



Enhancing Motivation to Think Critically

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Abstract: In the recent few decades, critical thinking (CT) has been regarded as one of the main thinking skills utilised in academic fields and school learning. People usually need to think critically when they tend to solve a problem, assess an argument, decide about a belief, or make a decision (Valenzuela, Nieto, & Saiz, 2011). Critical thinking is a higher-order process, which requires self-determination, reflection, effort, self-control, and metacognition (Mertes, 1991, cited in Fahim & Hajimaghsoodi, 2014). CT also can help students organise their thinking structure, utilise supported standards and finally promote their thinking quality (Fahim & Hajimaghsoodi, 2014). This is why increasing numbers of universities and school establish critical thinking courses for students. Although critical thinking is a significant ability in academic learning, some students have not realise its importance. However, the element component skills of CT are deductive and inductive reasoning, problem-solving and decision making (Saiz & Rivas, 2008, cited in Valenzuela et al., 2011), which assist students when they are studying or doing researches. Thus, it is crucial to encourage students to think critically. For many students, although they have already required the skills of critical thinking, they are unwilling to use it in learning. Facione (2000) points out that some people may specialise in CT, but they are not interested in addressing an issue within critically way.

Keywords: critical thinking, intrinsic motivation, extrinsic motivation, cognitive process, cognitive load

This essay will explain the relationship between motivation and critical thinking and describe the common ways and teaching methods that teachers can use to enhance students' motivation to think critically. This essay will also explain how does motivation influence cognitive processes via working memory. However, motivation is associated with cognitive load theory so that the impacts of motivation on intrinsic and germane cognitive load will be discussed below.

1. The relationship between motivation and critical thinking

Motivation has referred to the inherent energy and desires for individuals to engage and maintain in a task (McDevitt & Ormrod, 2004). To be specific, they explain that more energy needs to be spent on tasks that are high level orientated in a particular situation. This means students are required greater desires and energy if they want to perform better in a directed goal. According to Self-Determination Theory (SDT), motivation is divided into intrinsic motivation (IM) and extrinsic motivation (EM) (Ryan & Deci, 2017). IM has been defined as that people do an activity because of their interests or enjoyment. A common example is that students prefer to acquiring second or third language due to their affection for that culture. SDT also maintains that EM is some particular consequences prompt people to do an activity. The rewards from parents to encourage students achieving better can be seen as this kind of motivation.

Motivation is one of the main elements to encourage students to think in a critical way. According to Valenzuela et al. (2011), a positive relationship can be seen between motivation and critical thinking ability. Similarly, Fahim & Hajimaghsoodi (2014) also point out students with higher motivation have usually mastered a higher level of critical thinking skill (see Figure 1).

Students' motivation is an indispensable precondition for critical thinking. On one hand, higher-order thinking requires people's motivation (Halonon, 1995, cited in Fahim, & Hajimaghsoodi, 2014). Critical thinking is one of the kinds of higher-order process so that motivation is needed. On the other hand, students' disposition of using critical thinking is based their motivation. Facione (2000) argues that the preference for thinking critically is an intrinsic motivation, which leads people to utilise skills for solving problems and making decisions. Intrinsic motivation (IM) can efficiently enhance students to think critically and also help to maintain this thinking condition because students use this skill from their enjoyment and interests. Similar to IM, enhancing students' extrinsic motivation (EM) also can stimulate the acquisitions and utilisations of CT. Offering external stimuli like rewards is a more common way used in school's thinking skill units. A variety of interventions have been effective in increasing students' motivation. For example, creating relevant extracurricular activities to promote the atmosphere for students to think critically or setting up some reading assignments related to critical thinking (Miele & Wigfield, 2014). However, most of these interventions only promote CT in short term because EM is related to surface

processing (Miele & Wigfield, 2014). Instead, they argue that IM leads to deep processing. Thus, this more effective way is to arouse students' interests and let them enjoy the period when they think critically.

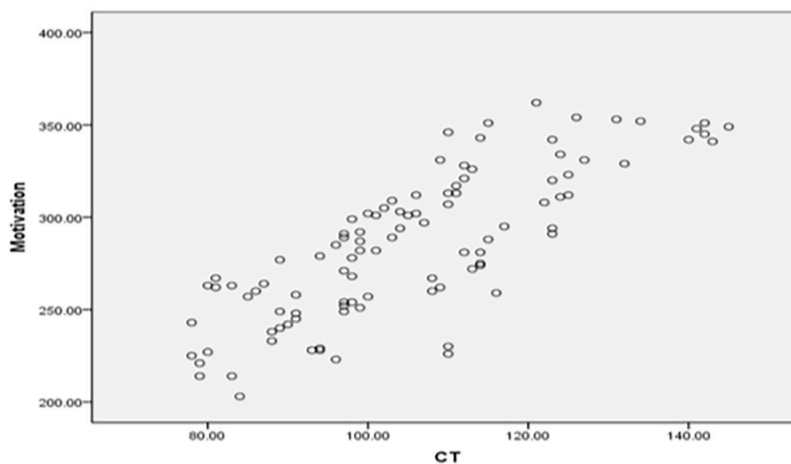


Figure 1. Scattergram showing the correlation between CT and motivation

Source: (Fahim, & Hajimaghsoodi, 2014)

2. Cognition and motivation

2.1 Motivation in cognitive processes

Motivation can be seen as the energy for people to take on and accomplish an event or assignment. It also can be the desire for people to acquire new knowledge or skill. This means motivation is one of the main conditions for cognitive processing. According to Kuldass et al. (2014), learners would utilise little or no cognitive effort to study a new knowledge or master a skill when nothing motivates them even if their cognitive capacities are available. How does motivation influence cognitive process? Motivation can enhance working memory (WM) capacity, which is the main central cognitive process (Krawczyk et al., 2007). High motivation condition not only can promote the working memory performance but also stimulate as well as maintain the process of encoding in WM (Sanada et al., 2013). Working memory is well known to temporarily process and store information and play an important role in many complex cognitive activities. Thus, motivation is one of the key elements influencing cognitive process by working memory.

2.2 Motivation and cognitive load

Motivation related to working memory (WM), has significant impacts on cognitive load. Element interactivity requires the allocation of working memory resources, associated with information processing (Sweller, 2010). He points out that germane cognitive load is linked to learner characteristics and working memory resources. The level of motivation is a kind of characteristic of learners. This means motivation is also associated with germane cognitive load. However, Sweller explains that germane cognitive load is not an independent constituent in cognitive load. It is only related to the working memory resources that use to deal with the element interactivity in intrinsic cognitive load. In other words, motivation has indirect influences on intrinsic cognitive load. Motivation also can increase the capacity of working memory (Krawczyk et al., 2007). Thus, if students acquire a thinking skill with high-level motivation, the total cognitive load is unlikely to exceed their working memory capacity. This also means motivation can make teaching and mastering thinking skills easier.

3. Implication: motivation used in thinking skills teaching

3.1 Intrinsic motivation

For long-term effect, intrinsic motivation is a better way to enhance students think critically in thinking skills teaching. For teachers, how to increase students' IM in mastering critical thinking and using it is more difficult than improve EM because the key is students themselves. However, there are still some methods of IM that teachers can use in teaching. For example, the contents of the units need to be interesting and attractive so that students are willing to engage. This is a way that arouse students' interest and increase their IM. The topics that chose in the classes also need to be easy for learners to think

critically. Riggs & Hellyer-Riggs (2014) set up a course about history in their research and let students discuss the moral results of these events. When students evaluated a historical or moral event, they usually required to use some CT' skills like assessing, analysing and exemplifying, which exactly enhance students' CT. They also created a human development course related to students' daily life. In this course, students required to discovery some children development issues and also discussed as well as explained in lessons. Riggs & Hellyer-Riggs maintain this is an effective way of enhancing students' thinking skills because they would realise the importance of critical thinking in daily life.

3.2 Extrinsic motivation

Although the influence of EM is short-term, it is necessary for teachers using motivation like praising and reward to encourage learners' critical thinking because EM would alter into IM to some degree. Ryan & Deci (2017) point out that internalisation of EM is possible if the external stimuli are interesting, challenging, or effective enough to stimulate IM. The voice of teachers is a beneficial way that can improve students' EM in thinking. Encouragement, praising and positive talk can stimulate motivation (Rugutt & Chemosit, 2009). Rewarding is another common way teachers prefer to involve in thinking skills teaching. Although rewarding is effective, what teachers need to be aware of is the degree and timing of rewards. Overexposing in EM, intrinsic motivation is likely to disappear (Ryan & Deci, 2017). Thus, when enhancing students' EM in critical thinking or teaching a thinking skill, teachers also require noticing learners' IM.

4. Conclusion

In conclusion, as energy and desire of people, motivation is a precondition for acquiring and utilising thinking skills such as analysing, creative thinking and problem-solving. This paper exemplifies that motivation can effectively improve students' think critically. Higher-level motivation students usually have higher abilities in critical thinking. Motivation also enhances the disposition of students to use CT. Besides, it can improve working memory ability, which plays an important role in cognitive process. Motivation is linked to germane cognitive load, meanwhile, has indirect effects on intrinsic cognitive load. Finally, in thinking skills teaching, although both intrinsic and extrinsic motivation can help students promote critical thinking, the results of IM is more effective than that of EM. Extrinsic motivation sometimes would have negative impacts because it may make the intrinsic motivation disappear.

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