

Historical Education in the System of Engineers' and Technical Specialists' Training

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Abstract

The importance and significance of the issue is determined by a new Federal State Educational Standard of higher education in Russia and changes in the system of engineers' and technical specialists' training. The report is aimed at the generalization of the experience and best practice of the new approaches to historical education implementation, mainly in higher educational establishments. The keynote methods in the research are historical and pedagogical methods. The report is focused on the application of the competence-based approach to teaching "History" in technical colleges through the organization of students' autonomy while studying the subject and implementation of interactive forms of education and on-line education. It reveals that a combination of the above mentioned approaches and forms of education in teaching "History" leads to the improvement of quality, progress in studies, professional competences advancement and the subject academic performance. The results of the research can be useful in teaching "History" in technical colleges and universities.

Keywords: historical education, high school, students' autonomy, teaching at technical university, Federal State Educational Standards, engineers' and technical specialists' training

1. Introduction

1.1 Relevance of the Problem

Historical education in technical colleges of Russia has been under serious changes lately. The changes were caused by a number of factors: modernization of Russian education and transition to the multilevel educational system (undergraduate, graduate and post-graduate programmes); introduction of new Federal State Educational Standards (FSES) of higher education; initiation of a new system of education quality evaluation and the principles of the complexity of the educational process (Levina, et al, 2015).

Due to the implementation of FSES at all levels of education (from pre-school to higher education), the priorities in training are changing and focus on the formation of an independent personality possessing high professional competences, able to make decisions and to estimate their consequences.

Russian researcher O. F. Piralova considers that "current situation threw new light on the problem of training engineers and technical specialists. It demanded to establish scientific rationale of it as a complete system of conscious and purposeful participation of all parties in a social and economic life of society" (Piralova, 2009). In this regard, she offered the integrative theory of professionalism as an approach to engineers' and technical specialists' training where the humanities would play a significant role (Piralova, 2009). The approach assumes a wide use of historical data.

Nowadays, the tendency is to reduce or refuse from historical subjects in technical colleges and to replace them with other subjects like "Introduction to specialty", "Quality management", "Management" and others. According to the supporters of this approach, it will allow to redistribute the time given to the humanities in favour of technical subjects. As a result, the time given for classroom work and self-study in "History" was seriously reduced, the so-called "national component" as part of historical subjects was cancelled (for example, "History of Tatarstan").

Meanwhile, historical education remains the most important factor in developing expert's professional

competence. History is the subject which promotes the development of critical thinking and moulds citizens of modern society with rich historical past; it introduces national and world cultural traditions, upholds respect for the past, teaches lessons from the past of the state and of the world community in general, nourishes patriotism and tolerance.

Modern technical specialists should be able to complete specific technical tasks. Besides, they should be able to bear responsibility for the decisions that is, undoubtedly, promoted by studying history.

1.2 Federal State Educational Standard and Competence-Based Approach to Training

Federal State Educational Standard of higher education in technical specialties provides training for bachelors to perform a number of activities: design activity; production and technological activity; experimental and research activity, organizational and administrative activity. Respectively the FSES of higher education sets professional tasks for the graduates to solve, and states the competences to tackle professional tasks. As an example it is possible to consider FSES in "Aircraft industry" (FSES 160100.62 Aircraft industry (qualification (degree) "Bachelor"), 2011) as this profile makes the basis of preparation of engineers at the Kazan National Research Technical University named after A.N. Tupolev. The Standard defines the competences of the bachelors – future graduates.

Common cultural competences can be moulded only through teaching historical subjects to the students of technical profiles (better to say: humanitarian subjects).

According to FSES "National history" is substituted by the core subject "History". The time, given to studying History (according to the new FSES) is: 54, 36 or even 18 classroom hours. O. I. Sitnikova and I.N. Naumova (2012) write that "the only thing is to regret, but it will be more correct to think of the ways and conditions of implementing the purposes and tasks facing the humanitarians".

"History" as a subject is focused on the formation of historical consciousness and historical thinking, ability to think independently. As a result of its realization students have to receive and consolidate the extensive knowledge of history corresponding to the modern level of world historical science; to examine basic concepts of interpretation of the worldwide historical process, to develop skills of the comparative and historical analysis. Successful mastering the offered programme will allow students to enter the world of modern humanitarian knowledge intensively.

All subjects of the main educational programme, the competences to master, are pointed out. These are the competences which are moulded while studying History (example: "Aircraft industry", profile - "Aircraft construction"):

- to be able to use oral and written forms of the language logically, reasonably and clearly;
- to be aware of the social importance of the future profession, to have high motivation to perform professional activities;
- to demonstrate readiness to use basic principles and methods of social, humanitarian and economic sciences in the solution of social and professional tasks;
- to acquire computer-operating skills as the data and information management tool.

These competences are focused on the formation of common cultural views and abilities of students to help them in their future professional activity. Competence-based approach assumes strengthening of students' autonomy. In turn, independent work can act as a means of competences formation. The formation of autonomy learning skills while studying "History" is of high importance.

1.3 Explore Importance of the Problem

The approaches to historical education for technical specialists and engineers in connection with the FSES introduction were worked out by the History research and methodology academic board of the Ministry of Education and Science of the Russian Federation in the form of the model educational programme in "History". In the model programme the aim of the subject is as follows: "to create the complex idea of cultural and historical originality of Russia, its place in the world and European civilization; to create the systematized integral knowledge of the main regularities and features of the worldwide historical process, with emphasis on studying of history of Russia; introduction to the range of historical problems connected with future professional activity, development of acquisition, analysis and synthesis of information skills " (Chubaryan, 2009). The goal, in case of its successful implementation, will radically change the methodology of teaching History in technical colleges. It also demands serious changes in the curriculum content and structure of the given course (a transition from the isolated format of the subject "History of Russia" to the world history structure). As a result of studying

a new course, acquisition of additional competences will become true: «abilities to solve problems, to find answers to the questions raised in everyday life independently by the means provided by "History" course» (Chubaryan, 2009). It correlates with the general aim of the Federal State Educational Standard – formation of the independent personality capable of making decisions and being responsible for their results.

1.4 Status of a Problem

Historical education in technical colleges and for unhistorical programmes were studied from different points of view.

The papers by E.L. Grinchenko & O. I. Kurdumanova (2012), N. N. Matushkin (2010), O. N. Korzhenevskaya (2013) are devoted to the problem of the modern system of higher education in Russia.

D.S. Konkov (2007), O. I. Sitnikova & I.N. Naumova (2012) discuss the state and conditions of historical education and history teaching in technical colleges and in unhistorical educational institutions.

Application of the competence-based approach in training and its implementation through the students' autonomous work is studied by A. A. Vlasenko, N. V. Soboleva, S. V. Sobolev & M. V. Marzhenakov (2014), I.V. Sharf (2011).

The organization and management of students' autonomy is investigated in the works of O. N. Efremova (2013), T.N. Ivleva (2012), I.N. Luchinina, T.V. Tikhomirova, I.S. Voroshilova & D. A. Romanov (2013).

The analysis of the above stated authors' papers and many other publications on the problem of historical education in technical colleges, the organization of autonomous work in the conditions of FSES implementation showed that a number of researches was carried out: on the problems of training based on FSES; on the purposes and problems of historical education for unhistorical degree; on the organization of independent work within the Standard; on the application of the competence-based approach in the management of the natural sciences and social sciences subjects.

However, there are no researches in which the implementation of new approaches to historical education in technical colleges and for unhistorical educational programmes were studied.

2. Methodological Framework

2.1 Research Tasks

As part of the study the following issues were studied: 1) analysis of the historical education in technical colleges; 2) analysis of the competence-based approach to training within the implementation of the Federal state educational standard of the third generation; 3) application of the obtained data and information to the analysis of teaching "History" and autonomous work of students within this subject; 4) synthesis of the findings; the efficiency of teaching "History" and of the applied types and forms of independent work evaluation.

2.2 Theoretical and Empirical Methods

To carry out the tasks a combination of various methods complementing each other was used:

– theoretical – the analysis of literature, Standards, legislative, instructive-methodological papers and administrative and procedural materials on a research problem; studying and synthesis of innovative pedagogical experience, analysis, synthesis;

– empirical – the involved observation, the ascertaining pedagogical experiment, testing, studying of the results of class and out-of-class students' activity.

2.3 Research Methodology

The general principles of historiographic analysis were used: definition of the range of problems and perspective of researches, analysis of theoretical and methodological background to the issue discussed by the authors, and the following historical methods: *comparative and historical*, the application of which gave a chance to reveal the contribution of authors to the development of competence-based approach to higher school training implementation, taking into account the requirements of the Federal State Educational Standard; *typological*, thanks to which from a wide range of various materials the most important and necessary for the re-evaluation and understanding of the subject were chosen.

Also pedagogical methods of research were applied. First of all it is the traditional methods which were inherited by modern educators from the researchers, who originated educational science. These are observation methods, experience examination, studying authentic sources, studying students' creative papers, conversation.

Application of the observation method allowed to track the formation of the competences in the course of students'

autonomous work.

By means of the experience examination method the subtle analysis of the solutions of specific problems and the conclusions about their applicability and advisability in new historical conditions were made.

Studying of students' creative papers allowed to take a closer look at the students autonomous performance in History studying.

3. Results

3.1 "History"

"History" as a subject is studied during the first year (one semester) in the university. The general workload of the discipline makes 108 hours. According to the FSES half of the time given on the subject is for self-study, 54 hours, classroom work makes 54 hours, including 18 hours of lectures and 36 hours of project work and practical studies. Self-study includes the following tasks: preparation for seminars and discussion sessions, preparation of presentations and slide decks on the study subject, studying scientific, academic literature and research sources, doing tests and exam preparation.

At the lectures students study the main trends in the civilization development. The basic concepts and terms applied in modern science are introduced. To master the contents of the theoretical course students listen, think and at the same time take notes of the lecture which is given in the form of problem-based learning, in the form of a dialogue with discussion elements, with application of multimedia technologies.

The seminar is organized in the form of analysis and discussion (understanding and critical evaluation) of processes of civilization development. The discussion session is made of students' individual performances, collective discussions of the questions on the studied subject based on the self-study and is presented in the following forms: studying of the scientific literature and supplementary non-fiction, annotation or the abstract review of the literature, working at terms and concepts, the analysis of the lecture texts and electronic materials on the studied subject, writing reports and statements, multimedia-based presentations on the chosen subject, working with historical sources, examination and test preparation and other forms of the formative assessment. Work with cartographic materials includes the use of the textbook maps, atlas or wall maps. Student should be able to use the map and to get geographical bearings, to show where geographical objects are situated correctly.

The training course schedule is organized in the way that classroom and self-study correlate, at the same time, forming students' holistic view of the world history.

3.2 Teaching Materials on "History"

There were made adjustments to the teaching materials concerning subject, lectures and seminar structure, forms of students autonomous work and assessment criteria, requirements to the retention of the content and to the obtained competences, forms of formative and summative academic assessment according to the new approaches. In "History" course, the syllabus has three basic modules urged to show the main tendencies and directions of the history of Russia in the context of the world civilization development. The problematic/chronological principle of training is the cornerstone of this division. The first module is devoted to the agricultural stage of humanity development and highlights the main stages of education and evolution of community types, statehood and world civilization (from ancient times and Middle Ages to modern times). In the second module the history of Russia is presented in the context of world industrial development that expands on the array of issues of modernization of Russia, special aspects and characteristic features of industrialization in Europe and in Russia, the role of Russia in the world geopolitical space and development of model of socially oriented society and state in the XX century. The third module concerns the period of the second half of the XX and the beginning of the XXI century (the problem of world politics, scientific and technical revolution and challenges of the post-industrial era, integration of Russia into the "world information society", participation of Russia in the world globalization processes and a problem of new Russian identity construction – society, culture, policy). Such approach allows to give students a complex idea of the world historical processes and the role of Russia in the world history (History: teaching materials, 2011).

The use of teaching materials in the course of engineers' and technical specialists' training entails adjustment of the system of high school organization and management process: definition of types of work at lectures and seminars (including *pass-fail* exam), taking into account the use of scoring model and performance appraisal rating system, multimedia maintenance in educational process, students' self-study, etc. It seems especially important in the conditions of technologies expansion in an educational system, and reproduction of the accumulated knowledge. Also, it is necessary to use intersubject communication of "History" with the issues studied by the students of various technical specialties within the courses of vocational training (for example, the

problems of history of science and technology of the selected specialties).

3.3 Application of the Teaching Materials on "History" in Educational Process

The interactive technologies applied when studying the subject are presented in the form of visual material (maps, schemes, tables, illustrations), and also in the form of presentations prepared by the teacher or students, video clips taken from scientific, publicistic or historical feature films. They can be used as in special computer classes by means of Black Board system or connection to the Internet, and in specially equipped rooms. Relative intensity of the interactive classes depends on the main goal of the educational programme, features of the student body and the contents of the subject. In general, in educational process they make not less than 20% of classroom studies.

Interactive training is a training in the form of a dialogue between the teacher and the students. During interactive classes ready-made knowledge isn't introduced, the teacher induces his students to an independent information search. As a result interest in history and creative activity of students increase, and skills of practical application of the gained knowledge are formed.

Role-playing – the imitating game as a method of active training – an active form of education which is characterized by defining a task, roles and responsibilities of the participants for their solution, interaction between them, assessment of the results of the discussion and summary. For example, the participants of practical classes in History represent themselves as a certain historical personality and offer the option of actions during the crisis period in development of the country. Such "immersion in history" allows to understand and evaluate the events better and more objectively.

The analysis of situations is an effective method of educational cognitive activity. The use of the situation-problem (the description of a real problem situation with the view of finding the solution of the situation or to come to the conclusion) and situation-evaluation (the description of the situation when the way out is already found, with the view of carrying out the critical analysis of the decisions made, to draw the motivated conclusion concerning the presented situation and its solution).

Discussion or a debate is the method of active training, stimulating students' initiative.

These interactive forms are applied at lectures and practical training classes and help students to understand historical processes more profoundly.

It is possible to define the following aims of students' self-study on "History":

- to learn to apply traditional sources of information, Internet resources on history independently, to be competent in compiling texts on the computer;
- to develop ability to show basic knowledge in the field of history and to form the experience of finding the solution of professional tasks based on the obtained knowledge;
- to develop students' professionally important personal qualities, such as a choice of own strategy, responsibility for decision-making, etc. (Golobokova, 2011).

The purposes of a competence-based approach contribute to the choice of forms and types of students' autonomous learning and preparation of the corresponding tasks. The following tasks on self-guided work of students are provided: preparation for seminars including additional sources and literature reading, working at terms and maps, paperwork, multimedia presentation, test preparation.

Let's consider the above-mentioned forms of students' self-study.

Self-study involves preparation of oral presentations for the discussion. It represents students' performance at the seminars on any subject issue. The answer should be full and combine the information from different sources and research literature. It is necessary to show the cause-and-effect relations of the events in the answer and to formulate one's own attitude to the facts and events. The answer of the student has to be accurately structured, that is have an introduction, the main part and the conclusion. It has to be a presentation of the topic. The time limit for the oral answer is 10-15 minutes. After the report questions can be asked both by the teacher, and the students. Other students can add some information. However, the supplementary material should not repeat the mentioned before. The addition to the report should be short and disclose new aspects of the subject matter.

The report or the paper as a form of an educational task aims at the extension and deepening of the knowledge on separate subjects of the studied course. It should be a kind of a minor research. Core requirements: highlighting of the issues and questions not included into the seminar and lesson plan, scientific character of the analysis of the studied material and conclusions, logic and consistency of the statement presentation. The paper should

contain the plan consisting of an introduction, the main part, the conclusion and a list of references, used resources and literature. The report is one of the students' research forms and can be submitted at different conferences.

The formative progress assessment is held in the form of the midterm examination. The quality of education and progress in a subject is defined by the point rating system parameters involving modular testing and verbal quiz which make part of the general score for the work during the semester and is the form of summative assessment of "History" study.

Self-study accomplishment develops skills of information study, provides scientific study and academic research development, develops the ability to interpret historical issues based on the analysis of versatile sources, and reveals creative abilities. For more effective course study, educational process provides consultations when the teacher gives individual help in the course of independent tasks performance and at the same time estimates their results.

Electronic learning "The electronic educational milieu" based on the e-learning technology (www.bb.kai.ru) was set up at the Kazan National Research University. The content-knowledge of the studied subjects is in structure of on the platform. It is supposed that every teacher assigned to a certain subject has to place teaching materials in the system as the electronic learning resource. The system "involves three types of the module: module of information acquisition (for example, lecture notes, course programmes), module of practical training (subject and plans of practical studies, a list of necessary literature and resources, educational and methodical study guides), assessment module (tests). The minimum requirements for functioning of a resource are: content-knowledge, monitoring and measuring sources, glossary, and a list of bibliography. Electronic learning involves students' independent work with electronic resources computer-assisted, consultations, practical advice, grades, etc., creation of user community to conduct common educational activity.

The electronic course allows students to look into the subject matter and to get prepared to answer questions during the discussion session and be ready for the formative knowledge assessment.

4. Discussions

Some aspects of the studied problem were considered in the publications of Russian scientists and teachers. It is possible to allocate the following publications:

researches on modern higher and high school education (Grinchenko & Kurdumanov, 2012; Matushkin, 2010; Korzhenevskaya, 2013; Levina, et al, 2015; Gafiyatullina, et al, 2015; Kovaleva, et al, 2015);

works on teaching History in technical colleges, problems of historical education for unhistorical specialists (Piralova, 2009; Konkov, 2007; Sitnikova & Naumov, 2012; Khayrutdinov, 2014; Mrathuzina, et al, 2015);

abstracts on the organization of students' independent and research work and their influence on students' professional competences formation (Vlasenko, Sobolev, Sobolev & Marzhenakov, 2014; Sharf, 2011; Vorobyov, Davydov & Yashchenko, 2012; Fedotova & Yashchenko, 2012, etc.).

However the questions of practical implementation of the offered approaches in teaching "History" in technical colleges weren't raised in the above-mentioned researches. It generated an imperative need for the research of practical implementation of the approaches to historical education in technical colleges and unhistorical departments offered by various authors, such as competence-based approach to teaching in higher school, the organization of students' independent work from the point of view of professional competences formation, application of interactive forms in teaching "History" to the unhistorical profiles.

5. Conclusion

The implementation of new approaches to historical education in technical colleges touched upon in the report meets the needs of higher educational institutions and considers the implementation of the new Federal State Educational Standard of higher education and the competence-based approach registered in it.

The aim of historical education in technical colleges is the formation of complex idea of the cultural and historical originality of Russia, its place in the European and world civilization that assumes introduction an extensive range of sources, literature on history and culture of Russia and the countries of the world. These ideas are realized through interactive forms of education and students' independent work.

Students' independent work on "History" consists of studying monographs, collecting and analyzing the resources and literature necessary for practical studies, writing extracts and preparation of papers, working with cartographic materials, exam preparation and, finally, passing the examination in History.

While teaching "History» students' independent work is assessed in points that allows them to estimate their success in independent work. Communication opportunities of the electronic course on "History" provide getting advice from the teacher on any question.

In general this system allows students to master the content of the subject "History" successfully, it promotes the competences formation determined by the Federal State Educational Standard and by the main educational programme. Finally, it is focused on the formation of a successful personality.

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