

A DIRECT AND EXPLICIT INSTRUCTION OF CRITICAL THINKING SKILLS BY THE PROCESS OF INFUSION

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Abstract. Educators, employers, and governing agencies view critical thinking (CT) as one of the most desired outcomes of higher education. This study employs a qualitative phenomenological design by applying an explicit five-stage procedure to infuse preselected thinking skills to a class of 22 international students in a 14-week reading programme at a local university. Six lessons, two hours each per week on critical thinking were taught to the students by three different teachers. The total of 12 hours of instruction was based on articles selected from the National Geographic series which contained structured sections on critical thinking. Adequate time was allowed for discussion when students were encouraged to deliberate on views of the authors of the articles. The guiding questions of the instructors led to positive outcomes of the lessons, and consequently students expressed their views freely. Two more articles (lessons 7 and 8) were handed out to the students as independent tasks. This was to ensure that students could work independently and that critical thinking skills had actually been infused after the six taught lessons. The data from the two lessons, 3 samples each (selected randomly) were analysed qualitatively using the Association of American Colleges and Universities rubric instrument. Findings on their performances indicated that critical thinking skills were infused through explicit and direct instruction. The result indicated that students were able to apply critical thinking skills in reading.

Keywords: *critical thinking, explicit, instruction, qualitative, infusion*

Introduction

There has been a strong and on-going interest in critical thinking in tertiary education, and the interest in developing critical thinking skills in academic and vocational training is now growing (Indar, 2016). The main objective in teaching critical thinking is how it could be infused effectively in reading. There are many schools of thought in the implementation of critical thinking skills by the infusion approach. In this study, an infusion is a process by which applying a teaching model systematically teaches skills. Hollingsworth and Ybarra (2013) propose a stand-alone approach, Explicit and Direct Instruction (EDI) which makes critical thinking into a specific topic or part of an English reading lesson. The EDI is a method of explicit teaching that promotes a five-stage teaching instruction that is well-defined, easy to follow by learners, and is one of the most effective teaching methods in the instruction of critical thinking, regardless of students' past experiences. It is economical and flexible in that it promotes the teaching of critical thinking skills in any reading comprehension lesson, in part or in full-the innovative instructor has a choice.

All generally accept the need for critical thinking in today's education setting, but enough emphasis should also be placed on teacher training and professional competencies (Kulshrestha and Krishna, 2013). This includes the development of teaching material and the application of the latest information technology (ICT).

Teachers should also be able to construct assessments, evaluate procedures, and organise activities for all levels of learning skills. Adams (2015) describes skills that learners desire to master and demonstrate call for higher levels of cognition which lead to deeper learning and knowledge transfer to various tasks. These tasks that require critical thinking skills are presumed to be for only academic education. But research by Indar (2016) also presented results that indicated the impact of critical thinking development on vocational studies. It appears that the task of teaching critical thinking skills is challenging, and the teacher must first be armed with tools of instruction and oneself as a tool (Pek, 2014). What comes important as well is the instructional style, the teacher's personality, the learner's attitudes, classroom climate, physical and mental barriers, and culture.

In the long run, reading teachers must decide in what way they would use to achieve their desired goal of instructing critical thinking. Teaching critical thinking remains unachievable if the fundamental problems in schooling today are fragmented by lower-order thinking. Davies (2015) pointed out that an explicit teaching model should be recommended in higher-order learning. The teaching of CT is proposed to be carried out in 5 stages, with an emphasis on reasoning and pedagogy skills. Thus, pedagogy narrows down to a paradigm shift by incorporating direct and explicit instruction, the scope of which covers lots of modelling, practices, and scaffolding until learners reach the stages of mastery and independent learning. Unfortunately, it was observed that most lessons taught here were by the conventional approach, which lacked exposure to thinking-based activities. The teaching of critical thinking should be promoted by a process in an infusion that enables learners to participate in repeated cognitive tasks in stages with the support of structured reading, which comes in a section or sections on critical thinking.

Literature review

Greene and Yu (2016) argue that the ability to construct, evaluate and use knowledge is desirable in critical thinking. Knowledge of skills for scrutinising methods and evaluating sources is called epistemic cognition. For example, epistemic cognition is required to assess whether a claim is worthy of being considered knowledge. So, one has to look for reliable sources to justify a claim, and whether the sources continue to be reliable is another question, considering people are now open to a myriad of perspectives online. Greene and Yu (2015) suggest that students of critical thinking use varied justifications to better interpret, evaluate, and integrate knowledge. Critical thinking focuses on contextual reading, the parameters of which lie within the context of what is being read by learners of the English language. Facione (2015) explains that critical thinking means making a judgement in a reflective way on what to do and what to believe. It is a purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, inference, and explanation of the evidential, conceptual, methodological, criteriological, or conceptual considerations upon which that judgment is based (Facione and Facione, 2006).

The components of critical thinking are the components of analysis, evaluation, inference, and the self-regulatory metacognitive function of reflective judgement (Dwyer et al., 2014). Interpretation, inferencing, and explanation are extensions of understanding, a critical thinking skill. Facione (2015) believes self-regulation and self-correction are as important as it improves critical thinking. This is as simple as asking, "How am I doing?" or "Have I missed anything important?"

Conceptual framework

This study proposes a 5-step framework (Figure 1) that can be implemented in a teaching or training setting to effectively move learners toward critical thinking. It integrates the principle of infusion learning with the application of the Explicit and Direct Instruction instrument. It provides teachers with a useful framework in which to move students and lecture-based courses toward an active-learning environment. At the outset of the reading lesson, some effort is undertaken to select appropriate material for the class, considering age and varied backgrounds.

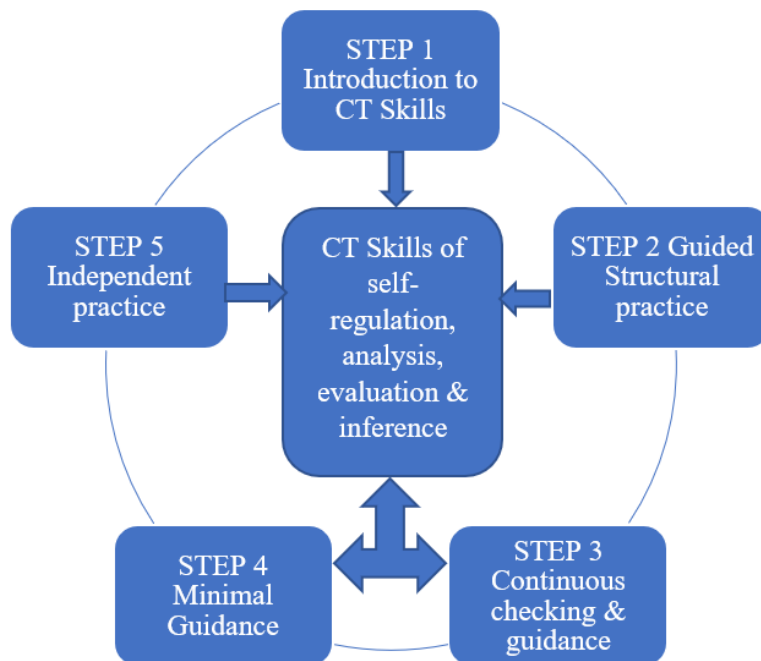


Figure 1. The proposed 5-step framework.

Instruction in critical thinking aims at achieving the ability to explore, criticize, or advocate different ideas, to reason inductively and deductively, and to infer sound conclusions from reading sources (Freeley and Steinberg, 2000). But at the same time, the teacher needs to understand the interaction between the thinking process, pedagogy, and reading material used. This may be a final goal and a point at which readers begin their critical discussions (Molden, 2007).

Materials and Methods

The instruction of critical thinking was conducted by three trained teachers well versed in handling critical reading. Eight lessons were conducted by the teachers, and six out of the eight lessons were taught according to the proposed 5-step framework (Figure 1) of instruction by infusion. The final two lessons (Lesson 7 and Lesson 8) were used as a performance assessment. In lesson 7, the tasks of six students (randomly selected) were collected after going through 6 training lessons of two hours each. The

procedure was repeated for another six students in Lesson 8. The total number of assignments collected from twelve students out of 22 was based on the research procedure. In Step 1 of the lesson, the teacher used student-friendly language to explain, modelled by thinking aloud, and demonstrated the concept of the skill. At the same time, he interacted with students, encouraged responses, and gave feedback to responses. By completing some sort of graphic organizer as they talked about a skill or concept, teachers helped students trap ideas. Here, the most effective presentation included verbal and visual explanations (Joyce and Weil, 2000).

Step 2 was the stage where the teacher worked the problem step by step with the students to get the meaning of it. Throughout this and other phases, teachers frequently checked students for understanding. Next, the teacher slowly released control of the students to allow them to work by themselves. Later, only prompts were only given. Students actively took part in discussions, speaking freely. Step 3 was where the teacher checked regularly and continuously to understand the skill learned. It was also important to take into account that the majority of the students were able to describe and execute the skill. Step 4 was when the teacher gave guided practice and helped students move towards independence and shoulder more responsibility. Here the teacher gave work to every student but with a minimum quantity. Structured questioning techniques were used to ensure that every student participated and to check the accuracy of students' responses to provide immediate corrective feedback. In step 5, students practiced their newly acquired concepts independently and in unfamiliar situations. During this phase, students took over responsibility for completing academic tasks independently, although the teacher still monitored what they did and responded to their efforts.

Results and Discussion

The rubric of the Association of American Colleges and Universities (AAUC) was used to assess the reading performance of the 12 students in critical thinking. There are four values of critical thinking: explanation/description being the first. The next is evidence of interpretation/evaluation. The influence of context comes under the value of analysis. The last value is the student's position which reflects students' perspectives/inferences. The strength of the values is in a descending scale from the highest: capstone 4, milestone 3, milestone 2, and milestone 1. In this qualitative assessment procedure, students were told to analyse, evaluate and offer their perspectives freely, as encouraged in any phenomenological design studies. Results (*Table 1* and *Table 2*) showed the impact of CT skills learned in the final two lessons (in Lesson 7 and Lesson 8). It was gratifying to note that the additional ability to work independently was a success, giving the impression that the future student workforce could work efficiently and independently in a global environment where it would be essential to discern fake information from the real. The six samples (Lesson 7) of the independent classroom assignment were collected randomly to investigate if there was any impact on students' independent work assignment after going through the six infusion lessons. The participant's reading texts (Bolivian Wrestlers) were selected in this assessment. Students' annotations on the reading text were allowed as some form of assistance to boost thinking. The procedure of sampling was repeated in the task for Lesson 8. Another article (The Right Decision) was selected for this purpose.

Table 1. Findings of students' performance-Independent task (Lesson 7).

Student	Explanation	Evidence	Context	Student's position	Conclusion
S1	3	2	2	4	3
S2	4	3	3	4	3
S3	2	3	2	3	3
S4	3	2	2	4	3
S5	3	3	3	4	3
S6	2	2	2	3	2

Table 2. Findings of students' performance-Independent task (Lesson 8).

Student	Explanation	Evidence	Context	Student's position	Conclusion
S7	4	3	3	4	3
S8	2	2	2	1	2
S9	2	2	2	3	2
S10	2	2	3	2	2
S11	2	1	2	4	3
S12	3	2	2	4	3

When students worked on the section on critical thinking, they needed to apply the main areas of CT – analysis, evaluation, and inference or related skills related to the main skills. The assessment criteria, based on the Critical Value Rubrics, served as a guideline to check on the impact of the infusion lessons. The five themes in the rubrics- explanation of issues, evidence, the influence of context, student's position, and conclusion/outcomes-were all related to this paper's main CT themes of analysis, evaluation, and inference. For example, the student's position and influence of context were related to generating an opinion, which was akin to making inferences. Explanation of an issue requires analysis, and selecting information for evidence requires evaluation, and this experience helps shape learners' thinking. The emphasis of this study was to search for arguments generated by students, which was the threshold of the cognitive process. Table 1 shows the results of the tasks performed for Lesson 7. The concluding results revealed that S1 to S5 scored the critical thinking value strength of milestone 3. S6 scored the acceptable value of milestone 2. The findings generally indicated that all the students in this group could apply the core CT values in reading.

Table 2 displays the assessment summary of results for the task performed in Lesson 8. The concluding results revealed that half the students scored milestone 3, and the other half scored milestone 2. This article (The Right Decision) used in this lesson appeared to be a little more complicated, but the scores indicated the successful infusion of CT skills. Thus, the teaching of critical thinking can give rise to the creation of active learners who are enthusiastic about both their studies and their lives. This indicates that they dare to venture out of their comfort zones and explore what they do not know. They are able to reflect on their thinking and learning and seek better ways to learn out of the box. They are also prepared for academic learning in colleges or universities and social life once they are out to work. This study reveals that thinking tasks are not a burden to both instructors and learners, and findings show a shared interest in learning outcomes. The provision of a practical teaching model has made teaching CT in five stages valuable to literature in the education field, even though this paper emphasises critical thinking in reading. The conceptual framework (Figure 1) makes teaching both challenging and orderly in its application. To the learner, learning critical thinking skills can lead to mastery if practised conscientiously.

Reading as an important school subject becomes more important when utilized as a tool for higher learning in colleges and universities. It is mainly through reading that a learner learns to write at the beginning. It was pointed out that critical thinking skills learned along with a school subject enabled students to feel that their thinking is meaningful and that their skills are useful (McGuinness, 2006). Findings implied that students needed explicit instructions (*Figure 1*) and the teacher's scaffolding role to guide them in using thinking skills to complete tasks. This supports the suggestion by Kirkwood (2000) that in infusion lessons, teachers need to provide explicit instructions and modelling of thinking processes. They can then follow these methods to engage in similar processes subsequently. Finally, the above discussion implies that explicit instructions used in infusion lessons encourage critical thinking skills and create an environment of learning.

Conclusion

The tasks in the reading lesson were based on the concept that enabled students to express their views and share their experiences. The classroom environment was, therefore, encouraging, and students felt free to talk and willing to take risks. The instructor's role was to assure students that making mistakes was all right, as this would get students involved and immersed in learning. The conceptual framework made teaching both challenging and orderly in its application. Results of the two reading tasks, upon evaluation by the AAUC rubrics, provided further evidence as to what had been infused, that is critical thinking skills. The students learnt to apply the three key thinking skills of analysis, evaluation and inference along with related skills like expressing an opinion or making a reflective judgement. To the learner, learning critical thinking skills could lead to mastery if practised conscientiously. The findings in this study revealed enough evidence that the infusion of critical thinking skills was successful and that students improved their reading and thinking skills. It also offered opportunities to think and judge things by themselves as they took responsibility for their learning. Their views and contributions during the study were respected and valued.

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Conflict of interest

The authors confirm that no conflict of interest is involved with any parties in this research.

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