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COMPREHENSION OF DEFINITIONS AS A WAY TO DEVELOP SCIENTIFIC CRITICAL THINKING IN STUDENTS

S Modern higher education is designed to form a competent professional for a particular professional field, as well as to create new academicians and pedagogical staff. Instilling a love of science, developing critical thinking, and skills of nonstandard academic research is a priority of productive learning. An important factor for achieving the goal in the learning process is the appropriate method. The discipline «Fundamentals of Scientific Research» prepares students for scientific and creative activities, writing articles, term papers, and graduation theses papers. In the process of studying the discipline, students must also master scientific concepts and their definitions. It contains a significant amount of complex theoretical material, so it is recommended to combine both theory and practice, involve students in direct comprehension of certain theoretical provisions, including definitions. The article proposes and describes a method for stimulating educational activity and a method for developing cognitive activity, in European education, this method of teaching is called research. During the study, students comprehend the options proposed by the teacher definitions of certain concepts (methodology and method), that is, they make the first attempts at scientific research, based on the views of individual scientists. The completion of the task is followed by a discussion, during which students exchange views and clarify unclear points under the guidance of the professor. This method for mastering theoretical material helps students understand the existence of contradictions in the definition of scientific concepts and the essence of these contradictions, activates the process of cognition and promotes critical thinking, opens the path to new knowledge, promotes academic abilities, and instills a love for scientific research.

Key words: scientific and pedagogical activity; definitions; learning method; alternation of theory and practice; knowledge acquisition

A Слюсаренко Марія. Осмислення дефініцій як шлях до вироблення наукового критичного мислення у студентів.

Сучасна вища освіта покликана формувати компетентного професіонала для певної сфери діяльності, а також ростити науково-педагогічні кадри. Прищеплення любові до науки, розвиток критичного мислення та навичок наукового творчого пошуку є одним із пріоритетних завдань продуктивного навчання. Важливим фактором для досягнення мети у процесі навчання є доцільно вибраний метод. Навчальна дисципліна «Основи наукових досліджень» має на меті підготувати студентів до наукової творчої діяльності, написання статей і курсових і кваліфікаційних робіт, вона містить значну кількість складного теоретичного матеріалу, для викладу якого актуальним є чергування теорії та практики, залучення студентів до безпосередньої участі в осмисленні окремих теоретичних положень, зокрема і визначень понять. У статті запропоновано й описано метод стимулювання навчальної діяльності та метод розвитку пізнавальної діяльності, за якого студенти осмислюють запропоновані викладачем варіанти дефініцій певних понять і письмово оформлюють власні погляди, тобто вони роблять перші спроби наукового пошуку, спираючись на погляди окремих учених. Після виконання завдань відбувається обговорення, під час якого студенти під керівництвом викладача обмінюються думками, уточнюють незрозуміле. Такий метод опанування теоретичного матеріалу допомагає студентам усвідомити факт існування суперечностей у визначенні наукових понять і сутність цих суперечностей, активізує процес пізнання та сприяє критичному мисленню, демонструє шлях до нових знань, сприяє розвитку наукових здібностей і формуванню любові до наукового пошуку.

Ключові слова: науково-педагогічна діяльність; дефініції; методи навчання; чергування теорії та практики; здобування знання

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The urgency of the problem. Ukrainian education is developing following the latest global trends. Its goal is the comprehensive development of a person as an individual and as the highest value for society. A graduate of a higher education institution is a qualified specialist who, according to the Law of Ukraine «On Higher Education», has the appropriate level of «theoretical knowledge, skills, abilities and other competencies sufficient to produce new ideas, solve complex problems in professional and/or research and innovative activity, master the methodology of the scientific and pedagogical activity, as well as to conduct their scientific research, the results of which have scientific novelty, theoretical and practical significance» [8].

Ukrainian higher education institutions are called not only to train specialists for various fields of activity but also to give growth in their classrooms to future academic and pedagogical workers, to involve students in research, to instill interest in science. Only a high level of the research culture of graduates can guarantee the successful development of science in the future. Educational and professional program «Psychology» of the first (bachelor's) degree in major 053 «Psychology» of the South Ukrainian National Pedagogical University named after K.D. Ushynsky is developed following the Law of Ukraine «On Higher Education» and contains a list of competencies required for a bachelor's degree in psychology. The program provides for the development of skills important for scientific activity: the ability to learn and acquire new knowledge; be critical of others and yourself; be creative; to take care of scientific values and achievements of society; plan, organize and conduct research; analyze the data and organize the results, formulate sound conclusions and recommendations.

One of the compulsory subjects of the Educational Program is the «Fundamentals of Scientific Research», which is offered in the third semester and is designed to instill in students a love of knowledge, to form a culture of scientific thinking, to prepare them for writing articles, term papers, graduation theses papers and more. In the basis of discipline, a foldable theoretical material is to be found, so nutrition about creative ideas is taken before carrying out, before the introduction of discipline and the choice of methods of victories is even more relevant.

Analysis of current research and publications. Scientists from the international community pay attention to the effectiveness of education. There are several aspects that the authors of scientific articles emphasize, namely that:

- modern students have good knowledge and strive to improve it; they report their interest in social networks, and the most discussed among young people are questions about teaching methods, the teacher's ability to explain and illustrate knowledge [13];

- the university professor must be a professional, endowed with competencies and should continue to improve oneself throughout their working life, e.g. regularly upgrade their qualifications and continue to study [7]; present the material clearly and meaningfully, using effective teaching methods

- (lecture-visualization [6], a heuristic method [18], comprehension assessment method aimed at obtaining feedback from students [9], involvement of texts with hidden meanings (wayang) for mastering a foreign language [12], competitive methods [11]), etc.; and have a culture of scientific thinking [4];

- competence model of education is aimed at achieving such a comprehensive development of students, which will help them overcome life's difficulties, be responsible for their lives, achieve success, develop themselves and think critically [19]; will allow them to carry out successful professional and further educational activities [6], and continue to be qualified experts, academic and pedagogical workers with critical thinking skills [12];

- modern students need to make a lot of effort to learn to distinguish the essential in scientific information, because very often they, instead of analyzing and determining the important, retell opinions. However, “the most significant characteristic and the result of critical thinking is a subjective judgment, based not on intuition, but the awareness of information obtained from the analysis of facts and evidence [2, p. 39].

The vision of non-virulent earlier parts of the foreign problem. The international scientific community is comprehensively studying the problems of education, and the development of critical thinking in students is named as one of the top priorities of modern learning [3; 12; 19]. Meanwhile, the topic of forming critical thinking has not yet been fully studied and needs to be further explored.

Thus, **the goal of the article is** to reveal the features of the formation of critical scientific thinking in students in the process of studying the topic of “Methodology and methods of scientific research”.

Presentation of the main material. In the process of theoretical coverage of the topic, we suggest exploring a method of stimulating educational activities and a method of developing cognitive activity as a way to switch students from the perception of theory to direct participation in its formation. We involve students in understanding and comprehending different views on certain concepts and developing their points of view.

At the beginning of the day, students will be given the theory and they will learn it one hour before their scientific education. There are many options for starting: 1) students are aware of the prepared results and the stench of passive participants in the process of starting; 2) students get knowledge about the ready results and the end of the day, the week of studying before discussing scientific problems, before scientific discussions; 3) students learn about the scientific processes and problems, get information about the processes, for the help of which they have reached the beginning of knowledge; 4) the beginning will last for a while, the students will take on the fate of the best science at once with the weekend [3]. The fourth option is called research, it is especially productive for the development of scientific critical thinking.

Research activities are useful for students because they enhance the ability to focus, analyze, compare, synthesize, stimu-

late critical thinking, encourage them to make independent assumptions, and open the path to new knowledge. These tools are essential in writing scientific articles, term papers, and graduation theses.

Higher education institutions are designed to grow creatively independent people who can defend their position and critically evaluate the conclusions of others. Critical thinking is defined by analytical thinking, one of the key skills of the XXI century, and the method of teaching – an important means of ensuring the effectiveness of the process of formation and development of critical thinking [2].

Scientists note that teaching critical thinking means teaching to see problems, to ask questions; analyze, compare, synthesize, evaluate information from any source; make hypotheses and evaluate alternatives; make a conscious choice, make decisions and justify them [15], as well as to use special concepts and definitions and be able to operate with them [4], to carry out terminologically competent scientific communication [6].

Modern education fights for productive learning. It is not about students' unquestioning perception of the content, but also their reflection, the learning process as a comprehension of the content, and hence – the process of «development of thinking» [15]. The process of learning as a result of intense mental activity is a complex act of cognition: the transition from ignorance to knowledge. The teacher must create appropriate conditions for the cognitive activity of students, «the desire not only to acquire knowledge but also to know how to acquire it» [11].

One of the tools of such training is taxonomy, the direction of the learning process from low-level thinking (knowledge acquisition, understanding, application) to the formation of high-order mental operations among students, such as analysis, synthesis, and evaluation [12].

Experience demonstrates that students are often confused in defining concepts such as methodology, scientific approach, and method. To successfully master these concepts, we used during classes the method of stimulating educational activities and the method of developing cognitive activity.

The purpose of the class is to stimulate students' critical thinking, the ability to analyze, synthesize and evaluate.

We informed the students that there is some difficulty in defining the concepts of methodology, scientific approach, and method, so we invite them to participate in the study.

We have prepared 2 tasks.

Task 1. We distributed worksheets among students, which presented six definitions of the term “methodology”, made by Ukrainian, Russian and Polish scientists, authors of articles, monographs, and textbooks. These definitions were based on controversy, namely, some scientists said that methodology is a science about methods and a system of methods [5; 14; 16; 17], one author denied the idea that methodology is a science and suggested his arguments [1], one author argued in favor of methodology as a science [10].

Each definition had a reference to the source of the information, and a list of sources was also provided.

The task for the students was the following:

1. Read the definition carefully.
2. Please, indicate what term does this definition refer to?
3. Please, describe similarities and differences in these definitions.
4. What are the counterarguments?
5. Express your own opinion about what you read, write 6-7 sentences about the views on the concept of methodology, and support them with excerpts from citations.

We took 50 minutes to complete this task. Then the students handed over to the teacher the written assignments, and we had an oral discussion. We asked the students how they understood the task. Did they notice a contradiction in the definitions? What is this contradiction? What do they think about the fact that there are conflicting views? Did they manage to formulate their opinion?

Task 2. We also discussed the methods that students subconsciously used in the research process. We talked about analysis, comparison, and synthesis and their features.

We also assigned a similar task for students to perform at home. On a piece of paper, we prepared quotes from Jose Ortega-y-Gasset's article «Two Main Metaphors» [20] about the role of artistic reception for a scientist; and also gave three definitions of the term method (these were definitions from the dictionary of foreign words, the dictionary of the Ukrainian language, as well as from the works of the philosopher Francis Bacon). Definitions from dictionaries were formulated using concepts, and F. Bacon's definition was metaphorical, he compared the method with a lantern in the dark:

1. Read excerpts from Jose Ortega-y-Gasset's article «Two main metaphors». Find out who Jose Ortega-y-Gasset is, where and when he lived.
2. Highlight the conceptual ideas in the quotes from this article.
3. Read the three proposed definitions of the term «method».
4. Prepare a written answer on a separate sheet. Connect your thoughts on the method and the features of its definition, using excerpts from the article by Jose Ortega-y-Gasset. Formulate 6-8 sentences using the suggested material.

Research results. Task 1: a group of 28 people worked on the task. It is important that not all students completed the task, some did not understand it, some did not want to admit that it was difficult for them, some were very close to completing the task correctly, and some performed it correctly. The main point here is that in the process of discussion all students were active, they asked for clarifications, made questions, agreed, argued, and understood that in the interpretation of the concept of methodology multiple definitions can exist. Nevertheless, the most common interpretation is that methodology is a science and a system of methods.

Task 2: in the process of discussing the task, we asked students the question: what is the concept? What is a metaphor?

Why, in their opinion, were excerpts from Jose Ortega-y-Gasset's article offered for review? What are the features of the definitions of the concept of «method»?

Interestingly, students performed the tasks differently, but during the discussion, they were active, wanted to learn about the answer options, and realized that scientists often use artistic techniques, so definitions can not only be formed logically but also metaphorically.

Conclusions from this study. The discipline "Fundamentals of Scientific Research" is full of complex terminology and a large number of definitions. Theoretical coverage of the topics of the discipline becomes effective if it is interspersed with practical actions, alternation of theory and practice, involving students in research activities, in direct participation in the discussion of individual definitions.

The method of stimulating learning and the method of development of cognitive activity proposed by us help students to understand the existence of contradictions in the definition of scientific concepts and the essence of these contradictions, activate the process of cognition and promote critical thinking, demonstrate the road to new knowledge, promote scientific abilities, and instill the love of scientific research.

Prospects for further scientific research. The question of students' mastery of definitions of other concepts, in particular, such as categories of science, may be relevant for further research.

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