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Teaching Critical Thinking Skills in Large Classes

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Abstract

Developing learners' critical thinking skills (CTS) has become the goal of education in general and higher education in particular. This is mainly due to the spread of technology, the change in job market requirements and the belief that CTS improve the civic, personal and professional life of individuals. Multiple definitions were given to the term 'critical thinking', but Ennis (1985) is adopted here, and Facione's (1994) classification of CTS is used as a basis. It comprises six major skills, specifically interpretation, analysis, evaluation, inference, explanation and self-regulation, each of which includes sub-skills. There are three approaches to teaching of CTS: Process, content and mixed approach, and a number of classroom techniques are used, three examples of which are described, especially questioning, argument analysis and problem solving. When CTS are taught in large classes many challenges arise. These are classified under three categories: Pedagogical, organizational and affective, and finally three solutions are suggested, namely changing the teaching method, using Information communication technology (ICT) and working with teaching assistants (TAs).

Key words: Critical thinking skills; Large classes; Teaching methods

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INTRODUCTION

The proliferation of information technology, the change of the job market requirements, and the competition in the economic sector have changed not only the objectives of education but the methods of teaching as well. The major purpose of education has become training learners to think (Dewey, 1916). As a result, there appeared many courses which aim at developing young and adult learners' CTS. In addition, schools, universities and policy makers compete, at least in their mission statements and courses descriptions, to develop learners' CTS. It is widely believed today that teaching CTS affect positively the personal, educational and civic life of learners (Herrnstein, Nickerson, de Sanchez, & Swets, 1986; Block, 1985).

The ability to advance plausible arguments and support one's viewpoint in everyday communication is a result of critical thinking on the personal level. Critical thinking also enables individuals to decide on the career they want to pursue in the future. In order to achieve all the aforementioned objectives, the teaching of CTS aims at training learners to recognize logical arguments from illogical ones, clear ideas from the unclear, and relevant information from irrelevant. On the educational level, the teaching of CTS improves the metacognitive skills of learners and allows them to sustain and reflect on their learning. Learners are citizens, or future citizens, and they need to make decisions about people to vote for and the policies to endorse. Therefore, since critical thinking is "reflective and reasonable thinking that is focused on what to believe or do" (Ennis, 1985, p.46), the goal of teaching CTS is to qualify the learners to position themselves vis-à-vis the different, sometimes contradicting opinions and beliefs in the community.

1. CRITICAL THINKING SKILLS

Critical thinking is difficult to define (Facione, 1990; Abrani, 2008) for a number of reasons, one of which is that it has roots in philosophy, psychology and education. This has given rise to various definitions of the term. Nevertheless, some of these definitions, such as Ennis's

(1985) definition mentioned earlier which is adopted in this article, are succinct, comprehensive and widely accepted by scholars. Defining the term is not the only challenge involved in teaching CTS. The next challenge is deciding on a classification or taxonomy of these skills. Among the available classifications of CTS is Facione's (1990) which is one of the most quoted in the literature. In this classification, Facione and the 46 experts in his team set 6 CTS, each of which is composed of sub-skills (see Table 1 below); however, the list is not meant to be conclusive nor fixed.

Table 1
Consensus List of Critical Thinking Cognitive Skills and Sub-Skills

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

Souce: Facione, 1990, p.12.

2. TEACHING METHODS

CTS can be taught in three different ways. The first consists of devoting a special course or courses to these skills based on the assumption that these skills are mere cognitive abilities that can be learnt separately of any content. This approach, often referred to as the "process" approach, treats the critical thinking course as a supplement to the curriculum rather than a substitution, and it often uses special material and textbooks in teaching CTS. The main practice in these courses is resolving abstract problems, recognising patterns, and solving real life problems. In spite of the prominence which some of these courses had gained worldwide, they had serious limitations (Willingham, 2007, p.13). One problem is that these courses are not efficient compared to their cost. Another limitation is that they require considerable knowledge and expertise from the part of the instructor to the extent that success is dependent on his/her skills rather than the effectiveness of the method of teaching. Most importantly, these courses are based on the assumption that CTS can be taught separately of any content or subject specialty, which is not always true.

The "content" approach is the second method for teaching CTS. The underlying belief of this approach is that the best way to teach CTS is within the subject specialty of the students, for example students of physics or chemistry are taught CTS through physics or chemistry and students of linguistics or psychology are taught the skills in question through linguistics and psychology. According to Ennis (1989) and Paul (1990), explicit instruction (also known as *infusion)* can be used; otherwise, the instructor can teach these skills through implicit instruction, and in this case it is *immersion*. The *content* approach does not require deep knowledge or specialised training from the part of the instructor, as the process approach does, but it is quite challenging to measure the transferability of skills in this approach.

A more ideal approach to teaching CTS is called the "mixed approach", and it is based on combining the general approach with infusion or immersion. Scholars like Ennis and Paul postulate that for a better teaching of CTS, learners should be taught subject-specific critical thinking in their subjects of specialty, in addition to a special course on critical thinking that uses special material and teaching methodology. The mixed approach is an eclectic attempt to benefit from the process approach and the product approach. Still, it has one limitation that is related to the special material and expertise required from teachers. Regardless of the approach that is adopted for teaching CTS, instructors need to use appropriate classroom techniques that will boost learners' skills.

3. CLASSROOM TECHNIQUES

CTS can be taught through a number of classroom techniques such as *questioning*. Training learners to ask and answer questions, especially questions that require higher order thinking, are believed to improve their CTS. Besides, asking and answering questions can activate meta-cognitive processes which boost learning (Godfrey, 2001, pp.28-29). What is more, some studies showed that there is a strong relationship between questioning and CTS of the learners. An example is Hasan and Sevki (2008) in which student-subjects with higher order thinking came up with more questions compared to students with lower thinking, and most importantly those students with higher order thinking produced questions that targeted skills like analysis, synthesis and application. In the same way *Socratic Questioning,* which Paul (1995) defines as "the use of thoughtful questions to stimulate students to continually probe the subject", is a form of questioning which promotes the learners' CTS.

Another classroom technique that is used to teach CTS is argument analysis. It consists of exercising how to recognize and diagram arguments, and how to analyze the different components of an argument. Although some scholars decline the idea of reducing CTS to a mere

analysis of arguments (Govier, 1989), other studies proved that argument analysis helps learners improve their CTS (Davies, 2012). However, the limitation of this technique is that it requires some background knowledge in logic and philosophy from the part of the teacher or instructor. Reading comprehension is also used as a technique for teaching CTS in the classroom. Reading itself is a complex and sophisticated activity in which the reader creates meaning through the use of various CTS. Critical thinking and reading comprehension are interrelated in the sense that critical thinking activates the reader's schemata during the process of reading (Norris & Phillips, 1987). Although the use of this technique in large classes poses a number of challenges, especially the fact that it is time-consuming, a number of studies showed its effectiveness in improving learners' CTS (e.g. Aloqaili, 2011).

One last example of the techniques used in teaching CTS is problem solving. It is part of a whole approach to teaching in particular and education in general, which is often labelled problem-based education. A problem is usually defined as "a gap or barrier between where you are and where you want to be" (Halpern, 2014, p.453), and *problem-based* education evolves around the idea of allowing the leaners to acquire skills and knowledge through solving everyday life problems. Critical thinking and problem solving are so intertwine to the extent that it is difficult to decide which is the means and which is the end, or which is the cause and which is the consequence. Nonetheless, problem solving has been widely used in teaching and practicing CTS in the classroom. Again, this technique consumes a significant amount of time, especially when applied in a large class, and it is quite impossible to provide feedback to all the learners during class time. This leads us to the discussion of the nature of large classes and the challenges they pose, especially when teaching CTS.

4. LARGE CLASSES

Large classes are a prevalent aspect of modern education in general and higher education in particular even if there is no agreed definition of what constitutes a large class. People's perception of a large class differs from one context to another. This is why there is no quantitative definition of a large class (Hayes, 1999). Accordingly, a class of 20 students may be considered large in some private schools, whereas in Lancaster University project, for example, a class of 50 is a large class (Coleman, 1989). In this paper, following Ur (1996) a large class is one which is perceived by the teacher/instructor as being large. Large classes have become the norm in many colleges and universities in the last three decades because of the rising enrolment and declining funds (Lewis, 1994, p.319).

Globally, large classes are associated with university introductory courses which are meant to provide common foundation for freshmen, but lately they appeared also in schools, particularly in language courses. From the institution's perspective, "large classes are [...] economically desirable" because "one full time faculty member can instruct the same number of students in the same way that it would take four or five faculty members in smaller classes" (Lewis, 1994, p.320). Conversely, from the learner's perspective

> the increased prevalence of large class teaching and learning environments arguably adversely affects the quality of the educational experience along with student performance, motivation and engagement, and impacts upon the ability of students to gain valuable problem solving and critical thinking skills. (Hornsby, 2013, p.1)

Though there is no consensus on the effect of large classes on students, a number of challenges arise when one attempts to teach CTS in a large class.

Following Lacastro's 2001 classification of the problem related to the teaching of English to large classes, the challenges of teaching CTS in large classes can be sorted out into three categories: pedagogical, organizational and affective. The pedagogical challenges refer to the difficulties which the instructors face when they teach CTS in large classes. One is the fact that traditional methods of teaching do not help learners in a large class to acquire or practice CTS. Leaners would find it challenging to learn how to interpret, analyse, evaluate, explain and self-regulate just by listening to the instructor lecture about these skills. Even if they do understand these skills, they would not be able to practice them in a large class. Besides, there is little active learning in listening to a lecture regardless of the expertise of the instructor. Another pedagogical challenge resides in the fact instructors find it difficult to check learners' comprehension in a large class to allow time for practice. Finally, the instructor/teacher cannot provide feedback to all learners in a large class.

The organizational challenges refer to the problems related to the management of time, tasks, discipline and so on. For example, it usually takes more time to get started with a large class and to make one's instructions clear. It is equally challenging to control discipline in such classes. Using techniques like problem solving or argument analysis is simply impractical in a large class since not many learners can participate. Managing logistics such as sound, handouts distribution or homework collection can also be a real frustration in a large class.

Generally speaking students have negative attitudes towards a large class.

> Often students indicate that they find large classes to be "hazardous to your learning." Typical descriptions of large classes are that they are impersonal, rigidly structured, poorly organized and noisy. The prevailing feelings are that instructors who typically teach large classes are usually inaccessible, boring, and give terrible tests with little constructive feedback on students' performance. And— as if that weren't enough— students who are in large classes are often very competitive, and

many of them lack integrity (i.e., they cheat on exams). (Lewis, 1990)

Affective challenges are the frustration that students experience in a large class. Many students feel anonymous in a large class and this has a negative impact on their motivation. The fact that instructors cannot remember the names and faces of all their students can be an unpleasant thought for the students. Many of them do not venture to participate in class discussion if it is a large class because of inhibition or fear of being judged. Overall, students associate negative feelings with large classes, and this affects negatively their learning in general and their learning of CTS in particular. This is why some creative solutions are needed to overcome these challenges.

5. SUGGESTED SOLUTIONS

Three interrelated solutions are suggested here to make the teaching of CTS more instructive, namely reconsidering teaching methods, using ICT and working with teaching assistants (TAs). To start with, teaching methods are so important that scholars claim that they have a direct impact on the efficacy of teaching regardless of class size. Lewis and Woodward (1988), for instance, contend that "it is the teaching methodology rather than the class size that contributes best to the efficacy of teaching". The two scholars completely deny the effect of class size on the quality of teaching, which is a debatable issue; however, I do share the point that teaching methods is decisive. Traditional teaching methods, particularly classical rigid lecturing, can hardly be useful in teaching CTS because "Critical thinking cannot be taught by lecturing. Critical thinking is an active process, while, for most students, listening to lectures is a passive activity" (Schafersman, 1991). That is why more instructive methods need to be used. An alternative would be interactive discussions in which the teacher models CTS and gives learners the opportunity to practice them. Another effective method would be multiple group discussions in which students discuss an issue or attempt to solve a problem in small groups. Later they get back to the big group to report their findings or ideas. Tutorials and seminars can also be useful in teaching CTS under the condition that TAs contributes to them by working with sub-groups. One of the most effective methods is perhaps question-answer method in which the instructor and the students take turns asking and answering questions about the issue discussed. This can help learners practice Socratic questioning in class.

Closely related to the two suggested solutions above is the use of Information Communication Technology (ICT). Two examples are discussed here. The first is the concept of flipped classrooms. The history of using ICT in education can be traced back to the invention of the World Wide Web in the twentieth century (Bishop & Verlger, 2013), but the roots of flipped classrooms date back to 2001 when Massachusetts Institute of Technology (MIT) took the first step by launching Open Course Ware or Open Educational Resources (OER) and provided learning resources. This project contributed to the appearance of flipped classrooms several years later (Ibid.). Yet, the actual practice of flipped classrooms started in 2007, when two high school teachers, named Jonathan Bergmann and Aaron Sams, began recording video lectures and posting them online (Noonoo, 2012).

A Flipped classroom, also called reversed or inverted classroom, consists of delivering lectures in the form of video for the learner to watch and study outside class, while class time is devoted to hands-on activities, discussions, and practice. One of the theoretical foundations of flipped classrooms is Bloom's Taxonomy, the revised version by Anderson and krathwohl (2001) in particular. In the flipped classroom students address the instructional material, which requires only remembering and understanding outside class, whereas in class they practice higher order thinking skills (apply, analyse, evaluate and create) with the help of the instructor. This gives them more time to cultivate their critical thinking (Lemmer, 2013, p.464)

The second example of the use of ICT in teaching CTS in large classes is asynchronous online discussions. Yang (2007) conducted a study to measure the effect using asynchronous discussion forums in teaching CTS in a large class. The study, in which a large university class of 278 students took part, consisted of engaging students in a series of online Socratic dialogues taught by the instructor and modelled by TAs. The results showed a significant improvement in students' CTS as measured by the California Critical Thinking Skills Test and the Coding Scheme for Evaluating Critical Thinking in Computer Conferencing. This leads to the conclusion that asynchronous discussions can be helpful in teaching CTS in large classes, if teaching assistants are available to help.

Teaching CTS in large classes can also be achieved through working with TAs. "Typically, faculty members who teach large classes have the service of one or more graduate students" (Lewis, 1994, p.326). TAs can perform a number of tasks which facilitate the job of the instructor such as grading exams, working with small groups, reviewing material with individual students or small groups and so on. For example, the instructor can have a session of argument analysis with the large class, and then TAs can follow up with smaller groups to make sure they understand the task and use the suitable method at work. Another example would be the instructor initiates a problem-solving session inside the class, and the TAs work closer with sub-groups outside class or online. All in all, TAs can be of great help in teaching CTS in large classes as long as they are given the right training. In exchange, of course, they are receiving direct and in direct training that will qualify them to become instructors in the future.

CONCLUSION

"The hallmark of higher education is to teach and develop students' critical thinking skills" (Barnett, 2004; Facione, 2007; Garrison et al., 2001; Yang et al., 2005; Yeh, 2006); however, the endeavour to teach these skills in large classes pose a number of challenges pedagogically, organizationally, and affectively. Three tentative solutions have been proposed in this article, namely changing the teaching method, using ICT and working with TAs. Still, research is needed to investigate some issues related to teaching CTS in large classes, particularly the transferability of CTS acquired in large classes in comparison to those learnt in small classes. Furthermore, the issue of gender in relation to learning CTS in large classes will certainly improve our understanding of critical thinking.

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