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The Interaction Between Understanding of Critical Thinking and Teaching/Learning of Critical Thinking Skills

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Annotation. This article aims to present the interaction between understanding of critical thinking and teaching and learning of critical thinking skills in higher education in Lithuania. Representative quantitative research was implemented, and 152 teachers and 1512 students took part in the survey. Exploratory factor analysis revealed two factors – the rigidity and elasticity of the conception of critical thinking – that have an impact on teaching and learning of critical thinking skills.

Keywords: *critical thinking*, *higher education*, *critical thinking skills*, *teaching*, *learning.*

Introduction

Critical thinking is at the heart of higher education (Wilson, 2016) and is an important goal in modern schooling. Its implementation provides students with the competencies needed to develop a personality (Veliz & Veliz-Campos, 2019) and to solve problems in a rapidly changing and uncertain world (Facione & Facione, 1996; Ku, 2009; Dwyer et al., 2012; Ghanizadeh, 2017). The demand for critical thinking is growing along with challenges and complex problems in a global, competitive environment (Smith & Stitts, 2013) that have not existed before.

Critical thinking is an ambiguous concept that is defined differently by different researchers and theoretical schools. The classical definition of critical thinking states that it is the totality of a person's cognitive skills (to interpret and analyse, to explain and evaluate, and to draw conclusions and make the corrections stemming from them) and dispositions (open-mindedness and inquisitiveness, analyticity and systematicity, trust in soundness and the pursuit of truth) (Facione, 1990). The importance of skills is also emphasised by Siegel (1988), who argues that critical thinking is the ability to be guided by substantiated arguments in various contexts in pursuit of substantiated and rational decisions, and by Beyer (1987), who defines critical thinking as the ability to argumentatively question unsubstantiated assumptions and reasoning in pursuit of truth and rightness. By including the aspects of truth and rightness, the latter definition also gives critical thinking a social meaning that is further emphasised by Barnett (1997), who argues that critical thinking is the ability to reason, reflect and act critically for the good of oneself, others and society. Other authors associate critical thinking more with the process of personal development, emphasising that it is the improvement of a person's thinking by changing habitual thinking patterns (Halpern, 1998), or a strong human-development thinking based on firm knowledge, cognitive skills, and honest, moral behaviour in all life situations (Paul & Elder, 2001). Ennis (1987) singles out reflexivity and argues that critical thinking is reflexive thinking when making a substantiated decision about what and what not to believe.

The first attempt to systematise critical thinking skills was presented in the Delphi expert consensus, which lists the core critical thinking skills such as analysis, evaluation, explanation, inference, interpretation, and self-regulation (Facione, 1990). Ennis (1987) and Beyer (1987) add the ability to evaluate assumptions, causes, and opinions to the skill of evaluation. Ennis (1987) expands the definition of explanation and adds sub-skills such as the ability to formulate questions, ask and answer clarifying/challenging questions, determine and/or formulate criteria for decision making, and analyse arguments. The inference is given as having sub-skills such as deductive and inductive inference (Beyer, 1987), the exploration of reasonableness, and anticipation of alternatives (Ennis, 1987). Other researchers attribute decision-making (Ennis, 1987; Halpern, 1998; Beyer, 1987), argumentation and reasoning (Halpern, 1998; Beyer, 1987) to critical thinking skills.

Decision-making (Ennis, 1987; Halpern, 1998; Beyer, 1987) is explained as the ability to evaluate source reliability (Ennis, 1987; Halpern, 1998), make decisions, and defend them by integrating all dispositions and skills (Ennis, 1987), follow observational process rules (Ennis, 1987; Beyer, 1987), and maintain consistency in making decisions (Ennis, 1987; Beyer, 1987). The reasoning is defined as scientific thinking to avoid pseudoscience (Halpern, 1998; Barnett, 1997).

Teaching and learning critical thinking skills is a complex process which among other important aspects is shaped by teacher and students understanding of critical thinking. The importance of developing critical thinking skills and the challenges faced by teachers in the study process have been drawing the attention of researchers around the world (Evens et al., 2014; Gillespie & McBain, 2014). Researchers argue that critical thinking can be learned, encouraged, and developed (Niu et al., 2013; Abrami et al., 2015, Veliz & Veliz-Campos, 2019; Puig et al., 2019). To achieve this, the development of critical thinking must be included in every study discipline (Penningroth et al., 2007), thereby justifying the objectives of higher education in terms of critical thinking (Ghanizadeh, 2017).

According to Edwards (2017), the inclusion of specific critical thinking skills in course content is an effective way to promote critical thinking among students. Also, incorporating critical thinking into the teaching may improve other skills, such as language skills (Toshpulatova & Kinjemuratova, 2020), or have general positive impact on students' academic achievements (Tiruneh et al., 2018).

However, researchers (Arth et al., 2019) note that students likely will not learn better critical thinking skills alone, also, student-centered learning in higher education requires the instructor to guide students to use the course concepts (Wright, 2011), therefore, systematically designed learning activities are crucial to acquire critical thinking. Integration of critical thinking activities into coursework or lectures, creating opportunities for appropriate and effective questioning (Fitriani et al., 2021), referring to content from related disciplines (Norris, 2016) can stimulate students to think at a higher cognitive level. Moreover, by developing critical thinking, teachers also contribute to the development of other soft skills to be applicable at the workplace (Tang, 2019).

In the context of higher education, critical thinking is referred to as conscious and purposeful teaching and learning activity. Studies (Kozikoglu, 2019; Özelçi & Çaliskan, 2019) show, that teacher's thinking and learning have great importance in stimulating students' thinking processes. On the other hand, confidence in own teaching practices, in turn, can create an efficient learning environment (Pearman et al., 2021). Hence, the role of a teacher in contributing to strengthening students' critical thinking competencies is very important.

Critical thinking is one of the most desirable intended learning outcomes in higher education and interest in developing critical thinking is growing among teachers, but some studies show that this goal is not being realised successfully. For example, Tsui (2008) argues that most teachers do not have sufficient pedagogical training and lack the

knowledge necessary to develop critical thinking (Zhang et al., 2020), and therefore they teach ineffectively (Crenshaw et al., 2011; Edwards, 2017). The interest to incorporate the teaching of critical thinking skills is increasing, but an overall lack of consistency in the implementation process is noted (Veliz & Veliz-Campos, 2019).

This illustrates that the teacher's understanding of critical thinking is central when interacting with students, and this influences the entire teaching process, creates a learning environment for students, and influences their motivation and achievements (Dehghayedi & Bagheri, 2018). The teacher's understanding reflects their perceptions and beliefs, and this determines the choice of appropriate behaviour or strategies in the teaching process (Zhang et al., 2020; Torff, 2005).

The development of critical thinking skills should be seen as a two-way process, in which interaction between teacher and student becomes particularly important. Both the teacher and the student are active and significant participants in shaping students' critical thinking. The interfaces of the construction of how teachers think and what they believe and know are explained by the teachers' interaction with students (Borg, 2003). Encouraging students to be independent thinkers Cohen (1993) argues that critical thinking is not just a series of thinking skills, but also the character traits that enable individuals to examine their own thinking. The teacher's understanding of critical thinking interacts with their type of work they do with students. It is important to emphasise this aspect when researching the teacher's role in the development of critical thinking and power to make a difference.

This article aims to present the interaction between understandings of critical thinking and teaching and learning of critical thinking skills in higher education in Lithuania. It presupposes two objectives: to investigate how critical thinking is understood by teachers and students, and to examine how teachers' understanding about critical thinking – whether it is an acquired skill or whether it is an innate characteristic – are related to the critical thinking development.

Materials and Methods

Participants and procedures. The representative online survey involved 152 teachers and 1512 students of the Lithuanian higher education institutions. A multistage probability sampling method was used (detail in Table 1). Participation in the study was voluntary. The respondents were assured that the data submitted would remain anonymous and would only be made public in an aggregated form.

Table 1
Social and Demographic Characteristics of the Participants

	Teachers	Students
Number of research participants	152	1 512
Age (average)	48.9	23.8
Gender		
Women	64.0%	60.3%
Men	36.0%	39.7%
Type of higher education institution		
College	56.6%	28.2%
University	63.2%	71.8%
Cycle of study		
Bachelor's	84.9%	80.8%
Master's	45.4%	17.3%
Doctoral	11.2%	0.9%

Measures. Critical thinking skills were analysed in an empirical study designed to compare how much attention teachers give to the development of critical thinking skills when working with students, and how students evaluate the intensity of the attention that is given. The following skills were included for investigation: analysis, interpretation, inference, explanation, evaluation, argumentation, decision-making. The research participants completed separate online questionnaires designed for teachers and students. There were questions determining: which conception of critical thinking is prioritised, what is understanding of critical thinking, whether critical thinking is acquired or innate quality. The instrument for measuring the attitude toward the nature of critical thinking consisted of six statements that the research participants evaluated on a 5-point Likert scale. The development of critical thinking was examined by questions about the development of specific critical thinking skills, namely, how much attention the teachers gave to the development of students' critical thinking skills in the study process, and the students' evaluation of how much attention was given to the critical thinking skills in the study programmes that they were in. Each item should be evaluated on a 7-point scale from 1 (no attention at all) to 7 (particular attention). Cronbach's alpha (α) measure of internal consistency, which helps to determine whether each individual variable that makes up the scale serves the overall purpose of the scale (Aiken, 2002; Drost, 2011), was used to validate the instrument. In evaluating the statements on the manifestation and development of critical thinking, Cronbach's alpha coefficient ranged from 0.961 to 0.456 for the teacher questionnaire, and from 0.974 to 0.692 for the student questionnaire.

Data analysis. Descriptive and inferential statistical methods were applied for data analysis, using SPSS 23. The Kolmogorov–Smirnov Z test was used to identify the normality of the distribution. The non-parametric Chi-square ($\chi 2$) test of independence and the analysis of the variance method were used to evaluate the statistical significance of Mann–Whitney U differences between groups.

A factor analysis of the student and teacher samples was performed in order to investigate in searching which model best explained the development of critical thinking skills. Exploratory factor analysis (EFA) was used to investigate the factorial structure of the critical thinking skills in the student and teacher samples. The purpose of EFA is to describe multidimensional data of the student and teacher samples using fewer variables. EFA was conducted using *Mplus 8.4* with the MLR estimator. Before proceeding to the analysis, the eligibility of the data for EFA was assessed by performing the Kaiser–Meyer–Olkin (KMO) test and then Bartlett's test of sphericity. In both samples, the KMO value was close to or higher than 0.70, and Bartlett's test was significant ($p < 0.001$), supporting the factorability of the correlation matrix. The extracted factors were expected to be correlated, so an oblique rotation strategy, Geomin rotation, was used to interpret the factors (Sass & Schmitt, 2010). Oblique rotation strategy provides for correlations among the latent constructs.

Factor eigenvalues and a set of model-data fit indicators were also used to determine the optimal number of factors (looking for solutions that had RMSEA and SRMR values lower than 0.08 and CFI values higher than 0.90, as they indicated acceptable CFI, RMSEA and SRMR, the most likely popular measures of goodness-of-model fit). In examining the factor eigenvalues, solutions that had factors with an eigenvalue greater than 1 (Brown, 2015) were considered. In both the samples, model fit statistics supported the two-factor solution. That is, in both samples, the one-factor solution did not show a good model-data fit in terms of CFI, RMSEA, and SRMR statistics. In addition, the eigenvalue for the third factor was less than 1, showing that a third factor may not be meaningful. The two-factor solution, however, was a good fit with the data and in both samples. The results are presented in Table 2.

Table 2

The Results of Exploratory Factor Analysis and Model Fit Indices

Factor	Eigenvalues	Model fit indices					
		χ^2	df	n_{par}	CFI	RMSEA	SRMR
Teachers (N = 152)							
1	2.263	27.67	9	18	0.780	0.117	0.059
2	1.101	5.83	4	23	0.978	0.055	0.021
3	0.782	Did not converge					

Students (N = 1512)							
1	2.575	987.68	9	18	0.490	0.268	0.150
2	1.728	36.41	4	23	0.983	0.073	0.019
3	0.596	0.00	0	27	1.00	0.000	0.000

Note. χ^2 – Chi-square goodness of fit test; df – degrees of freedom; n_{par} – the number of free parameters in the model; CFI – comparative fit index; RMSEA – root mean square error of approximation; SRMR – standardised root mean square residual.

Results

The conception of critical thinking. In order to determine which conception of critical thinking teachers and students adhere to, they were asked to choose one of the seven descriptions of critical thinking that they most related to. Over one-third (36.2%) of the teachers and around one-quarter (24.1%) of the students choose the description of critical thinking as the totality of a person's cognitive skills (to interpret and analyse, to explain and evaluate, and to draw conclusions and make the corrections stemming from them) and dispositions (open-mindedness and inquisitiveness, analyticity and systematicity, trust in soundness and the pursuit of truth. A small proportion of the students (7.5%) and teachers (5.3%) believed that critical thinking is the improvement of a person's thinking by changing habitual thinking patterns. When comparing critical thinking understanding of teachers and students, one statistically significant difference was found: the teachers were more likely than the students to respond that critical thinking is the totality of a person's cognitive skills and dispositions ($\chi^2 = 15.560$; df = 6; $p < 0.05$).

Critical thinking understanding. The teachers essentially adhered to dynamism, i.e., that critical thinking is a changing personal skill. The majority of the teachers agreed or strongly agreed with the following statements: that critical thinking can be developed (92.8%), that there are various ways to demonstrate critical thinking (88.1%) and that critical thinking is possible in every situation (81.0%). Teachers' opinions differed more regarding the statement that a person can think critically if he or she wants and tries to, i.e. 71.1% of the teachers agreed, while slightly more than one-fifth (21.7%) neither agreed nor disagreed and 7.3% did not agree. With statements about critical thinking as a static, unchanging personal characteristic, teachers largely disagreed. That a person's ability to think critically is unchanging did not agree 72.4% and that critical thinking only occurs when criticising did not agree 84.2% of the teachers. Generally, the teachers understand critical thinking as a dynamic, developed, and changing process that every person needs in different situations.

The opinion of students is very close to that of the teachers, but there are several differences. 76.0% of the students were inclined to agree with the statement that critical thinking can be developed, and more than two-thirds of the students were inclined to

agree with the statement that there are various ways to demonstrate critical thinking (70.8%), critical thinking is possible in every situation (69.1%), and a person can think critically if he or she wants and tries to (68%). Thus, the students basically recognised the role and effort of the person in the manifestation of critical thinking. However, compared to the teachers, the students were more scattered when responding to the statements illustrating the one-sided, static nature of critical thinking. More than a third of the students tended to agree that critical thinking only occurs when criticising (38.8%), and that a person's ability to think critically is unchanging (38.3%).

A Mann–Whitney test was performed in order to compare teachers' and students' understanding of critical thinking (Table 3).

Table 3

Teachers' and Students' Understanding of Critical Thinking; the Mann–Whitney Criterion Denotes the Rank

	Mean rank, teachers responses	**Mean rank, students responses**	**Mann-Whitney U**
A person's ability to think critically is unchanging	997.2	815.94	68728.000***
A person can think critically if he or she wants and tries to	873.44	828.38	108688.500
Critical thinking is possible in every situation	1136.34	801.96	95905.000***
There are various ways to demonstrate critical thinking	1212.09	794.34	92345.500***
Critical thinking only occurs when criticising	980.96	817.58	57214.000***
Critical thinking can be developed	957.55	819.93	89877.000***

Note. Statistically significant parameter when: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Data analysis revealed that teachers' and students' understanding of critical thinking differed. A highly significant difference (Table 3) was identified in that the teachers agree more than the students that there are various ways to demonstrate critical thinking and that critical thinking is possible in every situation ($U = 92345.500$; $p < 0.001$). Also, a significant difference was found in that the teachers were more likely than the students to agree that a person's ability to think critically is unchanging ($U = 68728.000$; $p < 0.001$).

Development of critical thinking skills. The study revealed that, in developing students' critical thinking skills, the teachers paid attention to working with all listed critical thinking skills. The teachers allocated particular attention to developing the constituents of the inference ($M = 5.95$), interpretation ($M = 5.93$) and argumentation ($M = 5.92$) skill groups.

The teachers gave a bit less attention to developing the abilities in the other groups, i.e., analysis (M = 5.85), evaluation (M = 5.77), and explanation (M = 5.76). The least attention was given to developing decision-making (M = 5.52) and self-regulation (M = 5.26) skills.

According to the students' evaluations of how much attention is paid to the development of critical thinking skills in the study programme that they were in, the most attention was given to developing argumentation (M = 5.33), inference (M = 5.25), and decision-making (M = 5.22) skills. A bit less attention was given to self-regulation (M = 5.19) and explanation (M = 5.17) skills, and the least attention was given to interpretation (M = 5.10), analysis (M = 5.06), and evaluation (M = 5.05) skills.

The study sought to compare how much teachers focus on developing critical thinking skills when working and interacting with students, and according to the students, how much attention is paid to the development of these skills in their study programme (Table 4).

Table 4
Comparison of an Attention Given to the Development of Critical Thinking Skills

	Mean rank, teacher responses	Mean rank, student responses	Mann-Whitney U
Self-regulation	832.41	832.51	114896.500
Decision-making	956.83	823.02	100574.000*
Explanation	1029.92	812.65	84903.500***
Argumentation	1030.34	812.61	84841.000***
Inference	1059.23	809.71	80448.500***
Evaluation	1087.65	808.86	79168.500***
Analysis	1108.32	804.77	72987.500***
Interpretation	1110.44	804.56	72664.500***

Note. Statistically significant parameter when: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Statistically significant differences were found in the following cases: the teachers agreed more than the students that, in the study process, attention was given to the critical thinking skills of interpretation ($U = 72664.500$; $p < 0.001$), analysis ($U = 72987.500$; $p < 0.001$), evaluation ($U = 79168.500$; $p < 0.001$), inference ($U = 80448.500$; $p < 0.001$), argumentation ($U = 84841.000$; $p < 0.001$) and explanation ($U = 84903.500$; $p < 0.001$). Furthermore, a small but significant difference was found in decision-making skills. Meanwhile, responses of the teachers and the students coincided concerning the attention given to developing self-regulation skills.

Factor structure of critical thinking understanding scale. A factor analysis of the student and teacher samples was performed in order to investigate which model best explains the development of critical thinking skills. Factor loading is a correlation coefficient between each variable and each factor in factor analysis. While the factor loadings had some

similarities across the student and teacher samples, there were also some notable differences. In particular, in both samples, Items 3 and 4 had clear and strong associations with the first factor, while Items 2, 5, and 6 had clear associations with the second factor. However, the first item on the scale had different associations with two factors across two samples. In the teacher sample, the first item loaded negatively on the first factor, while in the student sample, it loaded positively on the second factor. This result suggested that the factor structure of the scale was somewhat different across the two samples. It also suggested that the items should be grouped differently for the teachers and the students. Despite this difference, the meaning of the factors across the two samples was fairly similar. According to the essence of the items, it labelled the first as 'rigidity' and the second as 'elasticity'. The internal consistency belonging to these two factors was also sufficient. The Cronbach's alpha coefficient was 0.60 for the rigidity factor in the teacher sample and 0.86 in the student sample, while the alpha coefficient for the elasticity factor was 0.58 in the teacher sample and 0.80 in the student sample. Standardised loadings from the two-factor solution are presented in Table 5.

Table 5

Standardised Factor Loadings Obtained from EFA of Critical Thinking Understanding Scale in the Teacher and Student Samples

Item	Teacher sample		Student sample	
	λ_1	λ_2	λ_1	λ_2
Critical thinking can be developed	-0.40	0.17	-0.15	0.78
A person can think critically if he or she wants and tries to	0.01	0.67	-0.01	0.71
A person's ability to think critically is unchanging	0.80	0.00	0.84	0.01
Critical thinking only occurs when criticising	0.53	0.01	0.90	-0.01
There are various ways to demonstrate critical thinking	-0.17	0.37	0.10	0.69
Critical thinking is possible in every situation	-0.01	0.58	0.13	0.64

Note. λ_1 – standardised loading on the first factor; λ_2 – standardised loading on the second factor. Factor loading is a correlation coefficient between each variable and each factor in a factor analysis.

The teachers who held the understanding that critical thinking is static had a negative assessment of the possibilities for developing critical thinking (λ = -0,40), and very strongly supported the positions that a person's ability to think critically is unchanging (λ = 0.80) and that critical thinking only occurs when criticising (λ = 0.53). Meanwhile, the teachers who held the understanding that critical thinking can be learned agreed that a person can think critically if he or she wants and tries to (λ = 0.67), that critical thinking is possible in every situation (λ = 0.58), and that there are various ways to demonstrate critical thinking (λ = 0.37). The situation in the student sample was very similar. Those, whose understanding

was that critical thinking is innate strongly agreed that a person's ability to think critically is unchanging (λ = 0.84) and that critical thinking only occurs when criticising (λ = 0.90). The students, whose understanding was that critical thinking can be acquired, strongly supported that critical thinking can be developed (λ = 0.78), a person can think critically if he or she wants and tries to (λ = 0.71), there are various ways to demonstrate critical thinking (λ = 0.69), and critical thinking is possible in every situation (λ = 0.64).

Interaction between the rigidity and elasticity of the conception of critical thinking and the development of critical thinking skills in the teacher sample. A path model was built and tested to examine the interaction between understanding of critical thinking and the critical thinking skills that are developed the most. In the path model, the factor scores for each of these dimensions were used as outcome variables, and the item-total scores of the rigidity and elasticity of critical thinking were used as predictors of outcome variables. The standardised slope parameter estimates from the path model linking understanding of critical thinking with the critical thinking skills that are developed the most are presented in Table 6.

Table 6

Standardised Slope Parameter Estimates From the Path Model Linking Understanding of Critical Thinking With the Critical Thinking Skills That are Developed the Most (N = 152)

Predictor variables: Understanding the nature of critical thinking	**Outcome variables: Critical thinking skills**								
	General factor	**Decision-making**	**Inference**	**Explanation**	**Analysis**	**Self-regulation**	**Argumentation**	**Interpretation**	**Evaluation**
Rigidity of critical thinking	-0.18*	0.01	0.07	0.06	-0.07	0.09	0.01	-0.19*	-0.12
Elasticity of critical thinking	0.23**	0.14	-0.10	0.02	0.11	0.08	0.03	-0.06	-0.07
R^2	0.07	0.02	<0.01	0.01	0.02	0.02	<0.01	0.04	0.02

Note. Parameter is statistically significant when * $p < 0.05$ and ** $p < 0.01$.
R^2 – the coefficient of determination, which indicates the proportionate amount of variation in the outcome variable explained by predictor variables.

In general, there was one notable pattern of interaction. The rigidity factor negatively predicted, while the elasticity factor positively predicted the general factor of the critical thinking skills that are developed. This finding shows that teachers who understand critical thinking skills as being very rigid and inflexible tend to put less effort into developing all of the skills related to critical thinking, while those who understand critical

thinking skills as being flexible and teachable tend to put more effort into developing all the skills related to critical thinking. Only one association emerged with the specific factor – the rigidity of critical thinking negatively predicted the teaching of interpretation skills. It shows that teachers who understand of critical thinking skills as being very rigid tended to put less effort into developing interpretation skills when working and interacting with students.

Discussion and Conclusions

The research data revealed that the teachers and the students understand critical thinking as it is defined by Facione (1990), i.e., that critical thinking is the totality of a person's cognitive skills (to interpret and analyse, to explain and evaluate, and to draw conclusions and make the corrections stemming from them). The least acceptable understanding of critical thinking was associated with the conception of critical thinking as improvement, as defined by Halpern (1998) and Paul and Elder (2001). The concepts of critical thinking put forward by other authors, such as Siegel (1988), Beyer (1987), Barnett (1997), and Ennis (1987), are less known and less used by the research participants. The results also show that critical thinking manifests itself as the ability to make decisions based on real-life problems. This is not unique to this study, and is also confirmed by other studies (Liu et al., 2016; Eagan et al., 2014), which argue that critical thinking is one of the most important learning outcomes expected of graduates and is reinforced by the observations of Giancarlo and Facione (2001) that critical thinking is an independent and well-organised cognitive process leading to high-quality conclusions and decisions.

The teachers understood critical thinking as a dynamic, developing, and changing skill that every person needs in different situations. The students understood critical thinking as being developed and demonstrated in each situation and in a variety of ways. Critical thinking was seen as a process that depends on a person's skills, dispositions, values, and beliefs. According to the research participants, anyone can think critically as long as they want to and make an effort to do so. This dynamism is related to the individual's capacity, when an active, reflexive actor can influence his or her own decisions and create and re-create a social reality accordingly, and use available resources to transform the social structure. This finding responds to the idea of the interaction between the individual and the social structure (Giddens, 1986). Teachers and students understand critical thinking as a changing process that helps a person to demonstrate critical thinking skills in different ways, depending on the situation, and associate critical thinking with the efforts of each individual. In general, the research participants do not think that critical thinking only occurs when criticising, although at least a third of the students take the opposite understanding. Other studies, such as the one conducted by Hyytinen et al. (2014), also revealed that students' critical thinking can be characterised

by both flexibility and rigidity, which in turn allows students to adapt their thinking or behave according to established patterns.

The results revealed that the process of developing critical thinking is not uniform. It is influenced by the teachers or, more specifically, their understanding of what critical thinking is, their position toward the possibility of developing this thinking, and finally, the specific attention they give to developing critical thinking skills. The complexity of developing critical thinking was also noted by Abrami et al. (2015), who argued that developing critical thinking is a complex and manifold process. The teachers indicated that, in the study process, they developed all of the critical thinking skills presented, but to varying degrees. They gave slightly more attention to the development of argumentation, interpretation, and inference skills, and less to skills related to assessing or presenting context, different attitudes or perspectives to others. These results raise new questions about how deep of an understanding the teachers have about the essence of critical thinking.

The importance of teachers understanding is also illustrated by other studies (Grant & Smith, 2018; Zhang et al., 2020) which confirm that the understanding of critical thinking and the frame of mind of teachers are related to how they develop critical thinking, what work methods they use, what tasks they give to students, and what criteria they apply for assessing. In the presented research the model was designed to show the internal structure of the understanding of critical thinking. It showed that the development of critical thinking is essentially influenced by the understanding of the teacher regarding whether critical thinking is an innate or an acquired quality. When working and interacting with students, teachers who understood critical thinking as an innate quality put less effort into developing all of the skills related to critical thinking, and vice versa - i.e., teachers who understood critical thinking as a certain skill that can be learned tended to put more effort into developing all of the skills related to critical thinking.

As Mahdi et al. (2020) argue, developing critical thinking skills also improves student-learning outcomes. According to the students, attention was given in study programmes to the development of all critical thinking skills, but a bit more attention was given to developing argumentation, inference, and decision-making skills. It should be noted that the students felt that teachers gave the least attention to developing analysis, interpretive and evaluation skills.

Teachers who understood critical thinking skills as being very rigid and inflexible tend to put less effort into developing all of the skills related to critical thinking, while those who understood critical thinking skills as being flexible and teachable tend to put more effort into developing all the skills related to critical thinking. The rigidity of critical thinking negatively predicted one specific critical thinking skill – the teaching of interpretation skills. The research findings can be seen as contributing to a better understanding of how individual understandings of critical thinking and its teaching and learning interact.

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Kritinio mąstymo supratimo ir kritinio mąstymo įgūdžių mokymo(si) sąveika

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Santrauka

Sparčiai besikeičiančiame, informacijos valdomame pasaulyje kritinis mąstymas laikomas vienu iš aukštojo mokslo tikslų. Kritinio mąstymo ugdymas įvardijamas kaip sąmoninga ir

tikslinga mokymo ir mokymosi veikla: dėstytojai laikomi aktyviais veikėjais, kurių supratimas apie kritinį mąstymą daro įtaką jų darbui ir sąveikai su studentais ugdant kritinį mąstymą. Šio straipsnio tikslas – pristatyti supratimo apie kritinį mąstymą ir kritinio mąstymo įgūdžių mokymo ir mokymosi sąveiką Lietuvos aukštosiose mokyklose. Atliktas reprezentatyvus kiekybinis tyrimas, internetinėje apklausoje dalyvavo 152 dėstytojai ir 1512 studentų. Tyrimo duomenys atskleidė, kad dėstytojai ir studentai laikėsi nuomonės, jog kritinis mąstymas yra asmens pažintinių gebėjimų visuma. Kritinis mąstymas vertinamas kaip procesas, kuris priklauso nuo asmens įgūdžių, polinkių, vertybių ir įsitikinimų. Faktorinė analizė atskleidė du veiksnius – kritinio mąstymo sampratos nelankstumą ir elastingumą, – turinčius įtakos kritinio mąstymo įgūdžių mokymui ir mokymuisi. Pirmasis veiksnys apima supratimą, kad kritinis mąstymas yra įgyta savybė, kurią galima ugdyti, antrasis – kad kritinis mąstymas yra įgimta asmens savybė, todėl statiška. Šie veiksniai sąveikauja su pastangomis mokyti ar mokytis kritinio mąstymo.

Esminiai žodžiai: *kritinis mąstymas*, *aukštasis mokslas*, *kritinio mąstymo įgūdžiai*, *mokymas*, *mokymasis*.

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