THE SIGNIFICANCE OF THE COURSE «ANALYSIS AND PROCESSING OF THE RESULTS OF PSYCHOLOGICAL RESEARCH» IN THE PROFESSIONAL DEVELOPMENT OF MAGISTRATES OF PSYCHOLOGY

Abstract. The article is devoted to the significance analysis of the course «Analysis and processing of the results of psychological research» in the professional development of psychology magistrates. It was determined that mathematization of the humanities is an objective process of penetration into various fields of known mathematical methods and means, the creation of completely new and flexible mathematical theories and methods adequate to new research subjects. The purpose of the article is theoretical substantiation of the significance of the educational course «Analysis and processing of the results of psychological research» for the professional development in the conditions of mathematization of education, its organization and satisfaction with this process of magistrates-psychologists. To realize the goal, the following tasks were set: first, to determine the difficulties associated with studying the given course; secondly, to find out the relationship between mathematical competence and the specified course, as well as the degree of satisfaction with its study. During theoretical analysis, it was established that the study of the specified course by the students of the second (Master’s) level provides the formation of such skills as ability for generalization of empirical data and formation of theoretical conclusions; ability to present research results in written and oral forms in an accessible and reasoned manner, to participate in professional discussions; to carry out an analytical search for scientific information relevant to the formulated problem and evaluate it according to adequacy criteria. From the practical experience of teaching this educational course, it has been established that the application of mathematical methods by future psychologists is associated with certain difficulties, since they primarily investigate the qualitative characteristics of phenomena and events. As a result, when processing and interpreting information, there is an urgent problem of matching the purpose and content of the research tasks with the possibilities of mathematical and statistical procedures used by them. On the other hand, the solution of the mentioned aspects is related to the level of mathematical competence formation of the second
(Master’s) level applicants. A review of the psychological and pedagogical literature on the problems of forming mathematical competence was conducted and the author’s vision for the definition of this phenomenon was presented. The effectiveness of the use of the specified educational course during the training of magistrates-psychologists was implemented and it was established that, firstly, its teaching arouses interest in acquiring new knowledge, and secondly, that it is a prerequisite for the formation of their mathematical competence.

**Key words:** educational course, mathematical competence, applicants of the second (Master’s) level, professional training, Master’s degree in psychology.

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**Анотація.** Статтю присвячено аналізу проблеми значущості курсу «Аналіз та обробка результатів психологічного дослідження» у професійному становленні магістратів-психологів. Визначено, що математизація гуманітарних наук є об’єктивним процесом проникнення в різні галузі відомих математичних методів і засобів, створення абсолютно нових і гнучких математичних теорій і методів, адекватних новим предметам дослідження.

Метою статті є теоретичне обґрунтування значущості навчального курсу «Аналіз та обробка результатів психологічного дослідження» у професійному становленні в умовах математизації освіти, його організації та задоволеності цим процесом магістратами-психологами. Для реалізації мети було поставлено такі завдання: по-перше, визначити труднощі, що пов’язані із вивченням означеного курсу; по-друге – з’ясувати взаємозв’язок математичної компетентності із зазначеним курсом, а також ступінь задоволеності від його вивчення. Під час теоретичного аналізу було встановлено, що вивчення зазначеного курсу здобувачами другого (магістерського) рівню забезпечує формування в них таких умінь, як: здатність узагальнювати емпіричні дані і формувати теоретичні висновки; здатність практичними засобами та формування теоретичних висновків; вміння доступно і аргументовано представляти результати досліджень у письмовій та усній формах. З практичного досвіду викладання цього навчального курсу встановлено, що застосування математичних методів у майбутніх психологів пов’язане з певними труднощами, оскільки в них насамперед досліджуються
саме якісні ознаки феноменів та явищ. Як наслідок, при обробці та інтерпретації інформації виникає нагальна проблема узгодження відповідності мети і змісту поставлених дослідницьких завдань можливостям математико-статистичних процедур, що ними застосовуються. З іншого боку, вирішення означених аспектів пов’язано з рівнем сформованості математичної компетентності здобувачів другого (магістерського) рівня. Проведено огляд психолого-педагогічної літератури з проблем формування математичної компетентності та подано авторське бачення до визначення цього феномену. Здійснено перевірку ефективності використання означеного навчального курсу під час підготовки магістрантів-психологів та встановлено, що, по-перше, викладання його викликає зацікавленість до набуття нових знань, а по-друге, що він є передумовою для формування в них математичної компетентності.

Ключові слова: навчальний курс, математична компетентність, здобувачі другого (магістерського) рівня, професійна підготовка, магістрант-психолог.

Statement of the problem in general. The relevance of the research is connected with the global world migration and transformation processes, both in the development of educational and personal spaces. On the other hand, the possibility of instant spread of information with the help of modern information and communication tools encourages the society to search for ways of intellectual development of people, their preparation for staying in a new reality, definition and projecting of directions for educational problems solving and finding possible ways for their improvement. In solving these problems, a special place is occupied by the training of highly qualified specialists in the field of psychology, who are able to carry out professional activities at a high level, in such areas as: psychodiagnostics; psychological counseling (in particular, family one); psychocorrection according to requests; psychoeducation; professional and psychological support of a person’s personal transformations; psychological assistance to the citizens in crisis and extreme situations; developing of scientifically based psychological recommendations regarding the enhancing of the activities of organizations efficiency, business structures, etc.; scientific and psychological studies of a certain problem, etc. However, the accepted standard of higher education in specialty 053 «Psychology» for the second (Master’s) level of higher education (order of the Ministry of Education and Science of Ukraine № 564 dated 24.04.2019) provides for the training of specialists capable of solving complex problems in the process of training and professional activity in the field of psychology, which is related to the formation of special (professional, subject) competencies [6]. At the same time, the solving of methodological and practical problems of modern psychology is influenced by the mathematization of the humanities, therefore there is no doubt about the relevance of the developing and using in the professional training of applicants of the second (Master’s) level in the specialty 053 «Psychology» of the
training course «Analysis and processing of the results of psychological research», which has its own object, subject, goal and task of research and is primarily aimed at a better understanding of the methods of mathematical statistics and correlations and patterns of individual behavior in real life conditions in particular.

**Analysis of recent research and publications.** The analysis of the scientific fund proves that such scientists as N. Bunyak, V. Lefterov, S. Maksimenko, V. Plokikh, O. Sannikova, O. Skrypchenko, O. Stepanov, O. Tsilmak, V. Yamnytskyi and others devoted their research to the preparation of the future specialists for professional activities in various fields of psychology. Various directions of mathematization of humanitarian sciences and humanization of mathematics were studied by P. Gress, K. Kartashova, E. Shykin, etc. Such scientists as E. Chekotovsky, J. Glass, M. Hrabar, V. Klymachuk, V. Kovalchuk, K. Krasnyanska, E. Luzik, Yu. Peleh, N. Rosenberg, V. Rudenko, J. Stanley, M. Yevtukh, etc. devoted their studies to the peculiarities of the use of mathematical statistics means in humanitarian research. Despite the wide range of research on the given problem, the question of the significance of the course «Analysis and processing of the results of psychological research» in the professional training of the applicants of the second (Master’s) level of specialty 053 «Psychology» remains open.

**Highlighting of previously unresolved parts of the general problem.** The training of modern applicants of the second (Master’s) level of specialty 053 «Psychology» should create appropriate conditions for their professional development and correspond to the realities of today, the mathematization of humanities in particular. Despite the availability of scientific research on the mentioned problem, it is necessary to study theoretical foundations of the professional development of magistrates-psychologists in the conditions of mathematization of humanitarian sciences. Of particular importance becomes the question of significance, organization and vested interest in the course «Analysis and processing of the results of psychological research» by students of the second (Master's) level of the specialty 053 «Psychology» during their studies at the National University «Odesa Law Academy».

**The purpose of the article** is to determine the significance of the educational course «Analysis and processing of the results of psychological research» in the professional development in the conditions of mathematization of education, its organization and satisfaction with this process of magistrates-psychologists. To realize the goal, the following tasks were set: first, to determine the difficulties associated with studying of the given course; secondly, to find out the correlation between mathematical competence and the given course, as well as the degree of satisfaction with its study.

**Presenting main material.** The analysis of the scientific research practice in the field of humanitarian sciences proved that the issue of full and correct application of mathematical and statistical means of processing the results of measurements in the practice of humanitarian research, in particular those used in the process of completing Master’s and dissertation works, take on special significance.
Filling up the domestic scientific space with investigations in which the mathematization of the humanities is declared, made it possible to establish that it appears in such three forms, as: quantitative analysis and quantitative formulation of qualitatively established facts, generalizations and laws of specific sciences; construction of special mathematical models and creation of special sections of the field of mathematized science, mathematical and logical methods that can be used for constructing and analysis of specific scientific theories, in particular their language; significantly increases the scientific status of a specific science by transforming the essence of special scientific thinking on the base of understanding the internal logic of the development of mathematical thought (in the form of axiomatization, algorithmization, cybernetization, the use of modern information technologies, etc. in which the relationship between qualitative and quantitative methods is revealed), and not mechanical borrowing of the method and language of mathematics. In addition, the mathematization of humanities, as V. Pavlova rightly defines, reveals its essence as an objective process of penetrating into various fields of known mathematical methods and means, creation of completely new and flexible mathematical theories and methods adequate to new research subjects (for example, mathematical linguistics, mathematical psychology, mathematical pedagogy, mathematical sociology, mathematical theory of management, etc.). According to the scientist, it is connected with the highlighting of the qualitatively homogeneous in the studied subjects and processes, with the abstraction of the general in the different, and is based on the dialectical interrelation of mathematics and specific sciences according to the principle of qualitative-quantitative interrelations: the better is studied the qualitative peculiarities of the researched processes, the easier it is to know the quantitative relationships between them and, on the contrary, a deeper quantitative analysis contributes to a more complete knowledge of their qualitative specificity [4].

However, based on the abovementioned, we note that in order to solve the given issues, the training course «Analysis and processing of the results of psychological research» has been implemented into the professional training of the applicants of higher education in the specialty 053 «Psychology» for the second (Master’s) level of higher education. The study of this discipline provides the formation of professional competences in the second Master’s level applicants and is aimed at: assimilating the methods of analysis and processing of test results, surveys, questionnaires; determination of quantitative indicators of the results of psychological research of personality behavior; formation of general mathematical and socio-psychological culture of students; mastering the methods of expert assessment of qualitative indicators and characteristics of research subjects. The purpose of the specified training course is to reveal the possibilities of mathematical (in particular, statistical) methods of processing socio-psychological characteristics, as well as to establish correlations and patterns of individual’s behavior in real life conditions. The essence of the main tasks of the training course consists in the
development of skills: 1) to create a graphic representation of experimental data (histogram, polygon of frequencies, polygon of accumulated frequencies); 2) distinguish and use significance criteria for testing the research hypothesis (null hypothesis, alternative hypothesis); 3) analyze and understand the functions of the distribution of random variables (mathematical expectation, moments of higher orders, normal distribution, Student’s distribution, Fisher’s distribution, etc.).

The study of the specified course by the second (Master’s) level applicants provides the formation of such skills as: generalizing empirical data and formulating theoretical conclusions; present research results in written and oral forms in an accessible and reasoned manner, participate in professional discussions; carry out an analytical search for scientific information relevant to the formulated problem and evaluate it according to adequacy criteria[3].

Note that the problem of teaching mathematical methods in psychology was revealed in the research of such scientists as: D. Campbell, D. Martin, A. Nasledov, O. Sydorenko, and others. Thus, Yu. Vitomsky, during the study of the problems of mathematical competence of psychology students, comes to the following conclusions: normative statistics has long been relegated to the background, and the teacher’s task is to develop the ability to reflect the obtained results in abstract models on psychological reality (teaching the principles of probabilistic-statistical language construction); students believe that the use of only mathematical methods guarantees the reliability of research results; students make mistakes when using statistical criteria that require a low significance of differences between two independent samples and conclude that the samples are indeed similar based on this criterion[1].

Therefore, from the practical experience of teaching the specified course, it was established that the use of mathematical methods by future psychologists is associated with certain difficulties, since they primarily investigate the qualitative signs of events and phenomena. As a result, when processing and interpreting information, there is an urgent problem of aligning the purpose and content of the research tasks with the possibilities of the mathematical and statistical procedures used by them. On the other hand, the solution of the mentioned aspects is related to the level of formation of the mathematical competence of the second-level (Master’s) applicants.

The review of the scientific literature revealed that scientists interpret the essence of mathematical competence of various profiles specialists in different ways and define it as follows: the ability to see and apply mathematics in real life, understand the content and method of mathematical modeling, the ability to build a mathematical model, to investigate it using mathematical methods, to interpret the obtained results, to estimate the calculation error (M. Holovan, 2014); a component of functional competencies, asserting that the components of these competencies are «intellectual development, the ability to apply logic, mathematical knowledge and abilities, systemic thinking and the ability to solve complex logical and
mathematical tasks, spatial skills and modeling (M. Hubanova, 2009); an integral characteristic of a person, which is manifested in the availability of thorough knowledge of mathematics, the ability to apply the acquired knowledge in a new situation, the ability to achieve significant results in professional activity (N. Kazachok, 2010); integrative personal quality, based on a set of fundamental mathematical knowledge, practical abilities and skills, which indicate the student’s readiness and ability to perform mathematical activities (L. Kudryavtsev, 2008); the ability to see and apply mathematics in real life, to understand the content and method of mathematical modeling, the ability to build a mathematical model, in particular, a computer model, to investigate it with the methods of mathematics using modern ICT, to interpret the obtained results, to evaluate calculation errors (S. Rakov, 2005); a personal property characterized by a complex combination of mathematical literacy and personal experience of successful performing of mathematical activities, the ability to apply the acquired knowledge in the new situations, the orientation on self-development (S. Strilets, 2013); personal formation, which is characterized by the ability to apply the experience of mathematical activity in the process of solving educational and cognitive, practice-oriented professional tasks (N. Shustova, 2015) [2], [7].

Therefore, based on the purpose of the research and the analysis of the essence of the mentioned scientific phenomenon, we consider that mathematical competence of magistrates-psychologists is an integrative formation of the personality, which combines mathematical and general psychological knowledge, abilities, skills, personal qualities that determine the striving, readiness and ability to solve problems and tasks that arise in real life situations and require the use of mathematical methods, while realizing the importance of the subject and the result of professional activity.

In order to implement the second task of the outlined goal, a review of the effectiveness of the use of the specified educational course during the preparation of magistrates of psychology was carried out, within the scope of which a study was conducted (in the first semester of 2023-2024 educational year), in which we tried to find out: «Do the second (Master’s) level applicants in the specialty 053 «Psychology» need to study and use the methods of mathematical statistics both during their studies and in their professional activities?». For this purpose, a sample survey of respondents of the 1st year of the second (Master’s) level of the Faculty of Psychology, Political Science and Sociology of the National University «Odesa Law Academy» was carried out, 12 respondents (full-time) and 36 respondents (part-time) forms of education. The results of the survey by the forms of education were not the same. Chi-square was used for the effectiveness of implementing the research. The hypothesis of the study was the absence of distinctions between the two empirical distributions. For the reliability of the empirical Chi-square value [5], the following formula was used: 

$$\chi^2_{emp} = \frac{N \cdot [A \cdot D - B \cdot C - N/2]^2}{(A+B) \cdot (A+C) \cdot (C+D) \cdot (B+D)}$$

After
counting it was obtained $\chi^2_{emp} = 75.8$. Therefore, a positive attitude towards the use of mathematical statistics methods is statistically significant for the higher education applicants of both forms of education, regardless of their number.

Summarizing, we come to the conclusion that the usage of mathematical statistics methods provides the effectiveness in the training of magistrates-psychologists, affects the formation of their mathematical competence, arouses interest in acquiring new knowledge in the methodology of psychological research, positively affects the attitude to psychological problems in professional activity. On the other hand, the use of the educational course «Analysis and processing of the results of psychological research» during the magistrates-psychologists training is a prerequisite for the formation of their mathematical competence. We see the prospects for further research in the consideration of the structure of mathematical competence of magistrates-psychologists and the definition of pedagogical conditions affecting its formation.

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