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## ASSESSMENT OF META-COMPETENCIES IN THE COURSE “CREATIVE PEDAGOGY” AT HIGHER EDUCATION

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### Abstract:

This paper describes the development ways of the meta-competencies of students based on creative techniques in the lessons. A 6-credit module aimed at developing students' meta-competencies is included in the curriculum and uses innovative techniques for developing the meta-competencies of students and given the classification of the creative learning techniques. Analysed the results of the study with 352 students in Tashkent University of Information Technologies given the reliability and validity of the made teaching technique. To investigate the validity hypotheses based on groups with known criteria used the test of Torrence. Students who are experienced in using creative learning techniques in the module "Creative Pedagogy" have significantly improved their professional creativity. In sum, the results of the analyses suggest that the survey and teaching technique created by us is reliable and has 12.1% effectiveness for developing meta-competencies of students.

### Keywords:

Meta-Competencies, Students, The Module “Creative Pedagogy”, Lecture

## Introduction

### *The Importance of Meta-competencies in Education and Society*

The development of meta-competencies, which is one of the "21st-century skills", creates the need for the representatives of the field to develop competencies such as logical thinking in complex situations, finding original solutions to problems, and forecasting. (Rochmawati, Wiyanto, and Ridlo 2020)(Erdoğan 2019).

OECD Learning Compass 2030 organization says that the formation of people's cognitive and meta-cognitive skills, social and emotional skills, and practical and physical skills increases their adaptability to changes in society (Organization for Economic Cooperation and Development, 2018).

If we look at pedagogic personnel, globally, today, based on the demands of society, their metaverse competence (Thongprasit and Piriyastrawong 2023);(Karapakdee and Wannapiroon 2023); (Sinlapaninman, Yonwilad, and Pattanachai 2023)the ability to form leadership competencies (Shchetinina and Zinchenko 2018), the highest structural and science-related competencies (Lytvynenko and Yamnitskyi 2014) means metacompetence. Based on this, in the development of pedagogues' metacompetencies, they should carry out such activities as conducting subjects based on the principle of metasubjectivity (Radevsky 2022) forming lesson content based on the individual characteristics of learners, organizing integrative training, and using innovative educational technologies. Shows the urgency of increasing.

### *Applications and Objectives of Meta-competencies Development*

Meta-competence can be used in various fields, including Project-based learning (PBL)(Guo et al. 2020), medicine (Bennett and Shafran 2023); journalism (Wieczorek et al. 2024), engineering (Thongprasit and Piriyastrawong 2023), professional training (Lytvynenko and Yamnitskyi 2014) have been researched.

We can observe the role and place of pedagogical conditions in the development and evaluation of students' meta-competencies in the educational process in Osipov's research (Osipov 2020). Based on this, taking into account that the development and assessment of meta-competencies of students of higher education institutions are carried out in the field of science, we set two objectives in the article: (i) create "Creative pedagogy" module in the curriculum; (ii) develop a framework that reflects the content of meta-competencies.

## Literature Review

### *Evaluation Trends and the Role of "Creative Pedagogy"*

The process of evaluating students in the field of science is an important pedagogical process aimed at an in-depth analysis of the knowledge, skills, and competencies of students in each science, and objective determination of their knowledge level (Roji and Zamri 2024). Today, the trends in the educational system include the transition from traditional methods of evaluating students in subjects to alternative methods (Ahmad, Sultana, and Jamil 2020), i.e. digital technologies, innovative methodological projects (Cahyadi et al. 2023), test questionnaires (Mather and Schneider 2023), (Mather and Schneider 2023), pedagogical observe (Taylor et al. 2023), pedagogical observation (Yildirim-Erbasli and Bulut 2023).

In the course of our research, we found it desirable to include the "Creative pedagogy" course in the curriculum for the development and evaluation of students' metacompetencies. During this course, students' creative competence, critical thinking, and skills such as organizing the educational process in a creative environment are formed. The course is 6 credits and consists of 44 hours of lectures and 30 hours of practical training. If we systematically analyze the educational process of higher education institutions, we can see a student-oriented towards professional activity. Rapid changes in the educational system, the importance of the educational system in the development of personnel that meets the requirements of world educational standards, taking into account the meta-competencies of future specialists, improving the educational modules and updating the content, as well as conducting lectures and practical training in a new way is appropriate.

### ***Teaching Approaches and Development of Meta-competencies***

Various forms of teaching are conducted in the higher education system, that is, interactive, passive, and active. In our opinion, the parallel development of metacognitive, metaverse, and metacreative competencies of students along with the organization of lectures in a creative environment along with the above forms of teaching will make them become experts in their profession.

We present the analysis of the following lectures to develop these competencies.

**Table 1: Types Of Lectures In The "Creative Pedagogy" Course**

| <b>Learning Type</b>     | <b>Activity Of The Teacher</b>                                                                                                                                                                                                                                                                     |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Self – Directed Learning | Sets Learning Goals Based On Individual Characteristics, Searches For Needed Resources, Creates And Follows A Learning Plan, And Then Evaluates Their Result (Stephens and Coryell 2021)                                                                                                           |
| Transformative Learning  | Faces A “Referential Dilemma” That Challenges Their Perspective In Such A Fundamental Way That They Re-Analyze Their Existing Perspective And Think Critically To Apply It To Their Experiences (Khalil and Elkhider 2016)                                                                         |
| Experiential Learning    | Develops The Most Suitable Sequence Of Actions For Pedagogical Activity, That Is, Creates A Map Of His Activity (Morris 2020)                                                                                                                                                                      |
| Project-Based Learning   | Researches, Develops, And Tests Potential Solutions, Using Colleagues For Regular Feedback;<br>It Further Strengthens The Acquired Knowledge Based On Active Feedback And Directs It To Practice (Maros Et Al., 2023)                                                                              |
| Action Learning          | Creates and Participates in and Monitors a Question-and-Answer Environment Based on Problem-Solution-Oriented Debate. As a result, it determines the most suitable solution;<br>Forms Group Dynamics Based on Professional Skills Requirements such as Cooperation and Support (Cho and Egan 2009) |

The trends of educational development and the need for quality education require radically new approaches to certain educational technologies and, on this basis, the need for educational organization and methodical improvement. These approaches include many principles and methods but mainly put forward ideas aimed at the prospective behavior of the transition from the professional-vocational type of education to the meta subject. The use of differentiated

technology in metasubject training aims to adapt the educational process to the individual needs and abilities of students. Differentiated technology organizes the educational process in such a way that each student is given opportunities for the appropriate approach and level of mastery of materials (Wermke, Forsberg, and Schulte 2024); (Bergh and Forsberg 2024; Mpofu and Sefotho 2023). Project activities in conducting meta-subject subjects help students to combine knowledge and skills in different subjects and apply them to real life. Through a project-based approach, students can conduct their own independent research, develop creative thinking, develop collaborative skills, and solve problems (Markula and Aksela 2022). Through the interactive methodology, students will have the opportunity to apply their skills in practice, actively acquire knowledge, and learn to solve problems creatively. Interactive methodologies for meta disciplines play an important role in building comprehensive understandings by integrating multidisciplinary knowledge (Kutbiddinova, Eromasova, and Romanova 2016); (Marchenko, Slipchuk, and Yuzkiv 2023). The use of integrated technologies in the teaching of meta-subjects encourages students to acquire complex and multifaceted knowledge. Integrated technologies are technologies for organizing the educational process by combining several subjects. This approach allows students to have a deeper understanding of the connections between different disciplines, and to understand knowledge from a wider context (Schoville and Titler 2020).

In general, meta-competencies are universal professional skills that include a person's relationships with the internal and external world. Metacompetencies include reflection and metacognitive processes, which play an important role in regulating personal-professional relationships. These skills, combined with psychological culture, help to understand and develop a person's self.

Metacompetencies also play an important role in professional learning, as they provide opportunities for self-organization, planning, and self-evaluation. In the process of developing psychological culture, meta-competencies help a person to correctly assess his resources and knowledge to achieve his goals.

### ***Types and Descriptions of Meta-Competencies***

The concept of meta-competence has been considered by scholars from different perspectives. For example, Ustav and Venesaar interpret this phenomenon as a set of competencies and personal qualities that allow the successful formation of new knowledge and competencies (Ustav and Venesaar 2018). Khachaturova describes meta-competence as a "superstructure", that is, the highest level of competence and personal development, which ensures the effective transition of a person to a new stage of knowledge and self-development. (Khachaturova 2022).

Meta-competencies are the highest creative competencies that emerge as a result of training and personal development in meta-science (Aryal and Khanal 2013). At the same time, Cattaneo and a number of other authors emphasize that meta-competencies develop on the basis of effective interpersonal communication skills, teamwork and the ability to make unusual decisions in a specific situation (Cattaneo, Antonietti, and Rauseo 2022).

M.M. Fayzullayev said, "The basis of meta-competencies is a unique process - reflection. Psychological literacy is formed in the process of development and is purposefully defined in the nature and methods of solving problems and problematic situations in the educational process. It is determined by the effective performance of activities, the formation of personal

structures, and the initiation, management, and regulation of self-development and self-improvement. Emphasizes the need to create conditions for the formation of meta-competencies, in her research, D. Rakhmatullayeva developed innovative educational methods ("Entrepreneurship") wheel", "5 W", blended learning, flipped class, case study and analysis of economic situations, media education, programmed education, etc.) 13 has improved the methodology of organizing the educational process.

As a result of the analysis, 9 types of meta-professional competencies were identified. These 9 types of competencies are the competencies that are in demand today for the representatives of the industry, and in our research work, we set the goal of developing the primary types of these competencies in the students of the higher education institution. In the following places, we will describe the types of meta-competencies in examples:

**Table 2: Description of Types Of Meta Competencies**

| Types Of Competencies                            | Description                                                                                             | Example                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Inter-Relation Competencies</b>               | Empathy (Self-Social-Emotional Learning), Collaboration, Communication)                                 | "Management Through Interaction And Support"; "Collaborative Work With Organizations And Individuals" (Boyne and Dahya 2002); "Knowing And Interacting With Others" (Valley Et Al., 2020); "Identifying, Mapping, Facilitating And Managing Collaborations Between External Stakeholders In Running A Circular Business Model"(Sumter Et Al., 2020) |
| <b>Normative Competencies</b>                    | Identifying Ethical Issues And Drawing Correct Ethical Conclusions Based On Ethical Standards           | "Evaluating And Improving The Sustainability Of Social-Ecological Systems Based On Values And Principles" (Dentoni Et Al., 2012); "Understanding And Reflecting Values" (Leslie Et Al., 2018)                                                                                                                                                       |
| <b>Required Competencies In A Specific Field</b> | Gaining Knowledge, Skills, And Techniques In A Specific Field                                           | "Disciplinary Competence" (Mulder 2017) ""Having An Understanding Or Knowledge Of A Specified Field Of Study" (Stefl 2008) "Content Knowledge" (Roy Et Al., 2020)                                                                                                                                                                                   |
| <b>Transformative Competencies</b>               | Critical, Forward-Thinking, And Strategic Thinking, Ability To Actively Participate And Implement Plans | "Actively Participating In Responsible Action To Improve The Sustainability Of Social-Ecological Systems" (Dentoni Et Al., 2012) Ability To Inspire Individual And Organizational Excellence, Create And Achieve Shared Visions, And Successfully Manage Change To Achieve Strategic Goals And Successful Organizational Performance" (Stefl 2008)  |

|                              |                                                                                                                            |                                                                                                                                                                                                                                                               |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Innovative Competence</b> | Ability To Step Outside Of Traditional Problem-Solving Methods And Processes, Including Transdisciplinarity And Creativity | "Ability To Creatively Apply Knowledge To Solve Problems" (Malheiro Et Al., 2019); Transdisciplinary Competence" As The Ability To Use It As A Tool And Skill To Work With Other Disciplines And Professionals In Real-Time Situations (Demssie Et Al., 2019) |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

In the framework of our research, we took the transformative competence as the basis for the development of metaprofessionalism of students of higher educational institutions. Within this competence, we get a combination of students' metaverse, metacognitive and metacreative competencies.

## Methodology

### *Research Context and Participants*

The research work was carried out by students of the Tashkent University of Information Technologies named after Muhammad al-Khorazmi, technical department. Three groups of students from "The ICT in education", "Computer engineering" and "E-library" departments participated. The experiment was conducted in the academic year 2023-2024 and was carried out in the subject "Creative pedagogy". Experimentation and testing continued from December 2023 to December 2024. The total number of respondents was 352, of which 126 (35%) were women and 220 (62%) were men, 6 (3%) respondents did not participate for various reasons. Age characteristics were taken into account when determining the meta competencies of students (Table 3).

### *Stages of Experimentation*

Metacompetencies of students were determined in two stages during the experiment:

I-level: With helping the test of Torrence's "Unfinished pictures";

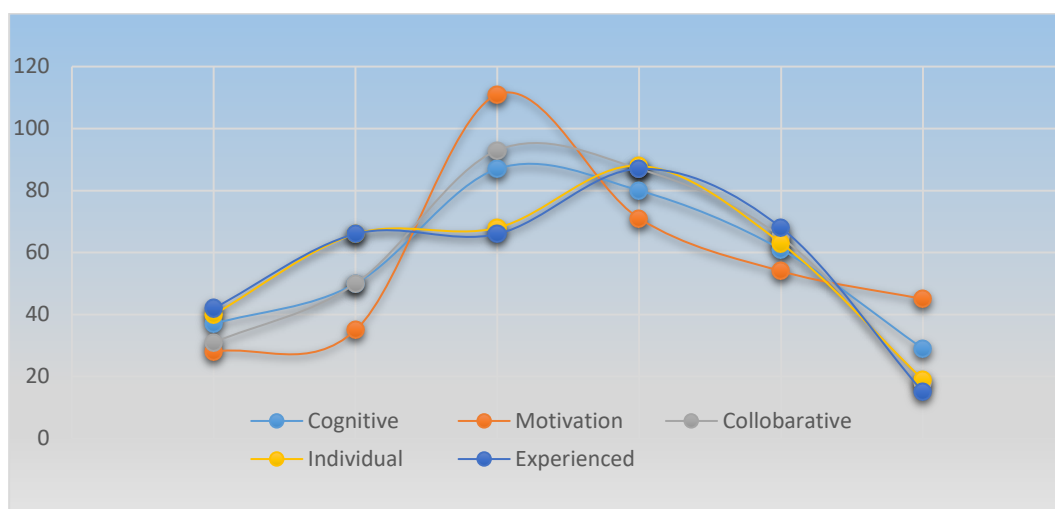
II -level: With helping cases related to the module. At this level, cases were given to students. Groups were divided into little groups by a differentiated approach. Every group should use creative teaching techniques such as, "Design thinking", "SCAMPER", "SCOUT", "Modular brainstorming", "Cubing", "Diamond" etc.

## Results and Discussions

As a result, every group should prototype their ideas through, vodcasts, flipcharts, role-based learning, and so on. As a teacher, we were giving recommendations related to doing the task hole lesson. And the end we assessed them by cognitive, motivation, collaboratives, individuality, and experienced criteria. Used the mathematical-statistical method to ensure the accuracy of the test results proposed by K. Pearson ( $\chi^2$ ). At the final stage of the pedagogical experiment-testing, the indicators of the level of development of meta competency of students of the university in all experimental-testing sites are presented in Table III, and they were mathematically and statistically processed based on the "X-square" ( $\chi^2$ ) compatibility criterion.

**Table 3: The Result Of Control And Experiential Group**

| Criteria              | In the control group<br>c=178 |        |     | In the experiential group<br>e=174 |        |     |
|-----------------------|-------------------------------|--------|-----|------------------------------------|--------|-----|
|                       | High                          | Middle | Low | High                               | Middle | Low |
| <b>Cognitive</b>      | 37                            | 50     | 87  | 80                                 | 61     | 29  |
| <b>Motivation</b>     | 28                            | 35     | 111 | 71                                 | 54     | 45  |
| <b>Collaboratives</b> | 31                            | 50     | 93  | 87                                 | 65     | 18  |
| <b>Individuality</b>  | 40                            | 66     | 68  | 88                                 | 63     | 19  |
| <b>Experienced</b>    | 42                            | 66     | 66  | 87                                 | 68     | 15  |

**Figure 1: Pedagogical Experiment-Test Results In The Form Of A Diagram**

Based on the results of the research, average means were analyzed in experimental and control groups using the Student's Test. A total of 352 students participated in the research, therefore 174 in the experimental group and 178 in the control group. The brief essence of the problem is as follows: let two prime sets was given. One is the average scores of the students in the experimental group, and the other is the average scores of the students in the control group. The scores are assumed to have a normal distribution. Such an assumption is reasonable because the conditions of approximation to the normal distribution were simple and they were fulfilled.

Based on the above tables, hypothesis H1 was choosen, which shows the effectiveness of the teaching of students in the experimental and control groups, and hypothesis H0, which contradicts it.

The mastery indicators and the number of students in the experimental group and the number of students in the control group have been statistically grouped variation series by determining, respectively, by means of Xinis and Yjnjs, as well as "High" level with 3 points, " We define the "Medium" level with 2 points and the "Low" level with 1 point.

Criteria has entered and get the following. So, the average result of students in the experimental and control groups is  $76.7\%-61\%=15.7\%$  by cognitive criterion, by criteria of motivation  $74.7\%-63.3\%=11.4\%$ , by criteria of collaboration  $80\%-64.3\%=15.6\%$ , by criteria of individuality  $80.3\%-64.7\%=15.6\%$ , by criteria of experienced  $80.7\%-68.7\%=12\%$ .

12.1% higher effectiveness of results in pedagogical research work was proved by mathematical and statistical methods. The effectiveness of the methodological support developed for increasing of the metacompetency of students in the university was verified in the research, and the analysis of the obtained results allowed to conclude that the use of the methodological support to develop will effectively enhance the teaching effectiveness.

### **Findings**

The study explored the development of meta-competencies among 352 students at Tashkent University of Information Technologies through the "Creative Pedagogy" module. The key findings are as follows:

The "Creative Pedagogy" module utilized innovative techniques such as "Design Thinking," "SCAMPER," and "Modular Brainstorming." Students in the experimental group exhibited a 12.1% higher improvement in meta-competencies compared to the control group.

Meta-competencies were measured using criteria for cognition, motivation, collaboration, individuality, and experience. The results revealed: cognitive skills: 15.7% higher performance in the experimental group; motivation: 11.4% increase; collaboration: 15.6% improvement; individuality and experience: gains of 15.6% and 12%.

Experimental group students actively engaged in creative tasks, producing outputs such as vodcasts, flipcharts, and role-based learning projects. These activities enhanced their creativity, critical thinking, and professional competencies. The effectiveness of the teaching techniques was statistically validated using K. Pearson ( $\chi^2$ ) test, confirming the methodology's reliability and accuracy. These findings underscore the value of incorporating creative approaches into higher education to enhance students' meta-competencies effectively.

### **Conclusion**

This study explored the development of meta-competencies among higher education students through the innovative implementation of the "Creative Pedagogy" module. The findings demonstrated that employing creative teaching techniques, such as "Design Thinking," "SCAMPER," and "Modular Brainstorming," significantly enhanced students' cognitive, motivational, collaborative, individuality, and experiential competencies. The experimental group showed a measurable improvement of 12.1% compared to the control group, confirming the effectiveness of the proposed methodology. Furthermore, the integration of theoretical and practical approaches allowed students to develop essential 21st-century skills, including critical thinking, creativity, and professional adaptability. The rigorous application of statistical methods, such as K. Pearson ( $\chi^2$ ) test, validated the reliability of the findings and established the pedagogical value of the "Creative Pedagogy" module. Despite these achievements, the study acknowledged several limitations. The research was conducted within a single university and focused on specific technical disciplines, which constrains the generalizability of the results. Additionally, the one-year timeframe may not fully capture the long-term impact of creative teaching methods on meta-competency development. To address these limitations,

future research should expand the scope to include diverse academic institutions and disciplines. Longitudinal studies are recommended to assess the sustained effects of creative pedagogy over time. Moreover, exploring the integration of advanced digital tools, such as artificial intelligence and virtual reality, could further enhance the development of meta-competencies. In conclusion, the "Creative Pedagogy" module provides a promising framework for fostering meta-competencies in higher education. By addressing its limitations and building on its strengths, future efforts can further advance the role of creative teaching methods in preparing students to meet the challenges of the modern world.

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