

CONVERGENCE AS METHODOLOGICAL BASIS FOR DEVELOPMENT OF TRANS-PROFESSIONALISM OF ACTIVITY SUBJECTS

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Abstract

Purpose of the study: The need for knowledge, skills, expanding the established functionality of a professional is increasing more and more. That is why young professionals-trans-professionals, who are able to realize themselves not only in one sphere but who are ready to delve into problems of other, absolutely "foreign" for the scientific and technical fields and cooperate effectively with specialists of these areas in one team, will be responsible for creation of new technologies determining the wellness of our country. The article is aimed at the analysis and generalization of foundations of the convergence and identifying its sense-creating content in the development of trans-professionalism as an integral characteristic of the activity subject in a rapidly changing social-professional environment.

Methodology: The leading methods in the study of this problem are the theoretical and methodological analysis of the subject and the problem of the research based on the study and logical generalization of scientific literature. Description of the phenomenon of convergence and trans-professionalism was carried out based on multidimensional, transdisciplinary, project and process approaches.

Results: The results of the study are content components of trans-professionalism of the activity subject, justification of the convergence theory as a fundamental basis of integration of educational content and new technologies as well as technology foresight of the formation of trans-professionalism of subjects on the basis of convergence.

Applications of this study: Materials of the article may be interesting for methodologists, Methodists, and teachers of the continuous professional education system.

Novelty/Originality of this study: The components that allow combining the different parameters of the activity subject, showing its qualitative change in the problem field of trans-professionalism, are stated to be the content components of trans-professionalism for activity subjects. The methodology of convergence provides a synergistic effect of the interaction of social-humanitarian and natural sciences. Improving the process of development of trans-professional competencies of activity subjects is associated with the development of new technologies - tools and methods.

Keywords: *convergence, trans-professionalism, subject of activity, foresight technology.*

INTRODUCTION

Today, changes in the world occur much faster than we can imagine, and the questions of how our world will change by 2030, what the world will require for the competencies and qualifications of future professionals the day after tomorrow, are far from idle. The main contradiction lies in the fact that objectively new scientific results will be obtained in narrow areas of science and technology, but the rapid realization of their potential is possible only in the case of close and effective interaction of specialists who can understand the problems of other scientific and technical fields and are ready for effective interaction with professionals of these branches in one team. Employees with qualitatively new qualification characteristics focused on the development of supra-professional (universal) competencies, who are able to build their professional activities in accordance with the challenges of social and professional innovations not only of today but also of tomorrow, became demanded and successful. In this connection, in recent years, new terms which coexist along with the notions "profession" and "specialty" established in this field have appeared in the world of professions ([Kislov, 2018](#)).

These are the concepts of *transfusion, transfessionalism, trans-professionalism and trans-professional*. The transfusion is a type of labor activity realized on the basis of the synthesis and convergence of professional competencies belonging to different specialized areas, respectively, transfessionalism means the ability and willingness of a subject to master and perform specialized activities in functionally close professions with common objects of labor. The other notion - *trans-professionalism*, the integral quality of a specialist, which characterizes the ability to master and perform wide-ranging actions of specialized activities from various types and groups of professions ([Zeer & Krezhevskikh, 2018](#); [Lebedeva et al., 2018](#); [Mukhametzyanova et al., 2018](#); [Dorozhkin et al., 2018](#); [Omarova et al., 2018](#); [Barinova et al., 2018](#); [Tastan et al., 2018](#); [Wang et al., 2018](#)) has a higher degree of convergence

Transprofessionalism is a challenge to the traditional understanding of competence and qualifications. It manifests itself, above all, in the application of convergent technologies - the mastering and realizing not only closely related professions but also those far away from each other, readiness to go beyond the formed experience. A future engineer, doctor, teacher,

lawyer, manager, and representatives of other professions should be researchers and practitioners, organizers and performers, managers and analysts, programmers and psychologists at the same time.

The idea of convergence of methods and technologies in modern science attracts researchers from various scientific fields. The term convergence (from the Latin *Convergo* - "bring together", "become similar"), used in modern studies of various natural and human sciences, means the process of convergence, synergistic interaction of different signs of humanitarian and natural science knowledge, convergence of different areas of activity and technologies connected with them. There is a need for the convergence of theories and practices in the psychological and pedagogical sciences. Accessibility of the informational environment allows using the experience of different systems of activity, different areas of human knowledge, as well as the experience of different countries. Convergence in the field of education initiates the development of flexible means of adaptation to changes in socio-humanitarian, natural science, and technomic technologies. Determining interdisciplinary and supra-professional interrelations, convergence is a factor of design and approval of a fundamentally new phenomenon in professional - trans-professionalism, whose predictor is the convergence of the most breakthrough technologies: nanotechnology, biotechnology, informational and cognitive technologies.

For the first time, an interesting and significant interaction of technologies was noticed by researchers at the beginning of the 21st century, M.C. Rocco and W.S. Bainbridge in the book "Converging Technologies for Improving Human Nature". Speaking about the convergence of sciences, interaction of technologies and their mutual reinforcement, they introduced the term "NBIC convergence", which implies the convergence of nanotechnologies, biotechnologies, informational and cognitive technologies. Subsequently, many scientists concluded that the four basic technologies cannot be considered in isolation from the block of socio-humanitarian disciplines, as a result the new term NBICS-convergence (in the first letters of the areas of knowledge: N - nano; B - bio; I - info; C - cogno; S - socio) has been applied. This type of convergence of scientific knowledge is regarded as a radically new stage of scientific and technological progress, as the most important evolutionary factor. In general, the relationship between these areas of science and technology is fundamental. According to scientists, in its possible consequences, NBIC convergence is the most important evolutionary determining factor and marks the beginning of transhumanistic transformations. The development of NBIC technologies greatly changes our understanding of the world, including the nature of basic concepts, such as life, human, mind, nature. The latest nanotechnological revolution gives new features to the science and 21st-century technology, returns humans to perception of the world as a whole, and gives the subject the opportunity to act objectively in nature using the same "technological methods" that nature uses ([Zhgenti et al., 2018](#)).

It is difficult to describe the result of such transformations where all aspects of human life are subject to change. But the changes are expected to become more and more rapid.

METHODOLOGICAL FRAMEWORK

Research Methods

In the scientific substantiation of the project of the development of trans-professionalism and the technologies for its implementation, we relied on the concept of personal professional development, as well as on multi-dimensional, transdisciplinary, project and process approaches. *Multi-dimensional and transdisciplinary* approaches allow uniting different parameters of the subject and types of activity, characteristics and conditions of activity, describing the conceptual and problem field of the convergence theory and revealing its content and role in the development of trans-professionalism as an integral characteristic of the subject of activity; understanding the qualitative change of the subject of activity in a dynamically changing socio-professional environment. The project approach in education is based on the use of projecting of the content of training and educational and professional activity of students in the framework of modern interactive educational technologies and in accordance with the requirements of professional and educational standards. It is focused on changing, transforming, modernizing existing, traditionally established education through convergent innovations. The semantic factor of the project approach is the design of educational practices, including the development and implementation of foresight projects of the development of the educational environment. *The process approach* is focused on providing the effectiveness of educational organization work, at the input of which there are requirements for applicants' preparedness, and at the output there is the quality of graduate training. An educational organization with resources converts input requirements for students into the final product in accordance with the requirements of professional and educational standards. The main target orientation of the process approach is to improve the quality of specialist training, while the objects of internal and external monitoring are educational processes. Exactly this methodology can become the basis for the study of the development of trans-professionalism based on the convergence of innovative technologies.

The theoretical basis of the research was the convergence methodology explicated in the papers of S. [Wang et al. \(2018\)](#) and others. Convergence in education initiates the development of flexible tools of adaptation to changes in socio-humanitarian, natural science, and technomic technologies.

The Research Experimental Base

Russian State Vocational Pedagogical University (Yekaterinburg) became the experimental base of the research.

Stages of the Research

The study was conducted sequentially in three stages. In the first stage, the research problem was determined, the scientific information on the research problem was collected, analyzed and systematized, the goal was formulated, the research methods were determined and substantiated, its plan was worked out. On the second stage, the content of the basic concepts was determined: convergence, trans-professionalism, foresight project, initial installations to their understanding were defined, a foresight project for magistracy was designed and implemented. The third stage included generalization and systematization of the study results.

RESULTS AND DISCUSSIONS

The content components of trans-professionalism for activity subjects are the components that allow uniting the heterogeneous parameters of the subjects of the activity, showing its qualitative change in the problem field of trans-professionalism: trans-professional orientation; regulatory component; vocational educational component; informational and communicative component; humanitarian and technological component.

Transfession is focused on a semantic factor that determines the multidimensionality of the activity subject: an orientation towards the implementation of a wide range of activities, readiness to master diverse professional functions, the ability to master several types of informational and communicative technologies at the same time. The theoretical analysis of the activity's multidimensionality of specialists allowed us to single out the following component constructs: Self-concept, social and professional adaptability, multidimensional identity, transfessional value orientations, a motivation of activity. The regulatory component is created to activate the psychological resource of the activity subject which is characterized by the level of formed skills in planning, projecting, forecasting and evaluating the results of the activity. Essentially, regulation is a mechanism of mobilizing social and psychological reserve capabilities of the activity subject. Conscious self-regulation of the arbitrary activity of a specialist is important in the realization of this component. The regulatory predictors of arbitrary activity include self-organization, self-actualization, self-effectiveness, autonomy and the regulation of psychical states. The vocational and educational component provides the formation of a multidimensional specialist. Its content basis is the competence approach; the result is interdisciplinary competence, meta-subject (hard-, soft-, digital skills) competencies and meta-professional characteristics of the subject. The informational and communicative component reflects the subject's ability of navigation in the informational environment, including virtual reality. Socio-communicative mobility, professional mobility, tolerance for uncertainty, reflexivity, perceptual adequacy (auto-competence) act as constructs of this component. The humanitarian and technological component integrates social and humanitarian technologies, presents the convergence of knowledge and technologies from many areas of activity, including professional ones. The variability of these technologies allows projecting individual trajectories of the trans-professional development of activity subjects. The constructs of this component include transdisciplinary knowledge, sociocultural competence, social intelligence, cognitive abilities, and reflex-estimating activity.

The term convergence (from the Latin *Convergo* - "bring together", "become similar") used in modern studies of various natural and human sciences means the process of approximation, the synergistic interaction of heterogeneous signs of humanitarian and natural science knowledge, rapprochement of different areas of activity and technologies related to them. The latest nanotechnological revolution gives new features to the science and technology of the 21st century, returns a human to the perception of the world as a whole, gives a subject the opportunity to act objectively in nature using the same "technological methods" that nature uses.

The study of the convergence methodology as the basis for the development of trans-professionalism of an activity subject is based on the person's professional development project, which is based on such particular principles as:

- Integration - uniting interprofessional and transdisciplinary components of social and professional activity;
- The selectivity of different professions interaction, generating new professional effects;
- Variability of the content of vocational education, defining individual educational paths;
- Coupling professional and educational standards with the transdisciplinary functions of education;
- The convergence of educational content and high educational technologies, ensuring trans-professionalism development of subjects of educational activity.

In the field of education, the theory of convergence is associated with overcoming the disciplinary boundaries formed traditionally in pedagogical thinking and scientific culture, disciplining disunity and looking for new concepts and pedagogical practice-oriented to integrative and interdisciplinary tendencies.

Qualificative requirements for professionals who are able to solve study, productive and organizational and managerial tasks in conditions of dynamic technological changes of content and structure of professional types of labor were identified basing on the analysis of Federal state educational standards, professional standards, definition of key psychological and pedagogical peculiarities of students in various specialties, determination of the didactic features of the formation of professional competencies, expert interviews results. In this connection, the problem of studying and forming trans-

professional competencies related to specialists in different professions is an important task of education. Scientists name these competencies in different ways: “over-subject”, “key”, “cross-cutting”, “universal”, “meta-subject”, “multidimensional”, “supra-professional” competencies which are called cross-cultural in educational standards. Cross-cultural competencies are non-specialized trans-professional competencies, the mastery of which allows the subject to increase the efficiency of professional activity in his industry and also makes it possible to move between sectors while maintaining his relevance. For all the importance and relevance of these competencies, the structure of competencies in the FSES HE is such that these competencies take too little, as can be said, an insignificant place. So, in the Federal State Educational Standards of Higher Education in the direction of training 44.04.02 Psychological and pedagogical education (qualification (degree) “master”) of 72 competencies that a graduate who has mastered the magistracy program should possess, only 3 are general cultural competencies, i.e. more than 20 times less than professional competencies. The pyramid of competencies existing today must be reversed: general cultural / trans-professional competences should prevail over professional and subject-specialized ones. And these competencies should be system thinking, inter-sectoral communication, work in conditions of uncertainty, ability to teamwork, developed organizational skills, ability to cooperative activities with representatives of other professions. The development of these competencies requires a new training system, and the convergence theory is one of the most balanced and integrated from the point of preparing a modern specialist for integrated innovative professional activity.

Improving the process of formation/development of trans-professional competencies of activity subject is associated with working out new technologies - tools and methods. A subject who has mastered complex technologies is able not only to use them but to improve them, to create a new necessity, idea or a material product. One of the effective technology, in our opinion, is the Foresight system. Scientists call this technology “foresight technology” because it allows mapping out the expected changes in the future. The term itself speaks of this: foresight - English "a look into the future". As V.A. Kozlov and V.P. Tretyak noted, the foresight is a new technology that allows you to map out the expected changes in the future. However, the essence of foresight is not only predicting and forecasting the future but also coordinated development of decisions about the future in the field chosen for the foresight, and it is realized in an active form. That is why it becomes not only a forecast but socio-humanitarian technology.

The cornerstone of Foresight is the recognition of the uncertainty and multi-variability of the vision of activity products. At the same time, the efforts of all participants in the process of anticipating changes in the selected segment are consolidated, and phenomena and processes that in the future become dominant are emphasized. The most important result of this technology is provision of the integration of science and technologies and, on its basis, the formation of priority trans-professional competencies.

Leadership constitutes technological, economic and social areas in the development of foresight. At the same time, other thematic foresight takes into account the nature of changes in social relations, culture, and education require attention. Thus, scientists draw insufficient attention to the foresight in the field of scientific research of the educational environment, in particular, the university environment, which contribute to the identification of new directions of development of the subjective areas of science and can have a serious impact on specific scientific developments of the university in the future.

Foresight projects can be thematically different: the use of innovations in education, continuity between levels of education, the use of informational and communicative technologies, the impact of digital educational space on professional development, respect for citizens' rights, the wide appliance of innovations and the preservation of traditions, culture of various nations and ethnic nationalities, Childhood-2030 and others. The basis of topics, that are promising and relevant for the direction of study and ensure the formation of competencies demanded in future professional activity, is important to be determined ([Murzinova et al, 2018](#)).

The result of a Foresight project is a Foresight product, which can be: a forecast, a scenario, a project, a theory, priorities, a model, integrated plans, programs, road maps, etc. This result is provided by a methodological toolkit, which includes a variety of methods existing in different sciences. The selection of methods should be adequate to the problem and the subject of the study - this determines the quality of the Foresight and its product. Among the most popular methods, the following can be determined: literature review, situation analysis, SWOT-analysis, discussion, brainstorming, group discussion, critical technology method, modeling, expert interview, focus groups, Delphi method, etc. The whole set of methods can be divided into 4 groups: expertise/forecasting, analysis, interaction and creative methods. The choice of methods for a particular foresight is individual and is determined to depend on the goals, the desired result, the time of the foresight implementation, experience and methodological competence of the circle of foresight perpetrator.

As this or that competence is not formed as a result of studying only one discipline, but, as a rule, it is formed during the mastering of three or four disciplines, the use of such complex technology as foresight is possible with the integration of several disciplines. So, let consider the thematic foresight project: “Developing Solutions for Organizing the Functioning and Development of an Educational Organization” (master's program “Management of Educational Organization” areas of training 44.04.02 Psychological and pedagogical education (qualification (degree) “master”). It involves the integration of such disciplines as “Management Analysis and Decision Making”, “Psychology of Educational Organizations Management”, “Management of Educational Systems”. Students choose their own research methods in their work independently; they are: SWOT analysis (analysis of the organization's external and internal environment, diagnosis of

organization's problems and risks), focus group (obtaining an idea of the image and perception of the organization by external/third-party groups of people and institutions) group discussion (general decision making). The foresight product was the formation of a roadmap for each of the key direction of the organization's development: a circle of participants, involved resources, the involvement of organizational units and other institutions in the implementation of the roadmap, the coordination of the participants' efforts, etc. The implementation of this thematic foresight project occurred in the form of joint practical activity, as a result, students participating in the process of predicting/forecasting the future - trans-professional competencies acquired: system thinking, inter-sectoral communication, work in conditions of uncertainty, ability to work in a team, ability to work with people, developed organizational skills, etc.

Thus, we see enormous opportunities in the implementation of foresight technology, thanks to its following innovative characteristics:

- Foresight technology is implemented on an interdisciplinary basis as an adequate integrative basis of convergent technologies;
- Foresight technology is implemented in a vigorous activity form, a form of joint practical activity, involvement in educational relations as an adequate integrative basis of convergent technologies;
- Foresight technology forms the trans-professional competencies that are necessary for forward-looking types of professional activity;
- Foresight technology provides co-development of the personality, education and professional activity of students;
- Foresight technology is based on the convergence of educational content and new educational technologies, thereby ensuring the development of trans-professionalism of subjects of educational activity.

CONCLUSION

The process of transdisciplinary measurements, the emergence of convergent technologies that began in the late 20th century requires specialists of a fundamentally new class who work on an interdisciplinary basis and are capable and ready to work in a new technological environment. Orientation to the development of basic meta-competencies allows finding complex and unique solutions based on transdisciplinary knowledge synthesis and inter-professional communication. Specialists focused on the development of basic meta-competencies create while a small formation of "trans-professionals". A unique basis for the formation/development of trans-professional competencies of activity subjects is convergence - an interdisciplinary symbiosis of scientific knowledge and new technologies. It seems relevant and appropriate to use Foresight projects as an integrated tool for managing the formation/development of trans-professional competencies of activity subjects.

The authors see the applied focus of the research in the following:

- In promoting the development of trans-professionalism of the subject of activity;
- In creating an interdisciplinary integrated environment to solve the global challenges of modern society;
- In the formation of trans-professional competencies and meta-professional characteristics;
- In the scientific and methodological support of education and trans-professional development of the subject.

RECOMMENDATIONS

The results presented in the work can be useful to work out educational strategies and practices in the education system, projecting different educational programs for various professionally-oriented groups of students, building teaching materials, new educational disciplines and courses that demand fundamentally new approaches that meet the requirements of modern social-technological transformations.

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