Critical thinking embeddedness in higher education programmes

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Abstract

Aim. The aim of this research is to examine how critical thinking is reflected in Lithuanian higher education study programmes and what conceptual model(s) of critical thinking are used by study programme makers.

Methods. The subject of the study encompasses 8 higher education study programmes and their subjects. They are analysed based on a constructed conceptual framework, which defines 9 critical thinking skills and 18 critical thinking dispositions.

Results. Analysis, evaluation and decision making are the most common critical thinking skills embedded in the goals of a study course and its learning outcomes. Explanation, interpretation and making inferences are less pronounced. Dispositions are listed rarely and in quite an indistinct way. Only open-mindedness and honesty have clear expression and statement in study programmes, though to a lesser extent. Dispositions such as concern for every person, inquisitiveness and flexibility are very fragmented.

Conclusions. For the meantime, critical thinking is neither reflected equally and coherently in all parts of study programmes – course goals, content, described methods and learning outcomes – nor clear conceptual models of critical thinking can be detected.

Research restrictions. The policy of the colleges and universities on providing the descriptions of study programmes and syllabuses publicly, limits their accessibility. Due to the sampling of study programmes, the research represents only selected study programmes.

Practical application. The created framework may be used to study programmes' development by introducing the defined critical thinking skills in the descriptions of the study programmes more systematically.

Key words: critical thinking, skills, dispositions, study programmes

Introduction

In a constantly changing world, higher education curricula need continual readjustment. In time of uncertainty, higher education plays an increasingly important role in social progress. Also, it is expected that higher education curricula should not only react to emerging social and technological phenomena, but would also demonstrate leadership and innovation. One may wonder as to what extent higher education curricula meet these needs.

Recently, one particular skill has been receiving increasingly more attention and is listed among the top skills of the 21st century. Critical thinking (CT) is named as essential for contributing to the development of economically sustainable, integrated, progressive society; for responding to the changing needs of a specific time; and for predicting and modelling these needs (Global education Monitoring Report, 2017; Organisation for Economic Co-operation and Development (OECD), 2015; OECD, 2016; Strengthening European Identity through Education and Culture, 2017; World Economic Forum, 2018). CT is indicated as necessary for living in plural, civil communities (Vieira, Tenreiro--Vieira, & Martins, 2011), helping individuals become members of smart sustainable societies (Halpern, 2014; Lu & Xie, 2019; Tolutiene & Domarkiene, 2010).

Although awareness of the crucial role of education in the development of CT is increasing, and we may find evidence that CT can be taught and learnt (Niu et al., 2013, Puig, Blanco-Anaya, Bargiela, & Crujeiras-Pérez, 2019), we still do not possess knowledge and understanding as to what extent CT is coherent at all dimensions of programming documents, starting with strategic goals, via study programmes, up to course and subject descriptions. Published research contains many examples of descriptions at distinct course or separate subject level, usually describing results of pre-test and post-test that make it possible to measure the effect of teacher-implemented initiative related to CT. However, in the literature are missing examples of research analysing to what extent CT is integrated in study programmes of higher education. Therefore, there is no tradition or tested models of how to perform analysis of this kind, and we hope that this study could become a reasonable attempt to investigate this field.

This paper examines the manifestation of CT skill in programmes of study, and raises the research question of CT being reflected in Lithuanian higher education study programmes. Moreover, it examines which conceptual model(s) of CT are used by study programme developers.

Two main limitations of the study can be identified. The first relates to the colleges' and universities' policy on how to or how not to publicly provide the descriptions of study programmes and (especially) syllabuses. The second limitation lies within the scope of research material, meaning that, due to the high number of study programmes, sampling had to be carried out. Hence, the research represents not all, but rather selected, study programmes.

The protocol for promoting CT in European higher education, prepared in 2019 (Promoting Critical Thinking in European Higher Education Institutions: towards an educational protocol, 2019), states that in order to support the development of CT, CT must to be an educational goal. This goal must be expressed at institutional, study programme and subject levels. The institutional level should encompass a clear statement of mission recognising CT as an important goal and explain ways to accomplish it. At the study programme level, CT should be similarly stated as the goal of the programme, while the methods how to achieve it should be presented. At the study subject level, CT should be reflected in learning outcomes and learning methods. This article presents research results from the study programme and subject levels, while discussion about institutional level is the subject of another paper.

The descriptions of study programmes provide us with information about the aim of each programme and what competencies the student will be able to demonstrate after completing the studies. Academic literature distinguishes two slightly different approaches towards the relationship between study programmes and the embeddedness of CT within them. The researchers (Cosgrove, 2011; Davies, 2013) of the concept of CT as being domain-general claim the existence of a certain set of CT skills which are general and applicable in various fields. These skills could be developed within the separate subject on CT or be integrated in regular courses.

On the other hand, researchers (Hammer & Green, 2011; Moore, 2011) who define CT as domain-specific, emphasise the dependence of CT competence on knowledge in a specific field. Therefore, the development of CT may be implemented only in relation to the context of this field. Certainly, there is a third approach, positioned somewhere in-between those two. For example, Martin Davies (2013) and Susan R. Robinson (2011) believe that the contents and issues associated with generality and specificity differ in various areas. The ability to think critically about a certain task is perceived both as highly dependent on content knowledge and task to be performed, and also dependent on knowledge about CT skills. This means that efficient development of CT has to be directed towards specific field knowledge and respective CT abilities at the same time.

Methodology

The conceptual axis of the analysis of study programmes is based on a CT model created specifically for this research. Because there is no single definition of CT but rather many competing and overlapping definitions, the inclusive CT conceptual framework informed by the works of the 8 most influential authors on CT was constructed. In order to identify these authors, a review of 303 articles in the field of CT in higher education and published during the last two decades in top-quality journals (Q1–Q4) was conducted. Concepts of the CT authors who were cited or referenced no fewer than 10 times were used to design the conceptual critical thinking framework for this research. This "use" means in-depth analysis of works of these authors in order to identify the constituent skills and dispositions of CT. Thus,

the ideas of Robert H. Ennis (1987), Peter A. Facione (1990), Diane E. Halpern (1998), Barry K. Beyer (1987), Ron Barnett (1997), Harvey Siegel (1998), Richard Paul (1992, 2001) and Linda Elder (2001) came into the CT conceptual framework. 9 major skills and 18 dispositions of CT were distinguished (table 1 and table 2).

It is important to emphasise that the concept of critical thinking in this research is inclusive as far as possible. We expected to find out the manifestations of critical thinking embedded in study programmes and their subjects, therefore, the ideas of the most prominent authors are connected into one whole.

Table 1.
Skills of critical thinking

Skills	Ennis	Facione	Beyer	Halpern	Siegel	Barnett
Explanation	x	x				
Decision making	x		x	x		
Making inferences	x	x	x			
Evaluation	x	x	x		x	
Analysis	x	x	x	x	x	
Self-regulation		x				
Interpretation		x				
Reasoning	x	x	x	x		
Critical thought and criticality						x

Table 2.
Critical thinking dispositions

Dispositions	Ennis	Facione	Beyer	Halpern	Paul	Paul & Elder
Reasonableness		x	x	x	x	x
Honesty		x	x		x	x
True beliefs and actions	x	x			x	x
Fair and clear presentation	x	x			x	
Concern for every person	x	x			x	x
Clarity		x			x	x
Diligence			x		x	
Relevance				x	x	x
Meaningfulness					x	x
Persistence		x		x	x	x
Scepticism			x			
Inquisitiveness		x				
Alertness		x				
Self-confidence		x				
Flexibility		x		x		
Willingness to reject unproductive strategies				x		
Courage						x
Open-mindedness		x			x	

The analysis of programmes of study employed the method of document analysis. In total, 754 study programmes were reviewed in the country's "Open vocational information, counselling and guidance system" (AIKOS). Using the key word *critical thinking* in all possible grammatical cases in the Lithuanian language led to the identification of 266 programmes whose short descriptions included these words either in a goal (89 cases) or in learning outcomes (177 cases). Due to restricted access to some study programmes on websites of institutions that deliver these programmes, 125 study programmes were left for further analysis. Then, ensuring the variety of study fields, eight study programmes – geo-informatics, ecology and environmental studies, primary school education, law and police studies, education management, business and economics, and arts and interior design – were selected for in-depth analysis using the inclusive conceptual framework.

Critical thinking skills and dispositions in higher education study programmes

Research data showed that the following skills are expressed in study course goals and learning outcomes: analysis (n=297), evaluation (n=138), and decision making (n=131); and to a lesser extent – explanation (n=71), interpretation (n=59), and inference (n=52). The least mentioned are self-regulation (n=18) and reasoning (n=4). Manifestation of dispositions is very limited in the analysed study programmes. Only two of them, open-mindedness (n=15) and honesty (n=12), are clearly expressed. Concern for every person (n=7), inquisitiveness (n=5) and flexibility (n=4) are found fragmentally in course descriptions.

Explanation in the analysed study programmes is mostly defined as the ability to state considerations upon which one's results were based (Facione, 1990). The ability to state results, to present reasonable opinion, information, conclusions, results, approach, and research reports are specified as explanation subskills. Also, explanation is described as presentation of summarised information orally or in writing for professionals or other persons for solving professional challenges or completing professional tasks.

Explanation also is expressed as reasoning for explanation of decision, and possible contradictions (Facione, 1990), and relates to such abilities defined in study programmes as the ability to discuss reasonably and to justify specific decisions, for example, in choosing strategies or methods for professional activity or research. Students' ability to explain legal acts, concepts, conceptions, systems, models and process relates to Ennis's statement that explanation could be described as a more complex definition of concepts and content, highlighting unspecified assumptions.

Analysis is reflected in study programmes in Facione's understanding as the ability to explore ideas; to define and compare concepts and challenges. In study programmes it expresses specifically the ability to compare information

from different periods or various contexts, and to identify and define problems. The ability to analyse statements emphasised in study programmes falls in the same subskill category. Other researchers (Beyer, 1987; Halpern, 1998; Siegel, 1988) interpret analysis as the evaluation of the possible consequences of particular actions or decisions. In study programmes it is defined as the analysis of opinion in order to formulate reasonable conclusions and provide recommendations. Beyer's definition that analysis is a relation between arguments and reasoning, between the whole and its parts, is also reflected in the analysed study programmes and is expressed as argumentation and reasoning about information, data (observational, research, professional activity) and problems (scientific, practical, professional).

Making decisions relates to students' abilities to suggest, justify, and evaluate decisions and is mostly related to Ennis's definition. Maintaining consistency in decision making (Beyer, 1987) in the analysed study programmes is described as the ability to identify decision making strategies, based on situation, available information, and internal and external resources at national and international levels.

Research data show that inference in the analysed study programmes is expressed as the ability to make inductive and deductive inferences (Ennis, 1987; Facione, 1990; Beyer, 1987). It is named as the ability to systematise and synthesise available study field-related information, data, and results. Making scientifically-based conclusions, formulating recommendations, propositions based on analysed and synthesised information or approaches of various stakeholders; and justification of relations between processes or phenomena, is emphasised in study programmes. This understanding relates most to the Ennis and Facione definitions of inference which include identification of necessary elements for drawing reasonable conclusions, consideration of relevant information flowing from data, statements, and evidence for making sound conclusions.

Interpretation encompasses decoding of meaning of information content, retelling the content revealing the meaning, beliefs, and values in various texts, paraphrasing, presentation of analogies, and rejection of ambiguities, It is expressed in study programmes as the ability to interpret results, information, and data, and relates most closely to Facione's concept.

Evaluation involves assessing the credibility of statements (Facione, 1990) in the analysed study programmes is described as evaluation of scientific information, knowledge, data, and problems related to the field of study. This skill is also manifested in students' ability to choose and apply strategies and methods for evaluation of processes, results, problems, and phenomena. Evaluation in analysed study programmes is also expressed as the ability to evaluate arguments (Facione, 1990) and described as evaluation of subject-related information, results, processes and changes. This subskill has traits of hypothetical thinking arising from assumptions, causes, opinions (Beyer, 1987; Ennis, 1987) and relates to changes predicted in analysed course descriptions.

Self-regulation in study programmes is described as monitoring and analysis of professional activity; self-assessment of personal and professional competences, and professional practice. Facione's definition of self-correction as changing one's own thinking and action, introspection, and elimination of causes in study programmes, is expressed as reflection on personal and professional activities, achievements of learning outcomes or specific skills in the process of professional development and career planning.

Reasoning as a CT skill (Beyer, 1987; Halpern, 1998) manifests as the ability to reason analytically and systematically, to think and reflect upon problems, processes and results related to a specific study subject.

Due to very structured and formalised study programme and study course templates it was difficult to recognise the following subskills:

- *explanation* in Ennis's definition as the ability to formulate questions, to determine and/or formulate criteria for decision-making, to analyse arguments, or to highlight unspecified assumptions;
- *analysis*, *i.e.* the ability to test hypotheses and identify uncertainty (Halpern); to find out arguments (Facione), to analyse arguments' suitability (Facione), or to judge reliability of written sources (Beyer);
- *decision-making* as following observational process rules (Ennis; Halpern), to monitor thinking (Ennis);
- *interpretation* as the ability to categorise information and data (Facione).

Barnett's conception of CT is least expressed in the analysed study programmes. We assume that this could be because his concept is too comprehensive, so can hardly be expressed in study programme or course descriptions.

In comparison with skills, dispositions are less manifested in the analysed study programmes. Open-mindedness (Beyer; Facione) is expressed as respect for other cultures and contexts, and open-mindedness to others and themselves. Tolerance and respect for otherness and diversity are also emphasised in the programmes and reflect open-mindedness. Another clearly defined disposition in the analysed study programmes is honesty (Beyer; Facione; Paul; Paul & Elder) defined as responsibility for one's own actions and results of activity; impartiality; and compliance with ethical standards. Concern for every person (Ennis; Paul & Elder; Paul) is described as empathy and recognition of individuality. Inquisitiveness (Facione) relates to the need for new knowledge, cognition process, and interest in novelty. The disposition of flexibility (Facione; Halpern) is expressed in the aspiration to act contextually.

Our analysis disclosed the most favoured skills as analysis, evaluation and decision making. Self-evaluation and reasoning are among the least mentioned skills. Open-mindedness, honesty, empathy, inquisitiveness and flexibility are dispositions that broaden conceptualisation of CT by providing more space for relationality and the wider context of social life. Summarising, it could be said that CT cognitive skills are present, but dispositions are very vaguely expressed in the analysed study programmes.

Discussion and conclusions

In the presented research we argue that in terms of CT skills and dispositions within study programmes, critical analysis is prioritised together with critical evaluation of data, processes and various subject related phenomena in descriptions of study programmes. Students' skills of interpretation, explanation, reasoning, making inferences and decisions are related to study course content and its overall context. Such dispositions as openness, fairness, inquisitiveness, flexibility, and care for others are reflected in learning outcomes to a certain extent.

We have tried to recognise well-known CT concepts and to understand what kind of models are used to develop students' CT, as well as to look for signs of theoretical assumptions that programme designers build into their teaching. However, we were not able to identify any clear conceptual model used in the design of study programmes. We think that the nature of study programme and course descriptions does not provide any possibility to identify clear concepts or CT development models. Study programmes have to follow readymade templates and fulfil certain requirements; hence, they look very schematic and even identical. Of course, we did not expect to identify Ennis, Facione or any other famous author's concept as an entire framework embedded in the description of study programmes. However, we did expect to find some coherence between course goals, content, described methods and learning outcomes with respect to our researched phenomena, as CT should be equally and coherently reflected in all parts of study programmes (Puig, Blanco-Anaya, Bargiela & Crujeiras-Pérez, 2019). In this research, CT as a study programme goal was mentioned in most of the programmes, though only in a few as a learning outcome. Unfortunately, CT as a coherent concept – expressed in goals, content description and learning outcomes – was found only in a few cases. Therefore, further investigation is necessary as to what extent the development of CT is a conscious, consistent and science-based process.

In analysing embeddedness of CT in study programmes, we were also searching for CT dimensions, as defined by Davies (2015) – individual, social and interpersonal. Research data show that the individual dimension of CT dominates in study programmes. In the majority of cases, CT is treated as a cognitive skill related to the development of students' reasoning skills for personal purposes – better learning results and intellectual growth. In exceptional cases, we have found some evidence of a social dimension. However, this is limited to interpersonal relationships. Other people are important for listening to reasoned arguments, understanding how and why a certain decisions are made, finding agreement in solving problems, and meeting and responding to the challenges of a specific study field. The importance of others manifests also via empathetic relationships: openness to others' opinions, different culture or/and context. Nothing was found about social dimensions in terms of questioning authorities, raising social problems, fighting for justice, or con-

tributing to societal welfare. Therefore, Davies' (2015) question "can we say then, that critical thinking is a social aspiration as well <…> that it has a social dimension" (p. 44), remains unanswered.

Davies' (2015) CT accounts in higher education provide a wide range of possibilities for the development of CT competence: from CT levels, defined in Benjamin S. Bloom's (1956) taxonomy, to critical action and critical being, described by Barnett (1997). Referring to Davies' (2015) model, our research findings mostly correspond to Bloom's taxonomy and reflect all its stages – from subject related knowledge and concepts up to evaluation. CT is treated mostly as higher order cognitive individual thinking skills that are developed in the process of study.

It is obvious that critical action which requires application of knowledge and reasoning is not well reflected in the analysed programmes. Critical action looks to be locked in the minds of students – they have to imagine, to simulate, to solve theoretical problems in theory, but rarely in practice. The concept of critical pedagogy is also absent. Students are not challenged to analyse social reality critically, they are not encouraged to fight injustice or to develop the values to react and reflect adequately to any situation which calls for critical response, meaning that understanding of critical thinking in higher education does not correspond to statements which are declared in official rhetoric and political agendas (European Commission, 2016; UNESCO, 2017).

On the other hand, study programme and course descriptions are restricted to specific requirements which do not necessarily emphasise education in transversal competences which also include CT. In order to find out how CT manifests in specific programmes and study courses, how it is successfully learnt and thought, and what meaning do students and teachers give to it, further qualitative investigations are needed.

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