

NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

INSTITUTE OF EDUCATION

As a manuscript

Yulia Nikolayevna Koreshnikova

Organizational and Pedagogical Conditions for the Development of Critical
Thinking of University Students

Summary of the thesis
for the purpose of obtaining academic degree
Doctor of Philosophy in Education

Academic supervisor:
Doctor of Sciences, Professor
Isak Davidovich Froumin

Moscow – 2021

Full name	Yulia Nikolayevna Koreshnikova
Dissertation research subject	Organizational and Pedagogical Conditions For the Development of Critical Thinking In University Students
Information about the thesis organization	Institute of Education, National Research University Higher School of Economics
Thesis Supervisor	Full name: Isak Davidovich Froumin Education: Krasnoyarsk State University, faculty: Mathematical, Mathematics specialty Academic degree: Doctor of Education: Russian State Pedagogical University, specialty 13. 00. 01 "General Pedagogy, History of Pedagogy and Education" Academic rank: Professor

Key results of the thesis research are presented in 5 papers published in journals indexed by Scopus/WoS and List of High-level Journals at HSE, namely:

Pos. No.	Publication title
1.	Koreshnikova Yu. N. Development of critical thinking in modern Russian society: what does the university give? // Public opinion monitoring: economic and social changes. – 2019. - No. 6 (154).
2.	Koreshnikova Y. N., Froumin I. D., Pashchenko T. V. Barriers for creating pedagogical conditions for the development of critical thinking in Russian universities // Pedagogy. – 2020. – Vol. 84. – No. 9. – pp. 45-54.
3.	Koreshnikova Yu. N., Froumin I. D. Professional competence of a teacher as a factor in the formation of students' critical thinking // Psychological Science and Education. 2020. Vol. 25. No. 6. pp. 88—103.
4.	Koreshnikova Y. N., Froumin I. D., Pashchenko T. V. Organizational and pedagogical conditions for the development of critical thinking // University Management: Practice and Analysis. - 2021. - T. 25. - No. 1. - S. 5-17
5.	Shcheglova I. A., Koreshnikova Yu. N., Parshina O. A. The role of student involvement in the development of critical thinking // Education Issues. – 2019. – No. 1.

Scientific conferences where the thesis research results were presented:

1. XXII April International Conference on Economic and Social Development (Moscow, 2021). "Report: Is it possible to develop critical thinking in the context of traditional education?".
2. 40th International Annual Conference on Critical Thinking (online, 2020). Report "Barriers for critical thinking skills development: Russian Universities cases".
3. International conference on new educational technologies #EdCrunch Tomsk "The role and function of education in the era of artificial intelligence" (online, 2020). Report "Barriers for critical thinking skills development: Russian Universities cases".

4. International conference "Development, Assessment and Validation of Social Competencies in Higher Education (Bremen, 2019). Report: "The Link between Critical Thinking and Participation of Students in Project".
5. XX April International Conference on Economic and Social Development (Moscow, 2019). Report: "The link between critical thinking and participation of students in project activities and presentations".
6. University pedagogy (Krasnoyarsk, 2018). Report: "Assessment of students' educational results as a factor in the critical thinking development".

Relevance of the Research Topic

In recent years, there has been a change in trends in the labor market, some professions are being automated, and non-routine analytical and interpersonal skills come to the fore (Author et al., 2003). For these reasons, employers expect from their employees, as from qualified specialists, both relevant knowledge and communication and cooperation skills, as well as the ability to select, acquire and use knowledge. As a result, the requirements for university graduates are shifting from mastering exclusively subject skills to the development of universal competencies (World Economic Forum, 2020, Chan et al., 2017), of which thinking is the most significant. And in particular, critical thinking skill. Developed critical thinking is one of the most important qualities of university graduates in the labor market, including in Russia (Vasiliev et al., 2012, Gruzdev et al., 2018).

In this situation, the ability to be critical of information becomes one of the competencies which formation is decided by the scientific and educational community in many countries of the world (Pascarella & Terenzini, 2005). However, the focus of researchers, especially in Russia, is the school, while it is higher education that is the main supplier of personnel to the labor market, especially given its massiveization. In addition, research has shown that critical thinking begins to develop in adolescence and reaches its maximum after 25 years, which is probably due to the fact that this skill depends on the gained experience (Friend & Zubek, 1958, Dwyer & Walsh, 2017). This is one of the reasons for the increasing interest in the development of critical thinking among university students.

Confirmation of the growing interest in the CT construct in the higher education system is the fact that the current version of the Russian Federal State Educational Standards (FSES) for higher education dated 10. 01. 2018 includes the skills of searching and critical analysis of information, applying a systematic approach to solving problems and constructing arguments as learning outcomes (see <https://fgos.ru>).

Another confirmation of the fact that Russia has an interest in the construct under study is the fact that in the early 2000s Russia was included in the large project "Reading and Writing for Critical Thinking" (RWCT). This project resulted in a number of teaching materials with practices for the development of critical thinking (for example, Zair-Bek et al., 2007, Temple et al., 1998), as well as a large number of papers describing the experience of using this technology (for example, Zykova, Sherikhova, 2013, Belyakova, 2014).

Attention to the development of critical thinking among university students exists both in the education system itself and on the part of business and the non-profit sector. It is no coincidence that such influential organizations as, for example, the Agency for Strategic Initiatives are implementing programs to develop thinking.

However, despite the fact that the CT skill is in demand among representatives of the labor market, the public and among the people themselves, the education system recognizes the importance of developing this skill; nevertheless, research results show that the level of development of the construct under study in students remains critically low (Halpern, 1993, Tsui, 2002, Pascarella & Terenzini, 2005, Van Gelder, 2005, Arum & Roksa, 2011, Belkin D, 2015, Huber & Kuncel 2016). It is important to note that the critical thinking skill does not develop in

Russian students, as evidenced by the results of the SuperProject international comparative study (Loyalka et al., 2021). These data are confirmed by the opinion of employers, who claim that university graduates enter the labor market with a deficit of critical thinking skills (Gruzdev M., et al., 2018, Vasiliev et al., 2012). Thus, a discrepancy arises between the recognition of the importance of CT development and modern educational outcomes, it is this fact that explains the *relevance* of this study.

Problem Statement with Gaps in Scientific Knowledge

Abroad, they have long been aware of the problem that CT does not develop in the learning process in universities, resulting in a significant number of specialists studying the reasons that impede the critical thinking development (for example, Paul et al., 1997, Chan et al., 2017). In Russia, interest in the study of the skill and its formation began to actively increase since the 90-s of the XX century. However, the bulk of research concerns the description of technologies for the critical thinking development (for example, Zair-Bek et al., 2007, Plotnikova, 2009, Shakirova, 2006, Tarkhanova, 2018). An important feature of the majority of such papers by Russian authors is that they lack an evidence base for the relationship between the described educational practices, the proposed pedagogical conditions and the level of critical thinking. If the relations are analyzed, it is done based on a small sample and not standardized measuring instruments (for example, Arseniev, 2011). In Russia, there are no paper that show what conditions lead to the critical thinking development.

A significant limitation for evidence-based research in Russia is the lack of standardized tools for assessing the level of critical thinking with satisfactory psychometric characteristics at the higher education level. The existing CT assessment tools in Russia are more suitable for use for formative assessment (Volkov, 2015).

In recent years, a sufficient number of theses have been written on the topic of the conditions for the critical thinking development (for example, Bednenko, 2010, Morochenkova, 2004, Plotnikova, 2008, Semenova, 2009, Tulasynova, 2010), however, most of them are focused on describing specific methodological techniques for the critical thinking development at the teacher level. The closest to the topic of this research is the thesis of N. F. Plotnikova where the author developed a system of pedagogical conditions to be created for the critical thinking development with an emphasis on teamwork. However, these papers do not use standardized and validated assessment tools, nor do they control a broader set of conditions. There are no papers showing the types of practical activities of universities or the types of systematic work of universities to develop critical thinking, both at the level of individual universities and at the level of the education system as a whole. This paper is intended to make a contribution to the discussion about the system of conditions for the development of critical thinking in university students, their relationship with the corresponding educational outcome and the variety of practices for the CT development.

In this study, the author proceeds from the assumption that certain conditions must be created for the development of critical thinking in students at Russian universities. Their absence will affect the growth of the critical thinking level in the process of studying at a university. Moreover, direct barriers to the CT formation can also arise. This obvious assumption in the thesis should be filled with a meaningful model of conditions specific to CT.

According to the results of foreign studies, critical thinking cannot develop as part of the traditional (knowledge) approach (for example, Gray, 1997; Miri, 2007). This is also evidenced by the papers of Russian scientists (for example, Korzhuev, Popkov, 2001). However, in Russia, this opinion is based on the expert position of the authors of these papers, it is not confirmed by valid results of empirical studies. Without diminishing the importance of Russian research, nevertheless, modern trends in the development of sciences in the field of education require an evidence base based on data.

A lot of studies have been carried out abroad, proving the relationship between various pedagogical practices and critical thinking. Some of them also analyze organizational conditions. However, it is impossible to directly transfer the results of foreign studies to Russian reality. On the one hand, because critical thinking is a culturally determined construct (Willingham, 2007), therefore, both assessment criteria and formation mechanisms should be developed taking into account the context of Russian educational practices. On the other hand, due to significant differences in educational conditions in Russia and in other countries (normative and regulatory model of management, conditions of admission, educational programmes, etc.).

Thus, without diminishing the significance of previous studies, a number of gaps in scientific knowledge can be identified based on the analysis done:

- the lack of studies based on objective data aimed at studying how the inclusion of CT in FSES 3++ influenced the practice of developing this competence;
- the lack of models for the critical thinking development that take into account organizational conditions that contribute to the CT development and take into account cultural and historical characteristics of Russian education;
- the lack of empirical evidence in Russia of the effectiveness of the conditions for the critical thinking development;
- the lack of valid and reliable tools for assessing the critical thinking level.

Thus, *the problem* to be solved within this thesis, is in an objective need for the development of CT skills on the part of the labor market, society and students themselves and the lack of an increase in the critical thinking level in the process of studying at the university (Loyalka et al., 2021). At the same time, there is a lack of research aimed at identifying the causes of the current situation, and, as a consequence, there is no understanding of what system of conditions is necessary for the critical thinking development. However, the paper presented to your attention is only a step towards solving this problem. Ultimately, it is proposed to create a model of conditions conducive to the critical thinking development with proven effectiveness. However, first it is necessary to understand the conditions actually existing, the theoretical model, which includes criteria for assessing conditions conducive to the CT development. Achieving this understanding is the goal of the thesis.

Research Issues, Goals and Objectives of the Research

In the course of the work, the answers to the following *research questions* were searched. As part of *the first research issue*, it was studied how the students' perception of their level of critical thinking¹ changes at course 1, 2, 3 using the example of students studying at one large national research university of the Russian Federation on programmes related to economics and management. The first issue is introductory, as it allows understand the dynamics of the CT development in universities and assess whether the same results as in the study by Loyalka et al. (2021) will be obtained.

Due to the fact that in Russia there are practically no research that study conditions positively related to CT, and the results of foreign studies cannot be directly transferred into the Russian context, the following question was distinguished as *of the second research issue*: what pedagogical conditions proposed by Russian and foreign authors are positively associated with the critical thinking development? The answer to this question will make it possible to compile the list of conditions to be created at the university for the development of students' CT skills. After that, it will be important to see if these conditions have been created in universities, as well as whether the existing organizational conditions contribute to their creation. Thus, *the third research issue* was the key question of this research: have Russian universities created pedagogical conditions that are positively associated with the critical thinking development and the corresponding organizational conditions?

The purpose of this paper is to identify conditions positively interrelated with the CT development and to assess their prevalence in Russian universities.

The following *tasks* were solved to achieve this goal and answer research questions:

1. Develop a conceptual framework and tool for assessing critical thinking;
2. Develop a conceptual framework for examining the conditions for the critical thinking development;
3. Form a research sample to answer the research questions posed;
4. Assess the students' perception of their level of critical thinking among students of course 1-3;
5. Compile the components of the pedagogical conditions positively associated with the students' perception of their level of critical thinking in Russian universities;
6. Study whether the universities have created pedagogical conditions positively associated with the students' perception of their level of critical thinking development;
7. Study whether the necessary organizational conditions have been created in universities;
8. Provide recommendations for educational policy-makers to create conditions in the educational environment of universities positively associated with the critical thinking skill of students.

¹ Further, in some paragraphs for brevity, the phrase “level of critical thinking” will be given as a synonym for the phrase “students' perceptions of their level of critical thinking development” in some places.

Theoretical Framework of the Thesis

Resolving the first issue requires developing a critical thinking assessment tool. This required an analysis of the papers of such authors as S.L. Rubinstein, 1946; A.I. Lipkin, L.A. Rybak, 1968; M.V. Klarin, 1994; S.I. Zair-Bek, I.V. Mushtavinskaya 2011; Dewey, 1933; Glaser, 1941; Dressel & Mayhew, 1954; Ennis, 1985; Ennis, 1992; Scriven and Paul 1987; Lipman 1988; Facione, 1990; Facione, 1990; Kuhn, 1991; Fisher and Scriven, 1997. And also the most famous standardized tests for assessing critical thinking – California Critical Thinking Disposition Inventory (CCTDI); California Critical Thinking Skills Test (CCTST); California Measure of Mental Motivation (CM3); Collegiate Assessment of Academic Proficiency (CAAP) Critical Thinking; Collegiate Learning Assessment+ (CLA+); Cornell Critical Thinking Test (CCTT); Ennis–Weir Critical Thinking Essay Test; ETS Proficiency Profile (EPP) Critical Thinking; Halpern Critical Thinking Assessment (HCTA); Watson–Glaser Critical Thinking Appraisal tool (WGCTA).

The selection of critical thinking components to be included in the framework of the assessment tool was based on several reasons. First, critical thinking was considered in relation to working with information. Second, given that the positions of the authors of definitions differ depending on their activity, there are three main approaches – philosophical, psychological and pedagogical (Stenberg, 1986).

Philosophers (Paul, Lipman, Ennis, Facione) consider critical thinking in terms of logic and emphasize that it is reflective, independent thinking. Psychology uses different bases depending on the tradition the author adheres to. For example, Kahneman considered CT in terms of cognitive abilities, as people use them in the process of critical thinking. Stenberg took a similar position in analyzing which mental processes help people solve problems (Stenberg, 1986). Behavioral psychologists include in the definition the specific actions of a person with developed critical thinking (for example, analysis, interpretation, formulating good questions) (Kuhn, 1991). Educators base their definition on Bloom's taxonomy, referring to critical thinking as appropriate actions at the levels of analysis, synthesis, and evaluation (Dewey, 1933; Dressel & Mayhew, 1954).

Considering definitions of highlighted authors, and the theoretical framework of the listed tests for assessing CT through the pedagogical approach and the objectives of this study, allowed us to formulate the following definition of critical thinking for this study: critical thinking is understood as a way of thinking that allows, based on previously developed criteria in the context of a particular problem, to select, analyze and evaluate the information necessary for reasoned reasoning and / or decision-making. Thus, the following components were identified, which subsequently constituted the theoretical framework for the CT assessment tool:

- (1) information retrieval (CCTDI, CM3, Ennis – Weir Critical Thinking Essay Test, EPP);
- (2) selection, analysis and assessment of arguments (CCTDI, CCTST, CLA, Ennis – Weir Critical Thinking Essay Test, EPP, HCTA, WGCTA);
- (3) formulation of conclusions (CCTST, CM3, CLA+, Ennis – Weir Critical Thinking Essay Test, EPP, HCTA, WGCTA);
- (4) building causal relationships (Ennis – Weir Critical Thinking Essay Test, EPP).

The next task was to develop a conceptual framework for examining the conditions for the critical thinking development; Analysis of the results of research that study the set of conditions for the critical thinking development allowed to build a conceptual model that combines all the conditions considered (Figure 1). It was this model that served as the basis for the empirical part of the thesis research.

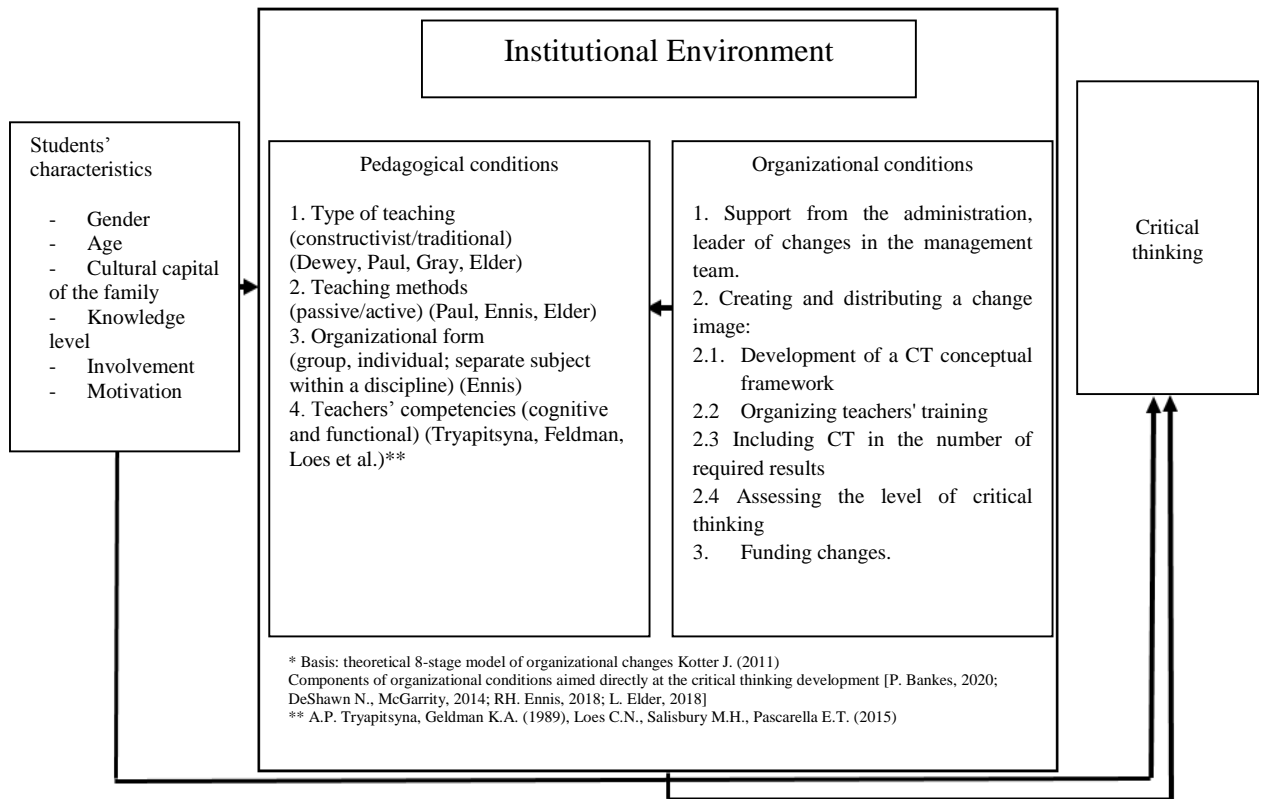


Figure 1 – Conceptual model of the critical thinking development conditions

Since critical thinking in this paper is considered as one of the students' educational outcomes of students (SEO), the grounds for the selection of conditions were searched among the existing theoretical models of situations associated with SEO (Astin, 1977; 1985, Tinto, 1975; 1993, Pascarella, 1985, Weidman, 1989). Analysis of these models made it possible to identify three key components: individual characteristics of students, institutional characteristics of the university, and students' educational outcomes. Individual student characteristics in most models include academic abilities and achievements, socioeconomic status, parental education, race or ethnicity, and gender. Institutional conditions include: structural characteristics of the university and internal “context” (for example, programs, policies and culture of teachers). Structural characteristics often refer to a set of factors such as selectivity, type and size of institution. Models that compare results between universities focus on structural characteristics, while models for assessing conditions within a university focus on internal context.

Since most SEO conditions' models were developed to address specific research issues, it was difficult to find a ready-made model to answer the questions posed. Therefore, the study was based on the general Asnin (1970) IEO (Inputs – Environment – Outputs) model. Inputs (characteristics of students, including their pre-university experience and demographic characteristics) – characteristics of the institutional Environment (including administrative policy

and practice, teaching methods, educational programmes, material infrastructure, characteristics of teachers and other characteristics) – Outputs (educational outcomes that the university influences or tries to influence) (Astin, 1970). More specifically, educational outcomes are the various effects of university learning, such as knowledge, skills, attitudes, values, beliefs and behavior. In our case, educational outcomes were critical thinking.

In a number of papers, it has been proved that, in general, SEO are associated with such components of the internal "context" classroom experiences, extracurricular (out-of-class) experiences, educational programmes (curricular experiences), university policy (Pascarella & Terenzini, 2005; Terenzini et al., 2015; Shcheglova et al., 2018). The CT skill is directly related to all of the listed components, with the exception of the curricular programmes' content, since CT skills can be developed in the content of any discipline (Ennis, 1989).

Researchers note the importance of including students in extracurricular activities, such as student clubs and organizations (O'Brien, 1995; Strauss, Terenzini, 2007). Participation in intellectual competitions, professional communities and associations is positively associated with the development of students' analytical skills (Strauss, Terenzini, 2007). Out-of-class activities bring educational outcomes such as the development of teamwork skills, critical thinking, individual and collective responsibility (Pace, 1984; O'Brien, 1995; Pascarella, Terenzini, 2005; Strauss, Terenzini, 2007).

But the competent organization of the educational process is much more important. The famous scientist J. Dewey indicates this in his paper on the description of the conditions for the thinking development (Dewey, 1997). Confirmation of the expressed thoughts of the American teacher is also the revealed circumstances found in the modern educational process:

- (1) the main condition for obtaining a diploma is the completion of a formal curriculum;
- (2) students spend most of their time in the classroom (Maloshonok, 2020);
- (3) pedagogical practices and methods applied by educators are considered the most influential tools for the development of students' knowledge and skills (Dolan & Collins, 2015),

in this paper, the concept of internal "context" will include the pedagogical conditions created by the teacher within the classroom, as well as the organizational conditions necessary for their creation.

The basic model of the learning process was initially considered as the basis for defining the concept of "pedagogical conditions": teacher – curricular content – student. In recent years, the basic model has been concretized and included goals and results, as well as the means to achieve them (Osmolovskaya, 2020). The goals and results in the case of this study are fixed – development of students' CT. The educational means necessary for the CT development were selected on the basis of research results, proving a connection with the students' perception of their level of critical thinking: the type of learning (Gray, 1997; Miri, 2007; Rumpagaporn, 2007; Yang et al., 2005, Beach 2007; Dill 2003; Hung 2002; Beach 2007; Dill 2003; Hung 2002), organizational learning forms (Behar-Horenstein & Niu, 2011), learning methods (Abrami et al., 2008). In addition to the dedicated teaching tools, the teacher's professional competencies have a significant impact on the development of critical thinking. This connection was proved in research (Loes et al., 2015).

Thus, we will provide the following definition of *pedagogical conditions*: it is a set of such components of the educational process as types of teaching, organizational forms and methods of teaching aimed at solving the assigned tasks, as well as the professional competencies of teachers.

There are several options for classifying types of teaching. Considering that only foreign authors studied of the effectiveness of conditions for the critical thinking development, we will adhere to their classification, highlighting two main types of teaching: traditional (knowledge) and constructivist (Brooks & Brooks, 1999). Domestic scientists compare constructivism and the activity approach (for example, Falikman, 2016; Lektorsky V. A., 2011). The theory of constructivism arose and is being formed abroad, while the authors of the activity theory are Russian scientists such as P. Ya. Galperin, A. N. Leontiev, N. F. Talyzin and others.

The main difference between constructivist teaching is that in constructivism, teaching begins with an independent attempt by students to solve a problem, based on their own experience, while within the framework of the traditional approach, the teacher offers students ready-made knowledge, demonstrates the correct methods of action, after which the student independently completes tasks. The task of students, within the traditional approach, is to get information from the teacher and strictly follow the instructions (Brooks & Brooks, 1999).

Depending on the type of teaching the teacher uses, he/she chooses teaching methods – a method of interrelated and interdependent activity of the teacher and the student, aimed at realizing the learning goals (Zagvyazinsky, 2001). For the constructivist type of teaching, positively associated with the perception of students about their level of the critical thinking development, it is the active teaching methods that are most suitable – teaching methods where the activities of students have a creative, exploratory, productive, heuristic nature (Behar-Horenstein et al., 2011, Abrami et al., 2015). As an example of active teaching methods, this paper will consider project activities (Snyder & Snyder, 2008).

There are a number of classifications of organizational forms of education. However, in this paper, two methods of classification are of interest: (1) forms used within the class (group/individual teaching is of interest) (Zagvyazinsky, 2001); (2) organizational forms for the inclusion of strategies for the development of critical thinking in the educational process (within a separate subject or the integration of special methods aimed at developing critical thinking inside the subject content) (Ennis, 1989). The effectiveness of using different organizational forms of learning is investigated in a meta-analysis, for example, by Abrami et al., 2015. The authors conclude that critical thinking skills are best developed either in the case of a single subject, or a special track for the CT development within subjects. Group form of education is also more effective for the CT development than the individual one (Abrami et al., 2015, Paas et al., 2003).

In this study, the key professional competences of teachers are cognitive and functional (Tryapitsyna, 2013). They are revealed through the competencies for creating pedagogical conditions, digital literacy (Jonassen et al., 1999), subject-logical and organizational competencies (Feldman, 1989, Loes et al, 2015).

Next, we will consider the composition of the organizational conditions necessary to create the listed pedagogical conditions.

Taking into account the fact that the traditional (knowledge-based) type of education predominates at universities (Dobryakova & Frumin, 2012, Froumin et al., 2020), not associated with critical thinking (Gray, 1997; Miri, 2007), it is important to introduce changes in universities for the creation of a constructivist educational environment, as well as overcoming other factors that impede the creation of pedagogical conditions associated with CT, which will be identified in the course of this study. It is based on the theory of organizational change by Kotter (1996).

Responsible for changes at the university level are representatives of the administration or representatives of the Ministry of Education and Science and other departments that influence the conditions within the university. This conclusion is made on the basis of the provisions of the institutional theory, which states that there is a field of forces directed from top to bottom, limiting the independence of action at each subsequent organizational level (Hanson, 2001).

As a key component in the theory of organizational change, Kotter emphasizes the creation of a vision of change and the transmission of this vision to key actors, in this case, university staff. In order to understand what the vision of change is, the papers on what organizational conditions need to be created at the university level, were studied (Paul et al., 1997, McGarrity, 2013, Tsui, 2001, Peirce, 2005, Chan et al., 2017). The analysis resulted in a list of organizational conditions necessary to create the listed pedagogical conditions used in this study as follows:

1. Support from the administration, leader of changes in the management team.
2. Creating and distributing a change image:
 - 2.1 Development of a CT conceptual framework
 - 2.2 Organizing teachers' training
 - 2.3 Including CT in the number of required results
 - 2.4 Assessing the level of critical thinking
3. Funding changes.

In order to assess the relationship between pedagogical conditions and critical thinking, in accordance with the Astin model (1970), it was important to take into account the characteristics of students. This is due to the fact that it is impossible to achieve high learning outcomes, even if all the required conditions are created, if initially students with a low level of knowledge enter the university (Williams et al., 2003; Tsai, 2014; Reiter et al., 2007; Sebok et al., 2014) or from families with low cultural capital (Sewell et al., 1972; Konstantinovsky, 2010; Carnoy et al., 2015). It is also important to consider gender (Denny, 1995, Pearson, 1992), age (Chao & Good, 2004, Graham & Donaldson, 1999), motivation to learn (Garcia & Pintrich, 1992, Ingle, 2007), involvement in the educational process (Astin, 1984; Pascarella, Terenzini, 2005; Strauss, Terenzini, 2007).

Research Methodology

The search for answers to the research questions posed was made using a mixed research design – quantitative and qualitative. Table 1 presents research questions and methods for finding answers to them.

Table 1 – Research questions and methods for finding answers

Pos. No.	Research question	Method for finding answer
1	How the students' perception of their level of critical thinking changes at course 1, 2, 3 using the example of students studying at one large national research university of the Russian Federation on programmes related to economics and management?	Questioning of students. Structural equation modeling (SEM). Quasi-experimental propensity score matching.
2	What pedagogical conditions are positively associated with the critical thinking development?	Questioning of students. Structural equation modeling (SEM), Multivariate regression analysis with cluster correction by course.
3	Have Russian universities created pedagogical conditions that are positively associated with the critical thinking development and the corresponding organizational conditions?	Semi-structured interviews and focus groups with teachers and representatives of the administration, the author of the Federal State Educational Standard 3++. Margin Notes Method (Strauss & Corbin, 1990). Questioning of the deputy heads of the university / branch in charge of educational activities in the framework of the large Russian study Monitoring the Economics of Education (MEE ²).

Therefore, a survey of students was conducted in order to determine how students' ideas about their level of critical thinking change, as well as to highlight the pedagogical conditions positively associated with the level of CT. To determine the organizational and pedagogical conditions created at universities, interviews and focus groups were conducted with teachers and representatives of the university administration, as well as with one of the authors of the current version of the federal state educational standards. To confirm the results obtained during the interview, a questionnaire was conducted among the deputy heads of the university / branch in charge of educational activities in the framework of the large Russian study Monitoring the Economics of Education.

Student Survey?

The study was done in the spring 2020 as part of the international study "Assessing the Economic Literacy of WiWiKoM Students". Out of 6921 undergraduate students, 4,897 students enrolled in the 2019/2020 academic year at one of the Russian national research universities took part in the study.

The author included questions for this study in the questionnaire as additional questions. However, due to the fact that the time of the questionnaire was limited, it was not possible to include more than a certain number of questions in the questionnaire.

² <https://memo.hse.ru/>

To assess CT, the questionnaire included questions aimed at students' self-assessment of the level of critical thinking: (1) assess the relevance of information; (2) assess the accuracy of information; (3) identify information that can be used as an argument; (4) assign arguments to different contexts; (5) assess the argument persuasiveness; (6) determine the lack of information in the argumentation; (7) make a clear judgment based on the information provided for argumentation; (8) develop valid conclusions; (9) evaluate causal relationships; (10) create explanations (answer the question “why?”). Subsequently, the questions were combined into one scale (the one-dimensionality of the scale was proved).

It is important to note that the critical thinking skills in this paper were assessed on the basis of students' self-assessment. In the sociology of education, a common point of view is that subjectively measured indicators have low validity (Porter, 2013). Nevertheless, a number of studies have shown that the use of self-assessment results in a valid assessment of educational achievement (Thomson, 2017; Zilvinskis, Masseria, Pike, 2017). Students' self-assessment is often used as a tool for assessing the quality of education even in international comparative studies Student Experience in the Research University (SERU), USA, The College Student Experiences Questionnaire (CSEQ), China, College Student Survey (CSS), USA, The National Survey of Student Engagement (NSSE), USA.

To assess the pedagogical conditions associated with CT, the questionnaires included sets of questions later combined into scales: questions on assessing the education types (traditionalism/constructivism scale); questions on assessing digital literacy; questions on assessing organizational and subject-logical competence. Certain questions related to methods and organizational forms of education were also included: the frequency of using project activities in the classroom, group work.

To assess the characteristics of students, both scales and individual questions were also used: questions on motivation (scale of motivation Deci & Ryan, 2000); student engagement was assessed through the frequency of questions to the teacher; the cultural capital of the family was assessed through the education of the mother; the level of knowledge was assessed through the score on the "economic thinking" test; gender; age.

All the quality indicators of the models resulted from the study are within the normal range (such indicators as RMSEA, CFI, SRMS, the reliability of the α -Cronbach scale were assessed), which evidences, among other things, the high quality of the developed questions. In connection with distance learning in the spring of 2020, the study was conducted online using the Examus asynchronous proctoring technology. The analysis of video recordings, carried out following the results of the study, did not reveal any violations.

The relationship between the components of pedagogical conditions and students' ideas about their level of critical thinking was analyzed on a sample of students from one large national research university. In this regard, the invariance of the resulting relationships with respect to other universities has not been studied. However, given that universities in a strong regulatory model are similar to each other (Boguslavsky, Nebrossky, 2014), extrapolation of the findings is possible.

Interviews and Focus Groups

At the second stage, interviews and focus groups were held with teachers, representatives of the administration and the author of the current version of the Federal State Educational Standard of Higher Education, in order to study the conditions created in universities for the critical thinking development. To confirm the conclusions obtained during the interviews and focus groups, a questionnaire was conducted among the deputy heads of universities / branches in charge of educational activities in the framework of the large Russian study Monitoring the Economics of Education.

The selection of universities for interviews and focus groups was carried out using improbability sampling using the typical units method. The sampling method is explained by the fact that universities in a strong regulatory model are similar to each other (Boguslavsky M.V., Nebrossky E.V., 2014). At the same time, in Russian universities, the level of funding differs depending on the university status (Abankina I.V., et al., 2016). Depending on the status, organization of the educational process is also different, this follows from the procedure for assigning status to universities³.

Institutional conditions differ depending on the university profile. The following enlarged groups of university profiles are distinguished - technical (educational training of technical specialists) and classical (educational training in a wide range of areas) universities (Filippov V.M., 2006). Depending on the university profile, the content of education, educational programmes, etc. may vary. (Kokorevich M.N., 2006).

A total of 11 universities took part in the study. The sample included national research universities (7 universities), federal universities (2 universities), and universities without special status (2 universities). The sample included universities from different federal districts: Central Federal District, Siberian Federal District, Volga Federal District, Ural Federal District. The following additional characteristics were used: participation in the 5/100 project (6 universities of participants), the university educational profile (5 engineering universities, 6 classical universities).

In each university, the sample included a representative of the university administration - the vice-rector for academic affairs or his/her assistant (11 people) and teachers (19 people), who, according to the administration, were focused on the development of critical thinking in students. Along with a survey of teachers and university administration, an interview was held with one of the authors of the current edition of the Federal State Educational Standard for higher education (entered into force on January 10, 2018).

As part of the MEE study, the questionnaire was filled out by deputy heads of universities / branches in charge of educational activities of 150 universities located in different regions of Russia and universities with different numbers of students.

The interview guide included questions aimed at assessing components from the research conceptual framework. Namely, the following questions:

³<https://base.garant.ru>

- what is CT, why is it important to develop CT (all categories of participants)
- How can universities develop CT, what changes should be made to the educational process of universities, did the state think over measures to support universities when it included CT in the Federal State Educational Standard? (author of the current version of the Federal State Educational Standard)
- how does the university work on the CT development: is there a person responsible for the development of this field; whether the concept is operationalized; are there any assessment tools; are there courses for teachers on mastering the practice of the CM development; whether additional funding is allocated for this (administration)
- how individual teachers work to develop CT: what approaches, methods and forms do teachers use; what teaching materials are used; how the practices of CT development were studied (teachers)
- What are difficulties, barriers when integrating CT development practices into the educational process of universities? (all categories of participants)

It is important to note that the interview was semi-structured, therefore, in addition to answering the questions posed, the participants could provide additional information.

The inclusion of CT as the main outcome in educational programmes was verified by analyzing the programmes posted in the public domain on the websites of the universities participating in the study. For this purpose, a special program was written in Python that downloaded educational programmes and searched for a section with educational outcomes, then searched for the phrase "critical thinking" in this section.

The questionnaire of deputy heads of universities / branches in charge of educational activities included the following questions:

1. Is the university interested in developing students' critical thinking? (Yes/No)
2. What measures does your university take to create conditions for the development of critical thinking in students?
 - 1) Appointment of a person responsible for the development of the direction
 - 2) Approval at the university level of the list of structural elements of critical thinking (indicators)
 - 3) Train teachers in the practice of developing critical thinking
 - 4) Inclusion of critical thinking in the number of required results in educational programs
 - 5) Assessment of the level of development of critical thinking at the university level
 - 6) None, the university does not have the goal of developing critical thinking in students
3. What is the organizational form chosen by your university for the development of critical thinking
 - 1) A separate subject of choice
 - 2) A module of interrelated disciplines aimed at the systematic formation of universal competencies for bachelors of any field of study - the core of the bachelor's degree
 - 3) Within subject disciplines

The study is non-experimental in nature, the study design is correlative. The researchers did not have the ability to assign participants to control and experimental groups and therefore could not control the variables. This evidences that this type of study does not allow to draw causal conclusions and evaluate effects.

Research Results

How the students' perception of their level of critical thinking changes at course 1, 2, 3 using the example of students studying at one large national research university of the Russian Federation on programmes related to economics and management?

The results of assessing the level of critical thinking of students were transferred to a 100-point scale with an average of 50 points and a standard deviation of 10 points. The average score of course 1-3 students varied from 70 to 71 points. Comparison of the statistical significance of differences in mean scores between courses using the t-test test shows that the differences are not statistically significant ($p > 0.1$).

Propensity score matching was used to assess the effect of one year of study on the level of critical thinking development. The control and experimental groups were aligned on the basis of variables responsible for the characteristics of students – gender, cultural capital, age, level of knowledge of students, motivation, involvement. The propensity score matching results confirm that the effect size is not statistically significant. It can be concluded that in the process of studying from course 1 to 3, in students of specialties related to economics and management, the level of the critical thinking development in the selected NRU does not change.

What pedagogical conditions are positively associated with the critical thinking development?

The results of the analysis made it possible to single out the components of the pedagogical conditions positively associated with the CT of students, namely: (1) the type of teaching (constructivist; traditionalist, subject to the development of subject-logical and organizational competence of teachers); (2) active teaching methods (project activities); (3) professional competence of the teacher (digital literacy, subject-logical and organizational). Along with the components of pedagogical conditions, the analysis model included the characteristics of students (gender, level of knowledge, age, involvement in the educational process, motivation, socio-economic status of the family). The resulting model allows a good explanation of the difference in the level of the critical thinking development. The variables included in the model explain 20% of the variance in the level of critical thinking.

One of the key conclusions of this study is that the traditional type of teaching can also be positively associated with the level of development of students' critical thinking, if the teacher has developed subject-logical and organizational competencies. This finding confirms the results obtained by Loes et al. and expands their research (Loes et al., 2015). Let's consider why this is happening.

Critical thinking is not a contentless construct. That is, students can develop critical thinking skills and dispositions as much as they want, but without background knowledge and

practice, students most likely will not be able to demonstrate the level of CT development (Willingham, 2007). Paul Bankes, speaking at the 40th Annual International Conference on Critical Thinking, said that success in developing critical thinking can be achieved by combining the following components: logical explanation and understanding of the logic of content (goals, key ideas, assumptions, etc.).

The results of S.N. Loes and coauthors (Loes CN et al) agree with Paul Bankes' assertion that the teacher's understanding of the logic of the content of a subject and teaching students to adhere to this logic, successfully using examples to clarify complex material, clearly explaining abstract theories and ideas, making understandable conclusions, contributes to an increase in the level of knowledge of students in a particular field and at the same time develops the construct under study in them (Loes et al., 2015) Thus, teachers help students to assimilate the basic concepts of the subject and form a way (or a set of ways) to look at the world through the prism of logic of the subject under study. Students develop conscious criteria for truth, thanks to which they can select relevant information.

It can be assumed that teachers with developed subject-logical competence have a high level of critical thinking and, working with, consider why this happens.

Critical thinking is not a contentless construct. That is, students can develop critical thinking skills and dispositions as much as they want, but without background knowledge and practice, students most likely will not be able to demonstrate the level of CT development (Willingham, 2007). Paul Bankes, speaking at the 40th Annual International Conference on Critical Thinking, said that success in developing critical thinking can be achieved by combining the following components: logical explanation and understanding of the logic of content (goals, key ideas, assumptions, etc.).

The results of S.N. Loes and coauthors (Loes CN et al) agree with Paul Bankes' assertion that the teacher's understanding of the logic of the content of a subject and teaching students to adhere to this logic, successfully using examples to clarify complex material, clearly explaining abstract theories and ideas, making understandable conclusions, contributes to an increase in the level of knowledge of students in a particular field and at the same time develops the construct under study in them (Loes et al., 2015) Thus, teachers help students to assimilate the basic concepts of the subject and form a way (or a set of ways) to look at the world through the prism of logic of the subject under study. Students develop conscious criteria for truth, thanks to which they can select relevant information.

It can be assumed that teachers with developed subject-logical competence have a high level of critical thinking and, working with information, they demonstrate to students by their own example how critical thinking is applied in practice. Probably, such teachers work well with argumentation in the course of explaining the material and explain the material in a non-dogmatic manner, which may explain the positive relationship between the competence being studied and the level of critical thinking. However, these hypotheses were not tested in this study. This is the reason for additional research on this topic.

Thus, despite the fact that traditionalist teachers give knowledge in a finished form, nevertheless, in the course of their work they use practices that are positively related to the level

of development of critical thinking, related to a clear and clear presentation of the material and competent organization of classes, which makes it possible to develop critical thinking among students.

Have Russian universities created pedagogical conditions that are positively associated with the critical thinking development and the corresponding organizational conditions?

The results of interviews and focus groups, as well as the results of a questionnaire survey of deputy heads of universities / branches in charge of educational activities, conducted within the framework of the IEE show that the responsibility for creating pedagogical conditions for the development of critical thinking in the vast majority of universities is occupied by individual proactive teachers. As the results of the interviews showed, these are mainly representatives of the humanities, but there are also representatives of the exact sciences among them. Educators who develop critical thinking have a preference for constructivist teaching and active teaching methods positively associated with critical thinking. At the same time, it was noted that, in general, the traditional type of education prevails in universities, which is not associated with the CT development. However, one of the key conclusions of this study is that the traditional type of teaching can also be positively associated with the level of development of students' critical thinking, if the teacher has developed subject-logical and organizational competencies.

Teachers who purposefully engage in the development of students' critical thinking use positively proven teaching methods – group projects, provoke students to ask questions. Such teachers also use semantic reading techniques. However, for the organization of semantic reading, teachers must independently select texts, since the tasks of textbooks do not contribute, but rather impede the critical thinking development, and material and technical conditions have not been created for the organization of group training (not enough classrooms), as well as insufficient funding. Perhaps this explains the lack of connection between group learning and the level of critical thinking.

The guide of interviews for teachers and administration, as well as a questionnaire for deputy heads of universities / branches in charge of educational activities conducted as part of the MEE study, were supplemented with questions regarding organizational forms concerning the student questionnaire. During the survey, students were not asked these questions, since they do not have this information, so it was not possible to single out the organizational form positively associated with CT. Based on the organizational forms used, it can be argued that there are three types of universities in Russia:

1. Universities that develop critical thinking among other universal competencies in all students in the first two years of study, creating a module of interrelated disciplines aimed at systematic formation of universal competencies in bachelors of any field of study – the core of the bachelor's degree.
2. Universities that have included a course on the critical thinking development as an elective course in their educational programmes.

3. Universities that have assigned the responsibility for the critical thinking development to teachers, while at the university level, the development of universal competencies is not tested⁴.

The selected types of universities indicate that the requirements for learning outcomes of federal state educational standards are not met in all Russian universities (type 3) and not for all students (type 2). If we assume that the educational process in all universities in Russia is organized in a similar way, we can conclude that the development of critical thinking, despite the declarations, is a real task only for individual universities.

Universities of the first type give preference to infusion (on the subject matter, students know that they are developing CT) and general organizational form (a separate subject), universities of the second type give preference to general, and universities of the third type, according to the respondents, give preference to immersion (on the subject matter, students do not know that they are developing CT). While abroad, when developing critical thinking on the content of subject disciplines, the infusion approach prevails (Abrami et al., 2008).

Probably, the reason for the prevalence of the general approach is that it is implemented by individual proactive teachers, and given the fact that in universities this is an elective course, interested students take part in these courses. The use of an immersion organizational form can be explained by the fact that the inclusion of critical thinking as an educational result in the discipline program imposes a certain responsibility on the teacher. If the inclusion of critical thinking as an educational outcome is not required, then teachers prefer not to. Additional research is required to clarify the reasons.

An analysis of the organizational conditions shows that the Ministry of Science and Higher Education does not create real incentives for the development of teachers in the field of mastering the pedagogical practices of developing students' critical thinking. This is confirmed by the results of interviews with teachers and representatives of the administration of universities, as well as the results of a questionnaire survey of deputy heads of universities / branches in charge of educational activities, conducted within the framework of the MEE study. Their analysis shows that in the overwhelming majority of universities:

1. there is no change leader and no support from the administration in the vast majority of universities
2. there is no clear conceptualization of the concept of critical thinking
3. there is a shortage of advanced training courses, pedagogical universities do not teach practices for the development of critical thinking there are no valid and reliable assessment tools; assessment tools are developed independently by initiative teachers
4. the material and technical base is not adapted for the CT development
5. additional funding is not allocated

This finding is confirmed by the answers from one of the authors of the current version of the federal state educational standards for higher education. In the course of the responses, evidence was given that the state did not create conditions for the development of critical thinking,

⁴ only based on interview results

nor did it develop an incentive policy. The representative of the Ministry of Education and Science says that one of the reasons for this position of the state is the provision of maximum freedom to universities and thus the opportunity to choose the most convenient strategy for universities. However, as the results of the interviews show that universities do not do this.

Based on the findings of the study, in Russia, as well as abroad, individual universities are working to create conditions (types 1 and 2). Most other universities distinguish organizational barriers to create the necessary pedagogical conditions. Taking into account that CT is included in FSES 3++, that is, the state require the development of this skill, a possible explanation of this situation can be found in the neoinstitutional theory (Meyer & Rowan, 2006). Universities can sabotage change by giving the appearance of compliance. The key reason for this is the inertia of organizations.

Thus, the result is included in the federal state educational standards of higher education, but there are no ways to develop it and assess the level of its achievement. Since the achievement of the result is not required and not verified, the textbooks continue to reproduce tasks that do not contribute to the critical thinking development, there are no methodological recommendations, there is no offer of refresher courses, teachers do not include critical thinking as an educational outcome in educational programmes, and other organizational conditions. The lack of an order from the state means the lack of funding to create the necessary organizational conditions.

Recommendations

All of these reasons hinder the development of a systematic approach to the critical thinking development. For the productive use of CT, as one of the most demanded educational outcomes included in the Federal State Educational Standard 3++, both in the interests of students and in making decisions about changing the educational process, for example, improving the quality of teaching, it is necessary that the administration of universities realizes that quality assurance of the work of universities is an undoubted priority and requires additional funding.

As one of the possible options for resolving issues related to the quality of education, it is possible to propose the creation of equipped centers for assessing the quality of education (CEQA) or other similar structures. The reason why it is important to create separate structures is the impossibility of assigning responsibility to teachers, since this requires significant financial and time resources, as well as special competencies.

The responsibility of the CEQA staff should be, among other things, *operationalization of requirements for all universal competencies laid down in the federal state educational standards of 01/10/2018 (FSES 3++), including CT, – a description of competencies in a measurable way in accordance with the professional standards. This will make it possible to form a common understanding of educational results at the university, for inclusion in educational programmes of universities and the development of common assessment tools.* The inclusion of CT as a result in educational programmes will allow organizing the educational process in accordance with the results-based model. Operationalization is best done with the involvement of representatives of the labor market, scientific and educational communities, as well as accreditation agencies.

It is also important, *upon the CT assessment results*, provide students with regular, meaningful feedback, discuss the results with colleagues and use this information to improve CT skill. This complex process may well reveal weaknesses on the part of all participants in the educational process – students, teachers, educational programmes and the university. It is imperative that the assessment results are used only to improve the educational process and not for punishment. Otherwise, if the results are used to punish, there is a risk that the data will start to be falsified.

It is important to make the data resulting from the CT assessment as one of the mandatory educational outcomes of students available to the public, including potential applicants and their parents. This will make the process of choosing an educational program within the university more reasonable and will increase the level of competition between educational programs, which can lead to an increase in the level of educational outcomes.

However, in order to select methods that contribute to the CT development, it is necessary *to create professional development opportunities for teachers*. These can be both advanced training courses and changes in the educational programmes of pedagogical universities. Model programmes should be made available to teacher training institutions.

It is possible to launch flagship master's programmes (3-5 programmes at leading pedagogical universities) and retraining programmes at leading universities within the framework of training and assessment programmes in the field of universal competencies, including CT. The development of such master's programmes can be funded by competitive government grants.

Due to the fact that the study proved the connection between the subject-logical and organizational competencies and the level of critical thinking even among teachers-traditionalists, the institutional support of efforts to develop these fairly simple skills among teachers can result in dividends in terms of the growth of the studied competence (Weimer, 1991). M. Weimer pointed out that the skills necessary for a clear explanation of the material and the competent organization of classes are quite specific and can be easily formed in the process of teaching teachers (Weimer, 1991). This is especially important given that it is difficult for teachers to change the type of teaching from traditional to constructivist due to the fact that most teachers believe that their main role is precisely to give lectures and do not consider critical thinking as something necessary for mastering (Wulff & Wulff, 2004). This is one of the key aspects of the practical relevance of this study.

An important measure can be the preparation of teaching materials describing exemplary pedagogical practices implemented by teachers who have achieved high results in the development of critical thinking in their classes. In addition to describing educational practices, teaching materials may include information about:

- problems hindering the development of critical thinking in universities.
- practices of introducing courses on the development of critical thinking at the university level.
- a selection of materials to promote critical thinking.

However, given the experience of the of Critical Thinking through Reading and Writing (CTTRW) project, where a number of recommendations have already been developed, but they did not provide the desired result, it is important to organize the communication of these recommendations to teachers and stimulate them to use these recommendations. In this regard, it is important to develop a system of incentives for teachers who introduce into their practice methods of developing universal competencies, including CT, are trained in courses on the practice of CT development.

Scientific, Theoretical and Practical Significance of the Results, Provisions Subject to the Defense

Scientific novelty of this study is that it is intended to make a contribution to the discussion about the system of conditions for the development of critical thinking in university students, their relationship with the corresponding educational outcome and the variety of practices for the CT development. Previous models for assessing the conditions of educational outcomes included individual components of these conditions. The authors of the existing models emphasized either the components of the pedagogical environment of interest to them [e. g., Terenzini, 2005], or the organizational conditions [e. g., McGarrity, 2013]. The proposed model uses a systematic approach to considering the organizational and pedagogical conditions for the development of critical thinking, as one of the mandatory results **of teaching** students. **The developed model** singles out the components of pedagogical conditions positively associated with critical thinking, make predictions of the level of critical thinking and assess whether the organizational conditions meet the necessary requirements.

The thesis, for the first time, provided a systematic study of the conditions necessary for the development of critical thinking and created in reality. It also proposed methods of increasing the level of the construct under study. For this: 1) a system of pedagogical conditions was built and empirically tested, which must be created within the classroom for the development of critical thinking of university students; 2) the place of professional competences of teachers in the system of pedagogical conditions for the development of critical thinking of university students was empirically substantiated; 3) the necessary organizational conditions were highlighted; 4) a single conceptual framework was built, including pedagogical and corresponding organizational conditions for the development of critical thinking, which was a refinement of the existing models of conditions for the development of educational outcomes.

Thus, the results of this study are *contributions to the development of teaching theories*. Previously, teaching theories included describing ways of working with learners without paying attention to the professional characteristics of the teacher. Research aimed at studying the relationship between the type of learning (based on theories of learning) and the level of CT showed that traditionalism does not contribute to the CT development, while this study found that traditionalist teachers can develop critical thinking if they have developed subject-logical and organizational competence. Although it was previously believed that only work within the framework of the constructivist type of learning can be positively associated with the development of critical thinking.

This study also made a contribution to the debate within the framework of neoinstitutional theory. In accordance with the provisions of neoinstitutional theory, organizations take a position

where conformism is ritual in nature, when no real change occurs, but the appearance of conformity to the requirements of the external environment is created (Meyer & Rowan, 2006). Therefore, neoinstitutional theory emphasizes both mechanisms of change and resistance on the part of organizations to demands for change (March & Olsen, 2010). This version of neoinstitutional theory casts doubt on the extent to which organizational change is the result of reforms. Advanced institutions with stable values, interests, culture and resources show inertia or friction when faced with reform efforts. For developed institutions, only changes are possible compatible with the institutional organization identity. Thus, looking through the prism of neoinstitutional theory, it is clear that universities can react in different ways to the demands imposed on them by the external environment. Based on neo-institutional theory, universities can, among other things, sabotage change, creating the appearance of compliance. The key reason for this is the inertia of organizations. We proved that as part hereof.

The results of the study have **practical significance** for representatives of the Ministry of Education and Science, accreditation agencies, university administration, since using the criteria given herein, one can assess the quality of the conditions for the CT development created at the university. For administrators, results can serve as a source of optimal managerial decisions for the development of higher-order skills, including critical thinking; for teachers, as a source of pedagogical practices in order to increase the effectiveness provided for by the Federal State Educational Standard. The materials of the thesis research can be used to develop educational programmes for pedagogical universities, advanced training courses, and methodological aids.

The results can be summarized in the following provisions subject to defense:

1. The model of the conditions necessary for the development of critical thinking of students, as one of the obligatory educational results, includes a system of pedagogical and corresponding organizational conditions, while the developers and researchers of existing models focused on either pedagogical conditions or organizational conditions.

2. The likelihood of developing critical thinking among university students increases if teachers create the following pedagogical conditions: (1) work within the framework of the constructivist type of teaching, the traditionalist type of teaching can be used by teachers who have developed subject-logical and organizational competencies; (2) use active teaching methods (project activities); (3) develop professional competencies (master the competencies to create the first two components of pedagogical conditions (types and methods of teaching), digital literacy, subject-logical and organizational competencies).

3. For teachers with developed subject-logical and organizational competencies, it becomes unimportant in what type of training they work. Even when choosing a traditional (knowledge-based) type of education, the likelihood that their students will develop critical thinking is increased.

4. Creation of pedagogical conditions for the development of critical thinking requires the university leadership to carry out organizational changes aimed at determining the leader of changes; operationalization of the requirements of the Federal State Educational Standard and their approval at the university level; inclusion of higher-order skills, incl. KM, in the number of compulsory educational outcomes in educational programs; organization of the assessment system at the university level; creation of a system of incentives for teachers to master the practice of developing critical thinking.

5. In Russia, there are three types of universities, depending on their organizational forms: (1) Universities that develop critical thinking among other universal competencies in all students in the first two years of study, creating a module of interrelated disciplines aimed at the systematic formation of universal competencies in bachelors of any areas of study - the core of the bachelor's degree; (2) Universities that have included a course on the development of critical thinking as an elective course in their educational programs; (3) Universities that have assigned the responsibility for the development of critical thinking to teachers, while at the university level the development of universal competencies is not checked.

References:

6. Abankina I. V., Vinarik V. A., Filatova L. M. State policy of financing the higher education sector in the context of budgetary constraints // *Journal of the New Economic Association*. – 2016. – Vol. 3. – No. 3. – p. 111.
7. Arseniev K. S. On the problem of the formation of critical thinking among university students // *Education and Science*. – 2011. – No. 10
8. Bednenko V. G. Theoretical and pedagogical aspects of the development of students' critical thinking by means of information technologies: thesis– Pyatigorsk State Linguistic University, 2010.
9. Belyakova E. A. Development of critical thinking among students of a pedagogical university when working with audiotext in a foreign language class // *Yaroslavl Pedagogical Bulletin*. – 2014. – Vol. 2. – No. 3.
10. Boguslavsky M. V., Neborsky E. V. Higher education in the Russian tradition: experience and modernity // *Humanities, Socio-economic and Social Sciences*. – 2014. – No. 9.
11. Valeyeva L. Formation of critical thinking of students in the process of teaching a foreign language // *Higher Education in Russia*. – 2008. – No. 11.
12. Vasiliev K. et al. Skills development for innovative growth in Russia // *M.: Aleks*. – 2015
13. Volkov E. N. Tests of critical thinking: an introductory review // *Psychological Diagnostics*. – 2015. – No. 3. – p. 5-23.
14. Galperin P. Ya. General theory of the activity approach to learning // *M.: MSU*. – 1968
15. Dewey D. *Psychology and pedagogy of thinking* / ed. by N. D. Vinogradov; transl. from English N. M. Nikolskaya // *M.: Perfection*. – 1997
16. Zhidova L. A. Critical thinking skills as a means of improving the quality of professional training of future mathematics teachers // *Bulletin of the Tomsk State Pedagogical University*. – 2009. – No. 4.
17. Zagvyazinsky V. I. *Teaching theory // Modern Interpretation*. – 2001. – Vol. 30.
18. Zair-Bek S. I., Zagashev I. O., Mariko V. V. Project "Development of critical thinking for higher education" in Russia // *Bulletin of Nizhny Novgorod University*. a. N.I. Lobachevsky. – 2007. – No. 6.
19. Zykova T. V., Sherikhova I. E., Khramova Yu. N. Actual use of technology for the development of critical thinking in the educational process // *Bulletin of the Volga University*. a. V. N. Tatishchev. – 2013. – No. 3 (
20. Klarin M. V. *Innovative teaching models in foreign pedagogical searches*. – 1994.

21. Kokorevich M. N. et al. Technical university in the educational tradition of the twentieth century // Bulletin of the Tomsk State Pedagogical University. – 2006. – No.
22. Konstantinovskiy D. L. Inequality in the field of education: the Russian situation // Monitoring of public opinion: economic and social changes. – 2010. – No. 5 (99).
23. Korzhuev A., Popkov B., Ryazanova E. How to form critical thinking? // Higher Education in Russia. – 2001. – No. 5. – pp. 55-58.
24. Lektorsky V. A. Active approach yesterday and today // Style of thinking: the problem of the historical unity of scientific knowledge. K. – 2011. – pp. 15-27.
25. Leontyev A. N. The problem of activity in the history of Soviet psychology // Questions of psychology. – 1986. – No. 4. – P. 109
26. Lipkina A. I., Rybak L. A. Criticality and self-assessment in educational activity. – Prosvescheniye, 1968.
27. Morochenkova I. A. Formation of critical thinking of students in the educational process of the university: thesis- Orenburg: specialty 13. 00. 01 – General pedagogy and history of pedagogy / I. A. Morochenkova, 2004.
28. Matukhin D. L. Technology of formation of critical thinking in teaching foreign languages // Bulletin of the Vyatka State University. – 2010. – Vol. 3. – No. 3.
29. Osmolovskaya I. M. Didactics: from classics to modernity: monograph M.: SPb: Nestor-History, 2020. – 248 p.
30. Plotnikova N. F. Critical thinking and its formation in a higher educational institution // Educational Technologies and Society. – 2009. – Vol. 12. – No. 1.
31. Plotnikova N. F. Formation of critical thinking of university students in the context of a command form of training organization: thesis– Kazan: N. F. Plotnikova, 2008.
32. Semenova O. M. Formation of critical thinking of a student –future teacher in the process of teaching at a pedagogical university: thesis- Volga State Social and Humanitarian Academy, 2009.
33. Rubinshtein S. L. Fundamentals of general psychology. – Publishing house "Piter", 1998.
34. Talyzina N. F. Pedagogical psychology: textbook // M.: Academy. – 1999.
35. Tarkhanova I.Yu., Kharisova I.G. Educational technologies for the formation of universal competencies of university students // Yaroslavl Pedagogical Bulletin. – 2018. – No. 5.
36. Temple Ch., Steele D. L., Meredith K. S. Critical thinking — advanced technique // M. Publishing house of the "Open Society" Institute. – 1998. – Vol. 368. – p. 1.
37. Tryapitsyna A. P. The content of professional training of students – future teachers for solving the problems of modernization of general education // Universum: Bulletin of Herzen University. – 2013. – No. 1.
38. Tulasynova N. Yu. Development of students' critical thinking in the process of teaching a foreign language // News of the Russian State Pedagogical University. a. A. I. Herzen. – 2009. – No. 112.
39. Falikman M.V. Methodology of constructivism in the psychology of cognition // Psychological research: electronic scientific journal. – 2016. – Vol. 9. – No. 48. – P. 3.
40. Federal state educational standards for higher education. Official website: <https://fgos.ru/>. Date of application 14. 11. 2019

41. Filippov V. M. Management in higher education: experience, trends, prospects. – 2006
42. Froumin I. D., Dobryakova M. S. What makes Russian universities change: an agreement on non-involvement // Education Issues. – 2012. – No. 2.
43. Shakirova D. M. Formation of critical thinking of pupils and students: model and technology // Educational technologies and society. – 2006. – Vol. 9. – No.
44. Shcheglova I. A., Koreshnikova Yu. N., Parshina O. A. The role of student involvement in the development of critical thinking // Education Issues. – 2019.
45. Tsui L. Fostering critical thinking through effective pedagogy: Evidence from four institutional case studies //The Journal of Higher Education. – 2002. – Vol. 73. – No. 6. – pp. 740-763.
46. Autor D. H., Levy F., Murnane R. J. The skill content of recent technological change: An empirical exploration //The Quarterly journal of economics. – 2003. – Vol. 118. – No. 4. – pp. 1279-1333.
47. Arum R., Roksa J. Academically adrift: Limited learning on college campuses. – University of Chicago Press.
48. Astin A. W. The methodology of research on college impact, part two // Sociology of education. – 1970. – pp. 437-450.
49. Astin, A. (1985). Achieving educational excellence: A critical assessment of priorities and practices in higher education. San Francisco: Jossey-Bass.
50. Astin, A. W. (1977). Four critical years. San Francisco: Jossey-Bass.
51. Beach G. M. K. An examination of factors contributing to critical thinking and student interest in an on-line college-level art criticism course. – University of North Texas, 2007.
52. Behar-Horenstein L. S., Niu L. Teaching critical thinking skills in higher education: A review of the literature //Journal of College Teaching & Learning (TLC). – 2011. – Vol. 8. – № 2.
53. Belkin D. US news: Skills gap found in college students //Wall Street Journal. – 2015.
54. Brooks J. G., Brooks M. G. In search of understanding: The case for constructivist classrooms. – ASCD, 1999.
55. Carnoy M., Khavenson T., Ivanova A. Using TIMSS and PISA results to inform educational policy: a study of Russia and its neighbours // Compare: A Journal of Comparative and International Education. – 2015. – Vol. 45. – No. 2. – P. 248-271.
56. Casner-Lotto J., Barrington L. Are they really ready to work? Employers' perspectives on the basic knowledge and applied skills of new entrants to the 21st century US workforce. – Partnership for 21st Century Skills. 1 Massachusetts Avenue NW Suite 700, Washington, DC 20001, 2006.
57. Chan C. K. Y. et al. A review of literature on challenges in the development and implementation of generic competencies in higher education curriculum //International Journal of Educational Development. – 2017. – Vol. 57. – P. 1-10.
58. Chao R., Good G. E. Nontraditional students' perspectives on college education: A qualitative study //Journal of college counseling. – 2004. – Vol. 7. – No. 1. – P. 5-12.
59. Deci E. L., Ryan R. M. The "what" and "why" of goal pursuits: Human needs and the selfdetermination of behavior. Psychological Inquiry, 2000, 11(4), 227–268.
60. Dewey J. How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process Vol. 8. – 1933.

61. Dill J. C. Student perceptions of critical thinking skills development in an online learning environment. – Texas A&M University-Commerce, 2003. – P. 1-171.
62. Dolan E. L., Collins J. P. We must teach more effectively: here are four ways to get started // *Molecular biology of the cell*. – 2015. – Vol. 26. – №. 12. – P. 2151-2155.
63. Dwyer, C. P. & Walsh, A. (2017). Age and critical thinking: observing mature students in educational settings.
64. Ennis R. H. A logical basis for measuring critical thinking skills // *Educational leadership*. – 1985. – Vol. 43. – No. 2. – P. 44-48.
65. Ennis R. H. Critical thinking and subject specificity: Clarification and needed research // *Educational researcher*. – 1989. – Vol. 18. – No. 3. – P. 4-10.
66. Facione P. A. The Delphi report. Committee on pre-college philosophy // *American Philosophical Association*.
67. Feldman K.A. The association between student ratings of specific instructional dimensions and student achievement: Refining and extending the synthesis of data from multisection validity studies // *Research in Higher education*. – 1989. – Vol. 30. – No. 6. – P. 583-645.
68. Friend C. M., Zubek J. P. The effects of age on critical thinking ability // *Journal of Gerontology*. – 1958. – Vol. 13. – No. 4. – P. 407-413.
69. Garcia T., Pintrich P. R. Critical Thinking and Its Relationship to Motivation, Learning Strategies, and Classroom Experience. – 1992.
70. Gelder T. V. Teaching critical thinking: Some lessons from cognitive science // *College teaching*. – 2005. – Vol. 53. – No. 1. – P. 41-48.
71. Graham S., Donaldson J. F. Adult students' academic and intellectual development in college // *Adult Education Quarterly*. – 1999. – Vol. 49. – No. 3. – P. 147-161.
72. Gray A. J. Constructivist teaching and learning. – Saskatchewan School Trustees Association, 1997. – P. 97-07.
73. Gray A. J. Constructivist teaching and learning. – Saskatchewan School Trustees Association, 1997. – P. 97-07.
74. Gruzdev M, Kasakova E., Kuznetsova I., Tarkhanova I. University Graduates' Soft Skills: the Employers' Opinion // *European Journal of Contemporary Education*, 2018; 7(4): 690-698.
75. Halpern D. F. Assessing the effectiveness of critical-thinking instruction // *The Journal of General Education*. – 1993. – P. 238-254.
76. Hanson M. Institutional theory and educational change // *Educational administration quarterly*. – 2001. – Vol. 37. – No. 5. – P. 637-661.
77. Huber C. R., Kuncel N. R. Does college teach critical thinking? A meta-analysis // *Review of Educational Research*. – 2016. – Vol. 86. – No. 2. – P. 431-468.
78. Ingle C. O. Predictors of critical thinking ability among college students: thesis – University of Kentucky, 2007.
79. Jonassen D. H., Peck K. L., Wilson B. G. Learning with technology: A constructivist perspective. Upper Saddle River, NJ: Merrill. – 1999.
80. Kotter, J. (1996). *Leading change*. Boston, MA: Harvard Business School Press.
81. Loes C. N., Salisbury M. H., Pascarella E. T. Student perceptions of effective instruction and the development of critical thinking: A replication and extension // *Higher Education*. – 2015. – Vol. 69. – No. 5. – P. 823-838

82. Loyalka P. et al. Skill levels and gains in university STEM education in China, India, Russia and the United States //Nature Human Behaviour. – 2021. – P. 1-13.
83. Maloshonok N. Undergraduate time-use: a comparison of US, Chinese, and Russian students at highly selective universities //Higher Education Research & Development. – 2020. – Vol. 39. – No. 3. – P. 515-531.
84. March J. G., Olsen J. P. Rediscovering institutions. – Simon and Schuster, 2010.
85. McGarrity D.S.N. A model for developing improvements to critical thinking skills across the community college curriculum. – University of Maryland University College, 2013
86. Meyer H. D., Rowan B. Institutional analysis and the study of education / The New Institutionalism in Education ed. by Heinz-Dieter Meyer, Brian Rowan. State University of New York Press. 2006. P. 1-13
87. Miri B., David B. C., Uri Z. Purposely teaching for the promotion of higher-order thinking skills: A case of critical thinking //Research in science education. – 2007. – Vol. 37. – No. 4. – P. 353-369.
88. Pace C. R. Measuring the Quality of College Student Experiences. An Account of the Development and Use of the College Student Experiences Questionnaire. – 1984.
89. Pascarella E. T., Terenzini P. T. How College Affects Students: A Third Decade of Research. Volume 2. – Jossey-Bass, An Imprint of Wiley. 10475 Crosspoint Blvd, Indianapolis, IN 46256;2005.
90. Pascarella, E. T. (1985). College environmental influences on learning and cognitive development: A critical review and synthesis. In J. Smart (Ed.), Higher education: Handbook of theory and research. New York: Agathon
91. Paul R. W., Elder L., Bartell T. California teacher preparation for instruction in critical thinking: Research findings and policy recommendations. – 1997.
92. Peirce, W. (2005). The year of critical thinking at Prince George's community college: An integrated professional development program. New Directions for Community Colleges,2005(130), 79-84. doi: 10. 1002/cc. 198
93. Reiter HI, Eva KW, Rosenfeld J, Norman GR. Multiple mini-interviews predict clerkship and licensing examination performance. Med Educ 2007;41(4):378-84. 15
94. Rumpagaporn M. W. Students' critical thinking skills, attitudes to ICT and perceptions of ICT classroom learning environments under the ICT schools pilot project in Thailand: thesis – 2007.
95. Sebok SS, Luu K, Klinger DA. Psychometric properties of the multiple mini-interview used for medical admissions: findings from generalizability and Rasch analyses. Adv Health Sci Educ Theory Pract 2014;19(1):71-84
96. Sewell W. H., Hauser R. M. Causes and consequences of higher education: Models of the status attainment process //American Journal of Agricultural Economics. – 1972. – Vol. 54. – No. 5. – P. 851-861
97. Snyder L. G., Snyder M. J. Teaching critical thinking and problem solving skills //The Journal of Research in Business Education. – 2008. – Vol. 50. – No. 2. – P. 90
98. Strauss L. C., Terenzini P. T. The effects of students' in-and out-of-class experiences on their analytical and group skills: A study of engineering education //Research in Higher Education. – 2007. – Vol. 48. – №. 8. – P. 967-992.
99. Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. Review of Educational Research, 45;89–125.

100. Tinto, V. (1993). *Leaving college: rethinking the causes and cures of student attrition* (2nd ed.). Chicago: University of Chicago Press.
101. Thomson G. (2017) *Self-Reported Learning Outcomes and Assessment: Making the Case* // 43rd Annual Meeting of the California Association for Institutional Research (Concord, CA, November 2017).
102. Tsai TH. Validating use of a critical thinking test for the Dental Admission Test. *J Dent Educ* 2014;78(4):552-7. 14.
103. Weidman, J. C. (1989). Undergraduate socialization: A conceptual approach. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. V, pp. 289–322). New York: Agathon.
104. Williams KB, Glasnapp DR, Tilliss TS, et al. Predictive validity of critical thinking skills for initial clinical dental hygiene performance. *J Dent Educ* 2003;67(11):1180-92. 13.
105. Willingham D. T. *Critical thinking: Why it is so hard to teach?* // American federation of teachers summer 2007; p. 8-19. – 2007.
106. World Economic Forum. *The Future of Jobs Report 2020*. – World Economic Forum, Geneva, Switzerland, 2020. <https://doi.org/10.15665/dem.v18i2.2280>.
107. Yang Y.T.C. A catalyst for teaching critical thinking in a large university class in Taiwan: Asynchronous online discussions with the facilitation of teaching assistants // *Educational Technology Research and Development*. – 2008. – Vol. 56. – No. 3. – P. 241-264.
108. Zilvinskis J., Masseria A.A., Pike G.R. (2017) Student Engagement and Student Learning: Examining the Convergent and Discriminant Validity of the Revised National Survey of Student Engagement // *Research in Higher Education*. Vol. 58. No 8. P. 880–903.