The Usage of It in forming Students' Information Competency

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ABSTRACT

The article presents the results of scientific research dedicated to the development of students' information competence via IT. According to the Federal state educational standard for Higher education development of students' information competence is of primary importance.

The article specifies the content and structure of «student's information competence»; determines the objective, content and structure of the study course "Information technology". The didactic support aimed at forming students' information competence via IT was developed and tested.

Grade-rating system was used to monitor the results of students' formative and summative assessment in 2015-2017. The average grade in control group was 76, the average grade of the experimental group was 84. The analysis of students' information competence formation in both groups showed that the students of experimental group demonstrated a higher level of information competence (average and high). Due to student's active participation in the learning process the experimental group showed increase in inner motivation. Research results broaden theoretical framework of IT application in the process of students' information competence formation. They can be implemented for teaching IT providing control of students' information competence formation.

Key words: students' information competence, information technology, information activity, academic motivation, didactic support.

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INTRODUCTION

The modern system of education in Russia is based on Federal state educational standard for higher education of the new generation (FSES HE). Competency –based approach is its specific feature. According to this approach special attention is paid to the formation of students' information competence. That happens due to the development of information society, rapid growth of information technology (IT) and their implementation into all spheres of human life. All the above-mentioned require a specialist to be a profound IT user who is able to process the stream of incoming data. As a result the level of students' knowledge and skills in terms of solving professional tasks with the help of IT (Reyes,2015; Zaripova,2016; Batrova et al, 2014; Lukoyanova and Khusainova,2016; Fuentes Agusti and Brando-Garrido .2016) must be increased.

Information competence presumes development of student's personal qualities, a definite way of thinking, abilities to work with and process information as well as implementation of IT-skills for study purposes, research and work. As a result there is a constant need in developing students' information competence via IT in the system of higher education.

In spite of the opportunities that IT implementation offers in terms of students' information competence formation there could be a number of problems connected with the lack of knowledge and motivation as well as didactic support. Our research solved the following problems: the structure and content of students' information competence was specified; the objective uniting practical aspects of IT study course for study and research tasks was determined (Lukoyanova et al, 2016), the content and structure of the study course providing it's unity and efficiency were determined; didactic support of students' information culture formation via IT was developed and validated.

1. METHODS

«Information technology» was chosen as the subject for students' information competence formation. The reasons for this choice were as follows:

- we considered competence to be «an ability to perform basing on available knowledge and skills when solving problems typical for different activity types»(Federalnij,2016);

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- «modern public and personal needs determined the information competency to be one of the key competencies»(Voinova,2004);
- IT is one of the disciplines studied within the core module of the university course;
- computer programmes and applications studied develop students' skills of working with different types of information.

In order to form information competence students should know theoretical and practical aspects of information literacy. When studying IT students will learn how to acquire knowledge independently, how to analyze and process information, solve problems and use effective and immediate actions. At the same time the researchers faced the problem connected with the differences in students' IT background knowledge. It was not sufficient enough for acquiring new material. That was due to different levels of IT teaching at school. As a result formation of students' information competence is to be based on a number of principles. They are the principle of active targeting, the principle of integrity and complexity of tasks connected with IT usage, the principle of authenticity and uniqueness of task performance.

The content of «Information technology» study course was objective-oriented. The main objective was determined according to the theory of pedagogical targeting (Turbovskoi,1993). It united studying of application-oriented course aspects that could be considered

in training and research. The following objective provides the unity of the course consisting of different application-oriented topics as well as the required educational result.

We consider student's information competence to be a set of progressive personal qualities (skills of efficient information search and usage, cognitive activity, emotional and value-based attitudes towards collected data, communication skills), a system of knowledge, skills and experience of IT activities, characterizing student's ability and readiness for career development using IT.

The following components constitute the structure of students' information competence (Fig.1).

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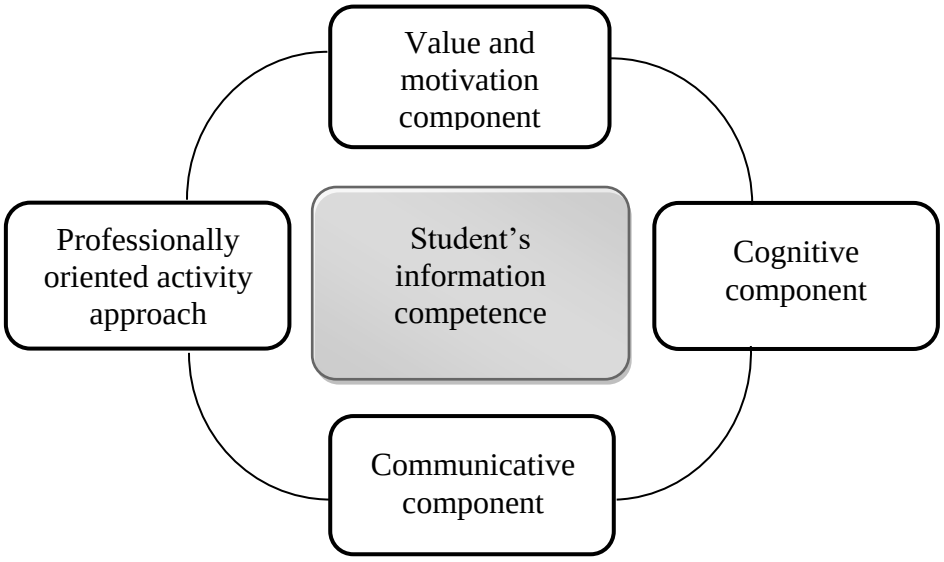

Fig.1. The structure of students' information competence

Value and motivation component means students' readiness to acquire IT skills individually; the need to develop information competence; understanding the necessity to develop personal information competence; emotional and value-based attitude towards information.

Cognitive component means the knowledge and understanding of information and information processes, IT knowledge and the ways it can be used in solving training and research tasks.

Professionally-oriented activity approach denotes the ability to search and apply information as well as the ability to use IT in professional sphere.

Communicative component denotes the ability to produce flexible and productive dialogues of different types, the knowledge of computer etiquette, etc.

In order to provide the unity of IT study course and raise students' motivation practical aspects of the course (like operating system, word processor, spreadsheet, slideware, information search and selection) and object linking as well as embedding technology were combined.

Additional practical tasks for self-guided work allow students to develop study and research skills of using IT for processing information. The following experience could be used in creating documents, processing the results of scientific research, creating a presentation for a course paper or research work.

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Students' understanding of the course main objective is connected with solving of training and research tasks within the basic topics of the course. These types of activities help students to develop positive attitude towards IT. The following factor plays an important role in the process of information competence formation.

Summative and formative assessment of students' success in IT course is based on the grade-rating system. The assessment implies total grades that a student can get for doing practical tasks and in addition to test results for every module studied.

Having studied all the modules of the IT study course students have to pass the final online test to determine the level of information competence and the online survey that is aimed at defining of students' academic motivation (based on methodology created by Dubovitskaja) (Dubovitskaja,2002). For instance, during the final class the students were supposed to complete an online survey in order to determine the focus and level of inner academic motivation when studying IT. The survey is anonymous as some questions presume critical attitude and evaluation of negative personal qualities. In case of anonymity the chances of getting objective and valid results are higher.

Survey content

1. The study of IT course will give me an opportunity to find out a lot of interesting things and prove my abilities.
2. I am interested in studying IT. I would like to know as much as possible.
3. The knowledge and skills that I get when studying IT are quite enough for me.
4. I am not interested in IT course tasks. I perform these tasks because my teacher tells me to do that.
5. Challenges that I face when studying IT make the course even more exciting.
6. When studying IT I intend to read supplementary material in addition to the text books and recommended literature.
7. I think difficult theoretical questions shouldn't be included into the programme.
8. I would like to acquire the skills of working with a word processing programme, to make charts in electronic spreadsheets.
9. I often don't feel like studying when in IT class.
10. I am active and perform all the tasks only in case the teacher is watching me.
11. I try to do all the IT tasks by myself. I don't like to be helped or prompted.

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12. I prefer tasks that do not require intensive effort as well as the tasks that I am sure I can fulfill. They are more attractive than challenging tasks.
13. In case I make mistakes I feel lost and frustrated rather than trying to correct them.
14. I consider all the knowledge and skills that I get when studying IT are necessary. It important to know as much as possible in this sphere.
15. The mark that I'll get in IT class is more important than knowledge.
16. In case I am not ready for the IT class, I won't feel frustrated or stressed.
17. IT is my hobby.
18. It is difficult for me to understand Information technology. I have to force myself to perform the tasks.
19. If I miss classes in case I am ill (or for some other reasons), I feel frustrated.
20. If I had an opportunity I would exclude IT from curriculum.

The developed materials became the constituent part of didactic support aimed forming students' information competence via IT (an academic programme for «Information technology», electronic learning resource «IT: laboratory tasks», a set of tests on Online Test Pad).

Chi-square test (χ^2) was used to prove the validity of research results (Novikov,2004).

2. RESULTS

Pilot testing was being conducted during 2 years (2015-2017). It was aimed at forming students' information competence with the help of IT as well as checking the effectiveness of didactic support and analyzing research results. 132 students took part in the experiment: 35 students constituted the experimental group and control group was presented by 32 students.

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The results of formative and summative assessment of students studying IT were based on grade–rating system and calculated by the average value from the maximum.

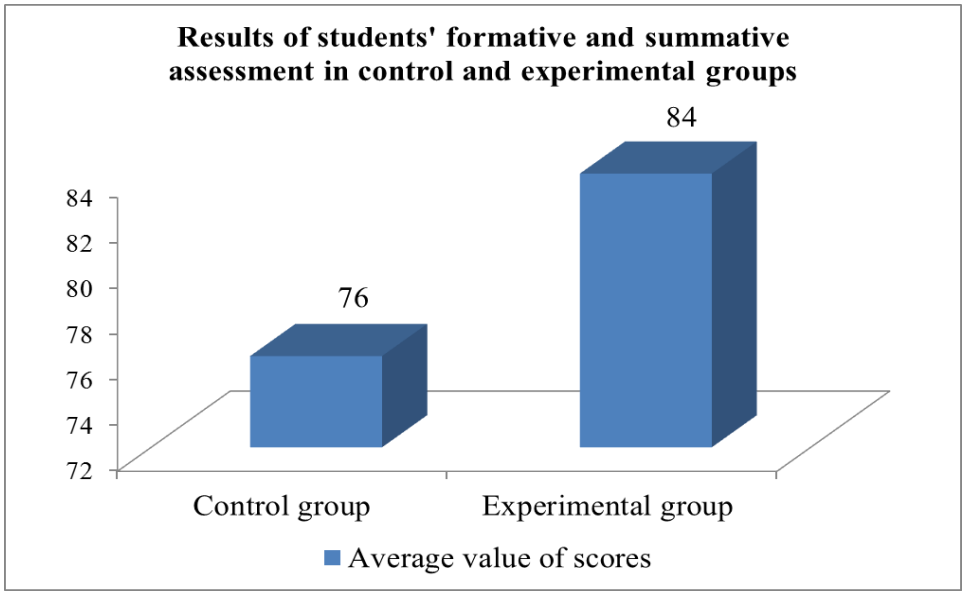

Fig.2. Comparative data of students' academic performance

The average score in the control group was 76 and the experimental group showed 84 (Fig. 2).

The authors defined 3 levels of students' information competence via IT formation (low, medium and high) and analyzed the results all the students showed before and after the experiment. The students of control group studied only application-oriented aspects of the IT study course. The main aim of the experimental group was to integrate the application-oriented aspect and IT usage for solving training and research tasks, particularly automation tools of processing data. The results are presented in figure 3.

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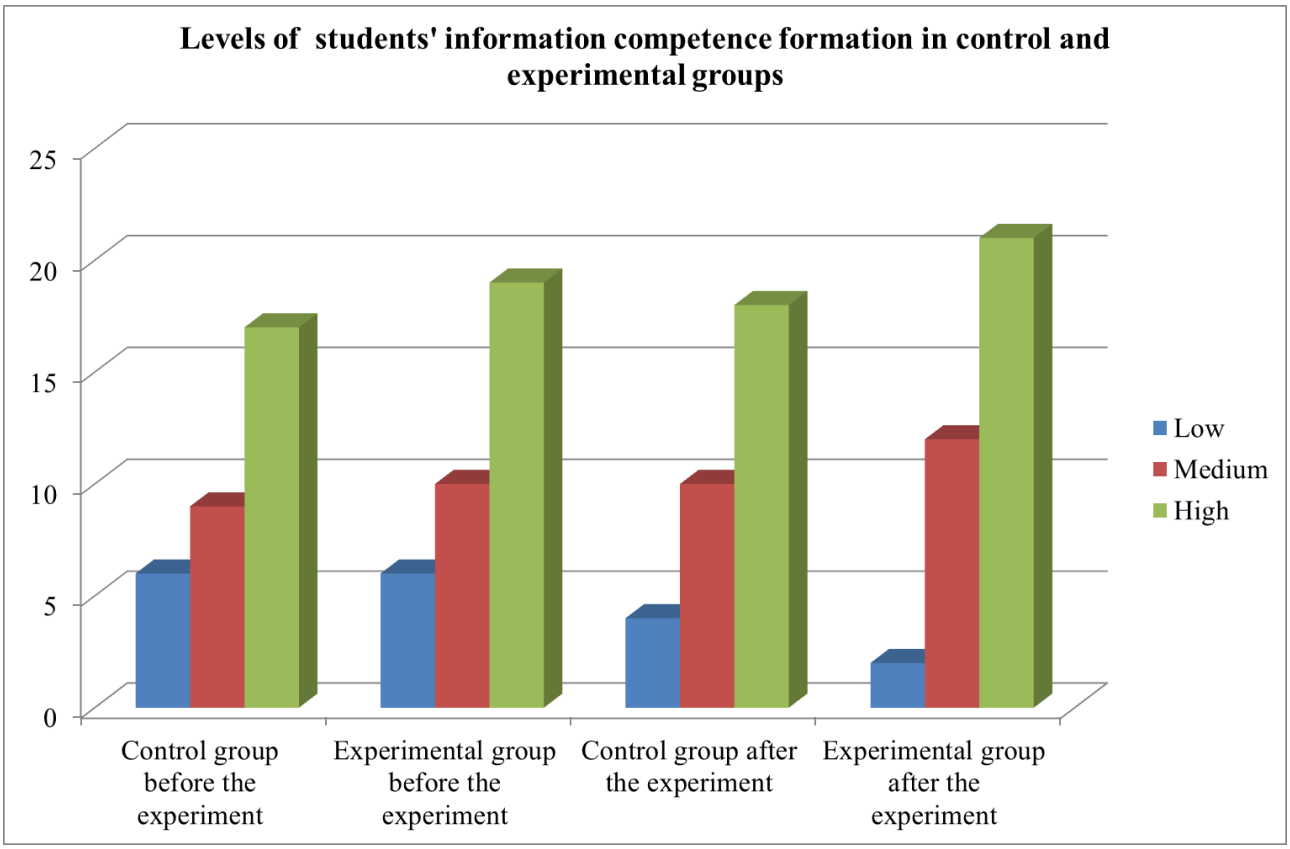

Fig.3. Comparative data of diagnostic results

Testing the focus of academic motivation (9) allowed the authors to get and evaluate the changes of value and motivation component formation. Before the experiment 24 students of the experimental group were inner motivated and 11students possessed external motivation. After the experiment 28 students showed internal motivation (determined by student's activity and his/her participation in the process of cognition). External motivation (determined by the desire to get a good mark, a grant or to be praised by the parents) was shown by 7 respondents (Fig.4).

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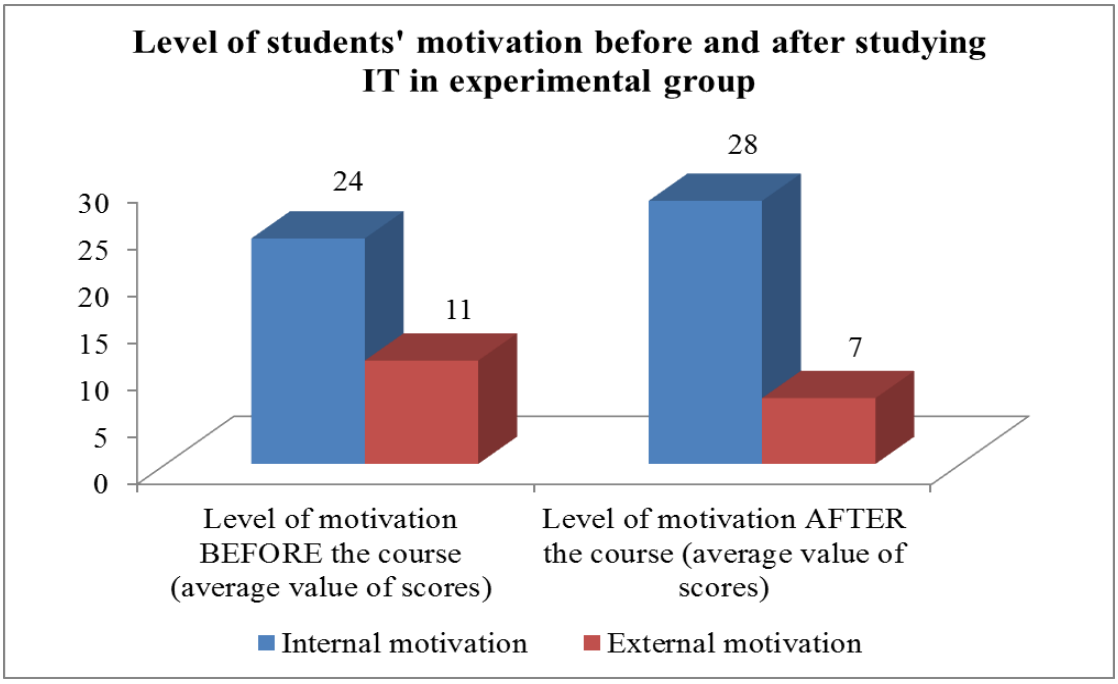

Fig. 4. Level of internal and external motivation development in experimental group

3. DISCUSSION

When conducting the research that was aimed at using IT in forming information competence of students the authors analyzed the results of students' knowledge monitoring. The results of formative and summative assessment were based on grade-rating system. The average score of the control groups was 76, while the scores of the experimental group constituted 84 points.

Testing the level of information competence via IT presented that the students from the experimental group show medium and high results in forming the above mentioned competence. The low level of competence was demonstrated by 6 % of students belonging to the experimental group and 13% of students from the control group.

In order to provide students with efficient IT, it is important to promote academic motivation. According to the results of the academic motivation monitoring in experimental group, 24 students possessed inner motivation before the experiment. 11 students showed external motivation at the same stage of research. After the experiment 28 students were motivated internally and 7 externally.

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The results obtained prove practical importance and efficiency of didactic support for IT application in the process of students' information competence formation. Developed didactic materials can be used in higher education and professional retraining.

4. RESULTS

Present day information society requires the sphere of professional education to be focused on training of specialists who are able to perform in rapidly changing conditions of the modern world. They are supposed to possess new personal qualities and skills determined by professional competencies. Information competence is among the leading ones. It is characterized by the ability and readiness of students to perform IT activities in order to solve different tasks with the help IT. As a result teaching information technology aimed at forming information competence of students is currently important. Experimental work and statistical analysis of the results prove the efficiency of the developed didactic support and IT in forming students' information competence.

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