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THE PARADIGMS OF LEARNING AND TEACHING IN A TECHNICAL UNIVERSITY: AXIOLOGICAL ASPECT

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The category of “learning paradigm”, approaches to the definition of this category, and the main modern paradigms of education (pedagogical, andragogical, acmeological and communicative) are considered in the article. The andragogical paradigm of guided learning and teaching, which is an important methodological basis of a person’s higher education (including technical one) at all the stages of their development is substantiated and its potential is characterized in comparison with other learning paradigms. The systematic approach is used to present the objectives and the main ideas this paradigm (autonomy of the institution and the student as the subject of study; the connection of the concepts “adulthood” and “education”; formation of the concept of “professional socialization” together with the concept of “social maturity”; the use of internal forces and the person’s aspirations for self-development, self-improvement as an activity basis; autonomy of the student and the university in the educational process; electivity of studies; participative character of training interactions), the principles of the andragogical paradigm (the priority of self-study; joint activities of the participants of the training process; the use of existing positive life/work experience; adjustment of the outdated experience and the personal attitudes that prevent the acquisition of new knowledge; individual approach to learning; electivity; reflexivity; the demand for practical training results; consistency; update of learning outcomes; personality development), specifics of implementation in terms of higher technical education (providing free access to information resources; ensuring individualized approach to learning; changing the roles of the educational process participants) and specifics of teaching activities in technical institutions of higher learning (being aware of the differences between the anthropocentric orientation of the teacher and the usual technocratic orientation of the technical specialist; being conscious of the state-of-the-art of sciences dealing with higher professional education; their orientation towards professional socialization of an individual).

Key words: *the paradigm of the guided learning and teaching, andragogy, andragogical paradigm, electivity of studies, autonomy, socialization, professional socialization.*

Introduction

All the processes of studying and education are traditionally associated with pedagogy that has centuries-long history and developed theory of these processes. However, the experience shows that pedagogical principles, approaches to substantiation of the subject-matter of education, recommendations concerning the structure of learning and upbringing are mostly oriented to the general education school and are little applied in higher education institutions.

Experienced higher schools teachers who have scientific degrees in certain technical specialties, being the heads of the departments and higher educational

institutions, thanks to their long practice, have realized the necessity to create the scientific basis for training higher school teachers, and are trying to generalize their experience in organizational and methodological monographs (Zinovyev, 1962; Zmeyev, 1995). The development of the higher school didactics is usually dealt with by the specialists who got training in pedagogical higher schools and teach there (Arkhanhelskii, 1974; Arkhanhelskii, 1980; Zazikin & Chernyshev, 1995). These specialists usually have pedagogical beliefs that were formed in the process of learning school pedagogy, and they are most often oriented to pedagogical higher schools.

Theoretical framework and research methods

The analysis of the experience and needs of modern higher school and technical higher school, in particular, shows the necessity of studying and taking into account the existing paradigms of the guided learning and teaching, revealing their didactic and social and pedagogical potential, possibility and expediency of their use at different age and learning stages (Yu. Fokin), the relevancy and potential of the andragogical paradigm of training (M. Vershlovskiy, N. Hromkova, S. Zmeyev, N. Klokar, I. Kolesnikova, L. Naboka, V. Puntsov, L. Sigayeva, S. Protasova, E. Starobynskiy, O. Tonkonoga, I. Yakuhno and others). On the basis of structural (V. Slaktionin, N. Talyzina, N. Udalov), functional (V. Antypova, N. Kuzmina, N. Levitov), systemic (V. Bepalko, I. Blaiberg, B. Markaryan, V. Polyakov), dynamic (Z. Yesaryeva, N. Svyrydova), personality oriented (K. Bondarevska), the general issues of the learning theory in higher school are analyzed (S. Arkhangel'skiy, A. Verbytskyi, Ye. Knyazeva, L. Ruvinskyi); the problems of the theory and practice of pedagogical education and its andragogical element are investigated (O. Abdullina, Ye. Byelozertsev, Ye. Bondarevska, H. Heller); the peculiarities of the higher school teachers activities are revealed (B. Ananyev, N. Kuzmina); the characteristics of the professional training of higher school teachers and improvement of their pedagogical culture are dealt with (L. Makarova, V. Molchanovskiy, I. Radchenko, H. Skok); the methodology of forming competence in the analytical work of scientific and academic staff is theoretically grounded and developed (O. Yarykhin).

Today we can say that there are a number of education paradigms, the most common among them being traditional-conservative (knowledge), rational (behavioral), phenomenological (humanistic), technocratic, non-institutional, humanitarian, learning "by discoveries", esoteric paradigms. They are different in their approaches to the choice of education's main aim, understanding of the role and purpose of education in the system of social institutes, its vision in the system of a person's preparation for life, formation of general and professional culture of the younger generations. However, two main holistic and systemic paradigms have been shaped in modern education: forming (traditional) and personality oriented (humanistic). The forming paradigm in its turn splits into two types – knowledge-oriented and activity-oriented approaches to the content and technologies of education.

Consideration of modern education paradigms and approaches to its organization allows us to make a conclusion that today education for a person is not only obtaining a certain amount of knowledge, abilities and

skills, but also being psychological ready to its continuous accumulation, renewal, alteration, in other words – to continuous self-study, self-education, self-development and self-perfection. The mentioned paradigms exist in the system of education, the global object of pedagogy, as they unite the processes of training and education, being internationalization of those social and cultural values of a society that are shared by its members.

Taking into consideration the diversity and at the same time consistency of the existing paradigms of the guided learning and teaching, M. Nikadyrov yet in 1974 vividly characterized the methodological drawbacks of the works in this field when he edited one of the textbooks for higher school (Arkhanhelskii, 1974): "... The author refers to the "classic" theory of learning... i.e. actually to the didactics of the general education school, to the experience that has been accumulated in the centuries-long practice. Certainly, it is a correct approach, though... a very important question of methodological character is neglected: to what extent can the findings and recommendations made for general education school be extrapolated to higher school" (General and professional pedagogy, 2009).

The aim of the study

The aim of the article is to analyze the axiological aspect of the category "learning paradigm" and to substantiate the expediency of applying the andragogical paradigm in higher technical education.

Results

The fact that till the middle of the XXth century it was considered that after the age of 20 a person became less able to learn made pedagogy and pedagogical psychology develop mainly as children's pedagogy and psychology. In the 60s of the XXth century B. Ananyev stood against this and put forward the idea about the necessity to investigate a person's psychic dynamics in mature age and the peculiarities if person's learning at different stages of life.

The term "paradigm" (from Greek "paradeigma" – pattern, example) means precise scientific theory embodied in the system of concepts that express the most essential peculiarities of reality. Its second meaning is used to characterize the generally recognized scientific achievements that supply the specialist community with the model of problem formulation and its solutions for some period of time. It is just in this sense that it is used in the pedagogical theory to indicate the conceptual approaches to education (N. Savotina, M. Skrypnyk). The paradigm in pedagogy means: 1) "...the initial conceptual scheme, the model of problem formulation

and its solutions, research methods existing during some historic period"; 2) "... a theory (or model, type of the problem formulation) accepted as a pattern of solving research problems" (Starobinskii, 1997).

The question of clarifying of the pedagogy paradigm remains relevant today.

It is natural that each paradigm is based on a certain conception.

The conception is: 1) "... a certain way of understanding, treatment of any notions, the main point of view, the guiding idea for their clarification; 2) the leading idea, the constructive principle of different activities" (Shadrikov, 1993); 3) "...the system of beliefs, a particular understanding of phenomena and processes" (Fokin, 1993).

The conception is a certain (adopted and consistently implemented) view on the studied processes and phenomena, a certain approach to solving the problems the specialist considered. Yet A. Einstein said that the future of humanity depends not so on scientific and technological progress as on the moral foundations of society; and the scientific and technological revolution has shown that the problems associated with application of the scientific results is not the problem of the science, but more the problem of ethics, morality and politics. As an illustration of the traditional conceptual approach to the problems of higher technical education there can be considered the documents of Technical Academy (1844), later the Polytechnic School (1877) and Lviv Polytechnic (since 1920) as well as the main principles of the "Notes to founding St. Petersburg Polytechnic Institute" developed in the early XX century.

Analysing the characteristics and conditions of education and training in secondary and higher schools, we cannot but conclude on the need of using different learning paradigms in these fields. Only as a result of a comparative review of school, university and other teaching situations four different paradigms of learning were identified: pedagogical, andragogical, acmeological and communicative. Each of these paradigms of the guided learning and teaching of the objective human experience has its own theory of education and learning, or the theory of the guided learning and teaching.

The pedagogical paradigm is a set of approaches to solving the problems of education and training, which is used by traditional pedagogy and is focused essentially on secondary school, on education for children yet unable to understand their needs and realize that education realizes one of their personal fundamental life needs. The name of this paradigm, as well as pedagogy itself, comes from the Greek words "paidos" (child) and "ago" (lead), the combination of which literally means "child leading".

The teacher's activity corresponding to this paradigm is focused on upbringing, development, strictness, knowledge transfer, prescription, compulsion, daily tasks and their control. Means of activation are interest and focus on the interest. With such approach, the student is inevitably in the position of an object of guided learning and teaching that can lead to passivity, the desire of students to try not to get failing grade, the loss of interest.

The desire to find a new paradigm was manifested quite steadily at different stages of social development. It is embodied in the works of V. Sukhomlynskyi, V. Shatalov, M. Shchetinin, Sh. Amonashvili (Amonashvili, 2000) and other teachers-innovators of the second half of the XXth century, in developing pedagogy of cooperation, calling for turning education to personality development. Recently, the emphasis is put on orientation of education on "the person of culture", which is going to replace the former orientation to "the person who knows" (Zahvyazinskii & Gritsenko, 1978, p. 58).

Although andragogy appeared as part of pedagogy focused on adult education by school type (in the interpretation of theorists, andragogy is aimed at revealing patterns, social and psychological factors of effective education, training and teaching of adults (Starobinskii, 1997), the main difference of andragogical approach is the subject's understanding of his needs that are satisfied in the process of getting education and his conscious activities directed at satisfying these needs, or, according to M. Smyrnova and E. Starobynskyi, inclusion of the specialist in the process of understanding his personal and professional goals through their correlation with the aims and values of modern life as well as his own needs, demands, and expectations (Fokin, 1994; Yakunin, 2000). S. Vershlovskyi focuses on the fact that "... adult education is effective to the extent to which there are created conditions that help to critically assess their experience and understand the essence of the role of knowledge in a broad social aspect" (Vykhreshch, 2015, p. 10). Thus, the main purpose of the andragogical approach is the person's socialization. Socialization is 1) qualitative and quantitative changes of the system of values, socially important beliefs and attitudes, value orientations, ideals, moral qualities of a personality necessary to be a success in the society and which are achieved in the process of an individual's own activities; 2) the process of learning and active reproduction by an individual his social experience, the system of social connections and relationships in his own experience (Shadrikov, 1993).

This paradigm considers social development and identity formation only in the process of self-conscious activity, and not as a result of external spontaneous

influence. The guideline of andragogy, unlike traditional pedagogy, is that the student and not the instructor play the leading role in the learning process. The function of the teacher in this case is to assist the individual in identifying, organizing, formalizing the personal experience, adjusting and updating the student's knowledge. So higher education is focused on socialization (professional socialization). Since in this case the subject tries to get vocational education necessary for successful work in a given society, the guidance of learning and teaching inevitably focuses on current social norms with which the education recognized by the society complies. In the process of socialization a person acquires qualities, values, beliefs, socially approved behavior needed for normal life and work in this society. Taking into consideration such peculiarities of higher education the function of the teacher and the priorities of teaching methods change (the latter become active in nature due to the factors related to learning motivation and need sufficient level of student's socialization).

The main category of the acmeological paradigm is self-realization. In this case, neither the result of this activity and the way to the top nor the scale for measuring the progress achieved in the process of professional training can be specified by the society: they are the product of the activity and the function of abilities of the subject himself in case he has chosen the acmeological way for the development. In professional acmeology, aimed at achieving the top professional skills by the student, independence from the standards recognized by the society is relative: a student has to focus on the existing professions, for which he has abilities and inclinations. Considering this, there was created acmeology, the basics of pedagogy for adults, it being an interdisciplinary field of knowledge about man in adulthood. Thus, the pedagogical science covered all the three major stages of human life: childhood (pedology), adulthood (acmeology), senility (gerontology). In the 90s of the XXth century prefix "acme-" began to be considered as the top (the highest level of achievement of something) of human development based on full implementation of the person's capabilities and opportunities. This led to the appearance of the field of professional acmeology (Zinovyev, 1975; Nikandrov, 1974). At the same time, the scientific discipline of andragogics associated with adult learning is actively developing (Zmeyev, 1997; Kuzmina, 1991; Yaksa, 2014). All these require differentiation and coordination of the acmeological and andragogical approaches in considering phenomena and problems of higher education.

The acmeological paradigm focuses teaching efforts on helping the student reach the top of his capabilities, the fullest realization of his personality's

potential. In acmeological works, achievement of the top professional skills by the student is considered the main purpose of this paradigm (Zinovyev, 1975). This was quite natural during the times when education was focused on preparation of the specialists that were demanded by the state and when professional education was viewed as the major value. However, with this approach the acmeological paradigm also focuses on social norms and actually duplicates the andragogical one. This field can be called professional acmeology.

The communicative paradigm is a paradigm of peer teaching which is realized when the subjects of didactic interaction, every of whom is aware of his needs and is competent in his particular subject area, exchange their achievements for the rapid dissemination and application of the new information and experience. A characteristic feature of this study is the active participation of the subjects' of didactic interaction in selection of the study objects and it implies the transition of the subject of learning into the subject of teaching and vice versa.

Unlike other paradigms, where the selection of the objectified human experience is done mainly by teachers and society instead of students, the communicative paradigm implies cooperation of the equally competent partners in the training process, they both being able to objectively evaluate the significance of possible objects of learning and to exchange the roles depending on the purpose, i.e. to become either the object or the subject of training. Self-improvement is the main category of the communicative paradigm, when new elements of the objectified human experience are acquired by each individual; individuals as the subjects of training interact with each other with the aim to enrich the experience of each participant and exchange knowledge and skills.

The main reason for the higher school teachers' claims to traditional pedagogy is associated with the fact that while implementing just one training paradigm (pedagogical or school) it does not specify the restrictions (didactic, age, communicative, professional) on application of its provisions. As the result, traditional pedagogical textbooks fail the expectations of the teachers of technical and other non-pedagogical universities because in them teachers cannot find scientific pedagogical assistance for improving teaching practices in higher educational establishments. "Targeting knowledge and the basics of sciences has apparently exhausted itself and has brought pedagogy to a standstill ... Today... in the process of training it is necessary to form skills and teach the generalized work methods. The students' intellectual activities should be developed rather than their knowledge of the subject area enriched" was emphasized in the discussion on the

training strategy in 1988 (Andragogical basics of studies of pedagogical staff in the process of training). Its participants saw the causes of the crisis of education in its being oriented to the past, to something already achieved by mankind (according to the terminology of "The Roman Club", the education crisis was provoked by "supportive studies") while there is a necessity in innovative training focused on the future.

The former strategies and policies for the development of higher education, including those proposed by UNESCO, do not bring appropriate outcomes. In the work "Philosophy of Education for the XXIst Century" it is stated that "... to overcome the global crisis of higher education, as well as its manifestations at the regional and national government levels, requires rethinking of the initial ideas about the nature of international educational practices, about the goals and values of training and education, their content and methods". Thus, according to many representatives of the higher education, it is about creating a new philosophy of education adequate to the challenges of the XXIst century. In the collective monograph "Philosophy of Education for the XXIst Century: Collection of Articles" (Moscow, 1992) as well as in the works of B. Hershunskyi, S. Hessen, E. Husynskyi, V. Shadrikov, the current state of society is reflected. In the interpretation of the director of the European Center for free time and activities I. Savytskyi the philosophy of education is a certain system of ideas about the world and the man's place in it, on the basis of which it is possible to identify the goals of education, its content structure, basic organizational principles, relationships between a teacher and a student etc. and, therefore, the dominant of training (the term of I. Lerner).

In the report on the results of the international symposium "Philosophy of Education in the Perspective of the XXIst Century" it is stated: "The crisis of education has turned into a global phenomenon, the failure in the implementation of the adopted earlier policies and strategies for introduction of educational reforms has highlighted the philosophical understanding of the situation. It is impossible to achieve the goals in the field of higher education put forward at both international and national levels without the development of new conceptual, methodological and axiological approaches".

The problem of designing the educational process on the efficient paradigm basis is particularly acute in higher technical educational establishments. Since 1972, International Society for Engineering Education (IGIP) is operating in Europe. Having been established in Klagenfurt (Austria), it is actually the European Association of teachers of technical subjects in higher school. The International Society for Engineering Education maintains the Register of European

teachers of engineering universities (Der Europäische Ingenieurpadagoge, The European Engineering Educator, ING-PAED IGIP), the enrollment to which occurs on the submission of the national associations and is confirmed by the issuance of a corresponding certificate. The candidate for the certificate "European teacher of engineering higher school" should be a graduate engineer, have at least two-year experience of engineering or scientific and technical activities, successfully work as a teacher in higher school for at least one academic year, speak one of the common European languages, as well as undergo a series of teacher training, which is not inferior in terms of content and volume to the minimally sufficient IGIP program requirements (General and professional pedagogy; Andragogical basics of studies of pedagogical staff in the process of training).

Detailing requirements for the technical specialist, in 1992 the World Congress on Engineering Education adopted the following requirements for the graduates of engineering higher school:

- professional competence (a combination of theoretical knowledge and practical training of a graduate, his ability to carry out all types of professional activities defined by educational standards in the field of study or in a particular specialty);
- communicative readiness (proficiency in literary and business written and spoken language; competence in at least one of the most widely used foreign language, skills to develop technical documentation and use it, the ability to use computers and other means of communication including telecommunication networks, knowledge of psychology and ethics of communication, skills of professional group or team management);
- developed capacity to have creative approaches in solving professional problems, the ability to navigate in unusual circumstances and situations, to analyze problems, situations, tasks, and develop action plans; commitment to plan and the responsibility for its implementation;
- stable, conscious, positive attitude to one's profession, desire to continuous personal and professional development;
- knowledge of the methods of technical and economic analysis of production with the aim of its rationalization, optimization and renovation, as well as methods of ensuring ecological production and engineering environmental protection;
- understanding the tendencies and main trends of science and technology development (General and professional pedagogy).

The outlined requirements for graduates of engineering higher educational institution may be provided in compliance with the basic principles of

andragogy: priority for self-study, joint activities of the subjects of the training process, use of the available positive life experience, adjustment of the obsolete experience and personal settings that prevent the development of new knowledge, individual approach to training, electivity, reflectivity, the demand of learning outcomes by the practical activity, systematization, actualization of the learning outcomes, personal development. N. Yaksa specifies the following system of educational principles within the andragogical paradigm: the priority for independence training, relying on the student's experience, individualization, systematization, actualization of the learning outcomes, electivity, the context-based study (Yaksa, 2014).

Based on the nature of the main principles of higher technical education the peculiarities of the andragogical paradigm can be specified as follows: the autonomy of the institution and the student as a subject of study; close connection of the concepts of "adulthood" and "education"; formation of the concept of "professional socialization" together with the concept of "social maturity"; the use of internal forces and human aspirations for self-development, self-improvement; autonomy of a student and a higher school in the educational process; electivity in training; participatory educational interaction.

The idea of autonomy of the higher school and the student as a subject of educational and professional interaction involves flexible organization of educational processes that focuses on student's freedom of choice of the further educational trajectory while maintaining the emergence of education in general.

The essential feature of the autonomy of the educational process is "to ensure freedom of choice", i.e. to ensure the freedom of students to choose and refine their educational trajectory, i.e. to freely choose subjects, order of priority and duration of mastering their content. A. Andreyev says that ensuring freedom of choice implies the existence of a number of features of the future system of open higher education, among which the most specific are:

- providing free access to information resources;
- providing individualized approach to studies;
- changing participants' roles in the educational process (Andreyev, 2000).

The possibilities of really free choice must be organizationally provided to students at the end of each semester or academic year.

As for higher education establishments that operate in the domestic realities, it is efficient to consider such a structure not as an alternative to existing one, but as an additional one prevailing in universities, where teachers focused on the traditional system can work successfully. If the university has such structures, the

conditions for self-organization of all the elements of the university will be created, the components of the structures that will be elected by a large number of students will develop.

The andragogical paradigm of the guided learning and teaching involves fundamental changes in the professional identity of teachers of technical higher schools: awareness of the differences between the anthropocentric orientation of the teacher and the usual technocratic direction of the technical professional, understanding the current state and peculiarities of the sciences about professional higher education, their orientation to the individual's professional socialization.

The philosophical distinction and the essential consideration of cognition and acquisition of others' objectified experience are necessary to clarify the importance of training and education of the individual in the progress of mankind. Unlike traditional pedagogy, this meaning is not declared and is derived from the consideration of the objective needs of the individual and society and their satisfaction: empirical cognition of the objective world is gradually complemented by other types of knowledge, accumulating results in the objectified social and professional experience available to other people. Mastering these results accelerates the specialist's development, since it deprives him of the simple repetition of what has already been comprehended by the predecessors. On this basis, some philosophical statements that are benchmarks for a teacher are introduced:

- shows the teacher the actual existence of different paradigms of education and the differences between the andragogical paradigm (characteristic of higher school) and traditional pedagogical (school) paradigm;
- introduces the need to take into account the andragogical paradigm for conceptual rethinking and synthesis of the specialty theory;
- promotes the concept of unambiguous simple definitions to develop logically consistent theory of learning in higher school.

The adoption of the andragogical paradigm of the guided learning and teaching in higher technical school allows specifying and directing activities of higher technical school teacher towards professional socialization of the future specialist.

Experience shows that without considering these issues, without finding out the differences between the paradigms, the further study of definitions and statements of the andragogical theory of learning in higher school will not meet understanding on behalf of the higher school teachers as they think that the foundations of the educational process organization in higher school have already been presented in traditional pedagogical textbooks.

An important aspect of the andragogical pedagogy is the awareness of the fact that to maximize the achievement of its objectives it is necessary to separate adults by different age categories (generations). Social science differentiates three age categories: under 25, from 25 to 45, over 45. Each age category requires additional research on the ways of implementation of the andragogical paradigm and development of the adapted technologies of the guided learning and teaching with regard to their age specifics and potential, prediction of goals, approaches, adequate methods and forms of study.

The first category is divided into two groups: people who have and have no professional education. Respectively, people of the first group should be given an opportunity to obtain such education so that they are involved in professional activities in specially organized production training classes. Conditions for professional development should be created for the second group.

The second category has professional education and working experience; targeted professional development, realization of personal potential within the andragogical paradigm of the guided learning and teaching are relevant for this group.

The third category of adults, despite the fact that it has reached a certain social and professional status, also requires continuous, adaptive study, but this study in many cases is impossible without the interaction with the first and the second categories, and therefore without interactive learning.

Unfortunately, there is lack of such scientific research. However, the society oriented to the andragogical paradigm of learning foresees activation and professional socialization of future specialists (giving them increasing opportunities to demonstrate individuality) and is objectively interested in implementing the andragogical paradigm of the guided learning and teaching in order to enrich educational and professional opportunities for each person, to increase recognized by the society levels and features of training technical specialists.

Conclusions

Pedagogical sciences seem incomplete without training and education theories developed on the basis of all the above paradigms, they cannot be perceived as sciences dealing with the guided learning of the objectified experience of mankind by an individual, though actually the guided learning is the very process at which every pedagogical science is aimed.

The theory of higher education like the rest of higher school didactics should implement the andragogical paradigm of the guided learning in its optimal combination with the key ideas of the acmeological and communicative paradigms. Only then it will be possible

to take into account the specifics of higher education and to provide a scientific basis for both solving the problem of specifying a set of specialties, synthesizing the content of higher education for specific professions and the high school teachers' acquiring skills of managing students' learning activities.

The andragogical paradigm of the guided learning and teaching in higher technical school will scientifically prove the requirements for modern educational process and identify the patterns in combined tasks that provide easing the students' information overload, transfer teaching from the level of informing and technologizing to the level of real management of development, socialization and professional development of training subjects. It creates new conditions for conducting each lesson, for teacher's conscious choice of methods, forms and means of learning, that take into account the specific objectives of higher technical education. The theory of higher technical education should be developed on the basis of the combination of the acmeological and communication paradigms with the leading role of the andragogical paradigm of learning.

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