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The importance of transversal skills in higher education curricula and in the labor market

Abstract. The main goal of the education system is to prepare specialists equipped with transversal skills. These skills have the potential to find optimal decisions for complex problems in the future, as well as one of the most pressing issues in society today. Transversal skills are the basis for the formation of digital and information literacy, critical thinking, leadership, communication, problem-solving and etc., as well as the knowledge that will help the future to discover the skills.

The purpose of the research presented in the article is to conduct an empirical study that will allow us to determine the transversal skills of future specialists.

At the theoretical level, the article provides an analysis of the concepts of «transversality» and «transversal skills».

An empirical part was carried out through the methodologies «XXI century digital skills instrument aimed at working professionals: Conceptual development and empirical validation» (Ester v.Laar, Alexander J., Jan M., Jos de Haan) and «Communicative and organizational abilities» (V.V. Sinyavsky, V.A. Fedoroshin) to diagnose transversal skills which were mentioned above. In order to define the level of critical thinking was used Starkey Lauren's test was in the adaptation of E.V. Lutsenko. As a result of the research, there were identified and differentiated the transversal skills of future teachers.

Keywords: transversality, transversal skills, XXI century skills, communication, digital skills, critical thinking.

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Introduction

The dynamic changes taking place in today's developing society such as the fourth industrial revolution, globalization, and digitization are the basis for the creation of a new system. Traditional professions are gradually decreasing, and professions that replace them are being transformed in a new way, or completely new types of professions are emerging.

In this regard, the purpose of the reforms carried out in the world and Kazakhstan education system is to train future specialists who acquired independent, i.e. transversal skills which means that they are educated, capable, competitive, responsible, communicative, media literate, creative; able to think critically, make the right decisions and choices, set goals and achieve them, care for national values by being spiritually strong, able to find solutions to unknown situations, and are in continuous development.

The main part

In accordance with the updated content of education, the training of competitive, transversally competent specialists who have mastered the skills of the 21st century is one of the main issues of the modern period. Future specialists need not only to be professionals in their field but also to be transversal persons who can keep up with the flow of information in the digital society, freely use digital and information technologies, and have accumulated many skills in the effective implementation of pedagogical activities.

It is obvious that the formation of the individual in the context of updated educational content in accordance with these requirements is in the hands of future teachers.

The European Commission's Cedefop glossary defines "skills" and "competencies" as skills are the ability to complete tasks and solve problems, and competence is the ability to apply and develop learning outcomes in a specific area (education, work, personal or professional) [1].

In the global educational space, "transversal competence", and "transversal skills" are one of the prerequisites. These skills are distinguished by the fact that they can adapt to any industry and meet all the requirements of the labor market. Therefore, we decided to focus first on the origin of the concept of "transversality".

Although the concepts of "transversal skills", and "transversal competence" are considered new concepts in the educational space, the evolutionary development of the concept of "transversality" dates back to the earliest times. This concept began to be used at the beginning of the 19th century in the natural sciences, in particular in the fields of mathematics and theoretical computer science. The concept of "transversal" as an adjective means a straight line entering a curved space in mathematics, "transversal" as a noun describing a straight line that describes the possibilities of intersecting space first in algebra, then in differential and geometric topology at the beginning of the 19th century [2,86-99].

Although the terminology and classification of transversal skills vary, the qualities expressed within the framework of the unified concept are primarily expressed in professional skills that increase the working capacity of an individual. In addition, it is considered a set of other special skills.

UNESCO has proposed the following components of transversal skills:

- Critical and innovative thinking
- Interpersonal communication skills
- Intrapersonal skills
- Global citizenship
- Media and information literacy

Others (including, for example, problem-solving, communication, teamwork, and leadership skills) [3].

The set of transversal skills may differ from one field of activity to another. For example, knowledge of a foreign language is a professional skill for a foreign language teacher, and digital literacy and negotiation skills are transversal skills for a teacher.

Transversal skills and competencies cover many types of professions and spheres. They are often referred to as main skills, basic skills, or soft skills, the basis of a person's individual development. Transversal skills and competencies are the basis for developing the "solid" skills and competencies needed to succeed in the labor market.

Sometimes, transversal skills are called soft skills, 21st-century skills, and global skills. These include critical thinking, leadership, the ability to use digital tools, problem-solving, and collaboration. They are "the basis for the personal development of the individual" and the basis for the application of any knowledge and skills [4].

In our view, transversal skills are skills that have the ability to move into another state while developing productively in a particular area. They are a set of skills necessary for individuals to work effectively not only in the workplace but also in everyday life.

In reviewing the literature, we have noticed that there is no generally accepted definition or interpretation of the concept of "transversal skills".

Table 1. Content analysis of the definition of “transversal skills”

Language and ICT skills developed before entering the labor market	Andreia Antunes Moura Maria do Rosário Campos Mira, Vânia Natércia Costa [5,41-47]
Transversal skills teach individuals to self-regulation, empathic tolerance, perseverance, adaptability to change, self-confidence and high expectations for their future. It also shows the relationship between the social and emotional development of individuals and their commitment to learning, academic and professional activities	Duckworth and Seligman [6,20]
A set of skills that students need to become a competent specialist and become a reliable and versatile professionals in the future. In addition, these skills coincide with the skills of the 21st century.	Angela Bailey, Nayibe Rosado, Lourdes Rey [7,87-108]
Versatile skills that are important and useful in any work environment.	Izzy Crawford [8,178-204]
Skills that are generally considered irrelevant to a particular task, subject, or field of study, however, have a wide	Monika Fischer, Tamás Halm, Tibor Koltay [9,99-120]

range of applications in a variety of contexts and settings.	
The student's ability to interpret information and process it using competencies acquired in other areas	Roberto Pierdicca, Emanuele Frontoni, Maria Paola Puggioni, Eva Savina Malinverni, Marina Paolanti [10,229-261]

Source: [11].

Based on the above comments, we propose the following characteristics of transversal competent specialists who possess transversal skills:

- Ability to take responsibility;
- Ability to communicate well with people;
- Ability to work in a team;
- Ability to organize time effectively;
- Ability to motivate for high-quality work;
- Fluency in digital technologies;
- Ability to analyze information;
- Ability to make effective decisions.

The analysis of the literature allowed us to distinguish the following three main groups of transversal skills of students:

- Cognitive skills
- Social skills;
- Emotional skills;

Research materials and methods

In the empirical study of the main groups of transversal skills of students, we used the following questionnaires (Table 3).

In the course of the identification of the most important skills of the 21st century, we used the test compiled by Ester van Laar, Alexander J.A.M. van Deursen, Jan A.G.M. van Dijk, and Jos de Haan which was developed as part of the project «21st Century digital skills instrument aimed at working professionals: Conceptual development and empirical validation» and adapted the questionnaire based on the project «ERI-Net Asia-Pacific Regional Policy Series Preparing and Supporting Teachers in the Asia-Pacific to Meet the Challenges of Twenty-first Century Learning Regional Synthesis Report, 2015 ERI-Net Regional Study on Transversal Competencies in Education Policy and Practice (Phase III)».

In order to determine the organizational and communicative skills "Communicative and organizational inclinations" (VV Sinyavsky, VA Fedoroshin), as well as to analyze the skills of effective thinking the adaptation version of Starkey Lauren's test "Critical Thinking" by

E.V. Lutsenko and Kirton's "Innovative Thinking" tests were conducted.

Table 2. Criteria and means for diagnostics of indicators of students' transversal skills

Measurement	Surveys	Indicators
Learning- Innovation and Information literacy skills	<ul style="list-style-type: none"> ▪ «21st Century digital skills instrument aimed at working professionals: Conceptual development and empirical validation» (Ester van Laar , Alexander J.A.M. van Deursen, Jan A.G.M. van Dijk , and Jos de Haan) . ▪ «Critical thinking skills» (Starkey Lauren, in the adaptation of E.V.Lutsenko). Kirton's test «Types of innovative thinking»; ▪ «Communicative and organizational abilities» (V.V.Sinyavsky, V.A. Fedoroshin); ▪ ERI-Net Asia-Pacific Regional Policy Series Preparing and Supporting Teachers in the Asia-Pacific to Meet the Challenges of Twenty-first Century Learning Regional Synthesis Report, 2015 ERI-Net Regional Study on Transversal Competencies in Education Policy and Practice (Phase III)». 	<ul style="list-style-type: none"> ▪ Communicative skills; ▪ Team work; ▪ Organizational skills; ▪ Problem solving; ▪ Collaboration; ▪ Innovative thinking; ▪ Critical thinking; ▪ Information literacy; ▪ Creativity

Source: "Compiled by the authors."

Our study was conducted in October and November 2022 at Taraz regional university named after M.Kh. Dulaty 22 students in the 2nd year of the faculty of psychology aged between 18-20 took part in the questionnaires.

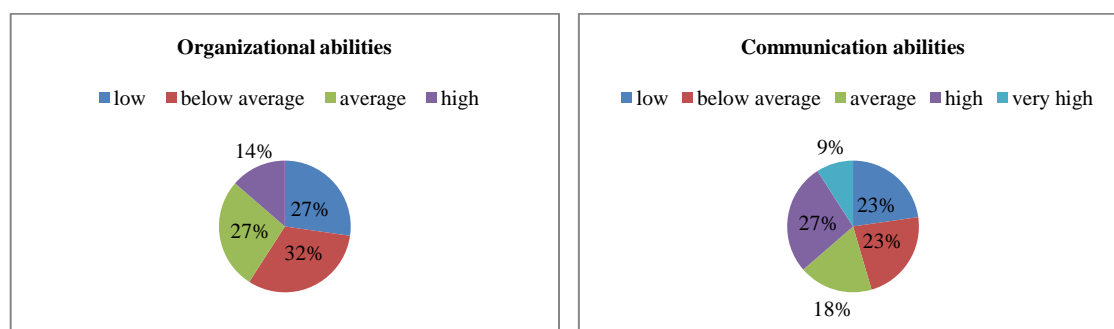
Research results

The analysis of the first empirical data made it possible to identify and demonstrate the transversal skills of future teacher-psychologists.

Figure 1 shows the results of the level of development of basic communication and organizational skills determined by the COI method. Some of the students who showed low performance during the interviews showed low levels of communication and organizational skills.

It is noted that groups of students who score below the average level (2 points) have a low level of communication and organizational tendencies, that is, they do not seek communication, they feel limited in a new company, team; they prefer to spend time alone with themselves, restrict their acquaintances; it is difficult to communicate with people and speak in front of an audience; they are poorly oriented in unfamiliar situations; they are unable to defend their opinion, they grieve and avoid independent decision-making on their own.

The average level of communication and organizational inclination includes respondents who scored 3 points. They strive to communicate with people, do not limit themselves to finding acquaintances, defend their opinions, do their work with a plan, but they are not stable. We found out that there are also students who showed a high level of these skills. They do not get confused in a new environment, quickly make friends, constantly strive to expand the circle of acquaintances, engage in social activities, help their loved ones, gladly participate in the organization of public events and they are able to make decisions independently in difficult situations. It should be noted that all these things are done not by force, but by internal desire.

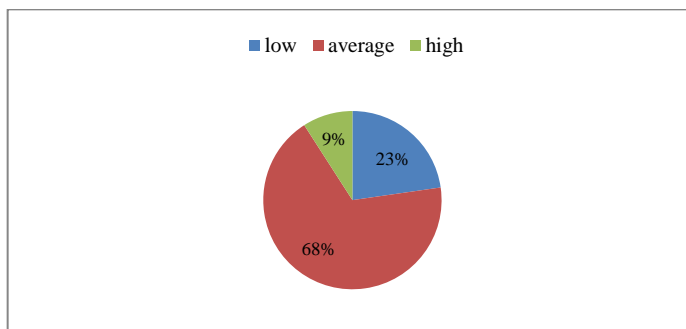


Picture 1-2. Results of Organizational and communication skills

Moreover, one of the skills that a transversal person should have is critical thinking.

Selective aspects of the formation of critical thinking are considered in the works of M.I. Karagozina. Her scientific work is based on the second module of the program of advanced training courses for teachers of the Republic of Kazakhstan which is training critical thinking. In his research, M.I. Karagozina adheres to the following definition: "Critical thinking is a disciplinary approach aimed at understanding, evaluating, analyzing and synthesizing information obtained as a result of observation, experience, reflection or reasoning, which can later become the basis for action"[12, P. 68-76].

Let's pay attention to the level of critical thinking of the respondents on the diagnostic data obtained in our study.

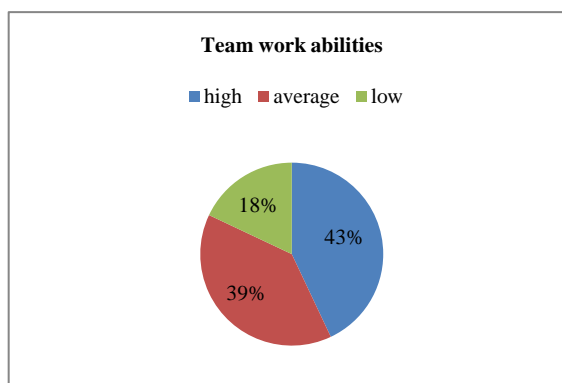


Picture 3. Critical thinking measures

Very high results indicate that a person has developed almost all critical thinking operations, i.e. logic, induction, deduction, effective decision-making, verification of information for reliability, distinguishing estimates and assumptions from facts, recognizing the limitations of their own thinking processes, developing the most optimal solutions in conditions of uncertainty and risk, setting goals and finding effective ways to achieve them. It shows the development of this type of thinking [13, P. 65-70]. A person with such skills is a specialist in demand in the labor market, that is, a specialist in the field of activity that requires responsible solutions.

However, respondents with low results indicate that only 10-20% of the proposed tasks were performed correctly, in other words, their logic, induction, and deduction processes are not well developed, information is not analyzed correctly, and so on.

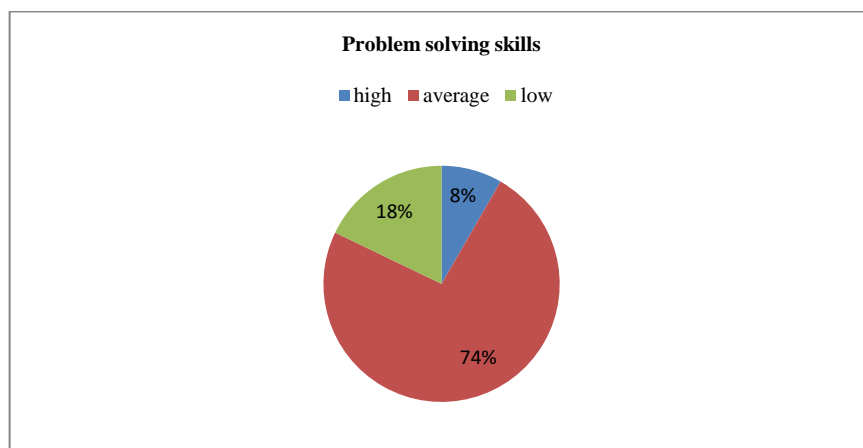
A team is a group of people who work together to achieve a goal. However, the group does not just appear, they need to be created. For teachers, teamwork also has a special place. When diagnosing "teamwork" skills, we found that the vast majority of students tend to work in a group. Detailed information is shown in the table below. Summing up the response of the majority of respondents, we came to the following conclusion: there may not be an "I" in the group, but being part of the group and sharing different information and opinions will help them grow and achieve success.



Picture 4. Team work abilities results

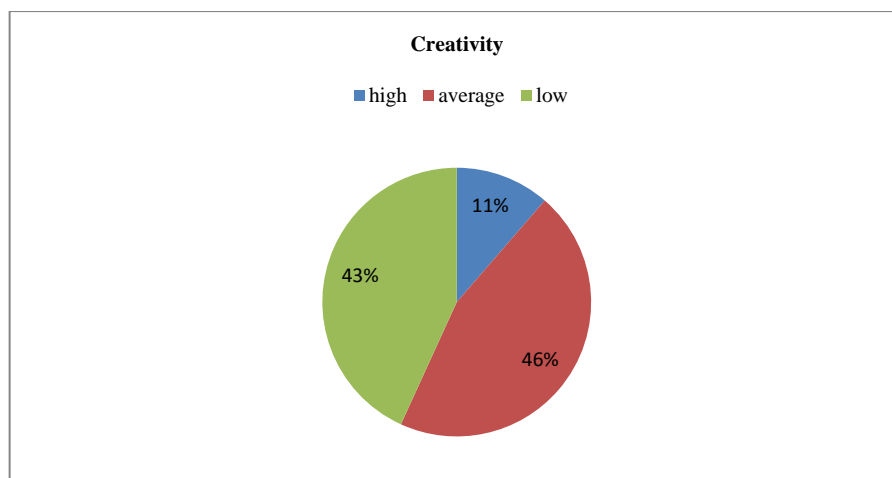
According to Ormond [14, P. 101], problem-solving is the use of existing knowledge and skills to solve an unanswered question or difficult situation. All professions, especially teachers, have the need to make many decisions in the learning process. According to Berliner, and Burke [14, P.101], teachers seem to make about thirty decisions about 25-40 students every hour.

As can be seen from the results of our survey, we are confident that future teachers-psychologists will be able to make optimal decisions in the course of their work without any problems, as we believe that they will be able to solve problems effectively (8% high - 74% average). However, some of the students (18%) have not yet fully entered the profession or due to behavioral characteristics give the following result.



Picture 5. The results of problem-solving skills of future pedagogues-psychologists'

In the psychological and pedagogical literature, the creativity of teachers is often characterized by the ability to accumulate efforts, courage, freedom of thought, a tendency to take risks with results, optimism, and a high level of self-esteem. These factors, according to scientists, do not directly determine the specifics of creativity, but, nevertheless, have a significant impact on the practical nature of creativity [15, P.70-72].

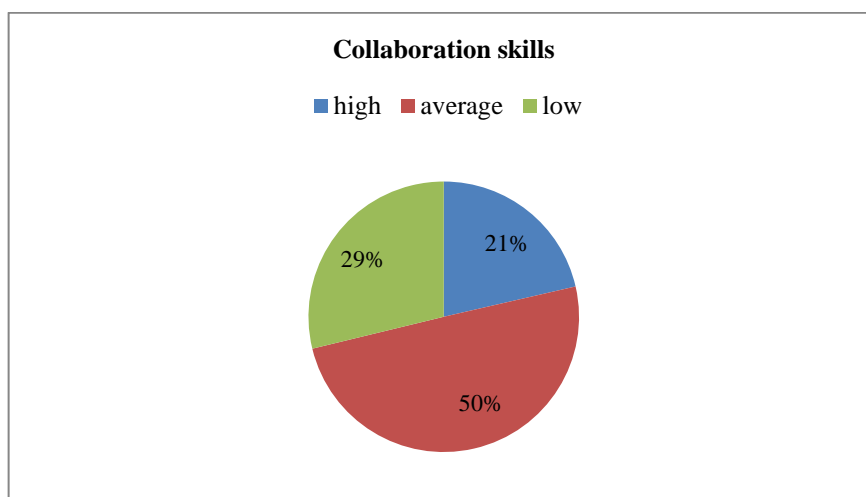


Picture 6. Creativity and its results

The low level of "creativity" in 43% of students indicates the inability of most of them to be creative, generate ideas, and achieve success. At the same time, the vast majority of respondents showed average and high values of the development of creative abilities.

Student collaboration is an important "transversal skill" in the learning process. Along with teachers, students are also active participants in this process.

Collaboration skills are transversal skills that students need to work together to solve a problem, complete a task, or create a task.



Picture 7. Collaboration skills and results

In the vast majority of students, the indicators of "cooperation skills" are satisfactory, that is, they are ready to work together and lend a helping hand. Less than half of the respondents, that is 29%, have a low level of development of these skills.

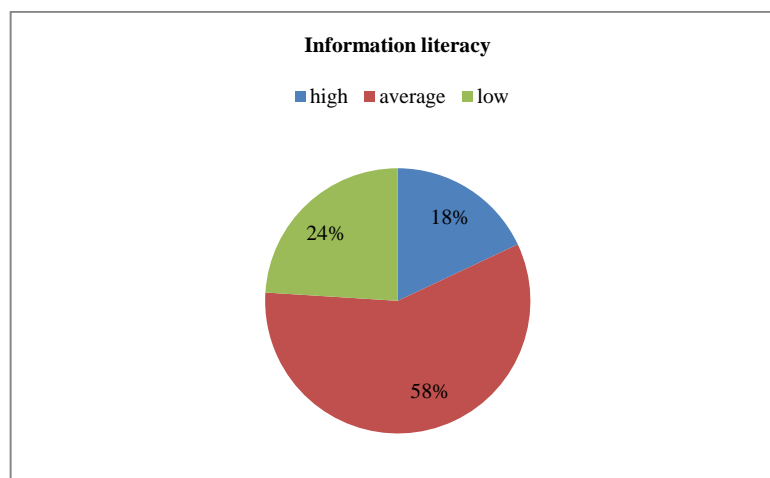
Employers pay special attention to candidates in the field of information technology, who perform high-quality, competent, and effective work.

Information literacy is one of the transversal skills required to find, search, analyze, and use information. The 21st century is called the information age due to the proliferation of sources of information. For this reason, information literacy skills help people become independent throughout their lives.

Below we present the results of a survey of future teachers-psychologists on the skills of "information literacy".

On average, more than half of the respondents have an average level of information literacy, and 18% have a very high level, that is, they are able to process and analyze information, use the information they need professionally and effectively, and pay attention to checking the reliability of the information. We also found that they pay special attention to the storage of information.

At the same time, we found that 24% of respondents made mistakes, such as failure to check the reliability and quality of information sources, and inability to use them effectively.



Picture 8. Information literacy skills of students

Conclusion

The 4C model in education encourages the development of creativity, critical thinking, communication skills, and the ability to work in a team [16]. This model consists of basic transversal skills. Consequently, there is a need to develop these skills in educational programs. In this regard, it is obvious that the main goal of the universities in Kazakhstan is to train graduates not only with certain professional qualifications but also with the skills of further self-improvement, which will allow future teachers - psychologists to remain constantly competitive in the labor market and work actively in their chosen professional field.

In this regard, we conducted a survey on the above-mentioned skills and tried to identify the skills that students have.

We have come to the conclusion that the transversal skills that we have tried to identify in the course of our research can make future teachers-psychologists competitive and able to guide future generations. Communicative, organizational skills (realization of communicative and personal potential), teamwork, problem-solving, cooperation, creativity (motivation, knowledge acquisition, reflection) and critical and innovative thinking, information literacy (diagnosing, innovation, flexibility), which are important for teachers-psychologists, help to improve the psychological stability of specialists, their readiness to withstand difficult situations and maintain stability.

At the same time, a significant part of the researchers found a lack of some transversal skills: critical thinking skills, and creative skills, as well as low and medium levels of information literacy, communication, and organizational skills, which were found from the responses such as self-doubt, inability to express themselves, lack of behavior and motivation. These characteristics can cause significant difficulties in the work of future

teachers-psychologists.

Analyzing the work of respondents, it was identified the need for psychological and pedagogical support for students as future professionals to develop the above-mentioned transversal skills, in particular, creative skills and problem-solving, and communication skills.

In order to be in demand in the labor market in today's world, build a career quickly, and achieve personal success, a professional in any field of work must have transversal skills: communication skills, creative thinking, teamwork, and taking responsibility, effective time management and quick adaptation to situations, ability to solve problems, etc. - that is, the future specialist must master the transversal competencies. Of course, transversal skills are difficult to quantify, and yet they are skills that provide high performance and productivity in any field.

Currently, the formation of transversal skills is being studied in many countries. Recently, Kazakhstan scientists have been paying attention to this issue.

The importance of transversal skills is reflected in the changes in the education system, changes in educational guidelines, and the requirements for professionals, which were discussed in the previous section.

In conclusion, the development of transversal skills depends on the individual motive of each person and the extent to which his personal qualities help him to build a successful career, to determine his productivity in a professional competitive environment.

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Жоғары оқу орындарының оқу бағдарламаларындағы және еңбек нарығындағы трансверсалды дағдылардың маңыздылығы

Аңдатпа. Трансверсалды дағдылармен қаруланған мамандарды дайындау қазіргі білім беру жүйесінің басты міндеті. Аталмыш дағдылар болашақта күрделі мәселелердің оңтайлы шешімін табуға мүмкіндігі зор сондай-ақ, қазіргі таңда қоғамның сұранысын туғызып отырған мәселелердің бірі. Трансверсалды дағдыларға – болашақ педагог-психологтердің жеке даму әлеуетін ашуға көмектесетін біліммен қатар цифрлық және ақпараттық сауаттылық, сын тұрғысынан ойлау, көшбасшылық, коммуникативтілік, қиындықты шеше білу және басқа да дағдыларды қалыптастыруға негіз болады. Трансверсалды дағдылар педагогтердің, жұмыс берушілердің және ғалымдардың пайымдауынша, өркендеуші қоғамда табысқа жетуге бағыттайтын аса маңызды білім мен дағдылардан құралған.

Мақалада ұсынылған зерттеудің мақсаты трансверсалды дағдылардың болашақ педагог-психолог мамандардың өзін-өзі дамыту параметрлері негізінде олардың табысқа жету дәрежесін анықтауға мүмкіндік беретін эмпирикалық зерттеу жүргізу.

Теориялық деңгейде мақалада «трансверсалдылық» және «трансверсалды дағдылар» ұғымдары талданған.

Эмпирикалық бөлім *methodologies «XXI century digital skills instrument aimed at working professionals: Conceptual development and empirical validation»* (Ester v.Laar, Alexander J., Jan M., Jos de Naan) және «Коммуникативтік және ұйымдастырушылық қабілеттер» әдістемелері арқылы жүзеге асырылды (В.В. Синявский, В.А. Федорошин) жоғарыда аталған трансверсалды дағдылар қарастырылды. Сыни тұрғыдан ойлау деңгейін анықтау үшін Е.В. Луценконың бейімделуінде Старки Лорен тесті қолданылды. Зерттеу нәтижесінде болашақ мұғалімдердің трансверсалды дағдылары анықталып, сараланды.

Түйін сөздер: трансверсалдылық, трансверсалды дағды, ХХІ ғасыр дағдылары, коммуникативтілік, цифрлы дағдылар, сын тұрғысынан ойлау.

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Важность трансверсальных навыков в учебных программах высшего образования и на рынке труда

Аннотация. Подготовка специалистов, обладающих трансверсальными навыками, является главной задачей современной системы образования. Эти навыки имеют прекрасную возможность найти оптимальное решение сложных проблем в будущем и являются одной из проблем, востребованных в настоящее время в обществе. Трансверсальные навыки являются основой формирования цифровой и информационной грамотностей, критического мышления, лидерских, коммуникативных и других навыков, а также знаний, помогающих раскрыть потенциал личностного развития будущих педагогов-психологов. Трансверсальные навыки – это самые важные знания и навыки, которые, по мнению педагогов, работодателей и ученых, ведут к успеху в процветающем обществе.

Целью исследования, представленного в статье, является проведение эмпирического исследования, позволяющего определить степень успешности трансверсальных умений будущих педагогов-психологов на основе параметров их саморазвития.

На теоретическом уровне в статье анализируются понятия «трансверсальность» и «трансверсальность навыков».

Эмпирическая часть была реализована с использованием методологий «XXI century digital skills instrument aimed at working professionals: Conceptual development and empirical validation» (Ester v.Laar, Alexander J., Jan M., Jos de Haan) и «Коммуникативные и организаторские способности» (В.В. Синявский, В.А. Федорошин) учитывались упомянутые выше трансверсальные навыки. Для определения уровня критического мышления использовался тест Старки-Лорена, адаптированный Е.В. Луценко. В результате исследования были выявлены и дифференцированы трансверсальные умения будущих учителей.

Ключевые слова: трансверсальность, трансверсальный навык, навыки XXI века, коммуникативность, цифровые навыки, критическое мышление.

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