



Unraveling the complex relationship in critical thinking, approaches to learning and self-efficacy beliefs among first-year educational science students



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ABSTRACT

Critical thinking is a key capability for academic experts and for developing one's expertise from the very beginning of studying at university. Self-efficacy beliefs and approaches to learning are important in this process, although their relationships with critical thinking are not clear. This study explores the relationship between critical thinking, approaches to learning and self-efficacy beliefs among Finnish first-year students in educational sciences ($n = 92$). The self-reported data were used to measure approaches to learning and self-efficacy beliefs, and performance-based assessment data of critical thinking skills were analysed by using both quantitative and qualitative procedures. The results showed that most of the new students applied the deep approach to learning and had high self-efficacy beliefs related to learning. However, there were great differences in the quality of their critical thinking. Three groups with remarkable differences in critical thinking skills were detected. There were no connections between critical thinking, approaches to learning and self-efficacy beliefs. The results imply that the development of critical thinking needs to be facilitated systematically during study at university.

1. Introduction

Critical thinking, approaches to learning and self-efficacy beliefs have been shown to be essential factors for university students to progress in their studies (Baik, Naylor, Arkoudis, & Dabrowski, 2017; Brooman & Darwent, 2014; Arum & Roksa, 2011; Evens, Verburgh, & Elen, 2013). As they are also related to the quality of student learning in general, these skills should be acquired during their studies (Chapman, 2001; Kreber, 2003; Lizzio, Wilson, & Simons, 2002). Empirical evidence has shown that there are differences between university students concerning the levels of these skills, and that some students do not acquire them at all (Arum & Roksa, 2011; Evens et al., 2013; Pascarella, Blaich, Martin, & Hanson, 2011). This might lead to unexpected challenges and disengagement as well as insufficient acquisition of the required academic capabilities during their studies (e.g., Baik et al., 2017; Korhonen, Inkinen, Mattsson, & Toom, 2017). For these reasons, universities should support the development of these skills systematically from the very beginning of studies.

Traditionally, higher education institutions set their own entry requirements for students wishing to enter the university. The aim of university admission is to identify individuals who have the aptitude or

necessary skills for acquiring the required subject-specific knowledge as well as generic academic competencies, such as critical thinking skills (Stemler, 2012). In Finland, university students in educational sciences degrees are selected through the “VAKAVA” multiple-choice entrance exam (2015) and an individual interview. Educational sciences programmes, especially in teacher education, are very popular, and there is fierce competition for the available places. Even though the majority of the applicants have performed extremely well in upper secondary school, only a small number of the applicants (6–8%) are accepted into the available study programme (VAKAVA, 2015). Because of this, relative homogeneity among first-year students could be assumed, especially in terms of the academic qualities required to undertake university studies. First-year students who have a good foundation for learning and are academically engaged are more likely to complete their studies than their peers without these attributes (Baik et al., 2017).

Previous studies on approaches to learning by first-year students have shown that a deep approach to learning is related to an ability to regulate learning (Heikkilä, Lonka, Nieminen, & Niemivirta, 2012) and desirable academic outcomes (Öhrstedt & Lindfors, 2016). Self-efficacy beliefs have been shown to be related to students' motivation, as well as

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their self-regulation, engagement and performance (e.g., Lane, Lane, & Kyprianou, 2004). Although a positive connection between the deep approach to learning and critical thinking is often presumed, there has been surprisingly little research into this aspect (Nelson Laird, Seifert, Pascarella, & Blaich, 2014). The relationships between critical thinking, approaches to learning and self-efficacy beliefs have not been empirically investigated among new students. The present study aims at gaining a better understanding of first-year university students' critical thinking, their approaches to learning and self-efficacy beliefs and how they are related to each other. The findings will help in understanding differences between students' academic achievements, and in developing pedagogical practices to enhance these skills.

1.1. Critical thinking - a key for student learning

Critical thinking is promoted as the foundation of democratic citizenship, freedom and autonomy (Arum & Roksa, 2011). It is also considered to be an essential factor for university students progressing successfully in their studies (Utriainen, Marttunen, Kallio, & Tynjälä, 2016). Students cannot meet the intended learning objectives without thinking skills. In addition, the adequate acquisition of critical thinking skills during their university studies will later enable them to work effectively in their professions when they enter working life. Critical thinking refers to self-disciplined thinking, during which a thinker assesses, evaluates, synthesises and interprets relevant information that is associated with a situation. The thinker must also apply that information in order to solve a problem, to decide on a course of action, to find an answer to a given question or to reach a well-reasoned conclusion (Abrami et al., 2015; Hyytinen, Holma, Shavelson & Lindblom-Ylänne, 2014; Halpern, 2014). Critical thinking involves open-minded thinking about alternative solutions and effective communication (Hyytinen et al., 2014; Halpern, 2014), and it is an essential part of the problem-solving process (Willingham, 2007).

There has been debate in the educational literature (e.g. Abrami et al., 2015; Kuhn, 2005), about whether critical thinking is general or discipline-specific in nature. Based on this debate, it seems that critical thinking involves both these elements; neither alone can capture this complex phenomenon. While the conventions of critical thinking are always embedded in social practices and they are also bound to disciplinary contexts, there are always myriad subjective elements (such as students' prior knowledge, expectations, engagement, motivations) related to and influencing critical thinking (e.g. Arum & Roksa, 2011; Evens et al., 2013; Kuhn, 2005; Shavelson, 2010). Moreover, many components of critical thinking (i.e. evaluating the reliability and relevance of evidence, analysing information, addressing opposing viewpoints, reasoning, making decisions, drawing inferences, and producing arguments) are relevant and commonly shared in all the disciplines.

It has been suggested previously that there might be limited opportunities for students to develop their capacity for critical thinking during their university studies (e.g., Arum & Roksa, 2011; Hyytinen et al., 2015; Hyytinen, Löfström & Lindblom-Ylänne, 2017; Evens et al., 2013; Pascarella et al., 2011). Using performance-based assessment, Arum and Roksa (2011) found in their longitudinal study that almost half of the students demonstrated no significant improvement in critical thinking and complex reasoning during their first two years at college (cf. Evens et al., 2013). Students who start their university studies without solid critical thinking skills are less likely to improve their critical thinking skills during their studies (cf. Pascarella et al., 2011). The progress of these students tends to show only modest improvements. Research has also shown that the various components of students' critical thinking skills can be unevenly developed. In other words, a student might be able to identify and evaluate information, yet at the same time struggle to acquire other abilities, such as arriving at a conclusion, adjudicating conflicting claims or producing arguments (Hyytinen et al., 2015, 2017). In a similar vein, a recent qualitative

study has demonstrated that a notable proportion of graduates are unable to evaluate and describe their academic competencies (Tuononen, Parpala, & Lindblom-Ylänne, 2017). These diverse concerns about the importance of critical thinking highlight the need to pay more attention to students' capacities for critical thinking and reasoning from the beginning of their university studies.

1.2. The relationship between critical thinking and approaches to learning

Interest in exploring students' approaches to learning arose in the late 1970s when researchers investigated how students read academic texts (Marton & Säljö, 1976). It was noted that some students concentrated on the text itself ('surface processing') while others aimed at interpreting the meaning of the text ('deep processing'). The term 'approach' was introduced in order to include the intentional component of learning with the processing component (Entwistle & Ramsden, 1983; Svensson, 1977). The *surface approach* is characterised by an intention to memorise and reproduce information, leading to routine fact memorization (e.g. Entwistle & Ramsden, 1983) and fragmented knowledge (Lindblom-Ylänne, Parpala, & Postareff, 2017). The *deep approach*, on the other hand, involves an intention to analyse and understand information, which guides the learner to study actively, relate ideas, use evidence and critically evaluate the study material (Entwistle & Ramsden, 1983). A third 'strategic' approach was introduced in the 1980s when researchers identified the fact that some students attempted to achieve the highest possible grades through studying effectively and applying organised study methods (Biggs, 1987; Entwistle, McCune, & Walker, 2001; Entwistle & Ramsden, 1983). More recently, this approach has been referred to as *organised studying*, which does not include such a clear focus on attaining the highest grades, but it concerns students' everyday study practices; how they organise their study and how they manage their efforts and time (Entwistle, 2009; Parpala, Lindblom-Ylänne, Komulainen, Litmanen, & Hirsto, 2010).

The deep approach to learning is considered to include elements that enhance deep understanding (Entwistle & Ramsden, 1983; Lindblom-Ylänne, Lonka, & Leskinen, 1999; Trigwell & Prosser, 1991) and thus it is likely to lead to high-quality learning outcomes (see e.g., Trigwell, Ellis, & Han, 2012; Watters & Watters, 2007). However, some studies have found a relationship between the surface approach and academic achievement (Lizzio et al., 2002). The reason for this might be that course assignments and good grades do not necessarily reflect the quality of learning outcomes in a reliable manner (e.g., Asikainen, Virtanen, Parpala, & Lindblom-Ylänne, 2013). Rytökönen, Parpala, Lindblom-Ylänne, Virtanen, and Postareff (2012) found that study success was most strongly associated with organised studying, and not with deep or surface approaches.

Researchers have commonly assumed that students' approaches to learning are related to their perceptions of the learning context (Parpala et al., 2010). However, previous research has suggested that the adoption of the deep approach to learning is not only characterised by context-specific factors but also by student-dependent factors such as age, personality, self-direction in learning, motivation and previous learning experiences (Baeten, Kyndt, Struyven, & Dochy, 2010). Hence, it follows that approaches to learning are not solely context-dependent.

The majority of previous studies focusing on approaches to learning among first-year students have been conducted at the end of the students' first study year at university, and thus, empirical evidence about their learning approaches at the beginning of their university student career is scarce. Surprisingly, relatively few studies have explored the relationship between approaches to learning and critical thinking, although critical thinking is often assumed to be a key capability related to deep approaches to learning (Nelson Laird et al., 2014). From the theoretical point of view, the concepts of critical thinking and deep approach to learning share same features, such as an intention to actively assess, evaluate, synthesise, understand and interpret relevant information and the different points of views. However, the conclusions

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