

and disciplinary knowledge. Polya [36] suggests a question based approach in promoting critical thinking to solve problems. Hence, teachers demand “time, practice, devotion and sound principles” to encourage effective holistic thinking.

Academics believe that critical thinking is essential as it has always allowed researchers to direct a new line of thinking. In academic enculturation, students are encouraged to think like academics. Critical thinking is students’ ability to analyse the given content or the issue in-depth, examining explicit and implicit information to advance a new idea or an argument or a perspective by providing valid and reasonable evidence considering every related aspects of the content or the issue. Thus, students’ need to let their mind become a moving prism and a critical thinker approaches materials with a critical attitude and directs his/her thinking based on the context given and examines connections and messages that are obvious and implied to form a new line of rational thought or a cohesive, coherent and cogent argument.

Furthermore, the study shows that the course structure and the lesson structure help students develop rational thinking when processing information in a hierarchal order such as in the Blooms’ taxonomy. Human thought is structure sensitive and thus, the structure in which the information is processed allows students to develop relational knowledge. The process delivering courses help developing relational thinking which is fundamental in academic domains. According to Bloom’s taxonomy, students’ understanding of a particular concept is enhanced through several processes. In addition to Blooms steps, this study shows that self-reflective activities, such as the synoptic essays, play a key role in helping students to make connections with knowledge, pragmatics and application. Thus, academics should ensure that they help their students to reflect of on their learning by adopting effective strategies.

As also confirmed by Barnett [2] the study shows the risks of academics being only concentrate on the subject specific knowledge. They can only focus on developing subject knowledge. Therefore, explicit focus for critical thinking is essential in learning. Kennedy et al. [19] claim that bad teaching neglects critical thinking in learning. As demonstrated in the assessment tasks analysis, the stimulus plays an important role in cultivating critical thinking. These stimuli can be a problem, a case, a question, a scenario, an argument topic or a research paper or any other kind. In responding to the given stimuli, students are expected to think holistically in a particular domain. They require numerous skills in reading, interpreting, analyzing and writing. If students’ confront issues with such skills, they may not demonstrate deep thinking. As the outcomes of

critical thinking can vary from student to student, academics seem to find it difficult to help students to direct their thinking.

Teacher feedback about students’ work is vital in developing critical thinking [30]. However, opportunities are very limited for students to act on feedback. Most formative and summative assessment tasks are completed with the action of teacher feedback and evaluation (see figure 3). This allows no opportunity for students to respond to feedback which is a major concern of the participants in this study. Figure 4 highlights one other significant process that completes the holistic learning process through reflecting on teacher feedback. This shows the need for closing the feedback loop. E-portfolios, peer review essays and the argument mapping essay tasks allowed students to act on feedback as they receive feedback before their final submission or they get regular feedback. In e-portfolios, students upload their responses for teacher to provide feedback and then, the portfolios are expanded or revised based on the teacher feedback. One of the concerns regarding this exercise is that teachers’ need to spend extensive time by providing individual feedback for large classes.



Figure 3. Linear assessment structure



Figure 4. Circular assessment structure

These results suggest the strong emphasis on the effective use of formative assessment. The above circular structure (see Figure 4) shows that formative assessment is more effective in developing critical thinking as teacher feedback is more important than the mark given to an assessment. Hence, an opportunity for feedback before the final draft of an assignment can be useful in the process of encouraging deep thinking. These opportunities can be maximized by allowing students submitting an argument map [34] of an essay or a plan of an essay for feedback. A study by Devereux and Wilson [10]

found students face difficulties in identifying weak and strong arguments against a particular dilemma. Peer review exercises can be an alternative strategy to challenge students' on their thinking. As Sadler [30] alerts, little learning can take place without students' receiving regular and effective feedback and thus, students need to develop measures to understand and respond to feedback. Sadler emphasizes the need for teachers developing an appraisal strategy for students to respond to feedback.

As confirmed by this study and many other studies giving effective feedback is time consuming and challenging. In order to give feedback and encourage students' act on feedback, teachers need effective strategies.

... it would be useful if somebody knows about how to entice students to act on feedback. I mean, the reasons why they don't act on feedback vary. It could be that they don't understand the feedback well enough to act on it, and that may be the case in some instances. It may be that they're too lazy" (P 13).

Therefore, this study has seen a crucial need for developing effective strategies to give feedback and encourage students to act on feedback and to promote deep thinking skills.

Teachers have difficulties in developing critical thinking in multilevel classes, as multiple intelligences, students' limited skills in reading and writing and students' experience in completing tasks that involve higher order thinking can impact their teaching. While some research argues the importance of scaffoldings [10], [35], some participants in this study believed too much scaffolding can hinder independent learning, thus scaffolding is not necessary for every student. Students should be adequately prepared by providing basic reading and writing skills to direct deep thinking. They should be exposed to higher level activities in their high school education.

The participants in this study were eager to know about effective strategies for developing critical thinking and thought they adopt a personalized pedagogy shaped by their beliefs and experience. Some were positive about the effectiveness of their strategies and tend to avoid using other approaches. This level of risk-aversion can generate limited opportunities to move forward in developing effective strategies. This illustrates the need for effective collaboration within and between disciplines to allow more opportunities for reflection of teaching pedagogies and learning from each other.

7. Conclusion

Despite the limitations of a relatively small sample, the study has revealed interesting findings about teachers' perceptions of critical thinking and their strategies for cultivating such skills in academia. One finding is that critical thinking is a metacognitive skill that can be cultivated both in a generic sense and a disciplinary specific sense. The informants in this study did not find domain specific differences in their pedagogies and many strategies discussed in this paper can be used across disciplines. One significant part of critical thinking is students' ability to transfer learning and their skills in disciplinary contexts, workplace and society.

Academics in the study use a wide range of activities to cultivate students' critical thinking: among them written tasks are dominant and teacher feedback seems to add immense value in developing critical thinking. The study found that holistic tasks that provide better opportunities get teacher feedback are necessary for cultivating critical thinking. Students can benefit from effective teacher feedback. While some tasks allow opportunities for complementary feedback, other tasks conclude the learning process only by an assessment of students' work. Hence, the findings show that formative assessment is more useful in developing critical thinking compared to summative assessment. It is important for teachers to 'open and close' the feedback loop for students to benefit from teacher feedback. Otherwise, students are not often encouraged to act on teacher feedback.

Out of many teacher related and student related challenges, the study highlights students' limited reading and written communication skills as major constrains of cultivating adequate level of critical thinking and promoting independent learning. Students' entry levels skills are not satisfactory in most disciplines to guarantee their post entry level skills. This highlights a crucial need for developing students' advanced reading and writing skills, particularly paying attention to genre specific differences in academic disciplines.

The study also demonstrates the need for consolidation and collaboration between and within disciplines in curriculum planning and implementation of pedagogies to allow academics understand the need for students developing transferable critical thinking skills, and disciplinary specific conditions. Academics need to challenge students' thinking to help them to become self-regulated learners. They also should engage in "purposeful reflective practice" [18] to develop excellence in teaching.

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9. References

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