Educational – Methodical Projects for Students' Intellectual Competences Formation: the Imperative Goal of the Educational Process of the University

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ABSTRACT

The research urgency is caused by the tendencies of the modern information society which produces and consumes intelligence, knowledge and competences as the main educational product of labor market. These trends fundamentally alter the methodological basis of the educational process of the University, subjecting it to imperative goals: the intellectual development of the individual of the student, independent acquisition of knowledge and competences, development of intellectual competences to work with information in any media. In this regard, the focus of this paper is allotted to theoretical and methodical substantiation of the structure and content of students' intellectual competences as a pedagogical category of the imperative goals of the University educational process. A leading research method is a project method which is focused on students' intellectual competences' formation in the process of creative activity products creation in the educational process. The paper reveals the discourse of the concept "intellectual competences"; defines the essence, structure and content of the training-methodical projects for students' intellectual competences' formation; on the basis of the results of the study substantiates the pedagogical algorithm of training-methodical projects for students' intellectual competences formation. Productivity of the algorithm's implementation is proven using the criteria: formation of knowledge (the content of the study course and related areas); comprehension of knowledge (the ability to restructure information, giving some interpretation of the main idea); the analysis of knowledge (the ability to compare the basic ideas of information, formulate conclusions supporting the assumptions with evidence, the ability to ask questions); knowledge synthesis (the ability to synthesize, develop logic of common reasoning, based on analyzed facts to create a final conclusion); assessment of knowledge (the ability to determine the accuracy and reliability of facts, to evaluate findings and conclusions). The paper can be useful to teachers, methodologists, managers of the universities

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Introduction

The relevance of the study

The transformation process of graduates' professional training is determined by the challenges and risks of modern civilization. The change of priorities in the educational process becomes habitual: the openness of the educational system, the appearance of the targets, attractors which guide the whole educational process on the development of students' intellectual skills, using of interactive project and computer technologies centered around the idea of development of intellectual potential, self-organization and self-transformation of the individual student. In the course of the study it is found that high-tech, innovative competences, in which the determining demand are the costs which are associated with the development of intelligence of the specialist, according to experts form the basis of its competitiveness and demand in the labor market. Personality as a commodity, without the intellectual component or its insufficient level, is not competitive and not demanded by the labor markets" (Kuznetsov, 2003; Vlasova, Kirilova and Curteva, 2016). In connection with the trends identified in the course of the study, the theoretical and practical significance of the transformations of vocational training through the implementation of educational methodical projects for students' intellectual competences formation is substantiated. In this respect, an important aspect is the development of scientifically – methodical bases of intellectual competencies' formation process in the educational process of the University (Raven, 2002). These issues in educational practice of universities to date are not systematic, are not scientifically justified. That is why in University practice there is a mixture of qualitatively different processes: the formation of intellectual competences is identified with the development of mental abilities of students. Therefore, to speak of a complete and correct understanding of the problem in the educational activities of universities are yet premature. Urgent attention from the side of researchers today belongs to the conceptual ideas of training - methodical projects for students' intellectual competences' formation in educational process of higher school and development of pedagogical practice-oriented algorithm.

The solution to this problem defines the purpose of the study.

Literature Review

The essence of the concept "intellectual competence"

It is established that the discourse of this concept has not sufficiently clear definition. In the works of leading methodologists of didactics (Eysenck & Camen, 2002; Zimnyaya, 2003; Makhmutov, 1998; Raven, 2002; Shadrikov, 2004; Asadullin et al., 2016) the student's intellectual competences are transformed through the structure of intelligence: intellectual capacity (cognition, memory, thinking, evaluation, etc.); concrete material perceived through the senses; the end results of thinking (elements, class, relations, system, foresight, etc.). Innovative conditions because of the discovery of nano – technology, determine the use of hybrid intelligent systems, liberating man from the routine activities for artistic creation. In this pedagogical study the

intellectual competences are considered as generalized ways of mental actions of the individual to expand knowledge in various fields, improve one's erudition skills, to demonstrate the ability to generate ideas in different directions, to give an original, unconventional ideas, elaborate in details ideas arose, to select from a huge variety of problems the main problems and to correct habitual patterns of decision-making.

Alternative approaches to the study of research problems

The origins of ideas about the intellectual competences are established in the work of J. Dewey (1999) on reflexive thinking, in which he proves that the persons with developed intellectual competencies possess fundamental qualities: a willingness to plan their own cognitive activities; flexibility of thinking (the concept "restricted or closed mind" or "open, flexible mind"); persistence in achieving results; a willingness to correct their mistakes (self-correct); awareness of the process of knowledge (the knowledge about knowledge, about what we know); the search for compromise solutions (group forms of activities in the modern world are paramount). These ideas of J. Dewey (1999) were updated by B. Bloom (1956), who established six fields of intellectual skills' application: 1)knowledge (the acquisition of knowledge as the cognitive area, which is subject to study, and related areas too); 2) comprehension (understanding of knowledge - organization and relating of new knowledge with previously learned: the ability to restructure information, giving interpretation of the main ideas); 3) application (using of new knowledge in accordance with certain rules and principles to new situations: ability to apply selected facts, and information in new situations to support or refute the author's position); 4) analysis (critical thinking, concentration of attention on individual pieces of information, their importance as a whole: ability to compare the main ideas of the text, read or heard, known from other sources to make the necessary findings, conclusions, important for the confirmation of the previously formulated hypotheses, assumptions; ability to delve into the depths of the problem); 5) synthesis (critical thinking, focusing on the connection of separate parts into new knowledge: the ability to generalize the selected data, develop logic of common reasoning, based on selected and pre-analyzed data in order to formulate a final conclusion); 6) evaluation (assessment – critical thinking, concentration of attention on the formulation of a judgment, its justification on the basis of the information received: the ability to determine the accuracy and reliability of facts and data selected to prove their point of view and to take decision). The study finds that most of the works of English authors (Halpern, 2000) has significant number of definitions of intellectual competences. Some authors identify it with the definition of informal logic, others with creative thinking, while highlighting the characteristics of each: knowledge, abilities, skills, capacities, qualities, experience. But virtually all definitions contain general indicators: evaluation, synthesis, analysis, application, comprehension, knowledge.

In Russian literature the formation of intellectual competences of students is determined by the influence of requirements of Federal state educational standards, initiating a significant amount of research of problems in realization of competence approach in professional training of students (Zimnyaya, 2003; Khutorskoy, 2002; Shadrikov, 2004). Based on these results, researchers are developing the contents of training and methodical support for projecting and

implementation of students' key competences in the educational process; formation of key professional or general cultural competences in the process of studying of separate disciplines' cycles, in the process of education, professional adaptation and in other educational areas (Integration processes in the modern professional education, 2013). To a large extent the results of these studies to date define the specifics of use of students' intellectual competences in the educational process of the University. In this study the necessity to use theoretical and methodical foundations for the projecting and implementation of training - methodical projects to form the students' intellectual competences is proven. The results obtained can be used as a training and methodical support of educational process with innovative technologies for implementation of project modules of students' intellectual competences.

Results

The modern discourse of the intellectual competences of students

The study finds that the use of the concept "competence" as a scientific category in the educational activities of the University refers to the 90-th years of the last century. In UNESCO reading materials this process is regarded as a desired outcome of education: "learn to know, learn to do, learn to live together, learn to live" (Delor, 1996). Simultaneously with UNESCO in March 1996, in Bern at the Symposium on the educational reforms on the program of the Council of Europe the issue of implementation of the competences which must be acquired by students as for successful work and so for further education are discussed. At this Council the five groups of competences for young Europeans were approved: political and social, communicative, social and informational, cognitive, special. It is established that the solutions identified characteristics of the content of higher education, which was defined as the pedagogically adapted social experience, mastered by the personality in its own activities, implementation of experience in cognitive, reproductive and creative activities and emotional and value attitudes to the real study of reality: nature, culture, technology, social communications and other real objects of the educational areas. It is proved that the content of education from this time includes not only knowledge about reality, but reality itself which is recorded in the form of a minimal set of real objects to be studied. In relation to these objects the relevant educational activity of students is available, which leads to the formation of their general educational knowledge, abilities, skills and ways of activities, systematized in the minimum list of key competences. The study finds that intellectual competences in accordance with European trends began to be defined as the ability of the individuals to expand their knowledge in various fields and to improve their erudition (the Bologna process, 2006).

The structure and content of the training-methodical projects for students' intellectual competences formation

The study establishes the performance of requirements for the projecting of the structure and content of training – methodical projects for students' intellectual competences formation:

- the presence of significant problem from the view point of its research and creative nature that require integrated knowledge, research for its solution (for

example, creating in social networks of a series of reports from different parts of the world on the issues of combating terrorism);

- hypothetical, theoretical, cognitive significance of the expected results (e.g. study report to relevant authorities about the state of the environment, video clips, reflecting the problem arisen and its solutions' ways);

- independent (individual, pair, group) activities of students in solving different problems;

- phased allocation of a substantial part of the project with intermediate results;

- the use of research methods involving a sequence of actions:

- definition of the problem and related research tasks out of it in the course of the joint method's using like brainstorming, interactive and computer technologies;

- the hypotheses' proposing for their solution;

- discussion of research methods (analysis of information, facts, statistical and experimental methods, observations, etc.);

- discussion of outcomes' presentational forms (presentation, role play, video, report, paper, etc.);

- summing up, forming of results, their presentation;

- conclusions, proposing of new research issues.

In accordance with the requirements established the typology of training- methodical projects is determined, defining main direction of their implementation in the educational process. Typological characteristics of projects are:

- dominating activities in the project (research, creative, role-playing, practice – oriented or informational);

- subjective-content area: mono-project (within the same field of knowledge), interdisciplinary project;

- the nature of the coordination of the project (tough, flexible), hidden (implicit, simulating the participants of the project);

- the nature of the contacts (among the participants of a single institution, group, city, region, country, different countries);

- number of participants of the project;

- duration of the project's implementation.

For the process of University students' intellectual competences' forming on the basis of the requirements established and typological features of the course of the study the effectiveness of the following types of training – methodical projects is proven:

- research. This type of projects involves reasoning of the topic relevance, formulation of research problem, its subject, object, designation of objectives of the study in accordance with the accepted logic, the definition of the research method, sources of information, the choice of the research methodology, hypotheses' proposing for solution of the given problem, development of its solutions, including pilot, experimental, discussion of the results obtained,

conclusions, and presentation of results of the study, the designation of new problems for further development of research;

- role-playing, games. The structure of the project remains open pending completion of the work. The participants take the roles, due to the nature and content of the project. It can be literary characters or virtual characters, simulating social or business relations developed by the participants of the situation. Gaming or role-playing activities. The results of the project are predicted already at the initial stage of operation;

- practice – oriented. These projects are distinguished by a clearly defined result of the activities. Moreover, the result necessarily is focused on personal interests of participants in the activities (research report, student vocabulary, project of a classrooms, etc.) This training – methodical project requires a carefully designed structure, the scenario of all the activities of its members with identifying of the functions of each of them, clear conclusions about the results of each participant in the forming of the final product. For this project is particularly important a well thought-out coordination, phased discussion, correction of joint and individual efforts, the organization of the presentation of the results obtained and possible ways of their implementation in educational process and systematic external evaluation of the project;

- interdisciplinary. It's any small projects involving two to three items, or big enough, long-lasting, collective, planning to solve a rather complicated problem which is significant for all participants (e.g., "Culture of communication", "Self-organization of students", "Educate Yourself"). They require skilled coordination, the coordinated activities of all participants, well-designed forms of interim and final presentations;

- the length of time. Projects can be developed on the basis of several classes of one subject or on interdisciplinary basis. The following types of projects are established: short-term (to solve a small problem or a part of a larger problem); medium-term (from a week to a month) and long term (from weeks to months). Short-term projects are conducted in the classroom on one subject, medium and long term – are interdisciplinary and contain a rather complicated problem or several problems, and therefore can provide a package of projects. It is established that in actual practice, teachers and students are dealing with mixed types of projects that contain features of research, role, practice-oriented, or other creative types. Each type of project is characterized by a particular kind of coordination, timelines, stages, number of participants. Therefore, in the development of training – methodical projects of students' intellectual competences' formation in educational process of higher school it is necessary to take into consideration the peculiarities revealed and the characteristics of each type.

Pedagogical algorithm of training-methodical projects of University students' intellectual competences formation

In the course of the study the effectiveness of educational algorithm for elective module's content projecting is proven:

- the choice of the theme of training – methodical project, its type, the number of participants. In this step, it is necessary to create the prerequisites for a successful psychological – pedagogical, methodical, organizational and resource provision;

- the identifying of all possible variants of problems which are important to explore in the framework of the proposed topics. This stage is characterized by the specification of the purpose, its functions: stimulating in relation to the participants; transformative in relation to the subject of projecting and its participants; normalizing in relation to the activity and its result; the orientation ones towards the final product; the nature of project perspectives, in general, possessing a search direction;

- planning of the project. One of the most important stages: the distribution of tasks for educational groups, discussion of different research methods, finding of information, creative solutions. In the result of the problem's definition and goal's setting, a common for all participants of work on the project motivational, value – sense, target and strategic direction is constructed for all subsequent actions. The result of this stage of work is the conceptual position based on the realized selection of approaches, ideas, theoretical positions, principles on which the project activities will be built or on the interpretation of available research (diagnostic) data. At this stage the project's boundaries are specified via the introduction of targets, resource and time constraints. Obligatory condition for the success of this work is the development of a plan related to ways of achieving goals, long-term implementation, with specification of elements;

- independent work of project's participants on individual or group research, creative tasks. Each of the participants started the implementation of the planned actions in accordance with their own logic. But in every moment of working on the project every participant must clearly imagine what and in what sequence he has to perform, to anticipate the results and their role in the overall design. The project's participant must imagine, where, from whom, in what forms he can find help and support in case of difficulty in performing the task. In one case, it could be a teacher, in another – the students' advisor, tutor, technical consultant or information retrieval database. Throughout this phase there should be a feedback system for students with teachers assuming the presence of students' focus on a critical attitude to their actions, the ability to monitor events with the help of special procedures and techniques of the observers, and experts;

- Protection of projects and peer review. This is primarily demonstration of results of independent work of students. Without the protection stage of the project the study could not be completed. During the project's defense, students present their own level of development of intellectual competences: to analyze information received, to defend their position, to take criticism properly, professionally represent the knowledge of the research subject;

- collective discussion, examination, formulation of general conclusions. Final examination and evaluation of the project determine the compliance of the product to the original plan. The following parameters for the external evaluation are used:

- the significance and relevance of the proposed problems, their adequacy to the studied topics;

- the correctness of the methods used and the methods for processing of the obtained results;

- creative activity of each participant in accordance with the individual abilities;

The collective nature of decisions taken, the nature of communication and mutual assistance, complementarity of the project's participants;

- establishing of the necessary and sufficient depth of penetration into a problem, bringing of knowledge from other areas;

- conclusiveness of decisions taken, ability to substantiate the findings, conclusions;

- the aesthetics of the results' presentation;

- the ability to answer the questions of opponents, conciseness and validity of the responses of each group member;

- project sustainability: the transition to a new project, integration with other projects, the dissemination of the project to other levels.

Discussion

The results of the study conducted clearly confirm the hypothesis that the problem of forming of students' intellectual competences in the process of implementation of training – methodical projects is an imperative goal of the educational process of modern University. This trend can be explained due to the needs of the labor market in high-tech intellectual competences of graduates of universities. The costs associated with the development of intelligence of specialists, according to experts form the basis of their competitiveness and demand in the labor market. In this regard, the trends identified in the course of the study, substantiate the theoretical and practical significance of the transformation of the educational process of the University through the implementation of pedagogical algorithm of training-methodical projects of students' intellectual competences' formation. Productivity of the implementation of the algorithm is proven using the criteria (a 5-point scale is used): the formation of knowledge ("before" experiment 3-4, "after" experiment - 4-5 points); comprehension of knowledge ("before" experiment – 2-3 points, "after" experiment – 4 points); the analysis of knowledge ("before" experiment – 2-3 points, "after" experiment – 4.7 points); synthesis of knowledge ("before" experiment – 2-3 points, "after" experiment, 4.5 points); assessment of knowledge ("before" experiment – 2-3 points, "after experiment – 4.8 points).

Conclusion

The study conducted confirms the theoretical and practical significance of the problem of students' intellectual competences' formation in the educational process of the University. Based on the results of the study, the paper re-interprets the discourse of the concept "intellectual competences"; it defines the essence, structure and content of the training-methodical projects of students' intellectual competences' formation; substantiates pedagogical algorithm of training-methodical projects of students' intellectual competences' formation. The productivity of the algorithm identified is proven using the criteria: formation of knowledge (the content of the study course and related areas); comprehension of knowledge (the ability to restructure information, giving some interpretation of the main idea); the analysis of knowledge (the ability to compare the basic ideas of information, formulate conclusions confirming the assumptions, the ability to ask questions); synthesis of knowledge (the ability to synthesize, develop logic of common reasoning, based on analyzed facts to create a final conclusion); assessment of knowledge (the ability to determine the

accuracy and reliability of facts, to evaluate findings and conclusions). This problem as a research direction is not exhausted by the solving of the goal. Its capacity possesses available resources, useful for improving of the educational process of the University: planning of the educational environment, improvement of the curriculum, subject content, technology, scientific – methodical and resource support.

Disclosure statement

No potential conflict of interest was reported by the authors.

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