

Educational Process Navigator as Means of Creation of Individual Educational Path of a Student

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ABSTRACT

Rationale of the problem stated in the article is caused by search for new alternative models for individual educational paths of students in the continuous multi-level education system on the basis of the navigators of the educational process, being a visual matrix of individual educational space. The purpose of the article is to develop the design algorithm and implementation of individual educational paths of different types based on nature and mechanisms of individual educational path formation. Leading methodological approach of the research was person-centered approach of the educational process organization, which had the following specific features: it is specially designed for a particular student as his individual educational program; in the stage of development of individual educational route the student was: a) a subject of choice of differentiated education offered by the educational institution; b) an “informal customer”, “showing” (at the start testing) the educational institutions which designed his educational program - an individual educational route - his educational needs, educational profile and other individual characteristics. Individual educational path flexibly adapts to the student's abilities, his professional development dynamics influenced by training and can have the following forms: adaptive type - education is used to prepare for the modern professional, socioeconomic and cultural realism; developing direction - it is characterized by a wide development of opportunities, abilities and creativity of man; creative direction - it means not only the development of features and abilities, but also their use for transformation, making yourself - self-education, career, and life.

KEYWORDS

Individual educational path (IEP), navigator of the educational process, professional development

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Introduction

Rationale

Modern specialist seems to us a person of new generation, which possesses spiritual freedom defining the right of choice and activity goal-setting. He is

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driven by a purposeful internal activity, regulated by his own socially valuable motivation; his future profession is considered not only as a means of social development, but also as a means of personal self-development (Asadullin, 2015). In this sense a person can “make himself” through education and self-education, self-development, self-improvement. Developing an educational path, a student formulates a conscious order to learn on the basis of his own interests, ideas about the educational resources of educational institutions of the city and the region, self-acquired experience and personal responsibility for his further professional education.

Comparing and analyzing different points of view to the multidimensional phenomenon of “individual educational path”, as well as taking into account the age characteristics of university students, it can be concluded that individual educational path in the system of continuous multilevel education is the process and the result of individual student’s choice of content, level and way of obtaining professional education, with targeted ongoing pedagogical support of this choice (Hutorskoy, 2005). A consistent set of tools, techniques and methods on this new problem was begun to develop, which together ensures performance of the individual educational paths development process. Thus, the study of the nature and mechanism of formation of the IEP represents a relevant knowledge-intensive problem for pedagogical theory and practice: construction of an individual educational path is associated with the choice of the future specialist, awareness of personal responsibility for his choices, the formation of installation on his own development as a specialist (Sytina, 2012).

It should be mentioned that in pedagogical literature there is the concept of “individual educational path” similar in meaning to the concept of “individual learning route”, but the analysis of psychological and pedagogical literature shows that the first term has a broader meaning than the second, characterized by several education path implementation directions - informative (realized through educational programs that determine an individual learning route), pragmatist (realized through traditional and non-traditional educational technologies) and process (defining the organizational forms of activity and communication) (Tryapitsyna, 2000).

Materials and Methods

Methodology and research methods

During the research it was used the provisions of a person-centered approach and the humanization of education, as well as the concept of integrative nature of the human, which represents the organic unity of the individual, subject, personality and individuality. They are the implementation principles: personal goal-setting; choice of individual paths of various types; interdisciplinary foundations of education content; situational training; educational reflection. The following methods were used: analysis of regulatory documents and activity products, forecast method, systematization and synthesis, modeling, design, method of expert evaluations, pedagogical experiment.

Experimental research base

Pilot testing was carried out at the Physics-mathematical Faculty of our University during the study of “Pedagogy” module disciplines.

Stages of research

The study was conducted in three phases:

- at the first stage - the preparatory stage – the current state of the researched problem in the pedagogical theory and practice was analyzed; a program of research methodology was developed;

- at the second stage - the main stage - an algorithm of design and implementation of individual educational paths was developed and implemented in the university taking into account the nature and mechanisms of formation of the IEP; experimental work was conducted;

- at the third stage - the final stage - systematization, interpretation and synthesis of the research results was carried out; theoretical conclusions were refined; processing and clearance obtained research results was carried out.

Results

Structure and content of the algorithm of the design and implementation of individual educational paths

Design and IEP implementation regardless the chosen type was carried out by students of Physics-mathematical Faculty of the University during the study of the “Pedagogy” module subjects in accordance with the following algorithm of pedagogical interaction on the formation of individual educational path:

- The first step - a teacher studies educational student's needs, defines the level of development and degree of students' personal qualities necessary for the implementation of those activities, which are peculiar to this professional field; self-knowing of a student.

- The second step - a teacher and a student evaluate the resource opportunities of the university.

- The third step - the description by each student and then by a teacher of basic educational objects as a matter of further knowledge.

- The fourth step - building a student's personal relationship system for the upcoming discovery of the educational and professional field/theme - the construction student's individual image of the cognitive field and professional activity, formulation of goal of educational and professional path.

- The fifth step - specification by the teacher of each student's path goal, filling the identified routes with content and technology tools (technologies, techniques, teaching methods); individual programming by a student of educational activities in relation to the fundamental educational objects (personal and common); individual training programs for the designated period are eventually created.

- The sixth step - the teacher organizes the performance of individual educational paths by a student; the activities of students in the simultaneous

realization of their individual educational programs and a collective educational program.

- The seventh step - diagnostic support by a teacher of each individual educational path of students; students' demonstration of personal educational products and collective discussion - every student discovers the same educational object from a subjective point of view in accordance with his individual educational and creative path; providing a process of formation and realization of individual creative path with complex psycho-pedagogical support, the teacher allows successful students to move in learning more or less independently (creates a situation in which a student independently searches for solutions and chooses modes of activity, along with the traditional information transmission functions, an explanation of the nature of some processes and events, organizes and coordinates the work of the group and advises students in the process of self-employment, including additional individual consultations).

- The eighth step – the obtained results are compared with the goals of individual creative paths; each student understands and assesses the degree of achievement of individual and common goals, the level of his internal changes, learned methods of education and discovered fields (reflection - the comparison of the products with the goals - self-esteem).

The following criteria and indicators were developed and used as criteria of formation of individual educational paths:

- motivational - the orientation of teaching and learning activities in the motives, values, attitudes of students, formation of their position to teaching and learning and professional activity as a personally-significant; actualization of educational and professional experience of the student, including the experience of prior learning;

- emotional-volitional – creation of a successful situation, awareness of the potential level of own abilities, setting the emotional sense of community, trust, security, and support; co-organization of educational material, providing student with the opportunity to select the content of the assignments or study methods of teaching material solving the educational problems, removing unnecessary stress and fear of failure;

- cognitive - inclusion in the content of educational material, the direction of self-identity and knowledge to the phenomenon of creativity; ability to carry out educational activities, to allocate general logical and specific subjective tools of studying, to demonstrate their different functions in the personal development;

- operational-pragmatist - organization of constructive partnership type of interaction with peers and a teacher in group work in class; involvement of students in the cognitive activity not only on reproductive, but also on a creative level, development of creative abilities on the basis of educational material;

- reflective-evaluative - development of reflection; willingness to ask questions about what is happening and about own actions; willingness to turn to own experience, not only to the “external source” of knowledge - the teacher, textbook, etc.; willingness to carry out the analysis of phenomena and events,

rather than to act as per once chosen way or given norm; orientation to self-control and, as a result, orientation on self-organization.

The search for new alternative models of individual students' paths defined by pedagogical tasks solved by the teacher was carried out during the experimental work. In particular, it was determined how effective are the *navigators* of the educational process, individual education path is impossible without; they are a kind of visual matrix of individual educational space, where by means of signs, symbols and abbreviations a degree of result achievement (product of education) is visualized. Formulated differently, this matrix is a visual detailed map, thanks to which the student is free to determine his place in the path as well as the immediate and long-term objectives. IEP matrix allows to determine in time and space - the coordinates of the four-link component of the educational process system, "I know (I can) – I learn (should be learned) - I will learn (need to learn) - I know the new (reached the next level)." As it can be seen, this educational process is a spiral path of ascent to knowledge (truth). Matrix elements are names projection images, addresses and activities to display. Activities of a student to know of the subject, discipline, course, unit, the acquisition of knowledge, skills, professions or occupations is represented by a vector, integrating content of the education activities getting.

Stages of implementation of the algorithm

Implementation of this algorithm assumes the following stages of experimental work:

- Implementation of diagnostic of IEP existing models use in teaching students the module "Pedagogy";
- Development and implementation of design and implementation of individual educational paths algorithm (as a navigator), taking into account the nature and mechanisms of formation of the IEP in a university.

Establishing stage

Diagnostic use of IEP models transferred into the matrix through a navigator as described above was carried out on the establishing stage of the experiment. This diagnostic has identified the students' need to use IEP in education, readiness of teachers for guidance and methodological support of the IEP as navigators. At this stage, both groups showed almost identical results of educational paths selection. (Table 1).

Table 1. IEP selection results

Total	Groups	Adaptive route	%	Developing direction route	%	Creative direction route	%
78	Control	27	34,6	33	42,3	18	23,1
79	Experimental	24	30,8	42	53,9	17	15,3

Forming stage

In the forming stage of the experiment an algorithm of design and implementation of individual educational paths of different types (in the form of

navigators) was developed and implemented taking into account the nature and mechanisms of formation of the IEP in the university. Scientific and methodological support (pedagogical interaction) of each stage of the algorithm is represented in Tables 2-9

Table 2. First stage

Teacher's activity	Student's activity
1. Studying of the educational needs of a student, diagnostic of the development level and degree of personal qualities needed to carry out the types of activity of the chosen professional field.	Self-knowing of a student
2. Studying of the concepts of the person-centered educational process, individualization and differentiation of learning	

Table 3. Second stage

Teacher's activity	Student's activity
1. Teacher's assessment of the resource opportunities of the university.	Students' assessment of the resource opportunities of the university
2. FSES specification, which is realized in the differentiated educational process	

Table 4. Third stage

Teacher's activity	Student's activity
Registering by each student and then by a teacher of basic educational objects to designate further object of cognition	Registering by each student of basic educational objects to designate further object of cognition .

Table 5. Forth stage

Teacher's activity	Student's activity
1. IEP goal forming	Construction of the personal attitude of a student to the upcoming discovery of the educational field or topic: creation of an individual image of the cognitive or professional area
2. Definition of the formation of operative tasks bank for specific individual paths of the students, specification of each path's goal	

Table 6. Fifth stage

Teacher's activity	Student's activity	Result
1. Specification by a teacher of the goal of each path of the student, filling each route with content and technological tools (technologies, approaches, educational methods)	Individual programming by each student educational activity in respect to his own and common fundamental educational objects	Freedom of choice, having the skill to build up programs of self-development in the constantly changing conditions
2. Definition of the directions of the diagnostical support of each individually creative path		

Table 7. Sixth stage

Teacher's activity	Student's activity	Result
1. Organization by the teacher of the student's individual creative paths realization	Student's activity on the simultaneous realization of the students' individual educational programs and common educational program.	Creation of the individual educational programs for the noted period
1.2. Development of the normative base of design and realization of differentiated educational problems.		

Table 8. Seventh stage

Teacher's activity	Student's activity	Result
Diagnostic support by a teacher of each individual educational path of students, teacher permits more successful students be more or less independent in the educational process	Students' demonstration of personal educational products and their collective discussion: each student masters the same educational object from the subjective point of view and in accordance with his individual educational path.	Process of forming and realization of individually creative path is provided by psychological and pedagogical support

Table 9. Eighth stage

Teacher's activity	Student's activity	Result
The results obtained are compared with the goals of the individual educational paths	Each student realizes and evaluates the degree of personal and common goals achievement, level of his inner changer, studied ways of learning and mastered areas.	Reflection is the comparison of the obtained products with the goals - self-esteem

Experimental effectiveness verification of the implementation of the algorithm of design and realization of individual educational paths (as a navigator), taking into account the nature and mechanisms of formation of the IEP in the university.

Comparing the results of establishing and forming experiments we defined that performance paths select indexes of the creative direction are higher for 17.7% (establishing - 15.3%) (Table 10). The ability to use the right to choose their own path of development by each subject of the educational area contributes to the emergence of alternative forms of education. More detailed and informative description of the IEP model structures presented, its components are relevant and informative, technological, reflective-evaluating.

Table 10. IEP choice results

Stages	Groups	Adaptive route	%	Developing direction route	%	Creative direction route	%
establishing forming	experimental	24	30,8	42	53,9	17	15,3
	experimental	9	11,4	44	55,6	26	33

Discussions

For the first time an individual educational path has been considered by teachers-scientists S.V. Vorobieva (1999), N.A. Labunskaya (2002), E.V. Piskunova (2008), S.A. Pisareva (2015), A.P. Tryapitsyna (2000), A.V. Hutorskoy (2005), who in their studies defined the concept IEP and directions of educational path realization: informative (realized through educational

programs), pragmatist (realized through innovative teaching technologies), process (defining the organizational aspect, types of communication).

This study does not pretend to be an exhaustive resolution of the raised aspects of the formation and use of IEP in the educational process of the university. Results of the study showed the prospects of further development of the IEP students design problems.

Conclusion

It is proved that the formation of the student's IEP is a process characterized by unity of action of educational process subjects, the implementation of which is carried out according to the research established algorithm and technology of training navigator presentation matrix. As a result, students learn to identify the individual steps to knowledge, which can additionally be recorded in the form of diaries or other records, which requires a certain culture of planning (including debriefing). Mapping is performed by means of computer, without causing rejection in students; moreover, formalization, and to some degree detailing of the educational plans and programs, own activities, by means of cognitive visualization: maps, figures, tables, logical-semantic models, according to the students permits to adjust the visual control of the educational strategy and life outlook. Since at cognitive visualization the image constructions are arranged internally or broadcasted in finished form from an external plan, they do not perform the functions of visual teaching tools but cognitive knowledge visualization tools gaining regulatory and reflective properties.

Thus, it was found that the navigator of the educational process for a student becomes a kind of guide in the area of education, which determines study of its key aspects - navigation as a didactic category and regulatory and reflective properties of the navigator as a social and pedagogical phenomenon.

Based on the foregoing, in the first approximation the phenomenon of cognitive navigation is defined as visual deployed cognitive self-promotion process of students (or joint promotion with the teacher) to the result (product of the education). Examples of such movements are: a) the navigator on theoretical pedagogy, in which the target is defined as a future split-level result – “know, understand, apply, carry out independently” according to it the student determine the content and ways to improve learning; important navigator element - assessment and effective, with a set of questions, assignments of informational, practice-oriented, transformative and creative nature; special importance is given to didactic support of students in the process of individual educational path implementing, based on continuous monitoring of his educational and personal achievements; b) operational plan of the “Pedagogy” module studying.

Long-term pedagogical experiment on introduction of IEP in the educational process of the university was held by the subdepartment of pedagogy (attended by students of all pedagogical specialties and profiles) on the basis of identified patterns of cognitive navigation of binary nature: a) the objective integration of educational and life (personal and professional) problems in the educational process, b) reciprocal diffusion and complementarity of substantial and process aspects of learning as a new source of personal and professional experience of students, allows to determine the features of the construction of individual

educational paths of students, guide them to self-awareness and awareness of their future professional activity.

A positive result of the experimental work was the determination of the main directions of IEP formation of professional development: the construction of a particular educational environment of the university - an effective external control with respect to each student on the condition of its subjective position development; strengthening of the personality-oriented focus of the educational process; organization of psychological and pedagogical support to individual professional development of students with the use of active and interactive practice-oriented methods, forms of professional training.

Materials of the article can be useful in a practical way for teachers and heads of structural divisions of the university in the construction of educational process on a separate discipline, in training specialists of different profiles and trends; as well as for the teaching staff of secondary education and the vocational secondary education.

In view of the obtained results of this research there can be defined a number of scientific problems and promising areas needed further consideration: extension of certain provisions of the article related to the formation and accumulation of psychological and pedagogical potential for the development of IEP.

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No potential conflict of interest was reported by the authors.

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