which questions?

Student 95: The questions.

I: I'm talking about the material in class.

Student 95: Ah OK.

I: I'm talking about the material in class. OK. If you remember I used to give you a handout every now and then and we would work on this handout right? OK now I'm talking about this kind of material. Do you think this was too much, OK, for the semester or was it like …?

Students: It was enough. It was good.

I: OK? This is the material I'm talking about. Forget about the test for the time being. OK do you think the material, this material has helped you or not?

Students ?: Yes.

Student ? : Sure.

Student ?: Yes.

Student ?: Of course

I: You can give your honest opinions guys, OK? Now if it has helped you, how did it help you?

Student 98: We know now what to believe when we read an article.

I: Yes Student 98? Can you explain more?

Student 98: We know if the source is reliable or not.

I: OK? Yeah go on.

Student 98: If the arguments are strong enough, logical.

I: What about the others? What do you feel about ….

Student 106: It helped us to understand more the essay, the articles we're reading. It helped us to analyse more what's the problem, what's the topic, what's the argument.

I: OK? Any other one? Yes Student 102? Do you have something to say?

Student 102: Ahhh ahhh in some ways but I think it took too much time. We got tired of the articles, working on the same articles, working on the same idea the whole semsester.

I: What was the idea that you were working on?

Student 102: On the articles, on the sources.

I: Yeah I'm not talking about this. I'm talking about the critical thinking lessons I gave you. You remember what we did throughout the semester. You remember there were certain handouts that were numbered, Activity 1, Activity 2, if you remember this very well. OK I'm talking about this. I'm trying basically to get your opinions on that.

Student 106: It teach us how to argue in a group.

I: Yes Student 106.

Student 106: When we talk about this topic. Me and my friends …. We are discussing what's the main purpose of this article, what's the conclusion, what's the argument, is it strong or not.

I: OK.

Student 100: We give our opinions. Everyone had his own opinion and then we discussed every opinion some ….

Student 106: We started debating

I: Yeah that's good Student 100.

Student 100: Some people were convinced, others no.

I: OK fine. Now umm have you ever used something similar to this before, this kind of material, remember we talked about logical fallacies at the beginning of the semester. I'm trying to remind you of the material. We did something related to correlation versus causation. We talked about assumptions. We did assumptions. OK have you ever had something similar to this before or was the material new to you? Yes Student 100? Would you like to comment on this?

Student 100: I got something similar to that, the correlation and causation stuff.

I: Yeah?

Student 100: We always say that there is a correlation but not a cause-effect relationship.

I: OK?

Student 100: So now it wasn't new but it helped me improve the …

I: So it was a sort of reinforcement of something that was already there? OK yeah for the others?

Student 96: It was new.

I: It was new? Everything was kind of new to you.

Student 96: Yes. The examples given in class were from real life. They helped us understand more.

I: Yes Student 96?

Student 96: And to improve our critical thinking. We knew how to think about it.

I: OK. Yes?

Student 106: We're thinking more deeply about problems. We're not superficial anymore.

I: Ohhh. Very good Student 106. OK yeah now. In what context have you seen this material before, for Student 100 for example. You've seen, you said that you have seen this material before. Where? In what context?

Student 100: Statistics.

I: OK. So you took a course in statistics and?

Student 100: Biostatistics.

I: Biostatistics?

I: Yeah. OK fine so this is why it was not new to you but maybe for the others it was new. Now how satisfied, generally, how satisfied, were you with the lessons?

Student 106: We are ummm, we are now ummm

I: Yes Student 106?

Student 98: In our every day is, we are not satisfied.

I: What do you mean by this Student 98?

Student 98: It's a lot in our every day, English.

I: I didn't really understand.

Student 98: Every day, we have one hour of English.

I: Yeah this is something else. I'm not evaluating this. I'm evaluating the lessons. OK the lessons themselves. How satisfied are you with them in general?

Student 106: It teach new things.

I: OK?

Student 106: Our culture.

I: General knowledge? They taught like general knowledge, some kind of general knowledge, Student 106? OK.

Student 106: Yeah.

Student 100: Miss can I talk about the test we took in the English lab.

I: Yes so you want to, OK, Student 100 wants to talk a little bit about the test in the English lab, in the computer lab.

Student 100: I guess it evaluates our logical capabilities but like it's a bit too long and I guess it can minimized so we can focus more.

Student 106: You can put some grades on it so students can take it seriously.

I: OK fine. Now.

Student 100: It should be minimized.

I: OK now do you think that the lessons could have been improved? How do you think the lessons could have been improved?

Student 100: Provide us with, with texts more reliable. Like we always had texts that where the sources weren't like reliable or where there was a logical problem and stuff like that.

I: OK very good Student 100. Yeah?

Student 100: We didn't have too many texts with good examples.

I: So you needed something that would provide you with a good argument, so it was always like something weak that you had to fix but you never had anything like an example of a strong argument? This is very good, excellent Student 100. A very good idea. Any other one, any other way to improve the material?

Student ?: Ummmm

I: Yeah?

Student 100: Improve the tests.

I: Yeah. I'm not really looking at the tests now. I'm just looking at the material more. No ideas?

OK. Now do you think that the teacher's pedagogic skills, the teaching style of the teacher, matter in the way the lessons were delivered?

Student 96: Yes.

Student 100: Of course.

I: OK? Yeah? How important is the teacher in order to give these lessons?

Student 106: If the teacher was energetic and he's teaching with [enthusiasm in Arabic]

I: Yes enthusiasm Student 106.

Student 106: Yes. Students will be more enthusiastic.

I: OK about the material. OK?

Student 106: They will focus more.

I: Any other ideas?

Student 96: He teaches students to know how to think, how to analyse the text, how to know. He was the main reason why students will understand …

I: Yes Student 96?

Student 96: the text and how they were supposed to think.

I: Good point. Any any other comments on this? Any other comments on this? OK my last question is: Do you think that the teaching of critical thinking skills should be taught explicitly, as a separate course by itself, or do you think it should be integrated in all lessons as a generic skill in higher education? When we say higher education, it's university. So should it be, OK, I rephrase my question. Should it be taught in a separate course, this is a course, just it teaches just critical thinking or you think that it should be taught at all levels. Now you move from, maybe you start at the Intensive level, you go up to 101, to 102, to 203, so it should have, OK, a part of the course, in each level?

Student 100: It should be taught at every level and not only in English.

I: OK? Yes Student 100?

Student 100: Not only in English.

I: Can you please explain your point of view on this?

Student 100: Yeah we should know how think. It's not about memorizing stuff and believing everything we hear. We should be careful. We should be careful of everything we read and everything that we see, so it should be integrated with every course we take.

I: Not only the English courses? OK a very good point.

Student 106: This will improve us when we are writing the essay. It will give us more ideas. We will be more able to analyse what we are reading and to write it in our own way.

I: So Student 106 you're saying that it will help you write better and read better?

Student 106: Of course.

I: Ok fine. So it's not an important skill that should be integrated in all English courses. OK fine.

Student 106: It complete the writing skills.

I: OK yeah it complements the writing skills. OK. Yes Student 95?

Student 95: It teaches us how to read critically and understand, to skim.

I: To skim yeah. Yeah this is Student 102. Can you please explain?

Student 102: It teaches us how to relate between two different ideas, how to link between them. Like the test we did on the computer.

I: So it's how to link things together. OK. To see things from different perspectives?

Student 102: Yes. And it shows how we logically think

I: OK yeah. Anything else you would like to add? Nothing. That's it. Thank you for participating in this.

Group interview - Class 7

Date : May 26, 2015 - Duration: 31 minutes 57 seconds

Interviewer – Student 117 – Student 115 – Student 116 – Student 114 – Student 120 – Student 112 – Student 113

The interview was done towards the end of the session. The researcher dismissed the other students 10 mins earlier and the interview went on a bit after class time.

I: OK thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Your responses will be kept anonymous and will not affect your 102 grade in any way. Fine?

Now what do you think of the critical thinking lessons that you have received this term in terms of content, in terms of the material itself, what's in it? Yes Student 117 would you like to start?

Student 117: We thought we learned how to think, how to think about the cause and effect, how to put the reasons, how to organize our ideas, information.

I: OK?

Student 117: To make a good paper or good research, or organize information properly

I: OK.

Student 114: To learn how to do things from different points, not from the same point.

Student 115: To think logically.

I: Yes Student 115? You were saying something? You want to add to Student 114? Yes?

Student 115: To think in a logical way.

I: OK?

Student 116: [mumbling]

I: Yes this is Student 116?

Student 116: I think we learned new vocabulary about how to think and what's right and what's wrong about a idea, about correlation and causation ehhhhh…..

[Pause]

I: I didn't get your point. Can you repeat please? Student 116, can you repeat? I didn't really understand.

Student 116: At the same time we learned two things ehhhhh ehhhhh. The … ehhhhhh. While we learned how ehhhhh to do a ehhhhh documented essay, we learned other thing in a good way ehhh ehhh to ehhh that facilitate to do what's what's ehhhh ehhhh we're responsible for.

[Student 116 had difficulty using the English language fluently to express his ideas]

I: OK? Yeah.

Student 113: Yes we also …

I: Yes this is Student 113.

Student 113: We also learned that if you want to do a study, we have to focus on several angles, not just like one angle, so we must study about different factors to have efficient results and …. [pause]

I: OK.

Student 120: When someone…

I: Yeah this is Student 120.

Student 120: When someone, when we see a thing on TV or something we should make sure that what they say is the truth and they don't play on hidden factors on our emotions to just said. We should take into consideration the way they are showing everything. We don't believe just what they say.

I: OK. Student 112?

Student 112: I learned that there are always alternatives and I should be careful and not to take care of, to see hidden factors, and as Student 120 said also I learned that I should look at the date, the title, the writer of the article to know how to choose the information that are good and reliable for our article or my research paper. Ummm. It was effective way of learning and we liked and enjoyed learning.

I: OK.

Student 120: Yes and …

I: Student 120?

Student 120: The video was very helpful when we saw what the woman that thought about stereotype, how people see, take an idea for knowing the truth and they just keep on thinking about that when they see people and it's sometimes wrong, not sometimes, it's usually wrong because when you take one sample and just apply what you see on a type of relation it's definitely wrong. You can't do that.

I: OK. Yes Student 114?

Student 114: We shouldn't believe any study. We should review it and see it many times and see if the sources in it are reliable.

I: Yes Student 117?

Student 117: Also we learned how to understand, how to understand an issue, experience or information, how to see the relation between the result and the cause, what is the problem, what is the reasons, what are the cause of the problem, that's all materials we learned to know how to us make a good research paper or more, many research papers.

I: Yes Student 115?

Student 115: About the advertisement, numbers, so we should concentrate more about the numbers, the difference like 80% and 100% we shouldn't believe like sometimes it's false research there is a difference, there's a big between percentages in advertisements like 90% of womens tried this but actually they are 9 who tried this it's not 90%.

I: OK. Oh! OK very good excellent.

Student 112: Yes also about the test that we did in the computer lab, the first time we took the test I felt that it was so difficult and I didn't know what to choose if this man is thinking in your own manner or if he is using only two alternatives so we chose randomly we didn't know the correct answer. After those activities and studies ehhh the post-test was easier and we learned, I felt that we knew the answer. It was so easy ehhh …

Student 117: [Interrupting Student 112] We are confident that our choice is the correct one because what we have learned lead us to the correct answer and the best choice of the choices.

Student 113: [mumbling]

I: Yes Student 113?

Student 113: The activities we did helped like think logically so it was easier to answer the questions.

I: On the test you're talking, in the lab?

Student 113: Yes.

Student 120: Yes and …

I: Student 120?

Student 120: We learned a very important lesson for our life that not every two things that happen at the same time can be related and might have, one causes the other, they might happen in two different, for two different reasons that are not related in any way.

I: Ok very good. Anyone else wants to evaluate the content of the material, the material itself?

Student 117: It teach us ….

I: Yes Student 117?

Student 117: We learned how to do a research paper and how to prove the falseness of what others believe.

I: Yeah?

Student 117: How to make a rebuttal of their arguments and how to refute them in a argumentative way.

I: OK. Yeah. Now what do you think of the critical thinking lessons that you have received this term in terms of the amount of material? Was it too much? Was the material, like too many lessons on critical thinking that …?

Student 117: [interrupting R] They were soft and smooth. We was evaluating them in the class as a debatable topic and we discussed the wrong information and the good information and put many choices to choose the correct information.

I: OK.

Student 117: To evaluate the information.

I: Yeah.

Student 120: The amount of material we had was not ehhh ehhh too much but it was enough on the right way to think logically and know how to think or ehhh

I: Thank you Student 120. Who would like to add?

Student 117: The materials, amount of the materials were a good basis for the next level of English, English classes or our English language, so it was important to learn this much of materials because it helps us in the future, in English classes or in our lives, how to write, how to convince properly, how to put the information and organize them properly.

I: OK Student 117. And yes Student 112?

Student 112: The material was so beneficial. Although it was repeated in studies about hidden factors, but we as students we need this amount of articles in order to learn because we need to repeat and repeat in order to get the idea so it will be like a reflex for us.

I: OK. Anyone else wants to ….

Student 116: [interrupting R] I think it was simple but we must do some effort to do the material. It's not too hard. The subject we've got is all about the writing, and how to write a documented essay and essay, how to paraphrasing and summarizing.

I: I'm not talking about these. I'm talking about the handouts I gave you. Evaluate the handouts not the course. OK?

Student 116: The handouts are simple.

I: They are simple, OK? What's your point Student 116? I didn't really get it.

Student 116: They gave us simple information how to do the work.

I: OK.

Student 120: Yeah and lots of the examples are very easy to understand and they are about everyday life so we could easily imagine what the situation is and understand the idea.

I: Yes this is Student 120. Now Student 114?

Student 114: They increased the communication between the class. Some people are with some ideas and some people are against so they start like communicating and sharing ideas.

I: OK. Anyone wants to add about the amount of material, the number of lessons?

Student 117: They were good enough to learn and memorise how to think properly and evaluate a text or information that we need to know.

Student 115: It's not too much Miss because we must know, it's important for us to know the correlation and the causation in order to know how to write a research paper if we needed to improve it, so it's not about the amount. We needed to know this kind of information in order to improve our logic …

Student 114 [interrupting Student 115]: Yeah it's about practising

I: OK yeah. Now do you think that the material has helped you?

Student 117: Yes

Student 115: Yes

Student 112: Definitely

I: OK. Now how and why has it helped you if you're saying it has helped you? Yes Student 117?

Student 117: It helps all the students because it teach them, teaches them, how to think properly, how to use the information ehhh in ehhh for ehhh, to put it, as, to convince someone using this information, for example, to read so much article and see the difference between the structure of article teach us how to write an article and ehhh to put the best article that we can, they teach us how to do ehhh the better article, the best article to write to avoid mistakes and illogical thinking and disorganization of information.

I: Yeah OK. Anyone else wants to explain how it has helped him? Student 120?

Student120: The course, the lessons we took weren't just to improve us in English course, this course just to improve our research paper and to pass this course, it was very helpful for our life even after we leave the classroom because we can now take any situation, analyse it correctly and see it from different angles so we can know the hidden factors, the real cause behind everything that happened and know that everything happen for a reason and just search for the reason, so we don't just believe everything that we are told.

I: OK. Yes Student 114?

Student 114: How to believe anything we see and we should see it many times and different points of view to believe it not what is given to us is right.

I: Yes. Who would like to explain how it has helped him? Anything else? Yes Student 117?

Student 117: Also as a final result on a research or a problem or anything a result should be studied in many ways to see the hidden factors to see the alternatives to see how the result or the final result came because of the causes or the problem of a …. For example, studying a debatable topic, the final result cannot be true or false after we learning this materials we can assume if the emmm the final result is a correct because the study is done in a good way or it's done emmm emmm in a fault way, the thinking of the study is good or no.

I: Yeah. OK. Anyone else wants to comment on this? No. OK. Have you used or have you seen something similar to this, similar lessons to these before previously?

Student 112: No I haven't.

Student 117: No.

I: Yes Student 112?

Student 112: No I haven't.

I: Never in your school, in previous courses, in another course you're taking in parallel to this course?

Student 112: It was something new.

I: So it was completely new to you?

Student ?: Yes.

Student ?: Yes.

Student 112: But we can use it now in other courses. We know how to use it in other courses.

Student 115: We know how to choose the reliable sources. Before we didn't know all the sources to …

Student 117 [interrupting Student 115]: that should be reliable.

Student 115: Yes.

Student 112: Before in every ….

I: [interrupting] Yes Student 112?

Student 112: Because in every course we have presentations and we should choose articles and search for information so now we know how to choose the reliable information for our presentations.

I: OK. Yes Student 113?

Student 113: We used to choose like articles randomly.

Student 120: Yes we used Wikipedia.

Student 113: Now we know how to deal with things.

I: OK. Anyone else? No. OK. How, in general, how satisfied are you with the material? Now after you finished, OK, the whole thing, how satisfied are you?

Student 117: Satisfied, we are very satisfied because we know now how to write a good research paper an important research paper with strong arguments, with good resources full of supporters, and how to prove the falseness of an argument or the weakness, and the weakness of this argument.

I: OK.

Student 117: Also how to write in the best way an article, the format of an article, how to take care of the language, how to use the words or the information in a good purpose.

I: OK.

Student 114: At the beginning…

I: Yes Student 114?

Student 114: … it wasn't satisfied. I felt it was something just to pass the time, but after many times I felt it was helping me a lot, in other courses.

I: In other courses you were taking? Can you give me something specifically or you cannot remember?

Student 112: Yes I can remember.

I: Yes Student 112?

Student 112: The first semester when I entered the university I didn't take good grade on my presentation, it was in nursing because I didn't know how to write the references and also about to choose the sources, so my doctor was not satisfied but now I know how to choose my sources and what to write in the presentation.

I: OK. Anyone else on this? No? OK. How do you think the material can be improved?

Student 117: For example…

I: Yes Student 117?

Student 117: in our future we are attending other levels of English, higher levels of English it can benefits us because we have, already have informations how to convince…

I: No my questions is how can you improve the material? How can you improve the material? Let's say you can, you are given the opportunity to improve the material I've given you. How would you improve it?

Student ?: By including videos.

I: By including more videos you mean?

Student ?: Yes.

Student ?: Yes.

I: Does this help you in your critical thinking? Can it help?

Student 117: Miss I didn't understand.

I: Ok. The material, the lessons on critical thinking, if you were to improve the material, how would you improve it? So you're saying … one second Student 112. So this is Student 115, she's saying by including more videos because?

Student 112: More stories because students can understand.

I: OK It sticks more.

Student112: Yes it sticks more because videos and .. we can use this imagination to remember what is meant.

Student 120: Can I add to what Student 112 says?

I: Yes.

Student 120: The video we saw about the woman who spoke about stereotype, it influenced our way of thinking, she said a lot of facts, and lots of really good things. We didn't, I have never thought about it that way.

I: How else would you improve the material? If you were to improve the material, so Student 115 is saying like I can add more videos. Now what else can I do to improve the material? What advice would you give me to improve the material? Yes Student 117:

Student 117: Give more simple examples in real life or something to people who cannot directly understand the materials and also use new methods to…, use new methods to make it, to figure the material. For example, use technology on the laptops, or images, or music, or YouTube you can find a lot of material that can be related to this materials.

I: To critical thinking?

Student 117: Yes.

I: Fine, so it's just like what Student 115 is saying in a way like more of maybe pictures.

Student 117: A student will understand more when he see.

I: When he sees. OK. Anyone else on this? OK. Yes? No one? Do you think the teacher's teaching style matter in the delivery of the lesson, is important in the delivery?

Student ?: Yes.

Student ?: Yes.

I: Ok. How do you think like my teaching style helped you? Did it help or it didn't help? Was it a barrier? For example Student 117 was saying…

Student 117: [interrupting] No

I: About being very strict, so? How did my teaching style affect the delivery of the material? Yes Student 120?

Student 120: While we are in class, it's totally different, you just let us talk and you only correct the mistakes we say about the ideas that is given you are never strict during class about just everyone is quiet and you give us the freedom

Student 113: [interrupting] to express.

Student 120: to express and then you only correct what's the mistake and then you give us the main idea. It's always comfortable to be in class and we have fun while studying and …

I: OK. Yes Student 117?

Student 117: Miss I didn't mean you are strict in materials. I meant you are strict in time, in deadlines.

I: Yeah. Yes who wants to start? Student 117? Student 116?

Student 116: Strict very strict ehhhh all sections instead of you sit in your chair you sit with us and let us share many ideas, many real life ideas and all times we have fun.

I: So you had fun while learning? Ok.

Student 117: Miss it was easy to, attending the English class, it was something good and comfortable because we are relaxed we can talk express and we can said whatever we want in the material. We can give our own example, we have to opportunity to say what we want, and we can debate, we can discuss, we can exchange information and ehhh we are sharing informations. Also, you, the teacher and the student are the same. They speak in the same way. We can give our opinion, we are comfortable to say whatever we want about the topic or about the material or the article in the materials.

I: Yes? Who's first? Student 114?

Student 114: You didn't give us the lesson and tell us it's like you're business to understand. You repeat many times, you tell us if you need help I'm ready.

I: OK? Yes Student 112?

Student 112: What I like about your style is that you always relate things together and help us to remember things that we took in lectures before, so I think that this is a good way of learning to relate things in order to remember them well.

I: OK. So to remind you of previous lessons you've taken. OK. Anyone else? Student 120, you wanted to say something.

Student 120: Yes at the beginning of the year while we were debating, the topics we were debating were very interesting, so we really enjoyed our while we are debating and I speak about myself I wasn't very good at speaking English but I think I have improved a lot since the beginning of the year. I can express better.

Student 113: Yeah I agree with

I: Yes Student 113?

Student 113: For example I used to like, I used to hate doing presentations but now I feel more comfortable.

I: OK.

Student 117: I feel more confident when I do a presentation and you let the students ask me and discuss about my topic or their opinion about the presentations topic or the presentations subject.We feel confident when we talk and when we answer in a good way to the student and convince them that my opinion is the right way.

I: OK. Yes Student 112?

Student 112: Also I would like to add something. At the beginning of the semester we used to memorise and when we used to speak we speak like a robot but now we do not memorise a lot. We just read understand and tell we express in our own words. For example for this presentation I read my research paper only two times and I felt that I can express in my own words, but in the beginning I used to memorise a lot of papers in order to express.

I: So was it like talking in class helped you improve your speaking skills because we're always discussing things in class? Is that what you mean?

Student 112: Yes.

Student 117: Yes. Discussion of topics and subjects in the class helped us …

I: Your English language skills.

Student 120: Especially you insist on someone talking even when he stops because he don't know the words that he will use, you insist that he keeps on talking.

Student 114: For example, for the last two oral presentations I didn't like memorise anything. I just like improvise and spoke based on the things I read.

I: OK. Yeah. Yes Student 117?

Student 117: Also when you have us information about a topic we can directly do a presentation without having, without preparing words or phrases to say.

I: Yeah.

Student 117: We can do a presentation about any topic we have a little bit of information about.

I: OK. Now do you think that critical thinking should be taught explicitly as a separate course or should it be integrated at all levels?

Student 114: It should be integrated at all levels.

I: Yes Student 114?

Student 114: It should be integrated at all levels.

I: Why is that?

Student 114: Because you can't teach someone critical thinking in a course, critical thinking, it's boring

I: Yeah?

Student 114: when it's integrated in a course it's more interesting and easy to understand.

Student 113: Yes exactly if you

I: Yes Student 113?

Student 113: if you take a separate class for critical thinking, it might be like boring and it's like it's more interesting to do it in other class and you learn more.

I: OK. Anyone else on this?

Student 117: Thinking, critical thinking should be learned in all courses. Every material should have many ways to think about it and to have the skills to see all it angles and to see all the results as same as we learned in this course.

I: OK. Anyone else on that? Whether it should be taught separately or part of a course.

Student 120: Part of a course.

I: OK. How do you think the material, you mentioned maybe how it has helped you, do you think it can help you in a way in the future?

Student 113: Yes.

Student 117: Yes.

I: The course is over now, nearly over. Now do you think the material that you've learned this semester, the critical thinking material might help you in any way in the future? Yes Student 117?

Student 117: Yes I already said in the future in our major courses, or in the English course, or in the English language we we we we've been taught how to think about a topic how to see the result, how to deal with the problem, how to see the cause, how to see the relation between two ideas, it's not ehhh for the English language, it can be used for many courses and many materials also English.

I: Yes Student 115?

Student 115: To avoid plagiarism.

I: How is that? Why? How did this give you this message? How did the material, how did the lessons in critical thinking, OK, teach you not to plagiarize and cheat? I didn't understand.

Student 115: It's just like ehhh.

I: Yeah this is interesting but I don't see the link.

Student 115: For example, if I, yeah try to not cheat on something, it doesn't mean that all the people cheats or depends on plagiarism in order to be a super person that means that you must cheat also and …

I: Like not to follow the crowd you mean?

Student 115: Yeah not to follow the crowd.

I: Yeah you shouldn't follow what people do like … Remember we talked about once this logical fallacy OK it's because people are doing it I should do it. Is that what you mean?

Student 115: In defence of cheating.

I: In defence of cheating. This is the text.

Student 120: I think what she means is that …

I: Yes Student 120?

Student 120: when we took the text about cheating it was basically about how to think properly and how to see from different angles

The text itself the idea itself that cheating is not good and we should stop it

Student 115: Plagiarism is not the

I: OK. Yeah. Yes Student 112?

Student 112: Also it

Because we were getting good grades so if we want to write we can express in our own words and write good articles

I: OK. Anyone else on this point? How would the material help you in the future? Any ideas on this? No More? OK. Thank you for taking part in this.

Group interview - Class 8

Date : May 21, 2015 - Duration: 17 minutes 17 seconds

Interviewer – Student 131 – Student 135 – Student 133 – Student 139 – Student 130 – Student 134 – Student 129

The interview was done after class.

I: OK first of all I would like to thank you for participating in this group interview, and the aim of this interview is to hear your opinions, OK, on the critical thinking activities that you did this semester. Your responses will be kept anonymous, confidential, they're confidential, and this will not affect your grade, OK, in your course. Fine? And try to give your honest opinions on that, OK?

Now my first question is: What do you think of the critical thinking lessons that you have received this term in terms of content, the material itself? How would you evaluate the material itself, the content of the material, what's in the material?

Student 130: It was challenging

I: Yes please your name?

Student 130: My name is Student 130.

I: Yeah. So this is Student 130. Yes?

Student 130: It was a very challenging ehhh, very challenging handouts and it made us think stronger than ehhh. It made us train our skills, thinking skills.

I: OK. In what way? Can you elaborate more on this?

Student 130: because we have to discuss ideas and see what's right and wrong and how to evaluate things so it improves our writing.

I: OK.

Student 133: My name is Student 133.

I: Yeah.

Student 133: So this Student 133 now. OK?

Student 133: It helped us to think logically and know the right answer especially we did in class in group, thinking in group is better than thinking lonely and we discuss the answers and we choose the better

I: Yes. This is?

Student 134: Student 134.

I: Student 134 yes please.

Student 134: I agree with hem ehhh [laughs]

I: Yes you agree. You want to add something new?

Student 134: No because they said everything.

I: Everything? Does anybody have something else to say on this?

Student 139: Yes I'm Student 139.

I: You're Student 139. OK?

Student 139: Ehhh I agree with them and when we was in group we know how to communicate with each other and share ideas and also we know better the difference between correlation and causation and generalization and about …

I: OK. So are you saying that group work, was it pair work or group work?

Student ?: Pair work.

Student ?: First pair then …

I: The group, the class.

Student ?: Yes.

Student ?: Yes.

I: As one group. So you feel that this helped you by sharing ideas first in pairs then the whole class.

Student ?: To know why the answer is wrong, to know why

I: Yeah.

Student ?: and why it's correct.

I: Yeah that's interesting. OK. Now anybody has anything to say on this first question? No? OK my second is, OK, what do you think of the lessons, of the critical thinking lessons that you have received this term in terms of amount of material? Was it too much for you or was it too little, or was it just right?

Student 135: Can I answer?

I: Yeah

Student 135: I think it was convenient and it was right like it really taught us many things that we should know later on that will help us and yeah it was enough.

I: It was enough?

Student 135: Yeah.

I: OK.

Student 131: My name is Student 131. The material that was given to us enough and it made us learn what we should have learned from these things.

I: OK? This is Student 130?

Student 130: This will build us for later on in English 203 it will help us think more and even if we were pressured that's a benefit for us like students to think more and work more

I: OK. Yeah. Very good. Thank you. Now do you think that the material has helped you, I think you answered part of this.

Students: Yes.

I: OK. Now if you think that the material has helped you, you all think that the material has helped you?

Students: Yes.

I: OK. Now why and how has it helped you? Now you said that, OK, for example, ehhh, you said that it will in a way prepare you for the next course, the next English course, can you see other …. Yes, please?

Student 139: And also interact with

[A new student comes in – He was sent late by his teacher to join his classmates in the interview]

Student 129: I'm Student 129.

I: So this is Student 129. You want to join us?

Student 129: Yes.

[Interviewer explains the aim of the interview to Student 129:

I: This is just your opinion of the critical thinking lessons that you did this semester, OK? The critical thinking lessons you did this semester, remember every now and then you will have a handout, your teacher will give you a handout and I would like your opinions on these handouts, the critical thinking lessons if you remember them well. Now the question here if they have helped you or if they have not helped you? Do you think that the critical thinking lessons have helped you or not? Now he was saying something, now let him finish. This is?

Student 139: Student 139.

I: Student 139, yes please.

Student 139: Yes this material helped us in the society to know how to communicate with other people if they are in a level

I: A higher level.

Student 139: or a less level

I: A lower level?

Student 139: Yeah with respect.

I: So they helped you to respect other people?

Student 139: Yeah to know how to communicate with others.

I: OK? [R looking puzzled at what Student 139 said – Students laughing] Yeah. Ah you had something else to say? You forgot what it was? OK.

Student 135: It helps later on if like for example if I read any article or something it would help me understand more like what's going on in the article and helps me like in 203 to write better in my essay.

I: OK. Yeah.

Student 129: Also it may help me this semester because I'm in a certain level of English and now I'm improving by these lessons.

I: OK. Your name?

Student 129: Student 129. Ok. Yeah. Now anyone else has anything on this point? Anybody would like to add to this point? Like how they helped you because you mentioned that they might help you in 203 maybe, in, you were saying something about your social life and this is when Student 129 came and you got distracted I guess.

Student 139: Yeah I forgot.

I: You forgot what you were going to say? OK. Now. Ehhh. Have you used such material before? Like was the material completely new to you? Or it was not something new to you, you've seen it before, maybe in school, maybe in, I don't know, anything. Yes your name?

Student 131: Student 131. Yes we've seen it but not in the same quantity that we took this.

I: Ah that's interesting. So it wasn't that much, you haven't …

Student 131: It wasn't concentrated, general, general.

I: Concentrated. Excellent.

Student ?: For example it was better than before.

I: Yeah. How?

Student?: Ehhhh

Student 135: It was more experienced yeah like exercises.

Student ? More professional.

Student ?; Yes.

I: OK.

Student ?: And we worked more.

Student 133: The the way it was offered to us it's more professional than before.

I: OK?

Student 133: It's more, they know what they want, they want, they offer the point very

Student ?: specifically.

I: Specifically. So this is Student 133? OK. Anybody else wants to say something on this? OK. Now how satisfied are you with those lessons?

[Pause – Silence]

Student ?: Pretty much.

I: Pretty much.

[A student mumbles – Students laugh]

Student ?: It was because we have read some articles to help us later on and we have

I: Can you remember certain skills after I mentioned them, some of them, I mentioned some, can you remember something in specific that you feel it was really important and it was new to you?

Student ?: Yeah the correlation.

Student ?: Correlation.

I: OK? What did it teach you?

Student ?: ehhhhh

Student ?: [In Arabic – how to get references]

[A student mumbles – Students laugh]

I: Yeah that's important by the way. What you're saying is very important. Student 129 you want to add on this? What's your opinion on this?

Student 129: First I want to say that for me it's somehow new because in my school English wasn't well teached but ehh ehhh I can be familiar with this lesson because of the explanation in class. Also about the correlation and causation yes we have learned how to differ between them because we, when we want to argue, we have to make, for example, some were correlations some were causation we don't have to make overgeneralization'

I: Yeah that's interesting. OK. Yeah this is Student 133?

Student 133: and they help us, like my friend Student 139 say in social life ehhh we ehhh we conclude very, in a better way, we conclude in a speech or something like that we conclude in a very good way.

I: OK. Yeah?

Student 129: Also they help us to convince one and ehhh

I: So this is Student 129, yeah? OK. They teach, they were basically, they helped you to convince and persuade people?

Student 129: Yes.

I: OK. Any other comments?

Student ?: No.

I: Now my last question, no it's my last, it's the one before the last. OK. Or basically there are more. Now can they be improved? How can they be improved? Do you feel that they can be improved in a certain way?

Student ?; Yes more practice.

Student ?; Yes more practice.

I: Like? Can you please Student 133?

Student 133: Every session we must to take from 5 to 7 minutes to do exercise like this.

I: So you felt that there should be more reinforcement, OK, in every maybe session or so.

Student ?: Yes.

I: OK. Fine. You needed follow-up on this?

Student ?: Yeah.

I: Right. OK. Good.

Student 131: It should be included in 101.

I: What's your name please again? This is Student 130. So you feel, OK, you're jumping to my last question. OK. I will come to this in a minute. OK. Good but you've already, like, OK, anticipated what my, OK, next question is. Yeah. Any way to improve the material?

Student ?: To give us five minutes to think about it.

I: OK. So you needed more time, first of all, to think on your own and then like to share ideas, so there wasn't enough time to think. So that wasn't enough. Two minutes would not be enough.

Student 130: No.

I: Yes please.

Student 130: [mumbling] and share ideas because it would be useful to hear other people's opinions so it would help.

I: But you did group work, No?

Students: Yes.

Student 130: Yes but like a debate thing, like five minutes each class.

I: OK?

Student 130: Like about a certain topic, it will help us in our communication skills.

I: And this is? Your name is Student 130.

Student 130: Student 130.

I: Now do you think that the teaching style of the teacher helped in the delivery?

Student ?: Yes.

Student ?: No comment.

[Students laugh]

I: Yeah it's basically, OK, like the teaching style if your teacher did that help in the delivery of the material?

Student 130: Yes it kept us more motivated to work.

Student 135: And sometimes like she writes a word and she tells us like check is it's right like she already knows if it's right but she tells us to check so that we see the meaning, synonyms.

I: Yeah you depend on yourselves right?

Student 135: Yes.

I: OK. Very good. Any other opinions on that? Any other opinion on that?

Student ?: No comments.

I: No comments. OK now do you think that the teaching of critical thinking skills, OK, should be done explicitly, in a separate course that just teaches critical thinking you can take it at university.

Student ?: Like the ELC.

I: No. You have a course which is basically critical thinking only. It only teaches you critical thinking or do you think it should be integrated in every course you take, in all lessons you take. Now this is why I said that you already answered part of my question.

Student 131: It's better that we integrate it.

I: So this is? Your name please again?

Student 131: Student 131.

I: So Student 131 you think it should be integrated in every course, in every lesson. Why do you think so?

Student 131: Because giving time for such exercises is beneficial for us to ehhh for the future.

I: Yeah fine, but here there is the difference between having one separate course or having it integrated in all courses?

Student 131: It could be taken ehhh it could be taken in new courses because it's not heavy material as we saw it's easy to understand.

I: OK. Yeah. Yes this is Student 133.

Student 133: It should be introduced in 102 and 102 and maybe 003 but at the highest level 204 it should not we must already know it from 003 to 101.

I: OK. Yeah. So you think they should be integrated in?

Student 133: The basic courses.

I: Yeah the basic courses, the basic levels, and who else has? Yes Student 129?

Student 129: I think it should be integrated, this material will keep in the mind of students because students have a lot of courses and maybe after one semester or two they forget the material they took.

I: OK. You repeat.

Student 129: Breaking it on a long period of time is more beneficial.

I: OH yeah that's interesting so it's like you are reinforcing the material somehow, you're getting reinforcement on the material.

Student 129: We will get well-prepared.

I: You will get well-prepared for it. OK. Anybody has anything on this? The idea whether to integrate it or just to separate it. No more. Any other comments concerning the material itself?

[Pause – Silence]

I: How did you find the test, by the way?

Student ?: Very long, boring.

I: Difficult or easy?

Student ?: Not difficult but ….

Student 135: It's confusing.

I: It's a bit confusing. OK.

Student ?: The answers look similar.

I: OK. Yeah.

Student ?: It's very long.

I: It's a long test. Yeah.

Student ?: It's logical, very logical.

I: Logical. You took your time I guess, so you're supposed to get a high score. OK. Now thank you for taking part in this. [Student noise] OK. Thank you for taking part in this.

Group interview - Class 9

Date : May 27, 2015 - Duration: 17 minutes 39 seconds

Interviewer – Student 150 - Student 157 - Student 148 – Student 152 – Student 149 – Student 156

The interview was done right after class.

I: OK thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Your responses will be kept anonymous and will not affect your English 102 grade in any way. OK?

My first question to you is: What do you think of the critical thinking lessons that you have received this semester in terms of content? How would you evaluate the material itself?

Student 149: Student 149.

I: Yes Student 149.

Student 149: I would say that they were very useful

I: OK?

Student 149: because like it helped us to build something when reading a text

I: Yeah.

Student 149: it's not like taking arguments. It's more than that. It's understanding the argument, evaluating it if it was good or bad. It could be an idea

I: Yeah.

Student 149: but it could be just a wrong idea. That's all.

I: What do you mean by "It could be an idea but it could be just a wrong idea"? So you were able to?

Student 149: to differentiate between the good and bad, or wrong and right.

I: OK.

Student 149: It could be like very, like we had in one activity could be very stereotypic, there could be no real examples about it, it could be just something really popular between people.

I: OK.

Student 155: Student 155

I: Yes Student 155.

Student 155: It helped us know ehhh like how to think about the articles we read, like if it's a good article, like with the reference, it helped us choose the reference, the good reference from the bad, like it really helps like to know the difference between the good and the bad.

I: In terms of references you're using?

Student 155: In everything like it helps us think, like it gives us logic in reading the articles, not just reading like taking everything we read

I: OK.

Student 155: like there are things that are not right these articles that we have to know

I: OK. Yes Student 148?

Student 148: Each article show show shows us a fallacies

I: Yeah?

Student 148: and if we don't know this fallacies we will not be able to find the good source so I find them useful.

I: OK. Anyone else on this? Yes Student 157?

Student 157: Ehhh it also helps us in real life like if you're reading something you if you didn't know read the previous tasks that we had you would not know if it's right or wrong

I: Yeah

Student 157: if it's reliable or not and it helps you like if something like it's happening like fraud or something you would know if it's right or wrong.

I: OK. Anyone else would like to add? Yes Student 150?

Student 150: Ehhh the articles we had were very interesting since some of them we live them in our actual life so we more interesting to know what really happens in this and how to learn the goal of it and achieve it.

I: OK. Anyone else on this point? OK. Now what do you think of the lessons, the critical thinking lessons that you have received, in terms of amount of material, the number of lessons? [Pause] Was it like too much for you? Too little? Or just right?

Student 155: Student 155

I: Yes Student 155

Student 155: No I think it's the right amount like it's they gave us like good amount of lessons to the point that now we know everything like if we read something now we know like it's not too much it's not like too little. It's good.

I: OK.

Student 148: Student 148. There is a focus on some topic like correlation

I: Yeah

Student 148: and causation. Yeah we do many activities about it but in some topics there is not many activities

I: OK. What were certain topics that were lacking?

Student 148: Ehhh

I: Can you specify or you can't remember?

Student 148: No I don't remember. Only I remember that we do many activities

I: A lot on causation and correlation?

Student 148: causation and correlation and that this number of activities may be divided into

I: Other things?

Student 148: other things.

I: OK. Yeah. This is Student 149 OK?

Student 149: Actually the correlation / causation part was really beneficial because in a lot of cases you can like give any example as I already said and it could be just not related at all to the subject but it somehow has something to do with it. It's not really affecting anything.

I: Can you give me an example of what you mean here?

Student 149: Well it could be students having low grades because of the temperature outside for example.

I: OK.

Student 149: Something I think

I: So you're saying now you can understand the issue of causation correlation better?

Student 149: Yeah yeah.

I: OK so before that you never like I never occurred to you?

Student 149: It was like basic knowledge

I: OK.

Student 149: I kind of knew it but I really didn't understand it the real facts about it.

I: Yeah. OK. Anyone else on this, on the amount? No? OK. Do you think that the material has helped you?

Student 150: Yes of course

I: OK. How did it help you? Yes Student 150?

Student 150: Ehhh first of all I really didn't know that there was anything called a reference list

I: OK.

Student 150: so this really helped me a lot in putting articles in doing some powerpoints etc

I: OK? Focus on the critical thinking material in your evaluation now. So how did the material, the lessons in critical thinking help you?

Student 155: Student 155.

I: Yes?

Student 155: It helped us not in just English. It helped us for future like future presentations and stuff like we now know that like we cannot anything from any article without giving them the ehhh the source you cannot take anything. You have to say that we took that from there.

I: Yeah?

Student 155: so it really helped us maybe for our jobs in the future

I: OK?

Student 155: It's not just for now.

I: OK. To reference anything you take?

Student 155: Yes.

I: OK. Yes.

Student 148: Student 148.

I: Yes?

Student 148: She didn't the topics don't help us only in choosing an article to write about them but they only

[interruption]

Student 148: but they they learn us also how to write our own articles without without making one of this failing or to use correlation instead of causation

I: Yeah.

Student 148: so it's very helpful for to use a reference or to write an article to be a reference.

I: Ok. Anyone else on this? If the material has helped you? Do you any use for this material in your future, the future, maybe your future courses, your future life, your everyday life? The critical thinking lessons you took this semester, is there any use for this in the future?

Student 155: Yes. Of course like now there is the BS project presentation like it's like three years from now but it's like English is preparing us for that, preparing us for like every job opportunity and every maybe like like presentation everything we're gonna do from now on. It helps us a lot.

I: OK.

Student It helps us in our thesis in the BS project. We have to find articles and

I: Relevant. Anyone else on this? No? OK. Now. Have you used such material before? I'm talking again about critical thinking lessons? Have you learned before something similar? Have you used something similar or learned. In school? Yes Student 150?

Student 150: Yes we've seen some of them in school but not in this amount

I: Aha.

Student 150: but we've never worked on reference list, on critical thinking in that way. It was question answer thing

I: OK.

Student 149: Yeah it was just like extracting information from the text, understanding the text but not really going beyond the text as the information itself and how to evaluate it

I: OK.

Student 148: Student 148.

I: Yes?

Student 148: No I didn't take anything like this in school because in school we were taking a text we find a reference this is all but here we know that the reference we can use is not reliable we cannot use it

I: Yes Student 155?

Student 155: I haven't taken anything like this in school. This semester it was the first time I got introduced to this kind of material like in school we just have a text, a reference list from the text, questions and you answer them, that's it so this course introduced us to more than we took before.

I: OK. Anyone else on this? OK. Now in general how satisfied, how satisfied are you with the lessons?

[Pause – Silence]

Student 155: Student 155.

I: Yes?

Student 155: Well like we didn't know at first we didn't know that it'll be too much work to make like it is like it's hard work like to write a text. How satisfied like we're satisfied to the point like we know we now know how to do it.

I: OK. To do what?

Student 155: Like to write a text with references with everything

I: Yeah. I'm talking about the critical thinking lessons. Focus on the critical thinking lessons in your evaluation. I'm not talking about the course. I'm asking you about the critical thinking lessons in particular.

Student ?: The computer test.

I: You just mentioned some of them. You just mentioned some of them. Should I remind you again of the topics?

Student ?: Yeah correlation causation.

I: Yeah this is basically what I'm asking you about. OK? This is basically what I'm asking about. So how much? Are you satisfied with the lessons? Were you satisfied?

Student 155: Yes like they weren't just about ehhh learning, there were some videos, like it's more fun and like and it's fun and we can learn from it. It's not just learning.

Student 149: Student 149. It's not just theoretical. There is a lot of practice and exercises that make the information better understandable.

I: Yeah.

Student 155: Can I add something?

I: Yes please Student 155.

Student 155: They introduced us to, they introduced the things in an intelligent way not just like as I said learning. They were, they gave us a bit of fun and it's intelligent.

I: OK. Yeah. OK. Now do you, would you improve the material? If you were to improve the material how would you improve the material? What would you change in it? What you remove, add, change, make it different? How would you improve the material if you were to improve it? Yes Student 155?

Student 155: I would say not like students don't like more tasks to do like these things we did on the computer

I: That's the test.

Student 155: Yes. Yeah. I'm asking you about the material, in class, the handouts you got.

I: Ah OK. OK how would you modify, change?

Student 150: Student 150.

I: Yes Student 150?

Student 150: I would make it more practical, something more enhanced than on the text, more than reading.

I: OK what would you do? Like what?

[Pause – Silence]

I: You don't know?

Student 150: No.

I: OK. Any

Student 155: As he said like more practical.

I: Student 155. More practical but you don't know how?

Student 155: Like not always like writing the things. Maybe just a bit of

Student ?: Watching

Student ?: Watching videos about it

I: Yes Student 157?

Student 157: watching videos we will understand it more

I: OK?

Student 157: be more specific and you see with your eyes like it's better than the text.

I: So introducing videos maybe. OK.

Student 149: Student 155 said something.

I: Yes? This is Student 149.

Student 149: about debating. Yeah that's a very good idea because it's not just like working in pairs or just writing something on the paper. It's more like there's communication between students or students and the instructor

I: Yeah.?

Student 149: which can really help more ehh understanding the material itself.

I: Yeah. OK. Yes Student 155?

Student 155: You think that you're involved in the things you're doing

I: OK.

Student 155: not just working in pairs like everyone is involved

I: OK so working as a class together?

Student 155: Yes debate

I: Sharing ideas, debating. OK. Fine. Now do you think that the teacher's teaching style matter in the delivery of the material, is important in the delivery of the material?

Student 149: Of course

I: OK? Yes Student 149.

Student 149: because the teaching style affects the student because the teacher can be very severe and at the same time can be very helpful for students like really get distracted easily. The same for other kinds of teachers and other kinds of students, so the more the teacher can understand the class's environment the better he can like transmit the information to the student.

I: OK. Yeah. Anyone else here on this? No? OK. Now do you think that the teaching of critical thinking should be done in a separate course or should it be integrated at all levels of English?

Student 155: What do you mean by all levels?

I: Yeah for example in 101 there should be a little bit of critical thinking lessons, in 102 there should be a bit of critical thinking lessons, the same thing applies to 203, 204, or should it be just taught in a separate course that focuses only on critical thinking?

Student 155: Student 155. I think it should be all in one course because like if you take it once at a time you like forget like if it was one session or something you won't be able to focus on that target. It should be all in one course.

I: Yes Student 148?

Student 148: It should be integrated because if you take it as a one course then after finishing it you will forget it after 2 or 3 years, but if it integrated in many courses you will continue it until you finish from university and you have better understanding if you take it little by little you will understand it better.

I: OK. Yes. Student 150?

Student 150: This is what I wanted to say.

I: So it's like it's reinforced if it's from one course to another.

Student 150: If you take it as one course it weighs much and as Student 148 said you forget it eventually while taking it step by step will brainstorm it in mind.

I: OK. OK. Yes Student 157?

Student 157: Even if you like it benefits you in a different level not just in 101 in 203 it should be given like critical thinking. Even though you don't know about in 203 you wouldn't take it in 101 so I think it's better to integrate.

I: OK. Anyone else on this? Any other comments concerning the material you would like to say?

Student 157: No.

I: Nothing at all? OK guys. Thank you for participating in this.

Group interview - Class 16

Date : May 26, 2015 - Duration: 18 minutes 30 seconds

Interviewer – Student 275 - Student 274 - Student 276 – Student 283 – Student 278

The interview was done right before class.

I: OK first of all I would like to thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Now your responses will be kept anonymous and they will not affect your English 102 grade in any way.

Now my first question to you is: What do you think of the critical thinking lessons that you have received this semester in terms of content? How would you evaluate the material itself? So who would like to give his opinion on that? Yes this is Student 275.

Student 275: It was good, beneficial like I really, things that we learned it was really new to me

I: Yeah?

Student 275: like reliability and the statistics and things like that I used to believe them right away but now no I have another opinion.

I: OK?

Student 275: I reconsidered my belief about

I: Yes. Anyone has something? Student 283? Would you like to say something on that?

Student 283: Ehhh I have something about stereotypes and assumptions I learned a lot from this course about this issue that I can believe or know how to take my opinion from any article that is more reliable.

I: Yeah. OK. Yes Student 274?

Student 274: Ehh we learned about things that I never thought that we would like learn about and it was very fun.

I: OK. It was fun. It was enjoyable to you?

Student 274: Yes.

I: Yes Student 275?

Student 275: and about causation and correlation it was like, it wasn't new to me like I knew it before but it was beneficial I think to other students but it was important to learn about.

I: OK. Now anybody else? Anything to do, to say about content?

[Door opens and closes]

OK Student 283 would you just see if it's one of the students or it if it's someone by mistake?

OK. Yeah. Now what do you think of the critical thinking lessons that you have received in terms of the amount of material, the number of handouts you got?

Student ?: It was too much.

I: Was the number like, was the number too much, too little? I mean your opinion, what's you opinion? Yes Student 283? Can you start?

Student 283: There was many handouts so ehhh I lost many

I: You didn't know where to put them you mean?

Student 283: Yes. I have a portfolio but I lost them.

I: But what about what happened in class? Like the number of handouts in class? The amount of material in class?

Student 276: Confusing.

I: Like covering all this? You got confused Student 276?

Student 276: Yes yes.

I: It was confusing to you?

Student 276: Yes Student 275?

Student 275: It wasn't confusing to me. I thought there was the same material more than once like it was repeated especially the articles and things like that. It was the same. We got two articles, the same point, the same

I: Like what? Do you remember

Student 275: Causation and correlation maybe we got three articles.

I: OK?

Student 275: It was the same. The same idea eventually.

I: So you could have understood the concept with one article instead of having 3articles.

Student 275: Yes and things we talked about in class were much more important than the articles we got.

I: OK.

Student 275: Like OK we got the articles, we got the point, what it could be when we might think it's causation, wrong causation but what we talked about in class was much more clear to us was much more clear to us.

I: OK. Yeah. So the discussion that you followed you mean?

Student 275: Yes.

I: Based on the articles. OK.

Student 275: Yes. It was much more important than the articles.

I: OK. Yeah.

Student 274: I agree with Student 275.

I: You agree with him so it was the conversations the discussions that helped you understand the material more than the articles?

Student 274: Yes. Yes.

I: OK. Yeah. Anyone else on this? OK. Now do you think that the material has helped you or not?

Student 274: Of course it helped us.

Student ?: Yes.

I: If it has helped you, how did it help you? Or if you say, OK, it didn't help me, you need to explain your opinion, so who would like to talk about this. Student 275?

Student 275: It did help us because if we just discussed it we wouldn't know how would be. For example, when we read something that we think it's true, and what we learn is things like that are not reliable can be true and cannot be true. If we didn't get handouts, articles we can't judge, we can just talk about things not see them in front of us.

I: OK.

Student 275: That's my point.

I: Yeah? Who else? Yes Student 276 please?

Student 276: and we learn how to write a better essay.

I: Yeah?

Student 276: citations

I: Yeah. OK. Anyone else on this? How it has helped you.

Student very good background about how to judge more articles

I: To find?

Student the construction of our thesis or anything we want to make in the future

I: Yeah.

Student it's very beneficial for us.

I: Yeah. Ok.

[Student 278 coming late to the interview]

I: Hi. So you can join us here. OK. We're talking about the critical thinking lessons you took this semester. OK, so you're going to join and I would like your opinion on this. Of course, it doesn't interfere with your grade, so try to be as honest as possible. So do you think the material, the handouts, remember when I used to come and observe, these handouts, these classes, OK, were they like did they help you in any way?

Student 278: Yes they helped us.

I: What's your opinion? Can you just tell us? This is Student 278 right? Yeah. So? Student 278.

Student 278: They were good because they gave some ideas or example we didn't know before and they helped us to memorise stuff like if we forgot something and we had an example like go back to them and they taught us like really really good stuff so we can know what we're, if we're writing to someone or we're writing an essay in general for writing in a good way or in a bad way, so we know how to write better.

I: OK? We're talking about the critical thinking lessons right? OK. Now my next question is: Is the material new to you? Was it new to you? Like you've never taken something similar to this before or not?

Student ?: Yes

Student ?: It was new to me.

I: It was completely new to you? You've never taken something. You just said a while ago that like the concept of causation and correlation

Student 275: The concept not the articles we got.

I: Yeah.

Student 275: Like I know how to think about that before. It has nothing to do with the course about. It's not. What did you ask?

I; I said if you the material was new to you.

Student275: Yes the material was new but the concept the idea I had it before.

I: All of them or only a few.

Student 275: Only the causation and correlation.

I: OK. Yeah. So in general the material was not something you've taken in a previous course or in school or maybe your parents taught you this? No. Any comments on this?

Student ?: No.

I: Nothing at all. OK. In general how satisfied are you with the lessons? If you want to look back at those lessons, how satisfied are you with them?

Student 274: Satisfied in what way?

I: Are they satisfactory? Did you enjoy them? You didn't enjoy them? You felt they were boring? So this is basically what we mean by satisfactory. Yeah.

Student 274: They were mostly fun. I liked it. I liked the discussions mostly, and yeah.

I: OK so is basically Student 274. Who would like to comment on this? Yes Student 275?

Student 275: I honestly enjoyed it more than things to do with the course. It was fun especially the discussion.

I: So you enjoyed the material more than the material for the course

Student 274: Yeah.

Student 275: Yes. It was fun.

I: It was fun? OK.

Student 275: Yes the discussions.

I: Any other comments on this? Now if you were, if I ask you, if I ask your opinion or your advice on how to basically improve the material what would you advise me? How can I improve the material? How can I make the material better?

Student 274: The articles?

I: The material in general. All of the handouts, OK, you got from Teacher 8, remember, so if I ask you, OK, if I ask you your advice?

Student 275: The material wasn't bad.

I: Yeah?

Student 275: I wasn't annoyed but like I said it was repeated for example.

I: Some of them were repetitive? Not all? All of them?

Student 275: Yes yes. No some of them.

I: Some of them were repetitive.

Student 275: It wasn't bad. It was normal. I can't think of a better way.

I: You cannot think of a better way, so it was only the issue of repetition like you mentioned something very specific here and it's interesting

Student 275: It might be normal

I: three articles on causation / correlation you could have taken something maybe else instead.

Student 275: Yes.

I: This is what you mean. Somebody else can improve the material? Yes? Student 274.

Student 274: I really liked it when we used TED.com.

I: What did you use?

Student 274: TED.com

I: TED. The video?

Student 274: Yes.

I: The Nigerian lady who talked about assumptions and stereotypes? You liked the video?

Student 274: I wanted to see more videos,

I: OK, so you were interested, OK, you're interested in more videos on critical thinking skills maybe.

Student 278: It's better when Teacher 8 used to take us to the library and do the presentations even if we were not listening to others when we see something it's stuck in our memory, so it's better maybe to give us the the

I: The material?

Student 278: Yeah the materials on the screen like a bit of life

[students laughing]

I: It's more interesting to you? Yeah. OK. Yeah. Any other comments on how to improve the material? Do you have any other ways to improve the material? No more? OK. Now do you think that the teacher's teaching style matter, is important, in the way to make you understand the lessons?

Student 275: Yes.

I: Yeah, can you please talk about this? Student 275 what do you have to say?

Student 275: It was like I think it was the best from Teacher 8 because she has a very good way to communicate with us and to make us, to give us the main point what she's saying

I: OK?

Student 275: It was very clear to us

I: Yeah?

Student 275: And we wasn't, we weren't annoyed at all.

I: OK. Who would like to talk about

Student 274: Can you repeat the question?

I: Yeah. Do you think that the teacher's teaching style, OK, is important in making students understand the material, the critical thinking lessons? How did basically your teacher help you in this?

Student 274: The teacher communicated with us. There should be communication between the teacher and the students so that the student will be like more into what we're doing in class. He should be comfortable with the teacher and like the teacher because once the student doesn't like the teacher he just stops working

I: OK.

Student 274: Like "I don't like this teacher".

I: So you liked basically your teacher and this is what pushed you

Student 274: Yes.

Student 275: Like what we said the discussions was, were the best part, if it wasn't for the teacher it wouldn't be acceptable, we wouldn't enjoy it.

I: Right. Exactly. Anyone else on this issue here? No. My next question is: Do you think that the teaching of critical thinking skills should be taught explicitly in a separate course or should critical thinking skills be integrated at all levels? I repeat my question: Teaching critical thinking skills, should it be done in a course, a separate course that teaches critical thinking skills only or you think that this is something that should be integrated at all levels the way you did it in 102?

Student 275: I don't know if there is this much of these things to teach. If there is, I think a course a separate course.

I: OK, so you think here it's the amount that matters so if there is more then it should be done in a separate course.

Student 274: It should be done in a separate course. It's so interesting to know more so maybe if it was alone without the other materials we're taking maybe students would be more interested in it, so it's better to be a separate course.

I: A separate course, Student 278 yeah? Anyone else? Like who thinks that it should be integrated at all levels, in 101, in 102 and in 203? Anybody? No. You all agree on that, that it should be done as a separate course?

Student 278: Yes if there is level in it like there is Level 1 in critical and Level 2 yeah it's better to do it like 101, 102.

I: Yeah. Anyone else on this? OK. You said it was useful to you, the material you learned was useful to you. Do you see any kind of use for it in the future? Do you think what you've learned this semester in 102, the material, the critical thinking lessons, might be useful to you in the future, or that's it, the course is over and that's it, you would forget what you've learned because there is no use for the material anymore?

Student 276: It will help us….

I: Student 276? Yeah one second. Student 276 you want to say something? Yes Student 283 is upset because he has already said that.

Student 276: It will help us in 203, 204, but I think in real life it don't.

I: It doesn't help you in real life? Why is that? You don't need critical thinking in your life, in your real life, in your everyday life?

Student 276: No.

I: No? OK. Student 283? OK this is your opinion. Can you explain why you don't need that in your everyday life?

Student 276: I'm ehhhh. My major is mechanical engineering so I don't need.

I: You don't need critical thinking? OK. Fine. Let's see. Student 283? What do you want to say?

Student 283: I already said that but how could we be not useful? We have to know how to ehhh, we have to know this because it teach us to organize our thesis, our ehhh

I: So you're saying it's useful to you in the future? Is that what you're saying Student 283?

Student 283: Yeah.

I: OK. Fine. Yes Student 274?

Student 274: I think it's useful for our everyday life, in society, in the ehhh we don't have to remember that we took it in class it's just us, it's a plus for our personality.

I: OK? Can you give me any example of something, of any context where you might use?

Student 274: The example of this African girl, the lady on TED.com it shows us the truth and how we ehhh

I: You've put a picture. You find you have some sort of a stereotype about maybe people right?

Student 274: Yes yes.

I: OK.

Student 274: Yes we changed our minds about things we never really thought of.

I: OK. So this is the use of what you've taken in your everyday life. Yes Student 275?

Student 275: That's something that happens everyday. We don't use it in university or in the course. It's not something that is specific to this course. We might use it with our friends, in our jobs later on, so it's important.

I: OK. Yes? Anyone else on this? Student 278 any ideas on this point?

Student 278: It's just like she said it's important in our everyday, if we wanna argue with someone about their point of view, like now we know how to argue, we know how to support very well.

I: How to convince people.

Student 278: It could be useful in our jobs too.

I: An how to detect weaknesses in arguments. That's very important right? OK. So did you change your mind? You still have the same opinion. Anything else about the material in general? Something you would like to add, something I didn't really cover in my questions? You're just thinking. Anything else? OK. Thank you for participating.

Group interview - Class 1

Date : December 8, 2015 - Duration: 19 minutes 12 seconds

Interviewer – Student 318 – Student 310 – Student 309 – Student 319 – Student 322 – Student 370

The interview was done towards the end of the session. The researcher dismissed the other students 10 mins earlier and the interview went on a bit after class time.

Interviewer: Thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Your responses will be kept anonymous and will not affect your English 102 grade in any way.

What do you think of the critical thinking lessons that you have received this term in terms of content?

Student 318: I think they were really helpful, they helped me they helped me evaluate sources better, they helped me uhh they helped me decide which, what information is reliable and what information is not reliable for support.

I: OK.

Student 370: I agree with her.

I: Yes Student 370? What do you want to say?

Student 370: I agree with Student 318 because uhhh when I took 102 the course I knew which website is reliable and which one is a blog and uhhh so I can easily, like, trust the website.

I: Yes Student 319?

Student 319: I found the content very rich and the subject itself it helped us expand our knowledge in research as well, and like in other, for example questions or fallacies you told us
some facts or research like now we can …

I: Student 310?

Student 310: I believe the content we studied helped me look at certain things from a different point of view than before. I managed to spot the difference between research paper, persuasive essays and how to look at reliable sources, and how to know if the survey or research paper is good and I learned how to in-text citations and reference list.

Student 322: Student 322. For me, I enjoyed really like looking at sources. Before I used to believe everything that I read but now when seeing stuff I think twice before just saying that it could be reliable, so I'm better at this now.

I: Student 309?

Student 309: Yeah before taking the English 102 course I basically believed like almost everything I read on the Internet so through this course I now know like criticize, read carefully before trusting the site, so now I know the difference between what you can trust and what you can't trust, so this course really helped me a lot uhhh and …

I: Yes Student 319?

Student 319: Student 319 agrees.

I: Student 319 agrees. OK.

Student 370: It is really a preparation for the other English courses.

I: OK. Now what do you think of the critical thinking lessons that you have received this term in terms of amount of material? Were they like too many of them, were there too many of them or too little or just right? Yes please Student 318?

Student 318: It's sufficient. It's the right amount like if we did a bit less than that it wouldn't have been stuck in my head so yeah.

Student 322: I think, Student 322, that the pace of learning was good to me. I got everything from it and slowly and not stressfully.

I: Yes Student 370?

Student 370: I think this course is a way opposite than 101. While in 101 you can, you have nothing to do like only once per month but in 102 you have to work everyday. It's a suffering course. You're under pressure all the time because every week we have something to present, you have something to do.

Student 309: Critical material.

Student 370: No I'm talking about 102. There is material we have to work on them. In 101 …

I: Yeah focus on the critical thinking lessons that you were given throughout the semester. OK? Not the whole course.

Student 370: Ah so …

Student 318: I like the topics in the material we were given, they were interesting most of the time.

I: Can you remember something?

Student 318: I remember one about driving lessons and one about working mothers, those were the most interesting to me.

I: Student 319?

Student 319: Yeah I found, I agree with her like the topics that were given to us were actually everyday uhh everyday things that we see in our lives but we never really paid attention to them, so they're really helpful for us especially when you gave us for example the government, the ISF government and the statistics.

I: Yes. Yes Student 309? You wanted to say something?

Student 309: Yeah I remember you gave us, I think, a paper with multiple websites on them so we had to read each one and evaluate so it really helped a lot uhhh uhhh I think we had to read it and evaluate if it's true or false uhhh based on knowledge and common sense so it really helped and I think the material was more than enough to help us advance in critical level.

I: OK? Anyone else on this? Now I don't know if this is like you've already answered the question, the next one. Do you think that the material has helped you? Why and how - if? You might say it did not.

Student 318: Yes I think it did.

I: Yes Student 322?

Student 322: for me I had no idea how to write an essay. I am a French educated person so I couldn't know how to write an essay but now I know pretty much.

I: Yeah. I'm talking about the critical thinking lessons, focus on the critical thinking lessons. How did they help you – if they helped you? Maybe you can say they didn't help you at all. Student 370?

Student 370: For example, the statistics, we learned how to, how to see the difference between like years and uhhh. You helped us how to know like, how to make statistics.

I: OK?

Student 370: So like this is an example.

I: Yeah.

Student 370: We benefit from this, the critical uhhh …

I: thinking lessons.

Student 370: Yeah.

Student 319: I yeah, Student 319, the subject as Student 309 said, it made us realize that not everything we read on the net is true like even things we read in newspapers, for example, not

everything they write is true like we can search for the original source or we can think more critically. People do lie just to gain for example wealth or money, so it definitely did help me in everything. It also helped me in my essay like I now write much better than I used to.

I: OK?

Student 322: Yeah Student 322. For me like I learned even sources that are very popular like Daily Mail or anything, they could also write something that is subjective and you never can trust sources without making sure it's true.

Student 318: I agree.

I: Yeah?

Student 319: Honestly, from the beginning of the semester till now English is probably the only thing I've learned, I've learned something new till now. I haven't learned anything new in Physics, Maths, or Chemistry, nothing is new.

I: Yes?

Student 310: I agree with Student 319. This course honestly helped me in uhhh. It gave me information I didn't expect to receive and it made me think in a critical way to evaluate sources and how to know if the source is reliable or not and it gave me new ideas and taught me new things that I didn't know before and it made me understand certain topics in a different point of view than I did before.

I: OK. Anyone else on this?

Student 318: No. I agree.

I: You agree Student 318. OK. Now have used such materials before?

Student 319: No.

I: And if yes, in what context?

Student 318: No I didn't. In school we uhhh. This is my first year in university and in school we used to have our English classes were completely different. We never learned anything related to critical thinking or uhhh or even evaluating sources.

I: Student 319?

Student 319: The only thing I learned which I already knew was kind of the citations but they weren't in depth as we took them in this course. I didn't know like a few things like in-text citations like simple things not the whole reference list that we had to do and learn in the course.

I: Yeah. Yes? Have you taken something like this before?

Student 309: No I haven't taken anything like this before. I remember in school all we did was like TOEFL exercises and SAT, mostly listening, comprehension and just essays but they don't like pressure you, like for example the essay, like I remember when you told me after the first essay I wrote you told me you don't know what a paragraph is. I had no idea for example when you put a full stop, I thought you would go back to the line like the French system so basically you know in school they don't teach you like …

Student 322: The APA style

Student 309: So yeah I've learned from my mistakes and now I'm way better than I ever was.

I: Yes thank you Student 309. Anyone else?

Student 310: Student 310.

I: Yes Student 310.

Student 310: I agree with Student 319. I've taken some citations, APA style, and honestly I don't remember well what I've studied in the other course but in this course I felt I can actually understand the topic and what we're doing and maybe in a way think more critically, and know what I'm actually doing. Before I used to just make an essay, introduction add some ideas and end it, but now I can feel myself progressing and becoming better and understanding what we're studying.

I: Yes thank you. Student 319?

Student 319: I know about the citations because in the second semester in school we had to write a research paper so we had limited time so they gave us the citations fast and we had to finish them so we didn't understand why. Here I understood how and why to put the citations more effectively.

I: OK. Now generally, how satisfied are you with the critical thinking lessons? Do you think they should be improved?

Student 318: No I think they're good. Can we rate them from 1 to 10 for example?

I: Yeah if you want OK.

Student 318: My name is Student 318 by the way. [laughing] (Student 318 is the only girl in the group interviewed)

Student 319: She's looking at the phone and my name is Student 318.

Student 318: My rating would be 10 because I really benefitted from them.

I: Yeah. OK. Anyone else would say something about the material?

Student 319: The critical thinking was really good, the essays you gave us, the articles but if you have more give more.

I: OK. Yeah. Anyone else on this? If you would like to change something in the material, the critical thinking lessons that you were given, what would you change? Yes Student 310?

Student 310: Personally I wouldn't change anything because we started at an easy pace and it slowly developed into a faster pace and more understanding. For example, the lessons were given in an understandable order and they didn't confuse me and we always practiced what we did and I understood the material.

I: OK. Yes Student 319?

Student 319: The only thing I would increase was, or put pressure on was when giving homeworks and paraphrasing and summarization like you did but it wasn't really that too much pressure on it.

Student 310: I agree with Student 319. I would have preferred if we were given more homeworks and try to submit them and get them corrected so we can prepare ourselves more for exams or when we had testing.

I: Yes Student 370?

Student 370: Can I say something?

I: Yes?

Student 319 to Student 370: I swear that it won't affect your grade.

I: Now do you think that the teacher's pedagogic skills, the teacher's teaching style, matter in the delivery of the lessons?

Student 319: Yes.

Student 318: Yes of course.

Student 322: Of course.

Student 319: Miss Nada Soufi was really good.

Student 310: Can you please repeat the question?

I: OK. Do you think that the teacher's teaching style, OK, matter, is important in the delivery of the material, of the lessons?

Student 310: Yes I believe that the teacher can make a major impact on the students' learning experience and I believe this course helped me receive all the information I was expected and promised at the beginning of the course.

I: OK? Anyone else on this?

Student 370: Yeah we were lucky to have you Miss.

I: Oh thank you Student 370.

Student 322: It's the most important thing actually how the teacher delivers the information because this is the only way they communicate so if it was bad it will demotivate the students probably.

I: Yes. Student 309?

Student 309: I believe that in order to deliver information to a student uhhh like multiple techniques must be used and you used, you gave us examples so for example the video you know we weren't just in class like you used technology like the videos, the examples, papers to read so it really helped deliver the information like the teacher if he doesn't speak much we're gonna learn anything so yeah you did a good job.

I: Yes Student 319?

Student 319: I agree with Student 309 and also one of the best ways to teach is also to take something out of context, out of context itself, out of the subject, and it's always good if the teacher gives advices for the students, it makes them more aware, the subject itself and your life.

I: Yes Student 370?

Student 370: And whenever we asked someone from other sections with different instructors like they told, they tell us like another way or another reasons whenever I asked them a question about the course, they told us their teacher like has another way. The teachers over there like they really have another way of teaching so each instructor has to follow his way of teaching, to deliver the message.

Student 322: Well personally I chose when you let us like talk, we go into a subject and we just express ourselves what do we think, you know? We have like free time to interact, to say our opinion which is very good.

Student 318: And the debate.

Student 319: And those opinions that we talked about sometimes were not about the English course itself, which is really good.

Student 318: Yeah we talked …

Student 319: about critical thinking as well.

Student 322: The topics we discussed in class, it has no, it's not related to the course.

I: Yeah?

Student 322: like about what's happening.

Student 318: It is.

Student 322: It is, but not directly.

Student 370: No no it is not related to the course.

Student 318: We addressed social issues I think that was really helpful sometimes in our material so I think that was really helpful and it's important for people in our age.

I: OK? Do you think the teaching of critical thinking should be taught explicitly as a separate course or it should be integrated in all courses at all levels?

Student 319: Integrated in all courses at all levels.

I: Yes can you explain Student 319?

Student 319: Uhh because you can't teach critical thinking alone. Critical thinking needs experience, needs examples on why this doesn't work, why this should be this way, why and how, so when you integrate it in other courses you can actually implement the teachings of the critical thinking in the course itself which you gave to students.

I: Yes? Anyone on this?

Student 318: Yes I think it's really important to teach critical thinking in all course as Student 319 said especially for me. I'm studying political science so critical thinking is very essential for our courses.

I: Yes Student 319?

Student 319: Like I'll give an example, in physics, critical thinking in physics is really good because physics is basically into depth in the dynamics of life. If you're taking the physics course itself and for example it doesn't give us real life examples of critical thinking we won't see how this helps us in real life for example

I: OK? Yes Student 310?

Student 310: Yes I agree with Student 319.

I: Anything else on this? Yes Student 309?

Student 309: I believe that you can't teach critical thinking alone because you know it doesn't make sense so that's why I believe it should be integrated with other subjects. In that way, like for example, political science critical thinking about this major uhhh English like any, you can learn it to any subject but you can't learn it alone because there is no uhhh uhhh specific ways of thinking so you need a major or anything else to integrate it with.

I: How important is critical thinking to you?

Student 318: It's very important of course.

I: How?

Student 319: Like to succeed you have to be able to think critically. If anyone tells you something you have to know why or if he's lying. He tells you a fact you have to be able to believe if it's a fact, you have to be able understand a fact, analyse it.

Student 318: You have to be able to question everything.

Student 319: Like you can't be arrogant and like

Student 309: You can't be naïve.

I: You can't be naïve?

Student 370: Because everything has a reason.

Student 322: It's important in our course and in life too. It's good to have.

I: Which course?

Student 322: 102?

I: Just 102?

Student 309: No everything.

Student 322: Of course because what we learn here we have to uhhh …

I: Apply?

Student 322: apply.

I: OK.

Student 319: I'm just kidding when we all go to 203 we're gonna have marks.

[student laughing]

Student 319: I'm just kidding.

I: OK. Anything else on this? Anyone would like to add anything? Something I didn't cover. OK. Thank you for your time.

Group interview - Class 2

Date : December 7, 2015 - Duration: 11 minutes 18 seconds

Interviewer – Student 342 – Student 340 – Student 329 – Student 338 – Student 333 – Student 330 – Student 335

The interview was done right after class.

Interviewer: First of all thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Your responses will be kept anonymous and will not affect your English 102 grade in any way.

Now what do you think of the critical thinking lessons that you have received his term in terms of content?

Student 338: There was nothing hard about it. It was pretty clear, straightforward, there was nothing ambiguous about it, so it's not that hard.

I: So your name again?

Student 338: Student 338.

I: Yes OK so that was Student 338. So how did you feel about the material that you were given the handouts? Yes Student 338? You want to add something?

Student 338: It gives valid facts, opinions, it's everything, all in one, so there is no trick, there is no uhhh anything, it's just straightforward and it's easy to comprehend.

I: OK? That's true what he's saying? This Student 340?

Student 340: That's true. I'm Student 340. It was easy like Student 338 said. It was clear and in one way it improved our English skills, so we learned how to think more logically and open up our minds.

I: OK. Anyone else wants to add? What do you think of the critical thinking lessons that you have received this term in terms of amount? Was it too much for you or just right or too little?

Student 338: I think it was fair.

I: Yes Student 338?

Student 338: It was pretty fair. It wasn't too much and it wasn't too little so it was just a decent amount.

I: OK?

Student 340: Not too much and not too little. It was perfect. It was the perfect amount for us.

I: This is Student 340.

Student 340: I'm Student 340 yes. As an English 102 it was good.

I: OK. Student 335 you want to say something?

Student 335: No. Just it was just right. It wasn't too much.

I: OK. Anyone else wants to say anything? No. Do you think that the material has helped you? Why and how it has helped you or not helped you? I mean you might say it didn't help me.

Student 338: I think it helped me but I'm not sure how, like how exactly it helped me. I think by, like what Student 340 said, it helped us think more logically, to reason effectively, like that.

I: Umm? OK?

Student 329: I think it didn't help me at all.

I: It didn't help me?

Student 329: No.

I: Why? Can you explain? Now this is interesting. I would like to hear something like this.

Student 329: No. This is just how I feel.

I: OK?

Student 329: It didn't help me.

I: It didn't help you?

Student 333: Yes me too. You name again?

Student 333: Student 333. 003 till now it's the same. Nothing has changed. My English is the same.

I: Yeah.

Student 333: What I know I know.

I: Is the same.

[Students laughing]

I: OK. Fine. OK. Fine. Anyone else? Anyone else?

Student 338: It is my first year so I'm not really sure what he's trying to say like comparing back then to now so I'm not really sure how to judge.

I: Yeah?

Student 338: Before till now. I'm not sure.

I: OK. OK.

Student 342: At the end of this semester I learned how to write an essay because I'm French educated so we didn't focus on writing and English essay so it helped me a lot. I learned some stuff from my mistakes and from my Mrs. she told me some remarks that I had to work on so yes it did help me.

I: OK. Now try to focus on the material, the handouts, related to critical thinking. Now do you think that the material related to critical thinking, OK, have you used something like this before and in what context if yes?

Student 338: In SAT.

I: Do you remember the material that was given to you every now and then? Every week you would have a handout related to logic.

Student 335: We used them in SATs, that's it.

I: OK.

Student 338: In SAT like sample tests, critical part. They give you like a text and then you have to, that's what I did.

I: OK.

Student 338: Like that was the only time.

I: You took.

Student 338: Critical.

I: In school or wherever, have you taken something like this?

Student 338: That was like 2 years ago. That's when I just started

I: OK?

Student 338: preparing for SAT. That was like the only time

I: OK?

Student 338: Back like in Grade 8, 9 never, not familiar with it.

I: OK? Now, other people?

Student 335: In 101.

I: What did you do? Something similar to this?

Student 335: Yeah.

I: What? Like what? Can you give me an example?

Student 335: Uhhh fill in the blanks and critical analysis but they gave us a box with vocab and something.

I: OK. I'm talking about the critical thinking lessons. You remember you took correlation/causation, logical fallacies, uhhh you took, who remembers what else you took? Studies, statistics, surveys. Do you remember those? Ok. This is what I'm trying to evaluate now. Have you taken something similar to this before?

Student 342: No.

Student 340: No.

Student 338: Not at all.

I: Ok. Have you taken this in 101 you said?

Student 335: No.

I: It's not. OK. You said something about SAT?

Student 338: Yeah. That was the only time we took anything related to critical, like that was the only time.

I: OK. Have you taken this in school?

Student 342: No.

Student 338: No.

Student 340: I'm French educated.

Student 335: I'm not sure.

Student 338: Never.

I: Never?

Student 330: Maybe.

Student 333: I'm not sure.

I: Maybe? Where? In school?

Student 330: Balamand English.

I: OK.

Student 330: but I'm not sure.

I: You're not sure.

Stduent 340: Balamand French no we just worked on grammar, SAT.

Student 338: In Bishmizzine they focused a lot more on SAT and then like little grammar and a lot of essays, never on critical.

I: OK. Anyone else wants to add something? No. OK. How satisfied in general are you with the lessons, those lessons? How do you think they can be improved? Are you happy with them or you think they can be improved?

Student 338: It's like a hard question. It doesn't need an answer. It's like rhetorical.

I: Not really. No. I mean are they boring? Are they fine? Are they new to you?

Student 342: New to us yes.

I: OK? Yes?

Student 340: Uhhh when we do those surveys in class or those exercises we talk a lot with the teacher, oral communication, that's a good thing and it opens our minds to a new thing like there's some survey about correlation/causation, it was nice, so she was asking us how this is linked to this, all the class was thinking how could it be linked to this.

I: OK.

Student 340: It helped us uhhh.

Student 338: It gave us a general idea.

I: Yes. Thank you Student 340. Yes. Anybody else wants to add to this? Student 329? Others? No one? Yes Student 330 you want to say something?

Student 330: It spend a lot of time.

I: Yeah?

[Students laugh]

Student 330: I'm here to study engineering, not English.

[Students laugh]

I: OK. So you don't need the material?

Student 330: No.

[Students laugh]

I: OK. Fine. Now do you think that the teacher's pedagogic style, teaching style, matters in the delivery of the content?

Student 329: Yes.

Student 340: Yes.

Student 342: Yes.

I: Yes? You would like to say something Student 342?

Student 342: The lessons would be boring if the teacher is not giving the information in a good way.

I: OK?

Student 340: The most important part the teacher has to be close to us and knows how to delivers the materials simply, by a clear way.

I: OK. Student 338 you want to say something?

Student 338: I want to say that if the teacher just came into class and read them nobody would be interested so nobody would participate so the closer the teacher is the more interesting the course would be.

I: OK. Anyone else on this? Now do you think the teaching of critical thinking should be explicitly as a separate course, or do you think it should be integrated in all lessons as a generic skill in higher education?

Student 338: Explicitly.

Student 340: Integrated.

I: Yeah. Would you like to explain Student 338 your point of view?

Student 338: I think that you study critical analysis that you have to learn a couple of tactics so it is taught separately it would be easier to comprehend, let's say we're taking it with English, it won't be easy because some people won't be familiar with the tactics so it won't be that easy to implement.

I: OK. Yes?

Student 338: That's how I believe. That's my opinion.

I: OK. Yeah.

Student 333: I think it's not needed because any educated person, he finishes his education, he can think reasonably, so it's unnecessary.

I: It's unnecessary. It shouldn't be taught. OK. Good. Anyone else on this? How should it be taught? How are you supposed to receive it?

Student 342: At the beginning of the semester, perhaps before we do the essays and all the homework yes we have to first like learn how to think wisely and with the teacher and get to know it better, with the class and everything and after we can do all the essays and the graded work.

I: OK. Yeah. Anyone else? No one? How important is critical thinking to you? How important is it?

Student 333: Not important.

Student 338: Honestly not really.

I: It's not important.

Student 338: Not really.

I: It's not at all. Why is that Student 338?

Student 338: Because I plan on majoring in mechanical engineering and I don't find critical relevant to my topic.

I: At all?

Student 338: At all.

I: That's interesting. Yes? What about you please Student 335?

Student 335: Same major so I don't think it's gonna help me a lot.

I: OK? Anyone else on this? Who believes that.

Student 335: I mean it should be related to what major we choose.

I: Umm. OK.

Student 335: It's not that everybody should take it.

I: Yes. Any majors in mind that might need it?

Student 335: Political science.

I: Political science.

Student 340: I think everyone needs this.

I: Yes Student 340? OK?

Student 340: Because it's about logic. All majors socialize. We don't get to the university to only study our majors. We have to study life.

I: OK?

Student 340: This is all about going to university. I don't think it's all about the majors.

I: OK. What do you think Student 329 and Student 333 and Student 330?

[Students laugh]

I: Any ideas? You think this is needed or this is just useless?

Student 333: Useless.

I: It's useless.

[Students laugh]

I: OK. Yes? Because of your major? Is it because of your major?

Student 333: Yes.

I: So you don't agree with the girls here?

Student 333: No.

I: OK. So any other things you would like to add? No. OK. Thank you.

Group interview - Class 3

Date : December 9, 2015 - Duration: 18 minutes 30 seconds

Interviewer - Student 362 - Student 358 - Student 359 - Student 443 - Student 361 - Student 354 - Student 349 - Student 356

The interview was done towards the end of the session. The researcher dismissed the other students 10 mins earlier and the interview went on a bit after class time.

Interviewer: Thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Your responses will be kept anonymous and will not affect your English 102 grade in any way.

What do you think of the critical thinking lessons that you have did this semester in terms of content? The material itself.

Student 359: Student 359. In my opinion I think that it was so beneficial. We learned too many thing and uhhh it's good for 203 class in my opinion. Thank you.

I: Yes Student 354?

Student 354: We knew new things that we didn't know about it in schools, how to write a research paper, and how to discover uhhh uhhh references if it is reliable or not. It was a good experience uhhh it was a good experience to participate in this class.

I: OK?

Student 356: Student 356. I think that this 102 section helped us to practice our speaking skills, writing skills, and learn from our mistakes especially from first draft and second draft. It helped us a lot to know our mistakes and never repeat them again and yes it helped us to know many stuff that we never knew about especially in schools we never used to do things as we are doing now.

I: Yeah. Can you focus more on the critical thinking lessons, not the course, the lessons themselves, you did lessons once per week.

Student 349: What do they talk about? Because I don't remember.

I: Who remembers? What did we do? What are some lessons? Like extra lessons?

Student 356: Correlation and causation.

I: Yeah what else?

Student 358: Statistics.

I: Yeah. Studies, KFC reliabiltity of sources. We did KFC if you remember? So those are the ones I want you to focus on. Yes Student 443?

Student 443: Yes for me it attract my attention to something I never uhh I was never aware of it like the credibility of the sources, so now I know how to, how to trust the source or not.

I: OK?

Student 356: And the correlation and causation it happens with us like everyday but we always link stuff to each other. They are related in some way but not necessarily causation. That helped me a lot to know, to know the difference between correlation and causation.

I: OK. Anyone else on the content, on the material? No? OK. What do you think of the amount of material you received, the critical thinking lessons? Were there too much of them or were there too little, like you needed more or it was just right?

Student 362: Normal.

I: Yes Student 362? What do you want to say?

Student 362: It was not too much and it was not uhhh

Student 359: It was enough.

Student 362: Yes.

I: Yes Student 359: It was enough to give us the specific basic things.

I: Yes. OK. Student 349?

Student 349: I agree with him.

I: You agree?

Student 349: Yes.

I: Anyone else?

Student 361: It was tiring Miss. Five days per week is too much for English 102 so it can be shortened and made like 203 two sessions per week 1 hour 30 minutes.

I: Yes but I'm not talking about the course.

Student 361: I'll come to your point so the content you were giving, you can give them in a much abbreviated way, shortened, since it's too little since everybody can catch up in a faster way by not attending the class every day, you will be able to catch with your class since the material is too little and they're uhhh uhhh

Student 359: too easy to understand.

Student 361: It's not something very hard.

I: The course or the material?

Student 359: The material.

Student 361: The material.

I: OK.

Student 361: Everybody can catch up even though I did not attend class for several days.

I: Yes. OK. Anyone else on this point? Now do you think that the material has helped you or not?

Student 361: Sure it helped me.

I: How?

Student 361: Sure. Since I can, since this material that we take it can be used in our real life, it can be used in daily lives, like everyday we can, we can see a newspaper and everyday we can take some, like SPQ and APA.

I: I'm not talking about the course. I'm talking about the critical thinking lessons you did. It's not about the course. OK. You did certain lessons in the course.

Student 359: Miss there is the statistics thing.

I: Yes how did that help? If it has helped you how did it did help you?

Student 359: That can help us in the future if we're doing such research or something in our job or career. It can help us like to give us an idea to do this statistic without going to Google and searching how to do it or something. That's it.

I: OK.

Student 361: It allow us to know which sources are much reliable than other sources.

I: Yeah.

Student 356: The statistics uhhh we should know about statistics all the conditions related to do this kind of study or research uhhh for example the time, the place, the category of people we're asking, and the type of question we're asking. We did a lesson about the type of question which can be emotional, contain emotions or not. It should be an objective question, not a subjective question.

I: OK. Yes Student 443?

Student 443: Student 443. Not about the material in 102. Just to tell you that in France I took a course only about this critical thinking and sources. It's name Methodologie de la Recherche Scientifique. All the courses about it, but here it helped us because it applied, we implemented it in the essay, how to take a source and put it in the text and reference it, and it was more practical.

I: OK. Anyone else on this? How it helped?

Student 349: It makes me think like I like sociology so I'm trying to check on certain groups and I was thinking about them if it was correlation or an effect like people who are addicted to heavy drugs is there any correlation between their being in the streets and using heavy drugs like people say they are overemotional and stuff so that's why they use drugs to run away from the world or just uhhh uhhh

I: They already have predispositions to this?

Student 349: Like because they are overemotional they use drugs to create their own reality because they don't want to leave the real world so it makes me think in correlation or actual effect.

I: Yes Student 356?

Student 356: The material we took the lessons helped us as well to always double check our resources or double check our information to know whether it's wrong whether it's right and, and to be aware each time we read something we should not directly believe it, we should see who wrote it, we should see who did it, when was it, was it long time ago, recently, it helped us to know, to differentiate between the right stuff and the wrong stuff.

I: OK.

Student 356: And what we should believe.

I: Yeah. Anyone else? Student 443?

Student 443: Uhhh uhhh Make sure it is still recording.

I: It is. OK. Uhhh uhhh Have you use such material, something similar to this before? And if yes, where? I think Student 443 you mentioned something?

Student 443: Yes.

I: Yeah.

Student 443: Can you explain a little bit on this?

Student 443: I took a course. Its name Methodologie de la Recherche.

I: In France?

Student 443: In French and it teach us how to search for information and how to know if the information are credible or not and we can believe it we can take it and how to write it in reference not to do copy paste for the link yes.

I: Aha.

Student 443: The overall is that.

I: Yeah. Anybody has taken something similar to this before.

Student 362: Yes in school.

I: Yeah? What did you take in school?

Student 362: How do I write a reference list and how

I: OK I'm talking about, I'm talking about the critical thinking material not about how to do research, not the course, how to do the APA style and stuff. Have you taken something like before, in school have you taken something like this before?

Student 356: No.

Student 361: No.

Student 359: No. It's the first time.

I: Nothing at all?

Student 356: Nothing at all.

I: OK. Not in any course?

Student 356: No.

I: Now in university are you taking something like this in another course?

Student 359: No I don't think. Maybe at CS course.

I: You take something similar?

Student 359: Maybe.

I: You take something similar? You're not sure?

Student 359: No I haven't took.

I: Ah you don't know. You haven't taken CS yet so maybe you take something like this in CS maybe. OK. Now generally, how satisfied are you with the lessons? Were they good? What would you change in them? What would you change in the ten lessons, the ten critical thinking lessons you took?

Student 349: Could we have more discussion?

I: Discussion?

Student 349: Yes between students. That's what I'll change.

I: OK so this is something you would like to have.

Student 443: Yes. All of I think.

I: More discussion?

Student 443: Yes not discussion to lose time but about the course, about the lesson.

I: Yeah.

Student 443: You maybe for example, you might ask us a question and uhhh let us think about it and bring information about it and talk about it in class, between us and with you.

I: OK. Fine. Anyone else would like to change something in the material that you took?

Student 359: Change uhhh

I: Yes Student 359?

Student 359: It satisfied me. It's good.

I: OK. Yeah. Do you think that the teacher's teaching style matters in the delivery of the content?

Student 361: Yes.

I: Yes Student 361?

Student 361: It matters, it is making a great difference. From my past experience, I repeated 102, this is the second time I repeat 102. This semester I was able to catch the material in a faster way and an easier way. The teacher was delivering the uhhh, I'm not talking for the teacher, it's not for the teacher. I didn't have any problems with the first teacher.

I: Yeah?

Student 361: I didn't have any problems but the way she was delivering the course is so different from the way I am now receiving this course. I'm now receiving this course in a better way, in a way which is more explained and more detailed, more communication, more communication between the teacher and the class will make the atmosphere of the class much better and this will allow the student to understand more, but when the teacher comes to class in order to talk just to give this 40 minutes 35 minutes for the students and tell them let's go they won't understand anything. This happened with me last semester and I had many problems with this but now this semester this changed.

I: OK. Anyone else on this? No? OK. Do you think that the teaching of critical thinking should be should be done separately in a course, or should it be integrated at all English levels?

Student 359: No it shouldn't be separated from English.

I: Why is that?

Student 359: It's better to do it in English classes.

I: Yes Student 361?

Student 361: It would be boring.

I: Yeah Student 359?

Student 359: Because as Student 361 said English would be more boring and something like that.

I: Yes? OK?

Student 359: And such topics will encourage students to share and practice more and discuss more ideas and their opinions about everything else.

I: Yeah. Student 358 do you want anything to this? Like do you think it should be done separately in a course, you take a course by itself on critical thinking or should it be integrated at all English levels?

Student 358: No it should be integrated at English courses.

I: Yes Student 359?

Student 359: Miss plus no one prefers to take another course just for such things as more credits will be added to your uhhh

I: You will have to pay for more credits?

Student 359: Not pay. Just you will have to spend more time for it.

I; OK.

Student 356: So why not making them all related to English uhhh

Student 359: While you can do it.

Student 349: But if you have lessons from critical thinking you may have a bigger subjects to talk about not only related to English, you can talk about many things. You can be free to talk about politics, economics, everything the teacher or the students want, and it can be less classes and more interactive classes.

I: Yeah. OK. Anyone else on this? Anything else you would like to add to this? OK. How important is critical thinking to you? How important is it to you?

Student 349: It is essential.

I: It is essential Student 349? How?

Student 349: If you don't have critical thinking and you're just a sheep you don't have opinions, you don't have anything, you have to think for yourself, you don't have to accept other people's opinions.

I: Yes. OK. Do you agree with him?

Student 443: Yes. We will be brainwashed.

I: Ah Student 443 you will be brainwashed if you don't have critical thinking?

Student 443: Yeah especially in Lebanon. For example, if I go to a website for a specific political party, uhhh, they will put the information on a specific purpose to bring us their idea and not the real idea so if I don't have this critical thinking I will believe it and think like them without using any sense, any common sense or any reflection.

I: Is it important in your majors?

Student 361: Sure.

Student 356: Of course because in each course we have presentation to do, a topic to present for example, so we need to know where to look up the information, and know which source to use and which source not to use, so all these lessons about sources and correlation and causation they will help us not only in our courses but in our daily life like they say.

Student 359: They will help us to have a certain kind of logic in life.

I: OK. OK. Anybody wants to add something? Do you have something you would like to add? No? OK. Thank you for your time.

Group interview - Class 4

Date : December 8, 2015 - Duration: 10 minutes 36 seconds

Interviewer - Student 369 - Student 375 - Student 371 - Student 374

The interview was done towards the end of the session. The class teacher dismissed the other students 10 mins earlier and the interview went on a bit after class time.

Interviewer: Thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Your responses will be kept anonymous and will not affect your English 102 grades.

Now what do you think of the critical thinking lessons that you did this semester in terms of content?

Student 371: The contact?

I: Content. What's in the lessons?

Student 371: I'm Student 371: Well some of them were interesting and beneficial but others were I think useless, just they mentioned many many things but they were not important.

I: Can you give me something in particular?

Student 371: For example, talking about KFC and all, I think it became a habit to criticize fast food these days because it's just like there are no other topics but criticizing fast food and these topics you know, and I think this is not right, we're just accusing some people of doing something which in fact they're not doing. Fast food is Ok for everyone and giving all these topics about and warning people about fast food I think is exaggerated a little bit.

I: OK? What do you think the others? What do you have?

Student 374: I agree with him.

I: Yeah. What's your name?

Student 374: I agree with him.

I: OK?

Student 369: Same opinion.

I: You have the same opinion? So they were useless to you? OK. All the material that you've got?

Student 375: Not all the material but some of them. Like KFC uhhh this point was useless.

I: OK.

Student 375: Uhhh but when we talked about the reliability of sources, it affected my notes and my grades because I chose my reference carefully.

I: OK.

Student 375: From the Internet, for the next test.

I: OK. Now what do you think of the critical thinking lessons in terms of amount of material? Were they too much, or too little, or just right? The number of lessons you got in critical thinking. Yes your name please?

Student 375: Student 375. No it's right.

Student 371: We can say they were acceptable, the amount was acceptable, kind of, if we look at the semester we have the number of sessions that we have and compare it with the amount of material that we took, it is, it sounds acceptable in the end.

I: Yes? Anyone else? No?

Student 374: Acceptable.

I: Do you think that the material has helped you?

Student 371: Can you indicate in which way?

I: I'm asking you. If it has helped you how? If it hasn't helped you, it means it hasn't helped you.

Student 371: Because about reading maybe it helped yes, because you know as much as you read even if you read a newspaper it will help you to improve and enhance reading abilities but if you're talking about giving you extra informations and life and writing it wasn't.

I: OK. Anyone else on this? No? OK. Have you used something similar to this material before, the critical thinking material? Have you used something similar to this before in other courses or in school? Yes Student 371?

Student 371: Yes we used in 101 almost the same topics like fast food about other like all those topics like sources how to get sources fast food and all these other topics. In 003 we had almost the same topics so we were just, I found that we were just repeating the same topics.

I: OK.

Student 371: Maybe with a little extra information from here and there but in general the main mood was the same almost.

I: Yes your name?

Student 375: My name is Student 375. They were different from uhhh.

I: From previous semesters or previous what?

Student 375: Previous 101. There is difference.

I: OK. Anyone else on this? No? OK. How satisfied are you with the lessons in general? If you were to change the critical thinking lessons, not the whole course, if you were to change the critical thinking lessons, what would you change in them? How satisfied are you with them?

Student 371: Well, I think I'm not really satisfied with the information that we studied during this semester. I think if I was about to change something I would change some topics like for example adding some politic topics maybe about scientific topics, just to enhance the way of thinking in these fields of life like maybe politics science, to be more interesting for us, but to read all the time about fast food and these topics I think it became boring the topics.

I: Yes Student 369?

Student 369: But it will become more difficult. When we add scientific material or political or anything else it will become more difficult to uhhh understand.

I: OK. Anyone else?

Student 371: Maybe this point is right but I think this course is not about simplifying our way of thinking. It's the opposite. It's about enhancing our way of thinking.

I: OK. So did it enhance? Did the course enhance your way of thinking?

Student 371: Our way of thinking I don't agree I don't think so.

I: OK. Do you think the teacher's teaching style matters in the delivery of the content that she's teaching?

Student 371: Sorry you mean the way she taught?

I: Does the teacher have an influence on the material that she is teaching?

Student 371: Well the teacher was trying to be neutral all the time like didn't try to be on one side and be against another side. As all teachers do usually, they try to be neutral as much as possible in class in order not to hurt maybe anybody that's what I think.

I: OK. Student 374? You don't have anything to say?

Student 374: I agree.

I: You agree?

Student 374: Yes.

I: Do you think that the teaching of critical thinking should be done separately in a course or it should be done at all levels at all English levels?

Student 374: I think at all English levels.

I: Why?

Student 374: We can make it from easy to difficult. I think this is more uhhh

I: OK. Yes Student 374?

Student 374: Just to have an idea about it not suddenly to talk about a critical point, it was difficult.

I: So you're saying that this is the first time you have something like this?

Student 374: Not the first time but from three years of the college it was my last time I take something like that.

I: OK?

Student 371: Well I think it can be done in different ways like you can do it separately by adding another course to enhance way of thinking but I think as they said the best way is to do it within the English courses and try to make it like, step by step, gradual, just step by step, like starting from the easiest and getting to the most complicated or difficult.

I: OK. Yeah. How important is critical thinking to you? Do you think that this is something important or you don't need it?

Student 371: I mean critical thinking you have to criticize everything in life so of course it is important, it is part of us, part of your personality, part of your life, part of your way of living even, it's just, all our life is about criticize this and that, it's to choose that or to say that this is right and this is wrong, this is about life itself, this is about criticizing everything which faces you in, so of course it is essential not only important.

I: OK? Anybody?

Student 369: I agree.

I: You agree? Is it important to your major?

Student 374: Of course.

I: How?

Student 374: Because when we start our job we have to criticize, we have many ways to use it.

I: Yeah?

Student 374: It's not all about writing on papers, it's about how to interact with others and how to defend ourselves to be more logical, this is what it's about.

I: OK. Anything else? Anything you would like to add to this discussion? Nothing at all? OK thank you for your time. That's it.

Group interview - Class 6

Date : December 8, 2015 - Duration: 7 minutes 5 seconds

Interviewer - Student 409 – Student 416 - Student 412 - Student 424 - Student 414

The interview was done towards the end of the session. The class teacher dismissed the other students 10 mins earlier and the interview went on a bit after class time.

Interviewer: Thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Your responses will be kept anonymous and will not affect your English 102 grade in any way.

Now what do you think of the critical thinking lessons that you have received his term in terms of content?

Student 414: Student 414. The content was very important, we liked it, like uhhh the correlation and the causation uhhh it was very important like we didn't know before what's the difference between the correlation or the causation, so I think it was important for us.

Student 412: Student 412. The topics were interesting, we liked the topics very much. It helped us in many ways like in the test we did the first time and then we did it in the lab we found the difference between them, how to find the wrong statement or how not to believe an article.

I: OK? Anyone else on this? OK. What do you think of the material, of the lessons in terms of amount? Were there too many of them, too little, or just right?

Student 416: I'm Student 416.

I: Yes.

Student 416: It was just right. We need the amount. It wasn't uhhh. It was perfect.

I: OK? No comments?

Student 414: We think it's perfect, it's not too much or too little.

I: OK. Do you think that the material has helped you, and if yes how, and if not why?

Student 409: Student 409. Yes of course the material helped us in our research in other courses.

I: OK.

Student 424: The material improved our language and critical thinking and it really helped us in the research and writing, writing an essay, a documented essay.

I: OK. Anyone else? Have you used such materials before? Have you used something similar to this before?

Student 414: Student 414. No it's the first time we use or I use this material. I never used it before.

I: OK.

Student 412: Student 412. I only used the argumentative essay but the documented and all that we didn't see before even the citations and all that.

I: What about the critical thinking lessons that you did? Have you seen this before? Have you done something similar to this before?

Student 412: No I didn't at school or nowhere else.

Student 409: Student 409. I took an English course at USEK in the BS I didn't take any of this before.

I: Anyone else has seen this before?

Student 416: Student 416.

I: Yes?

Student 416: I took something similar. It wasn't the same but it was similar.

I: Yeah. Where?

Student 416: In school IS.

I: OK. Yeah. Generally how satisfied are you with those lessons? Do you think they should be improved in a way? Is there anything you would like to improve in them?

Student 414: No it's fine.

I: It's fine Student 414?

Student 412: No it's fine.

I: OK. Now do you think that the teacher's teaching style matters in the delivery of the material? How important is the teacher's teaching style?

Student 412: Student 412. Yeah Doctor X was very good. He kept repeating things until we get it all and yes it affected them I guess. I think they couldn't be any better.

I: OK.
Student 409: Because he was communicating with us uhhh I like that, it improved our grades.

I: OK.

Student 424: Student 424. I think the relationship with the teacher is very important because when we like the teacher we're going to like the material, we're going to respect him at first and he was really a good teacher. He helped us like the material and get into it.

I: Anyone else?

Student 416: Student 416. He made the lesson interesting.

I: Yeah. OK. Do you think that the teaching of critical thinking should be done in a separate course or should it integrated at all English levels?

Student 409: Student 409. At all English levels.

I: Why is that?

Student 409: Because it's better to repeat it.

I: OK. So it will be kind of reinforced?

Student 409: Yeah.

I: OK.

Student 424: I think it should be improved, integrated in the English courses, but improved for example in 102 at a level, in 203 at another higher level.

I: Advanced.

Student 409: Yes advanced level because it makes the course more interesting and more of course.

I: Yes Student 414? You want to say something? Anyone wants to say something on this? OK. Now how important is critical thinking to you? Is it something you need?

Student 414: Student 414. Yes I think we need it because with critical reading we can know if an article is reliable or not reliable, if the source is also reliable or not.

I: Yeah.

Student 412: Yes it's very important because it's not about only English or level 102. It helped us in our lives, in everything we take in, it taught us the way we think, how to face everything we see.

I: OK. Is it important in your majors?

Student 414: Yes it's important because I'm a Mass Communication student so I think it will help me.

Student 424: Yes also I'm an Engineering student. I think it's more important.

I: OK. Anyone else on this? Anything you would like to add? Something that I didn't ask about and you think that it's important to say. Nothing at all.

Student 414: No.

I: OK. Thank you for your time.

Group interview - Class 7

Date : December 7, 2015 - Duration: 17 minutes 53 seconds

Interviewer – Student 442 - Student 429 - Student 438 - Student 440 – Student 430 – Student 433

The interview was done towards the end of the session. The researcher dismissed the other students 10 mins earlier and the interview went on a bit after class time.

Interviewer: First of all thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you did this semester. Your responses will be kept anonymous and will not affect your English 102 grade in any way.

Now what do you think of the critical thinking lessons that you have received his term in terms of content, what's in the lessons themselves, how did you feel about that?

Student 433: Interesting topics.

I: Student 443 would you like to explain, would you like to give your opinion on this?

Student 443: There were interesting topics that helped us in our, that gave us information about certain things that we didn't really know, those it allowed us to know if we should trust the source or not according to the source reliability. Thank you.

I: Student 429?

Student 429: I believe that the critical thinking lessons that we were given throughout the semester were more like a puzzle to us to formulate a picture or frame in the end. We had from the critical thinking to choose the topics, to find reliable sources or not. These parts actually formulated the main picture of the research paper which I personally found that we lacked the critical thinking that's the specific trait that we reviewed.

Student 440: Student 440. The content was, the aim was clear in the content you gave and it helped us to think better when reading any text.

I: Ok?

Student 438: Student 438. Some topics helped us to know information that we didn't know and also it helped us to know what to trust and what not to trust. The information that we read , not all the information that we read are correct.

I: OK.

Student 430: Student 430. Beside improving our critical reasoning, I think that even our language improved through the semester.

I: OK.

Student 442: Student 442. It helped us a lot. Many sources we used to read on the Internet, we used to believe anything. Now we know what sources to believe and what sources not to.

I: OK. Anyone else on this?

Student 442: No

I: OK. Now do you think that the critical thinking lessons that you have received were enough or were too much, the handouts I used to give you, were they like too much or just right or too little for the course?

Student 438: Medium.

I: Yes Student 438 would you like to explain?

Student 438: Medium. They are not little and not too much.

I: OK.

Student 429: Student 429. I believe that they were like limited to a certain aim. They weren't focusing on critical thinking in general. They were limited to, they had a target to go through and they reached that target by the research paper and how to look for information but critical thinking in general I believe it fulfilled the general critical thinking aspect.

I: OK.

Student 440: Student 440. I think it's the basic we should know. Now when we read any text, we think differently. We can know the information if we can trust it or not. We think in a different way.

I: OK.

Student 433: Student 433. I think they are fine because they're, they're also interesting to us to read. I hope that they were more also because they're interesting topics that give us knowledge and information.

I: OK. Student 430?

Student 430: I think that it was enough for our level.

I: OK. Yeah.

Student 442: Student 442. I think they were enough.

I: OK. Now do you think that the material, again the critical thinking material, has helped? If yes, how did they help? And if now, why didn't they help you?

Student 429: Student 429. I think yes they did help in certain ways. They helped by academically more, academic searching for sources, writing, concluding more logical way, we found this, I believe that everyone in the class achieved this point at least, and it helped some problems like I said previously, it didn't fulfil the general aspect of critical thinking beside the research paper in general, critical thinking while talking, while explaining your own idea or while interacting with one another.

Student 438: Student 438. Yes it helped me because I can give a bigger idea about researches. I can focus on my research and do it logically not memorise.

Student 442: Student 442. Yes it helped us a lot because now we know what sources to believe and what not to believe. Usually we used to believe any article we read and now we know how to do a research, a logical one.

I: OK.

Student 433: Miss can you repeat the question please?

I: The critical thinking lessons you did, like correlation/causation, logical fallacies, we did studies and looking at numbers OK what else did we do? Providing counterarguments, all of those, now do you think they have helped you? Maybe they did, maybe they did not. Now can you explain?

Student 433: Yes they helped us a lot also when reading an article, when we see correlation we understand that it's a causation, we do not that they're only related, not this cause this, so it helped us improve our thinking about the subject.

I: OK. Who's first?

Student 440: Student 440. I wanted to say that it didn't only help us academically, in anything else hearing about any topic, we can say if we can believe what we are hearing or not.

Student 430: Student 430. We need those skills when achieving our degree so it helped us a lot.

I: Anybody believes that they were kind of useless?

Student 433: No.

Student 442: No.

I: OK. Now have you ever had similar material to this before, in school or in other courses you're taking, something similar.

Student 440: Student 440. No it's the first time.

Student 438: Student 438: No.

Student 429: Student 429. I've been through this.

I: Yeah can you explain? Yes please.

Student 429: I actually took a course in university, the library course, it partially talked about this idea of critical thinking but not as extensively as we did through the English course. I've been through this procedure ever since Grade 9 in school, since I've been in different various

schools. So I've been through the procedure of critical thinking, critical analysis, distribution of the text and the information, that's it.

Student 442: I'm Student 442. I have never used such information before.

I: So it was new to you?

Student 442: Yes. OK. Yes Student 433?

Student 433: We used to take them at university …

I: University?

Student 433: At school, like how to write a persuasive essay, the counterargument, I've taken also logical fallacies, yes.

I: So you've taken them all?

Student 433: Yes.

I: OK. Anyone else?

Student 430: Student 430. At school, English was basic and we didn't care a lot about analysis, so it's all new here.

I: In other courses?

Student 430: No. my courses are mainly maths.

I: In maths?

Student 430: No.

I: Anyone else? No? OK. In general how satisfied are you with the lessons and if you feel they weren't satisfactory, now how can you improve them?

Student 430: Student 430. I felt I improved a lot because even my grades were rising through the semester so I'm so happy.

Student 438: Student 438. Me too like when we first started English I got on the essay 50 and throughout the semester my grades were increasing until I reached a 78 in the essay.

I: OK.

Student 440: Student 440. The same. In the beginning I was 58, 60, now it's 75, 78, so I improved.

Student 442: Student 442. I'm satisfied because I never passed my English courses, but now I have high grades.

Student 429: Student 429. I believe they were very good for 102. They actually prepare you for 203 as I know from my friends. They actually went to 203, they ask me for help about certain things, so I believe they're very good, and I recommend that they actually these parts of critical thinking to other classes like they might be standard for 101, 102, 203.

I: Student 433?

Student 433: Yes I'm satisfied since throughout the course my grades improved a lot and I was taught how to write a research paper, a documented essay, that will help me in further years.

I: OK.

Yes Student 440?

Student 440: As Student 429 said, 203 students they don't know how to uhhh the information we know.

Student 429: Student 429. The list of references, how to actually believe the information that they're reading, I have my friend writing an article in 203, she just read the information online and didn't actually study the website by itself and in the same time in her article she wrote a contradicting idea, maybe if I didn't take these lessons I wouldn't actually notice the contradiction.

Student 440: They have a lot of difficulties in 203.

I: OK. Yes Student 433?

Student 433: I think that every person, every student that enters the university should take 102 because it's the basic and it teach you a lot of important and interesting things.

I: OK. Now do you think the teacher's teaching style matters in the delivery of the content?

Student 438: I didn't understand the question.

Student 429: Yeah.

I: Yeah. Does the teacher have, play a role in delivering the material, in teaching the material?

Student 438: Yes of course.

I: OK?

Student 438: The teacher plays like 60% of the role.

I: OK. How?

Student 438: Because she has to be smart and know how to uhhh [Arabic]

I: To deliver the message?

Student 438: To deliver the message in a correct way to the students.

I: OK.

Student 438: Because she might know everything but she might deliver the message in a wrong way to the students.

I: OK. Student 433?

Student 433: The English class, it should be interesting to the student, the student must not be bored, so he should always be focused on the material that the teacher talks about.

I: OK.

Student 430: Student 430. The teacher should help the student to improve his difficulties in English.

I: Yeah.

Student 429: Student 429. I believe the teacher actually plays a huge role delivering the message especially in these lessons of critical thinking if you actually put practical thoughts, practical practices to the student he would actually understand the ideas, the student can always go home and read and research by himself but we all need guidance in a certain way, so the teacher plays a huge role.

Student 440: Student 440. The teacher's role is very important because if the student doesn't understand and get the information he won't care about the course.

I: Yeah.

Student 442: Student 442. The teacher play a very big role because if the student does not understand something he needs a teacher to uhhh explain the topic and the information needed.

I: Anyone else on this? No? OK. Do you think the teaching of critical thinking should be done explicitly as a separate course or it should be integrated in all lessons at all levels at university?

Student 429: Student 429. I believe it should be integrated in all lessons in all levels because as I said before I've been through critical thinking lessons in school but it's also always a good way to revise to practice more because practice makes perfect.

I: Yeah.

Student 438: Same thing.

I: Student 438 you agree with Student 429?

Student 438: Yes.

I: OK.

Student 440: Student 440. I agree also with Student 429 because in every level we discover something new about the topic, about critical thinking.

Student 430: Student 430. But it shouldn't be the same for all the faculties because the need of an engineer isn't the same as the one who is doing literature, so it would be like specific for …

I: For each major.

Student 440: Student 440. Everyone needs this information not only for his major, for everything.

I: OK.

Student 433: I agree with Student 429 because learning critical thinking it increases the ability of the student to analyse more in all the majors not only in English, in biology, in everything.

I: OK.

Student 429: Student 429. But I believe like Student 430 said if we were more specific in critical thinking for each and every single major maybe it would serve better to the student because some students need like a specific guidance how to use his or her critical thinking in his major maybe because now in English we're teaching critical thinking as a general idea as something maybe vague for some students, maybe they don't know to use them in their actual major. If it was specific it might greatly help.

I: Yeah.

Student 440: Student 440. And we shouldn't repeat the same information in every level.

I: Why? It will be boring?

Student 440: It will be boring.

I: OK.

Student 442: Student 442. I agree with Student 429. It should be integrated in all lessons.

I: OK. How important is it to you? How important do you see critical thinking is?

Student 442: Student 442. It's very important. It helps us in our daily life and

I: How?

Student 442: In communicating with people and knowing how to think, in our daily problems.

Student 433: It helps us also in reading, when you are reading a text like in any text in an article or also in a book how to understand it, how to understand a paragraph, how to analyse it, it helps very much.

Student 430: Student 430. We need to do a lot of research in our studies so this ability helps us have even better research.

Student 429: Student 429. If critical thinking wasn't important enough, it wouldn't be found in standardized tests for entering any college and university. Critical thinking helps us in various ways, broadens horizons of the student, whether academically or personally. It's an essential aspect actually for a person's life.

Student 438: Student 438. It helps us also in our daily life and communicating with other people to know what to believe what they say if it's reasonable or not.

I: Yes Student 440?

Student 440: Yes as they said everyone should know how to think how to separate what's, what we can use and what we can believe and what we can't.

I: Yeah. Anyone else on this? Anything you would like to add? No? OK. Thank you for your time.

Group interview with experimental teachers

Date : May 27, 2015 - Duration: 40 minutes 3 seconds

Interviewer – Teacher 2 – Teacher 3 – Teacher 8

I: OK thank you for participating in this group interview. The aim of this interview is to hear your opinions on the critical thinking lessons that you gave this semester. Your responses will be kept anonymous and the first question is: How did you find the material in terms of difficulty? How did you find the material in terms of difficulty? Teacher 8?

Teacher 8: I think that, that the different activities had different levels of difficulty but at least from the students' points of view from their perspective, right? I felt that at times maybe other factors played a role in the degree of their willingness to participate but they did express explicitly their ehhh acceptance of certain activities more than the others, right? Have you felt this?

Teacher 3: Yes, I think that the level or the difficulty that they found maybe just topics they hadn't covered before, information they hadn't really thought about before, but as the lessons were designed themselves they were not too difficult had they been following what we were doing with them in class.

Teacher 8: Aha.

Teacher 2: Well sometimes, only a few times language at times we needed to explain a few words maybe, a few expressions, some of them would ask about the same word over and over again I swear [laughing]

Teacher 3: Yes.

Teacher 2: but I think because this was not given as a test or anything, it was after all a kind of class discussion activity so they were free to express this. We could explicitly explain and facilitate that. For the level I would agree that some activities needed more thinking and drilling from their behalf.

Teacher 8: Yes.

Teacher 3: But I feel that even the more difficult tasks had they been paying attention when we did the tasks prior to those they would have had enough foundation to at least be able to do them if not as well as other students they could still get the task done.

Teacher 8: Right, so the level of interest was linked in a way also to the level of difficulty in their mind

Teacher 3: [interrupting] Yes as well.

Teacher 8: and as we progressed I think things were becoming smoother

Teacher 3: [interrupting] Yes.

Teacher 8: more natural for them and I did feel that the critical button in their head was turned on somehow, so it wasn't an alien feeling for them. Towards the beginning they were not really sure what they were supposed to do

Teacher 3: what we were doing, yeah.

Teacher 8: but towards the end it was kind of more autonomous I think.

I: OK. Yeah. Anything else?

Teacher 2: No for the skill, I think yes maybe towards the end it's true that they were able to answer maybe and feel more confident upon answering and they were more or less aware but my only concern is how well they transfer this … [laughing]

Teacher 3: That's my worry also.

Teacher 2: so maybe you're following the question.

Teacher 3: How much they will retain.

I: You mean how much they will use this later on once they finish the course?

Teacher 2: That's what I worry about because

Teacher 3: How much they'll actually realize that what they've done now is applicable elsewhere.

Teacher 8: Ummmm

I: OK.

Teacher 2: Yeah not just elsewhere. Now for the presentations I've had this I wanted to tell you they still I think make assumptions, having forgotten in a way what we were discussing you know throughout the semester. Like for example car accidents and alcohol, so they would say something about the number of car accidents without really showing me what proves the link between drunk driving and car accidents. The same happened for death of athletes today so many athletes die so he would say that's because of supplements so "how can you say this is because of supplements" "are you sure" "is it really a cause or a correlation" so I had to remind them, of course some, you know skilful ones [laughing] or witty ones were able to tell yes I saw this or that study I'm not really sure I wouldn't know because their purpose after all is to show me they have enough support. I think they're privileging this part you know how accurate their research is.

Teacher 3: Aha

Teacher 3: Aha

Teacher 8: So you're saying that maybe over one course it wasn't enough maybe?

Teacher 2: Not just this no what I'm saying given the time limitations their purpose is to show me I have enough support for this argument without really digging deep and seeing, you know, what we were asking them to analyse throughout the semester what we are asking them

I: When they are left on their own they don't really look.

Teacher 2: Yes exactly.

Teacher 2: Exactly.

I: For example assumptions because that's not their concern now their concern is to impress you with the number of studies they found no matter what the studies are.

Teacher 2: Exactly. That's what I meant. I think that's what I meant.

Teacher 8: We are maybe better critical thinkers we believe that we are and we should be because we are their professors but sometimes we do assume things right?

Teacher 2: We all do. Yeah. It's very hard to tell.

Teacher 8: Sometimes I'm talking to Interviewer and I'm telling her and I would tell her something like, "I have such a terrible headache today. It must be the weather" and she'd say "Remember assumptions? Remember what we talked about?"

[Teachers laughing]

Teacher 8: so maybe we overdo it and we don't even realize it so it could be in our culture maybe. It's really imbedded in the culture so it's difficult for them to get out of that ehhh mode.

Teacher 2: Yeah yeah.

I: It depends mainly on what their objectives are, the objectives

Teacher 3: If the objectives are not to focus on assumptions or fallacies they don't.

I: So when you tell them focus on this they might be able to do this at the end of the semester maybe.

Teacher 2: Maybe if that was the intent if they knew that they were going to be praised or given

Teacher 3: I think they also need a clear prompt. Exactly what is it we want them to look for.

Teacher 2: Yeah exactly.

Teacher 3: I don't think we can just give them something and they on their own find assumptions or fallacies.

Teacher 8: But after you remind them to

Teacher 3: After I tell them look at fallacies yes they would find them.

I: It's what you [referring to Teacher 8] usually do because I observed your classes and she would always tell them "Push this critical thinking button today", so it's like you need to keep on reminding them.

Teacher 2: It's something you need to switch on.

Teacher 8: OK. I just remembered one particular lesson that they found really difficult and I had to walk them through it. Otherwise there were lessons that they thought were a little easy and we finished faster than anticipated but overall if you just, you know, take a quick overall like an overview I think it was balanced in a way maybe one difficult lesson maybe one easy lesson and the rest were kind of fair.

Teacher 3: In between.

I: OK. Yeah. Anything else on this? No? Ok what do you think of the amount of the material?

Teacher 3: I think it was good. As an introduction to because in the end they hadn't been exposed to it before so I think as kind of a way to get them more informed and aware of it I think eleven lessons were good. They recovered a lot of the critical thinking skills.

Teacher 8: Aha

Teacher 2: and given the amount of hours given to the course I mean it seems fair because more would be maybe harder to tackle you know for us as, it would be harder to tackle and less might be a little bit too little you know too few because they need reminding.

Teacher 3: I think

Teacher 2: the number seems appropriate

Teacher 8: Or we can always follow up like have a personal reminder ourselves to keep following up with them. I remember, Interviewer, you told me every time you're not doing my activities but you're actually discussing any topic and it comes up remind them to link that

Teacher 3: And I used to do that

Teacher 2: We do

Teacher 2: to assuming. I would ask aren't you assuming a little bit.

I: So they were reinforced? The skills were reinforced?

Teacher 3: In addition to the eleven activities we also, I at least reinforced it throughout other things we read.

Teacher 2: Right

Teacher 8: They shouldn't be given in isolation

Teacher 3: Yeah

Teacher 8: There should be a foundation to something else that should be carried on throughout the course. I personally love them and I would love to incorporate them in my teaching from now on emmm regardless of the study.

Teacher 3: Yeah.

I: OK. Anyone else?

Teacher 3: I agree with that. I think that they really helped the class a lot and think had my students been more engaging it would have been a lot more successful

Teacher 8: Yes absolutely.

Teacher 3: I just feel my specific group of students were just so demotivated in general from the beginning of the semester that I feel they didn't take as much as they should have or could have taken from the activities.

Teacher 8: Yes mine too. I think it's a general problem.

Teacher 3: I think it's their overall attitude to how they view it that

Teacher 2: Aha

I: Teacher 2 had two groups

Teacher 2: I would say something else. I would say that some people don't like to read that much. It's not the activity, it's maybe if I'm allowed to give my opinion about that it's maybe varying it in a way when it's not always something really read, sometimes heard.

I: OK. This is my next question basically.

Teacher 2: Sometimes they might have this block before reading.

Teacher 8: Oh! I never thought about this before!

Teacher 8: Yeah! That's amazing!

I: If you were to plan a similar project what would you modify so Teacher 2 has something, so instead of having, OK, a text to read

Teacher 2: People are either kinaesthetic

I: what would you modify?

Teacher 8: So maybe they can watch a video that can trigger some

Teacher 2: Taking into consideration the different learning abilities of students not everybody is a such a good visual learner you know such a good reader

Teacher 8: Right. Right.

Tecaher 2: So and they would see it in different contexts they would know that they can decipher this in a speech they could see it in you know in written work, they could hear it, they could, I don't know in different ways.

Teacher 8: Yeah and they do welcome variety because I remember when Interviewer suggested an introduction to I think one of the earlier ehh lessons I, I joked and said I pointed

to one of the students and I said "Student I saw you coming to the university today in your red Ferrari. Where did you get it from? I didn't know that you were that rich" and we started joking about it and then we talked about assumptions because what do you think he got it from and they started saying "Maybe he stole it. Maybe he rented it to, you know, to show off", so they loved the approach because it was a little bit different from other activities so

Teacher 3: I think they engage more into discussion than actually in reading the activity and

Teacher 2: Yeah sometimes I have to read aloud part of it just so they would not feel alone

Teacher 8: Yes, but that's also something unfortunate.

Teacher 2: Of course [laughing].

I: Yeah I understand

Teacher 2: Because that's what happened with me in the last activity. "No! We don't want more reading. No!" [laughing]. There was a class that expressed it, you know, they expressed and then they wouldn't find the fallacies either because they had this distance and this refusal of you know having to read.

Teacher 3: My students from the fifth activity were sick of reading, you know.

[Teachers laugh]

Teacher 8: PowerPoint presentations could work if you show them a succession of pictures with a certain point of view right?

Teacher 8: Everything

Teacher 8: I never thought of it before but now you're mentioning it I think you're absolutely right.

Teacher 2: Yeah different approaches. We can still dig there. We can reach them on a deeper level probably.

Teacher 8: Definitely.

I: OK.

Teacher 8: You got me excited now.

[Teachers laugh]

Teacher 2: I want to see [laughing].

Teacher 8: I'm thinking about the visuals.

I: No we had one video basically and they loved it

Teacher 3: They loved it.

Teacher 2: Yeah they did. Actually they did love the video.

Teacher 8: It was amazing!

Teacher 2: Yeah good point because I was talking remember there was a video.

Teacher 8: It was the speaker the African Nigerian lady.

Teacher 3: They really enjoyed that one.

Teacher 2: Very well-chosen.

Teacher 8: Yes that was excellent and they had amazing answers.

I: OK what are your perceptions of students' receptivity to the material? [Laughing] I remember Teacher 3 was giving me updates on a daily basis.

Teacher 8: Look at her face.

Teacher 3: I mean with my class?

I: Yes.

Teacher 3: Ahhh! In one ear or the other with the majority of them. Just because they didn't take the time or put in the energy to focus on it the way they should have. Those who read the material and actually answered the questions with a little effort were able to retain information from one activity to the other but the ones who never paid attention from the beginning or paid attention every other activity it was obvious towards the end that they still couldn't do anything on their own without me kind of feeding it or forcing it out of them.

Teacher 8: I have a funny observation. I used to love when you come and observe me because the moment you entered the classroom they are disciplined [Group laughing]

Teacher 2: [Laughing] Yes.

Teacher 8: They're quiet

Teacher 3: It would have been great if you came.

Teacher 2: Yeah it would have

Teacher 8: The idea

Teacher 2: Now we feel jealous.

Teacher 3: Because mine were like zombies half the time

Teacher 8: I swear I told them one day I should videotape you on the day Interviewer is here and on the day she's not here because there is a huge difference

Teacher 2: You see it's not you. There is something

Teacher 2: It's variety. They crave variety that's it.

Teacher 8: I think so and because you know you're there you appreciate the jokes that they make and they feel your presence I don't know it just made a huge difference but

I: Even though they never showed it. They never showed it.

Teacher 8: They never showed it to you but I felt it.

I: I felt that this is how they act all the time.

Teacher 8: No it's like it's the best the peak of their performance [Teachers laugh]. So on the days that you were not there I thought compared to the days they have to write and do the regular activities they were surprisingly receptive of the activities, they liked them. The moment they saw that I had handouts and we had a different activity they were excited about it

Teacher 3: You see mine were the opposite.

Teacher 8: and curious. Yours were the opposite?

Teacher 3: As soon as they saw handouts in "Miss is that another activity? Miss what is this about? More assumptions Miss?" and I would say, "Did you even pay attention the first time that I gave them to you because even though we had done maybe two on assumptions and two on fallacies and about studies logically it would be that the second activity will be easier for them but the second activity it was as if it were the first activity all over again because they didn't pay attention the first time.

Teacher 8: Oh. So lucky with the very nice group of students [laughing]

Teacher 3: Yes I had maybe two students who have been consistent all throughout with the amount of effort they put in and they also had a lot of absences

Teacher 8: Aha

Teacher 3: and I've noticed it's the same students who were absent almost every time

Teacher 2: Yeah yeah usually it's the same student

Teacher 8: Yes

Teacher 3: But it wasn't on purpose because they wouldn't know that the activity was coming.

Teacher 2: No but usually a person was absent more than once a week is usually

Teacher 8: somehow

I: It's like Student in your section I remember she was

Teacher 8: Yes

Teacher 3: And I have Student missed a few of the activities

Teacher 2: Well I felt it was the last week the last week or two when they were really bored with everything I don't think it was just the activity but the activity reminded them that they needed to focus a bit. Ehhh and I remember always having to think how would I introduce it in a more attractive way for them. Well at one point I told you I had it look like a debate what they had about the vending machines so I had people who would say something that would be like a counterargument somebody else saying a rebuttal and then hearing different sorts of rebuttals.

Teacher 3: you see that was the article

Teacher 2: And that worked very well. That worked very well.

Teacher 3: My students could not grasp that activity at all

[Group laughing]

Teacher 3: At all.

I: The vending machines?

Teacher 3: The one about the vending machine.

Teacher 2: There are words that I explained like a zillion times.

Teacher 3: Like why we would you be with or against

Teacher 2: Silly

Teacher 8: They just, they didn't get it ha?

Teacher 2: yeah but once I turned it into a, what looked like a competition,

Teacher 8: even when I did that they still couldn't grasp the idea that for the counterargument there is a rebuttal

Teacher 8: But listen!

Teacher 3: For this argument there is another side.

Teacher 8: We should keep in mind that when we talk about our students in general we are talking about a class as an average but there are students that are consistently do not participate

Teacher 3: Yes right.

Teacher 8: At all

Teacher 2: Yes

Teacher 8: Like I would never be able to guess what's going on in the minds and they get it or not because those same students are the ones who come and ask me towards the end of the semester "What is a rebuttal?" or "What is a thesis statement?"

Teacher 3: Yeah.

Teacher 8: like those kinds of questions

Teacher 3: Exactly no.

Teacher 8: So you never know for those particular activities

Teacher 3: And that's the thing. Each activity didn't have the same receptiveness from that same particular student. He might have been paying attention this time not paying attention the next time or the time before or, so even the students themselves they didn't have the same consistency throughout.

Teacher 8: Right

Teacher 2: No sometimes some of them are not really so fast when we are giving them you know a traditional lesson essay focused lesson but they would do very well with discussion I remember having written that somewhere so it depends sometimes you would be surprised that the ones you would not expect to participate would be participating quite well and others who

Teacher 3: I have this sometimes

Teacher 2: so it's very hard to generalize I wouldn't generalize, but I think when I try to vary the way of giving it I reaped better results honestly.

Teacher 8: Aha. I think some of my students were excited about the idea that their decision, I mean their opinion matters like because I will always ask them about they thought, what they felt, their personal experiences to share, so they got excited about that in particular but again we cannot generalize it on all students because now maybe at least two of them in my mind that wouldn't participate at all.

Teacher 3: Yeah

Teacher 8: Even if I prompt them

Teacher 3: I have some students who never engaged in any of the activities regardless of difficulty or interest or anything and they just didn't want to give any feedback or include anything.

Teacher 8: Aha

Teacher 3: I don't even know if they understood or not because they never voiced whether they were grasping what

I: This is something you also raised at the beginning of the semester when you have silent students.

Teacher 3: Yes

Teacher 2: I know

Teacher 3: I don't know whether these silent students really got it didn't get it you know I just

Teacher 2: Yeah but you know I discovered towards the end that sometimes those who expressed themselves would all of a sudden tell you well that wasn't so much fun so it's not really an indicator by itself and I remember Interviewer having told me why would you think that they're not really grasping what you're saying

Teacher 3: Yes I don't think that

Teacher 2: They might but they are not very expressive

Teacher 3: Exactly yeah.

Teacher 2: Or they're not extrovert, something like that

Teacher 3: So even when they're receptive, how they receive, I can't judge it unless they've voiced it to me that they got the information. If they didn't voice it to me they might have gotten it and didn't tell or share.

Teacher 8: If you call their names would they usually?

Teacher 3: They would shake their heads and you know I don't have anything to say but they wouldn't say whether they understood it or not.

Teacher 2: Maybe it will be a good idea to assess them on that skill, that particular skill.

I: Motivation maybe, just motivation, they're not motivated maybe.

Teacher 3: Or again just the type of student that doesn't like to give their opinion in front of a group you know

Teacher 2: Somebody told me today I forgot to mention, "What does it have to do with my major? Why would I answer Interviewer that it was beneficial if it has nothing to do with my major?"

Teacher 8: That reminds me.

I: So he doesn't have to say it's beneficial.

Teacher 2: Yeah. I told him fine. Maybe it's not so much for your own, let's say, particular interest or job or whatever but if you want to talk about the course our aim is persuasion our aim is argumentation

Teacher 3: Aha

Teacher 2: And what we're doing is helping you to be a better debater, a better you know

Teacher 8: A better person in general. It doesn't have to be a better student I mean

Teacher 2: Well I didn't go that far.

[Group laughing]

Teacher 2: because then I wouldn't convince him

[Group laughing]

Teacher 8: They just want to see the direct

Teacher 2: The direct impact yeah

Teacher 8: That's it. They don't care about the long term.

Teacher 2: Some of them yeah

I: We move on?

Teacher 8: We move on.

I: OK. Do you think that similar material should be taught at all English levels or should it be taught in a separate course? Do you think that critical thinking skills should be done in one separate course or

Teacher 8: No definitely not

I: it should be integrated at all English levels?

Teacher 8: Yes definitely.

Teacher 2: Both. I can see it as a separate course [laughing]. Yeah I can see it as a separate course. Why not?

Teacher 3: It can be.

Teacher 2: For all majors.

Teacher 3: Definitely

Teacher 2: For all majors. That could be a separate course because you just said that it's important for a better person.

Teacher 3: Yes but I think it can

Teacher 8: But integrated within a course

Teacher 3: It can also be integrated.

Teacher 2: Both

Teacher 3: Even in 203 with the critical analysis

Teacher 2: I see both ways

Teacher 3: We could feed in more fallacies

Teacher 2: Of course.

Teacher 3: Because in 203 we don't teach them fallacies. We very easily could

Teacher 2: Yeah

Teacher 3: and probably should

Teacher 2: So let's say it's needed in different courses that they're taking but also it could form a course

Teacher 3: It could by all means

Teacher 8: I'm just worried that if it's an entity by itself it might be too detached, detached, repetitive,

Teacher 2: theoretical

Teacher 8: yes and they might get bored because remember we only tried it integrated in the course and even with that we had challenges so even though it was not you know like a course by itself they many students did show us sometimes that they were resilient

Teacher 2: Yeah I see but

Teacher 8: Imagine this resilience in a core course.

Teacher 2: Yeah maybe maybe but it depends because like CS is a separate course you have separate things so I can see it separate and because you were mentioning it being, seeming as

detached well I thought some of the activities had pretty much detached themes and topics, so for me they were every time detached one way or another because they were never linked to the topic that we were dealing with in class. They were always somehow detached and one paper would not resemble the other in terms of choice of material, of choice of text, themes and topics they were always

Teacher 8: It was not like a sequence you're saying?

Teacher 2: Yeah.

Teacher 3: I think if it should be its own course it has to become a sequence to work.

Teacher 2: Yeah exactly. Then it could be more thematic or linked to so imbedded within a course is really needed yes

I: You mean a separate forming, a separate course?

Teacher 2: A separate that would be interesting but having it imbedded in 102, in 203

Teacher 3: It's more applicable I think.

Teacher 8: I just worry about the message that we might convey to students that this is something that you work on you succeed you move on you don't need it anymore whereas if we make it imbedded you know

Teacher 3: It goes on with them.

Teacher 8: it goes on with them and they learn how to use it as skill in their life so the message also I totally agree with you know some of what you said but again I'm just worried that ehhh.

Teacher 3: It will be too distant from anything else they take.

Teacher 8: Yes I don't want them to think that it's something like CS to pass and move on. It should be part of their life in general to become better students to become better people

Teacher 2: Yes maybe but I doubt it.

Teacher 8: [laughs]

Teacher 2: Maybe it could be but as the opposite we don't want them to do it because this is important to pass 102

Teacher 8: Aha

Teacher 2: Also this is important for all university levels students come on

Teacher 3: Or you need it in 203 and you need it in 204

Teacher 2: Exactly and not only this. Many other courses.

Teacher 3: Yeah.

Teacher 3: Many courses. You need it in CS, you need it in psychology, you need it in any course you take

Teacher 2: Yeah

Teacher 3: Realistically speaking

Teacher 2: Exactly

Teacher 3: They just haven't been able to make that connection in their head. This is something that you know

Teacher 8: You know you're right. If you want to approach a student, you can't tell them it will make you a better person because then they won't care

Teacher 2: But we know that

Teacher 3: In your major it matters to the major

Teacher 2: a better communicator, a better you know debater, a better

Teacher 3: He will say I'm an engineer

Teacher 8: Right

Teacher 3: Yeah.

I: OK. Ehhh. Did explicit teaching of critical thinking skills differ from your previous ways of teaching?

Teacher 8: Oh. Definitely.

Teacher 3: Yes.

Teacher 2: Well yes because we put in more time this time more focus

Teacher 3: I focused more on it. I gave them more terminology than I would have. I

Teacher 8: It's just. Somehow it depends on the different teaching hats I think. I had to be in that persona I had to remind myself OK today is a different lesson

Teacher 3: And I tried to fish more out of them when I was in activity more and in critical thinking mode. Even myself as a teacher

Teacher 8: Yes taking more than giving. You need to illicit you need to make them think you need to make them do the connections on their own to make those connections between things. Yeah I think it's a different type of skill as a teacher

Teacher 3: with a certain focus in mind, and it changes everything I do with them

Teacher 2: Yeah a different persona, a different mode.

Teacher 2: Yeah we were more focused. Let's say we were that was our main primary target whereas maybe

Teacher 3: if I were reading a sample essay with them, I wouldn't have them think assumptions made in this essay. Yeah I would tell them evaluate the content, evaluate the types of sources used, evaluate

Teacher 8: Language mechanics

Teacher 3: Exactly

Teacher 3: I would never tell them, "Is it well-rounded, is it, you know

Teacher 8: Right, right.

Teacher 3: Where did the study come from? Where did the study, you know, I wouldn't have focused on all of that

Teacher 2: It's like a more of an in-depth analysis of more abstract

Teacher 3: And more abstract definitely

Teacher 8: In-depth and abstract, definitely

Teacher 2: Yeah yeah

Teacher 8: That's what I was thinking about it and I couldn't find

Teacher 2: Yeah you wouldn't do it every, in an everyday teaching

Teacher 8: And it's more tiring for the teacher but for me I thought it was more exciting because it was, like Teacher 3 said, it reminded me of those things that I usually disregard not intentionally because they're not my focus

I: Maybe because there is no time

Teacher 8: There is no time

Teacher 2: The focus is more on something else [laughs]

Teacher 8: Yeah it kind of forces you to elevate yourself and your students

Teacher 3: To get out of that

Teacher 8: To that level and you can feel it, you can feel it when they're thinking and trying to analyse and trying to think how that abstract concept relates to their lives in general and we try to help them feel it that it's not that abstract on a daily basis you encounter those assumptions or issues or you need to think this way so I think yeah definitely

Teacher 2: Which also prompts me to tell you that I also I was thinking because we're giving it that much time and focus and they're supposed to show what they have acquired what they can you know think of how they can evaluate I thought of it in a way OK so we should acknowledge their effort somehow when they do it and it's not in the rubric

Teacher 8: Aha

Teacher 3: Aha

Teacher 2: It's not in the rubric. When we have 50% for content we know that the relevance of what they're saying is important how strict

Teacher 3:

Teacher 2: But somehow I see something has to be acknowledged by the teacher by the system also

Teacher 3: Yes.

Teacher 2: Well well-done you have been working convincing the reader by avoiding

Teacher 3: because at the top of every activity the first thing that once I give them a paper "Miss is this graded?"

Teacher 8: Ohhh!

Teacher 3: Yeah because they and so many of them when I would say, "No it's not. It's just an activity.

Teacher 2: For them, they don't have feedback when they're doing a job or

Teacher 3: Yes. That's when they shut down on because they think, "Well it's not graded, so I'll just sit here. If I do it or I don't do it, it doesn't matter."

Teacher 8: So maybe we should somehow

Teacher 2: praise it

Teacher 3: I think it should be in the future incorporated into the actual

Teacher 2: Rubric

Teacher 3: assessment, part of the assessment

I: In their essay? When they write essays?

Teacher 2: two separate. This is activity time but now the graded time now is the real time for the course. We want really to transfer, to show us

Teacher 3: I also had students ask me, "Miss what does this have to do with the essay I'm going to write

Teacher 2: They always ask if it's graded

Teacher 3: "I thought we had a term paper so why are we doing this activity now?"

Teacher 8: Yeah I kind of anticipated that and I remember I told them

Teacher 3: Yeah I told them, "It helps you write a better essay." But still that's enough motivation to get to focus when they know this is not graded.

Teacher 8: Sure. Right. Right. But I think also we should that makes me think that I should have designed the classroom activities in a more motivating way, meaning that we have had some incentive like "Let's split into two groups or let's split into

Teacher 3: Even when I did that, even when I split the activities into groups and pairs and different strategies, if they weren't motivated they weren't and once again those that knew that they had no grade attached to it felt no desire to partake.

Teacher 8: What a horrible thing we have to go through [laughs].

Teacher 3: That's the first question I was asked every single time I would give them an activity. "Miss is this graded?"

Teacher 8: This is extrinsic versus intrinsic motivation, so no intrinsic motivation.

Teacher 2: Well at times I think a different approach worked for them. A few times I would write my comments on the paper I would give to Researcher. Sometimes doing things a little bit differently or having things differently would work

Teacher 3: But even when they know I was making notes of things and some of them noticed I always had this paper with me so once they asked me, "Miss what is this?" and I said, "It's my feedback form on the activity", so they said, "Oh you're grading me?" and I said, "No I'm not grading you. It's just a feedback form so they confirmed the idea that that was not graded.

Teacher 8: Aha.

Teacher 3: So feedback means nothing to them as long as it's not graded

Teacher 8:

Teacher 3: What matters to them is the number or a percentage, it's all that matters to them.

I: Do you have any suggestions on how students' critical thinking skills can be improved?

Teacher 8: Their thinking skills? How they can be improved aside from the activities that we did?

Teacher 3: We need them to be reading more.

Teacher 8: Yeah definitely.

I: They should read more?

Teacher 3: They should be reading more and again that's just another thing that the course time doesn't allow us to do. Any reading we do is just reading something to use in the essay, but even when I define sources in their term paper they're reading just to figure out if and use it. They're not reading it to assess it, so maybe I was thinking if next semester when they present their presentation of sources if the sources come with more of an assessment. Now they evaluate the source a little bit, but I think that if we focus more on that, that way it becomes graded.

Teacher 2: What did you mean? What would be the difference?

Teacher 3: Have them read more and understand that every time you read you read to evaluate and assess and to think critically and not "Does it give a statistic I can throw into my essay"

Teacher 2: Aha

Teacher 3: and I think if we work out this into the course it can integrate what we do in the activities more

Teacher 2: I thought that even if we have more like sometimes we do with them an essay to edit

Teacher 3: But even then they're focusing on editing

Teacher 2: Yeah. No no. What I meant was we could give them a flawless essay with no language issues and tell them we are editing for fallacies or specifically ask them to look for these wrong things that they were trained to see whether they are there or not

Teacher 3: and that's the thing we need them to read

Teacher 2: And evaluate the sources of this essay that we're reading together, so that's maybe one activity because you're asking for different suggestions. That's one activity that

Teacher 8: But that brings you back to the main issue

Teacher 3: they need to read

Teacher 2: But we are giving them sometimes things to edit but instead of only having it focused on

Teacher 3: focus on language more

Teacher 2: focus on content

Teacher 8: I tried a couple of times with 102 students and I gave them ehhh I gave them essays that were written by former students and they had to problems with the logic but eventually they don't read. Seriously! Honestly! I would give them the essay I would give them time to read it and I wouldn't do it for them and I don't want to read it out loud because that's not gonna help and in the two times they did not read. I mean only maybe one or two attempted attempted but it was towards the end of the semester so maybe it was one of the reasons they didn't because they got tired towards the end. Emmm next time maybe I'll try to introduce them earlier in the course emmm but I couldn't really find a way to motivate them so that's an issue. I need to find a way to motivate them like there is a prize but it's like a psychological prize, maybe divide them into two groups and have emm prize but some kind of a psychological reward. We have to think many ways.

I: Teacher 2 any other

Teacher 3: I also think maybe the material when we have them edit something not just edit it from the perspective of where mistakes edit it from the perspective of what's wrong with the reasoning, what's wrong with the logic.

Teacher 2: Yes

Teacher 3: what's

Teacher 2: and for assessment I agree with you as well Teacher 3 that having to look at in-depth assessing it really, evaluating it, but then I thought it was maybe hard for them to do for all three articles they had to read maybe if we can do it as a class for one particular article maybe it's like show and tell, it's much better than asking them to do it and waiting for them to do it well. It's not that easy

Teacher 3: Ummm

Teacher 2: I think that most of us noticed that it's not easy

Teacher 3: But I think with the outside activities for those who

Teacher 2: It helps them more

Teacher 3: Engage in the activities. It should be able to help them

Teacher 2: It helped them more. Yes it did but you know when

Teacher 3: how much the students actually retain what they

I: Any other comments concerning the material like something I didn't cover you would like to add?

Teacher 3: No I think that overall the material was great, the way it was presented. I think even the order that we went in, the very logical sequence. I think for me it was just my students and their just lack of enthusiasm that. It's not something we can change or control.

Teacher2: I thought that the either-or could have been introduced a little bit earlier because towards the end I don't think that

I: What is it?

Teacher 2: The either-or fallacy that we noticed in the last one. I think that maybe it was a little bit too late for an activity. Maybe earlier apart from Activity 1, maybe earlier also would have been nice to see because I can see that it's something they often do.

I: OK.

Teacher 2: Either you do this or you're doomed

I: That was introduced in the first activity.

Teacher 2: The first. Maybe another one because there was a time when we focused on correlation/causation a lot. Then I thought this would've been nice to

Teacher 8: Ohhhh!

Teacher 2: to focus on by itself.

Teacher 8: sheet. Yeah I remember.

Teacher 3: In my class when I covered the first activity about fallacies I focused on either-or more because to me it is a major fallacy that they commit so I focused on it a lot at the beginning of the semester

Teacher 2: but there were so many so it would have been nice to see it again

Teacher 3: again

Teacher 8: You know I think something that would really make a big difference is the fact that we were all introduced to the materials for the first time

Teacher 2: Aha

Teacher 8: Some of us prepared

Teacher 2:

Teacher 8: we had a short time to prepare right before class

Interviewer – Teacher 14

Date : December 7, 2015 - Duration: 16 minutes 12 seconds

I: Thank you for participating in this interview. The aim of this interview is to hear your opinion on the critical thinking lessons that you gave this semester. Your responses will be kept anonymous.

Teacher: Alight.

My first question to you is: How did you find the material in terms of difficulty and in terms of amount of material? So they're two different questions.

Teacher: Let me start with the second part. In terms of the amount of the material I think it was very adequate. I did not think at any point that I was overwhelmed with the amount of material I was given. I actually was given 10 different task sheets to do which I conducted over ten sessions as recommended. I think the way they were spread across the semester made a lot of sense to me. I wasn't, I didn't feel I was rushed into anything. However I did feel at a certain time that one task sheet required, let's say, the whole session of 60 minutes, at a time that others did not require 50 minutes just like it's written at the top of the sheet. This does not mean that 50 minutes was too much or too little. It only meant it depends on the group dynamics that day. Sometimes there are factors that facilitate a certain task or activity that makes it very smooth the way it goes and it flows very easily. You would see that there is a lot of response from students, which makes the activity go faster, but overall I did not feel the number of task sheets and the amount was perfect. I didn't have any problem with that. Now the first part of the question was?

I: In terms of difficulty?

Teacher: Uhhh I had, I did feel there was some kind of, not overlapping, what's the word, differentiating kind of, or varying levels of difficulty. There was a level of difficulty. For example, I remember very well the task that had to do with stereotyping was something that they identified with completely. I think it has to do with the society they were born in and raised in. the Arab society and the Lebanese one in particular has this kind of context where people classify others according to certain categories and that's why the students, I felt, they immediately, not only they liked the activity, that's another matter, probably you're not asking about this at this stage, but they did uhhh become very much uhhh fused in the activity more than other places for example that had to do with whether or not the information comes for example from a reliable source or whether the information, there's, you remember the correlational one or the causal relationship one, they had a difficulty sometime discerning the nuances, the very subtle differences between one aspect and another. So yes I did feel that at times they identified automatically with the material and they were engaged in the process and they actually knew what I wanted them to do and at other times they did not. However, I

have to report this and I'm happy to report it that at the conclusion of the session they walked out with a certain understanding and I think the message was delivered and the task was accomplished, but it was not like crystal clear all throughout the session. It only waited until the end of the session for them to realize the importance of a particular aspect yeah.

I: OK. What are your perceptions of students' receptivity to the material? I don't know if you covered part of it now in the way you answered the first two questions. Do you think they received the uhhh, how did they respond in class? How did they react to this?

Teacher: Well, it was again, it wasn't something uniform. It wasn't something that I thought would be like repeated in every single session, like you know, there were 10 activities, sometimes certain factors you wouldn't really take into consideration, they do happen sometimes. To give you a very small example, at many times I had 12 out of 15. For me it was automatically in my head, it was 80% attendance, which means 80% of the class were there when I did the activity, but it wasn't the case all the time. I felt that when they were 12, they were more engaged in the activity. I was able to, which is funny, maybe, I don't know, which might be surprising, but when I had, maybe once or twice, of the whole 10 sessions, I had a full attendance, I felt that there was, as if somebody was relying on the one sitting next to him for answers. This affected their receptivity in terms of participation. Some of them were passive participants. Let's say if I don't want to sound very negative but most of the time they were passive. I had to elicit as, responses from them. But again it depends on the nature of the task that day. As I said for certain activities such as stereotyping, I don't want to repeat myself, they were more receptive than in others. I think it had to do with two factors being at play here: the kid of material being targeted that day and the number of students, the smaller the more engaged in the process. I think it makes a little bit of sense because I wouldn't think in a class for example of 8 to 10 people, if you're conducting that activity in around table kind of discussion, probably you would get more answers from them than the way they were sitting in class with all of them attending for example yeah.

I: OK. Now if you were to plan a similar project what would you modify in the material, like something you would remove, something you would add, something you would elaborate on?

Teacher: UhhhI did mention something in my comments when I was giving, I was asked to give my comments regarding each and every activity, I thought it was a very nice thing to do that I had a say, the conclusion of every single activity to give my opinion, my feedback some of the times was I wouldn't change any single thing. I think the choice of the articles, the ones that had to do with the reliability of sources and the ones that had to do with the correlation one was very adequate, uhhh the length of the text that they were asked to read was very appropriate for a 50-minute session, I wouldn't remove much, I would add probably something and I did mention in one of the feedback, I don't know if this is doable, I would add more of uhhh a scenario-based activities, which by the way did happen as a warm-up for the activity. Let's say we would write something on the board and have them think about something from a critical perspective. I noticed that students who are given tasks that have to

do with, for example, A walks into a restaurant, B says what are you doing here, he answers this and that, students have a kind of a better grasp of things when they read it in the form of a scenario, so in one of the activities I remember the first or the second one, I forgot, I mentioned in my feedback, if there were more scenarios like this one maybe different scenarios where students get together and actually look at the scenario, how A is talking to B, and what B is replying, and they would look at this from a critical perspective, they would identify a little bit better.

I: Now do you think that similar material should be taught at all levels, at all English levels, or now this kind of thing should be taught like in a separate course?

Teacher: No definitely I would say it's something that can be integrated in several course levels. I wouldn't be as hopeful as saying it should be integrated, not it should be, maybe it should, but the difference between it should, whether it should or it can be there is a subtle difference, critical thinking is an, or reading stuff critically, reflecting on them, should be an on-going process ever since the beginning of the learning process for talking about leaning a foreign language here specifically. It depends whether or not students can actually engage in the process, actually have something to say depending on the language level. I would say, for example, in courses such as 102 where they are actually doing this and in other courses, definitely in 203 and in 204 of course. This should be an integral element of course. I would also think at lower levels, I'm not trying to exclude all together the aspect of critical thinking in lower levels. It depends on how much students have the skill set and the mind set, the language skills needed to actually become active participants in the process because as you may well know if they don't really interact with you and have something to say, I mean it's not something like passive, read this, just tell me what you think and that's it, it's about some kind of dialogue between you and the student, the student and the other student, kind of group discussion, if their language will affect the way they relate to the material and have a conversation, it might be, I don't know if the word is counterproductive but it might be, let's say, limited, so yes there is some kind of language component related here. Of course ideally, in an ideal world, it should be integrated across all levels.

I: OK. Did explicit teaching of critical thinking skills differ from your previous ways of teaching? Have you ever taught something like this before? This amount of material?

Teacher: Yes I understand. That's a very nice question. I did. I did. I have to say and I'm happy to report. There are certain things. Of course I would never claim I taught all of what I've been given this semester in terms of sheets and task sheets and activities, but one way or another I did imply some of the stuff. It was implied kind of teaching. Definitely this semester it happened in a very explicit manner. It was also, it happened in a kind of conclusive comprehensive manner. What I did previously was like bits and pieces, partial kind of teaching. I did send particular messages to students at many times for example. I always advise them and encourage them to test or to think about, to examine the reliability of sources, the credibility of information, the bias of the author. I did mention these words in

class but I have to say these were just words that I mentioned, like we say in French en passant, which is like passing over the. I did not really stress this enough. This semester I felt that I consolidated it this and I actually triple underlined these expressions and made them become really aware, so no I did, yes I did have some kind of implied teaching before but it wasn't as explicit as this one, no, but I did send some kind of indirect messages previously yes.

I: Do you have any suggestions on how students' critical thinking skills can be improved?

Teacher: Of course. I would say uhhh the material that they are being given. It all starts from the planning process when we do plan our syllabus or syllabi across all the levels when we make sure that such elements are present in our material. Of course it's easier said than done. People would claim that they would want everything to happen but sometimes different factors come at paly and maybe make this a little bit difficult to carry on with, but of course the choice of the material, for example, what we offer our students, what kind of articles we present to them, what kind of questions we ask them in response to these articles, for example this is what we're doing bow as much as we can in 203, we're giving them longer texts to read, not that longer means better, but I'm saying a little bit more sophisticated kind of texts from journals, which we encourage them to respond on, think outside the box, answer not only in terms of reiterating what the author said but maybe to develop their own position, reflect on their own individual personal experiences when responding etc., so the choice of material is the number one factor I would say we would have to be very selective in terms of what we offer to these students, what kind of handbook, what kind of documents are we putting together from here and there in order to give them the best variety of choices, from different backgrounds, scientific, literary etc., from different sources of information, journals, magazines, newspapers, etc. The variety is key here because students need to be exposed to different types of sources and also topics because I've noticed that we have a tendency of course and this is probably the aspect of the argumentative nature of the course to do well on issues that have to do more with social issues, socio-cultural issues maybe, both in 102 and 203, because I have experience in both, then maybe on issues that more amount to or account for, I don't know maybe related to, pertain to aspects that have to do with more scientific aspects of their existence maybe not only socio-political or cultural whatever, so variety of choices of material from different sources and topics as much as possible, so yes we can have a say, we can positively affect the process.

I: OK. Anything else you would like to comment on? Something you would like to add that I didn't cover?

Teacher: Uhhh I would only say that we need training. Whether we like it or not when we're hiring people, when we, not we, when the people who are the proper channels, the people who are in authority, in the managerial positions who are higher up the ladder, when they offer teaching positions for these people, they take into consideration the fact that these people, for example, should be a minimum of holders of Master's degrees, some of them

come to us from other institutions with the doctoral degrees, PhDs, EdDs, etc., but still it shouldn't be taken for granted that these people know what they need to do. It depends on which university they graduated from, what kind of educational formation they have got, not only in their graduate and post-graduate years but also maybe the kind of formation they've got at school, knowing how the situation really is in our schools in Lebanon and you know because we are a little bit aware of what's going on with our own kids' learning and with us when we were students, I would say there should be some kind of in-service training for these people, seminars, tools-of-the-trade workshops that would offer these kind of faculty some kind of things to ponder, to think, to consider, maybe the mere idea of having them think about this and talk to each other about it and start maybe integrating it in their own syllabi, whether in multi-section courses or not, is already a starting point.

I: OK. Thank you for your time.

Teacher: Thank you. Thank you very much.