



REVISTA INCLUSIONES

ESPACIO Y TIEMPO EN EL SIGLO XXI

Revista de Humanidades y Ciencias Sociales

Volumen 7 . Número Especial

Octubre / Diciembre

2020

ISSN 0719-4706

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Y CIENCIAS SOCIALES

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**APPROACHES TO THE REALIZATION OF TECHNOLOGIES OF COORDINATED FORMATION
OF STUDENTS' PROFESSIONAL AND FLEXIBLE COMPETENCIES IN THE PROCESS
OF PROFESSIONAL TRAINING**

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Fecha de Recepción: 29 de mayo de 2020 – **Fecha Revisión:** 10 de junio de 2020

Fecha de Aceptación: 18 de septiembre 2020 – **Fecha de Publicación:** 01 de octubre de 2020

Abstract

The article examines a range of issues related to approaches to the formation of students' professional competencies and soft skills in the process of implementation of technologies for their coordination. The practical use of an automated training complex developed based on modern information technology learning tools as a didactic means for the formation of professional competencies and soft skills of future specialists is demonstrated. Particular methods of coordinated formation of professional competencies and soft skills in practice are identified on the example of several specific competencies. The materials presented in the article may be used by the authors and developers of new approaches and conceptions in the modernization of professional training content and technologies.

Keywords

Professional competencies and soft skills – Coordination technologies – Professional training

Para Citar este Artículo:

Zueva, F. A.; Levina, S. G.; Manzhukova, L. F.; Likhodumova, I. N. y Kilmasova, I. A. Approaches to the realization of technologies of coordinated formation of students' professional and flexible competencies in the process of professional training. Revista Inclusiones Vol: 7 num Especial (2020): 11-18.

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Introduction

Contemporary world socio-economic transformations have a significant impact on the professional development of specialists which, in turn, presents the main driving force behind the development of society. In the third millennium, the formation of a high level of competence presents a condition vital for productive activity. Thus, the problem of our interest acquires special significance related to the professional training of future pedagogues. Said significance is due to the apparent need for training aimed not only at the development of professional competencies but also at the acquisition of new educational process goal orientations in the aspect of the formation of soft skills.

The study hypothesis he formation of students' soft skills and professional competencies in the process of professional training will be effective if the technology of their coordination is realized.

Methods

Not aiming for a detailed exploration of the phenomenology of the concepts "professional competence", "professional competencies", and "soft skills", we will only identify the approaches to their interpretation that we are going to adhere to within the framework of the present study. Following an acmeological point of view, A.A. Derkach and V.G. Zazykin interpret professional competence as a cognitive component of the subsystem of activity professionalism and define it as a sphere of professional behavior and a constantly expanding system of knowledge that allows high productivity in performing a professional activity¹.

D.I. Ushakov's explanatory dictionary defines competency as "a cumulative range of issues and phenomena in which the person has authority, knowledge, experience, and an area of influence"². Therefore, in the present study, professional competency is viewed as students' ability to apply their knowledge, skills, and personal qualities in further productive activity in specific (in this case, professional) and non-specific (in case of an unusual situation) areas. Soft skills present a set of supra-professional skills ensuring successful participation in the work process and high effectiveness^{3,4}.

Since the education system must target the development of soft skills, we believe that this task should be addressed in close association with professional training rather than apart from it. Adopting the presented interpretations as a basis, we suggest examining the general approaches to the formation of students' professional competencies and soft skills in the process of realization of technologies for their coordination.

A pedagogical technology is understood as a consistent, coordinated system of actions aimed at accomplishing the educational objectives or as a consistent and systematic implementation of the pre-designed educational process. Such an interpretation of pedagogical technology implies the following:

¹ A. Derkach y V. Zazykin, Akmeologija: uchebnoe posobie (Saint Petersburg: Piter, 2003).

² Tolkovyj slovar Ushakova. Retrieved from: <https://ushakovdictionary.ru/>

³ L. M. Spencer y S. M. Spencer, Competence at Work: Models for Superior Performance (New York: John Wiley & Sons, Inc, 1993)

⁴ Soft-skills: gibkost a ne miagkost. Retrieved from: <https://newtonew.com/opinion/soft-skills-gibkost-a-ne-myagkost>

– the technology involves the interrelated activity of teachers and students with consideration of the principles for optimal use of human and production and technological resources, as well as the differentiation and individualization of learning in the process of dialogue;

– the elements of a pedagogical technology should be reproducible by any teacher on the one hand and guarantee the achievement of the planned results by the students on the other;

– the diagnostic procedures containing the criteria, indicators, and tools for performance monitoring present an organic part of pedagogical technology.

The technology determines the content and order of stages of development of the educational process components the compliance with which ensures a steady increase in the degree of formation of professional competencies and soft skills.

Coordination of the formation of professional competencies and soft skills and the opportunity for their actualization in practice determine the use of didactic tools able to provide a combination of external influences provoking students' adequate reaction and the inner activity of the person themselves in which their professional competencies and soft skills would manifest⁵.

To provide an example, we will examine an automated training complex developed based on modern information technology learning tools as a didactic means for the formation of future specialists' professional competencies and soft skills. Each technical learning tool is attributed its own specific function in disclosing the properties of the educational process aimed at the formation of professional competencies and soft skills.

An automated training complex comprises digital laboratories, training machines, robots, models of flexible production systems, robotic assembly stands with machine vision, computer simulators, training machines, animated and video films, presentations, electronic lectures, workshops, and diagnostic and testing systems.

The process of implementation of an automated training complex involves a continuous increase in the number and complexity of tasks accompanied by the use of a combination of real and digital learning tools in the following order:

- conducting lectures with information visualization;
- students' independent study of educational material based on video and animated films;
- mastering programming;
- adjustment of production and technological equipment;
- virtual execution of the created control programs;

⁵ F. A. Zueva; G. O. Zhbankov y P. G. Mazein, "Development of professionally significant personal resources of pupils on the basis of the educational equipment with computer management", Nauka i studia Vol: 3 num 34 (2011): 63–67.

- completing practical and laboratory work using digital equipment (machine imitators, robotic complexes, flexible production systems, assembly stands, etc.);
- practicing skills using digital and real training equipment;
- completing practical and laboratory work on real computer numerical control (CNC) training equipment⁶.

It is necessary to note that the results of the completion of theoretical and practical tasks in the form of tests are evaluated by the automated control system that suggests the further training route based on evaluating the students' level of professional competencies development with the use of a digital or real training tool corresponding to the assessed level. The control system may bring a student back to the previous level of learning or transfer them to the next stage of training. If high-quality mastery of the current stage of training is demonstrated, the system may suggest moving several stages ahead to study more complex material.

In this context, development-inducing psychological diagnostics serve as a crucial element in the formation of students' soft skills since the process of formation of professional competencies presents the setting in which students' "self-image" in the unity of its three major components (cognitive, emotional, and regulatory) forms. In turn, the improvement of self-reflection provides the opportunity for a conscious and informed choice of professional specialization with consideration of one's psychological characteristics on the one hand and the opportunity for self-realization in future professional activity with consideration of the market economy demands on the other.

The program of development-inducing psychological diagnostics encompasses six psychological spheres that characterize the manifestation of soft skills:

- 1) the psychophysiological sphere (psychophysiological and behavioral manifestations of the basic properties of the nervous system);
- 2) the motivational sphere (stable motives and interests related to the types of professional training);
- 3) the characterological sphere (personality traits manifesting in the system of leading relationships of an individual – with activity, other people, one's self, and the objective world);
- 4) the emotional and volitional sphere (a person's typical emotional states and the capabilities of volitional regulation of activity);
- 5) the intellectual sphere (the development of intellectual abilities taking into account the indicators of intellectual productivity and intellectual activity originality);
- 6) the social and psychological sphere (a person's communicative qualities manifesting in the context of interaction with other people).

⁶ F. A. Zueva; G. O. Zhbankov y P. G. Mazein, "Development...

Discussion

It is necessary to highlight that the specific features of goal-setting present the fundamental starting component of designing the educational activity aimed at the formation of students' professional competencies. Significant individual differences in goal-setting are examined due to the importance of the goals being set by the students themselves, the correspondence between the goal-setting process and the internal and external subjective conditions, and the effectiveness of goal achievement.

The educational process imitation functions include the prediction of the components of actions to be performed, the ways in which these actions will be executed, and the algorithm of said execution itself. The specific characteristics of planning are determined by the confines of the detailization of executive activities and the degree of its correspondence to the objective and subjective prerequisites and conditions for the effectiveness of activity. Each stage of the goal achievement process involves the control of the current state and results of actions through comparison with the predicted results, the evaluation of the mismatch between them, and deciding on making adjustments to the executive activities or proceeding to the next stage of activity realization. Thus, the regulatory processes related to control and self-control permeate all the components of the educational process regulation⁷.

Therefore, the basis for the present technology is formed by the educational process design shaped by the initial orientations (educational guidelines, learning objectives). The technology is intended for the design and realization of the educational process with the process of learning being consistently oriented towards the goals the guaranteed achievement of which would ensure the timely acquisition of feedback which, in turn, permeates the entirety of the educational process.

The process of interaction of professional competencies and soft skills has certain specific characteristics that derive from its fundamental essence. Without a doubt, plasticity presents one of its most characteristic features: each student can study at their own pace and master their profile disciplines in a modular or linear fashion. Another feature important to indicate is adaptability which involves the organization of the educational process for students with varying starting opportunities which allows accounting for the specific characteristics of students' learning activity in the practical implementation of approaches to education. The ideas about the stages and objectives of learning, as well as the means of achieving these objectives for each of the learning stages are formed based on results of physiological, psychological, and pedagogical studies and empirical experience in professional training of students⁸.

The summarization of said materials allows providing substantial characteristics of individual methods of coordinated formation of soft skills and professional competencies in practical activity on the example of several specific competencies (Table 1).

⁷ F. A. Zueva, Razvitie tekhnicheskogo myshleniya obuchaiushchikhsia v obrazovatelnom protsesse: monografija (Chelyabinsk: "Pronto" LLC, 2018)

⁸ F. A. Zueva, Razvitie tekhnicheskogo myshleniya...

Nº	Professional competency type	Soft skills' type	Forms of organizing the coordinated formation of competencies
1	The ability to compose programs for machining on CNC machines	Communication (ability to listen to the interlocutor, argue one's point of view, ask questions)	Group tasks of composing programs for machining a part with the given parameters
2	Skills of students' educational activity organization	EQ (emotional intelligence)	Debate technologies
3	The skills of model design, construction, and testing	Systemic thinking (analyzing complex objects, taking into account the interrelation of different factors, using the knowledge about the specific characteristics of complex systems)	Project activities (individual and/or group)
4	The formation of knowledge on the construction of verbal models of different systems and concepts	Creativity (changing the ways of achieving certain goals, constructing feedback channels)	Tasks of describing the processes in the form of a narrative, explaining, and interpreting them

Table 1
The methods of coordinated formation of professional competencies and soft skills

Conclusion

The presented technology brings us closer to the understanding of pedagogical mechanisms of formation of new subject qualities that form in the process of setting and achieving educational goals new for the subject or in mastering new types of activity followed by a transformation of students' fragmentary experience into a stable professional personality orientation and motivation for self-improvement. Therefore, in a practical sense, it is highly important to not only identify, analyze, and predict the tendencies of development of professional competencies and soft skills, but also attempt to bring them into alignment to identify the dominant vector of students' development.

Acknowledgments

The article was written with the financial support provided by the Federal State Budgetary Educational Institution of Higher Education "Mordovia State Pedagogical Institute named after M.E. Evseyev" under the contract for scientific research on the topic "Formation of soft skills in future pedagogues based on interdisciplinary interaction" № 16-294 dated June 1, 2020.

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