

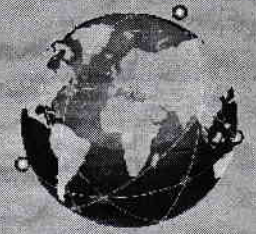


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Vol. 4 - Issue 7 (July - 2020)

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Keywords: Quality, Quality of Service, Hospitals, Gaza Strip, Palestine.
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To Elaboration of Information Base of the Integrated Training of Bachelors on Mathematical and Special Disciplines

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Abstract: *The paper substantiates the methodology for the implementation of intersubject communications of mathematical and special disciplines in the preparation of bachelors of the specialty "Software Engineering" in the fields of communication, information and telecommunication technologies based on the information base of disciplines and packages of applied training and knowledge control programs. Using this integrated teaching methodology based on the relationship of mathematical and special disciplines reveals new opportunities for students of future programmers, for teachers the need to go to a whole new level in teaching.*

Keywords: integrated training, database, discipline information base, intersubject communications, discipline logical structure.

Introduction

The quantity of the information necessary for ability to live of the person every day grows in the modern world, therefore there is a vital issue about an urgency of formation of abilities on its automation. After all, if to automate processes of processing and information storage it will give the chance to process большее quantity of the information for smaller quantity of time, besides reliability of its storage will increase also. For storage and processing of a considerable quantity of the information modern databases and control systems of databases which are studied at different levels of a modern education system [1] also serve. Acquaintance to relational databases occurs in the senior classes of high school. More detailed and their profound consideration occurs and on older years of various specialties in higher educational institutions.

Despite intensive development of information technology in all spheres of higher education, in particular, means of multimedia of educational appointment (electronic textbooks, encyclopedias, dictionaries, directories, presentations, etc.) Their use in educational process of high schools has fragmentary character. It is caused not only the limited technical possibilities of high schools, but also and not by ability or not desire of the faculty to use modern technologies in educational process. In student teaching special artificial systems of selection, structurization and representation of the substantial educational information are used. Receptions of a mnemonics or mnemonic receptions concern such systems. By means of various receptions of system facilitate storing, increase volume of the studied substantial educational information by formation of artificial associations. In psychology as associations understand communication between the mental phenomena, at which actualisation (perception, representation) one of them involves occurrence of another [2, 3, 4, 5, 6].

The modern expert in the field of communication, information and telecommunication technologies, in particular the bachelor of a direction of training «Program engineering», more and more requires mathematical modelling, algorithmization and programming, especially in the field of applied - calculus mathematics. Nevertheless, it is known: the majority of experts in the field of information-communication technologies uses only a small share of knowledge, почерпнутых from mathematical, and the courses connected with it on the applied programming, heard in the higher school. The impression is created, that the volume of the mathematical data entering into the programs, corresponds basically to necessity, but that at pupils ability independently is not developed in a sufficient measure to formulate the mathematical maintenance of the set technical problem. There is a requirement not only for giving «more mathematics», how many in that it is better to explain possibility of its application.

Materials and methods

The fluent analysis of the literature on a theme of research of the project shows, that, despite, a considerable quantity theoretical and applied researches in the field of mathematical preparation of the engineer, the problem of harmonisation of mathematical and special disciplines remains unresolved. In these researches computer science, especially applied computer science (programmer), as harmonisation of teaching of mathematical and special disciplines such direction of perfection of mathematical preparation of the future engineer is insufficiently presented to interrelations. Harmonisation of a statement of a mathematical material consists in use in educational process of historical and substantial aspects between mathematical and special disciplines, applied problems, information technologies [1,2,3].

Thus, has ripened necessity of elimination of contradictions between:

- Integrity of a scientific picture of the world and necessity of its division into separate areas and disciplines with a view of its knowledge;
- Historically caused interrelation of the general mathematical and natural-science disciplines, the general professional disciplines and disciplines of specialisation in preparation of the engineer in the field of communication, information and

telecommunication technologies, and absence of the theoretical and practical workings out harmoniously realising this interrelation.

The problem of an insufficient readiness of information, program and pedagogical conditions, forms, means and realisation methods in interrelation of mathematical and special disciplines defines an urgency of a theme of research of the project.

The research objective consists in a substantiation and working out of a technique of realisation of interrelation of mathematical and special disciplines in preparation of engineers in the field of communication, information and telecommunication technologies on the basis of information base of disciplines and packages of applied programs of training and the control of knowledge.

In work of the known researcher in a computer scope in I.V.Robert's training [6] it is noticed, that introduction of new information technologies puts a number of problems and problems before the teacher. They can be solved, only having well balanced course in which active methods of training allow to form at students of knowledge, skills by their involving in creative uchebno-informative activity.

The literature analysis on a problem allows to formulate lacks of existing techniques of training typical, in our opinion: criteria of the person of the trainee are poorly developed; the offered material is insignificant; there is no feedback between the teacher and the trainee, the algorithm of training is imperfect; time of the teacher is irrationally used.

Creation of conditions for elimination of these lacks in the course of transition from use traditional to qualitative to other technologies, is possible only on the basis of modern means, in particular, the computer. Revision and the analysis of the psihologo-pedagogical problems, many concepts and the representations realised within the limits of the traditional approach for this purpose is required.

Now perfection of system of higher education is impossible without complex information (computerisation). Thus it is necessary to understand as a computerisation not only equipment of high schools by modern computer aids and the software, but also wide introduction of new information technologies in educational process. Thus, the given problem is not reduced to the technical decision, and means reorganisation of scientific and pedagogical outlook of teachers and the future experts. Meanwhile, computer facilities introduction causes backlog of techniques from level of technical requirements of educational process. It speaks in most cases carrying over of old methodical receptions to Wednesday of new information technologies (НИТ), that does not give possibility of use of such important advantages of computer facilities as presentation, work with great volumes of the information; realisations of individual training.

Necessary component of introduction НИТ is the corresponding methodical maintenance directed on formation of skills of use technological and software with reference to mathematical and special disciplines.

The analysis of publications [6, 7, 8], and also the substantial party of preparation of experts in the field of information technologies in some technical colleges of the country, allows to draw a conclusion, that any of authors does not offer full and substantial system of preparation of the future expert in sphere of communication, information and the telecommunication technologies, any of programs mismatches to the full to modern requirements of highly professional preparation of the future experts.

The developed techniques and software of training of experts do not find practical realisation, qualification of teachers on use of computer technologies has no sufficient level.

Result and discussion

The decision of a problem of integration of training of mathematical and special disciplines in interrelation we see, first of all, in creation continuous didactic, scientifically-methodical, interactive компьютеризованной systems of preparation of the future expert in sphere of communication, information and telecommunication technologies.

Proceeding from a research objective, we put following problems:

- To define pedagogical essence of process of interrelation of mathematical and special disciplines and to prove necessity of introduction for a scientifically-methodical turn of concept of harmonisation and integration of training of disciplines as necessary condition of realisation of these interrelations;

- To establish intersubject communications in the form of columns of a semantic network between mathematical and special disciplines;

- To define a place of information technologies (information base of disciplines, packages of applied programs of training and the control of knowledge) in harmonisation of teaching of mathematical and special disciplines in preparation of the engineer;

- To spend skilled-experimental work on revealing of efficiency of harmonisation of teaching of mathematical and special disciplines in preparation of the modern engineer computer science.

Object of research - training to the fundamental and applied mathematics of students of technical faculties of high schools, in particular information technologies on branches.

Within the limits of the given work we can make some assumptions:

1. The interrelation of mathematical and special disciplines in preparation of the engineer assumes the harmonisation of their teaching including: the remedial component consisting of historical aspect of interrelation of mathematical and special disciplines by preparation of experts of an engineering profile, intersubject communications (interosculation) between mathematical and special disciplines, research activity as basic factor of interrelation of mathematical and special disciplines in preparation of the engineer, information technologies as means of interrelation of teaching of mathematical and special disciplines; the substantial component meaning consideration of applied problems, brought into accord with all components of a remedial component.

2. Realisation of interrelation of mathematical and special disciplines is carried out by means of entering of corresponding corrective amendments into methodical system of training to the mathematician, including: a concrete definition of the purposes of training: formation of professional competence of the future engineer; maintenance expansion (introduction of problems of applied character of corresponding sections;) an intensification of various forms of educational and research activity of students: statement differentiated аудиторных and semestrial tasks, strengthening of a mathematical component of final qualifying works, etc.; application various, including innovative, tutorials.

3. The majority of researches available at present, on the given subjects, problems of mathematical preparation of mathematics teachers mention. It is possible to assert safely, that unlike a technique of teaching of mathematics at school, the technique of teaching of mathematical disciplines in high school is in constant search and cannot accept accurate forms in any way. We will be надеяться, that ours research in any measure will bring a small mite in clearing of forms of a high school technique on preparation of applied experts in information technologies with profound studying of mathematics and special disciplines.

Conclusions

Thus, the presented technique of the integrated training of students, on the basis of information base of mathematical and special disciplines promotes realisation of the modern concept of formation in the field of information technologies, to development of modern methods of training. The created base of modern electronic resources, taking into account interrelation of mathematical and special disciplines, allows not only to raise interest of students to studied disciplines, but will allow also to teachers to keep those invaluable operating time which are available in an arsenal of any teacher.

Pedagogical conditions of realisation of modern requirements to integrated training of bachelors on mathematical and special disciplines provide improvement of quality of the higher vocational training, allow to consider mathematical and special disciplines as system integrity, concretise a technique of the co-ordinated, complementary teaching of mathematical and special disciplines which promotes development of coauthorship of students and teachers. Results of research allow to plan prospects of the further researches of the given problem which are connected with application of the structured teaching material as information-methodical means of increase of educational motivation of students, the organisations and managements of their informative activity; technology of preparation and application of electronic textbooks.

Hence, to teachers of special disciplines it is necessary to analyse by working out of own program the program of teachers of mathematical disciplines and textbooks corresponding to it for construction of logic of studying of the subject taking into account intersubject communications of mathematical and special disciplines.

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