The impact of digital education transformation on technical college teachers

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Abstract. The transformation of the educational environment based on digital technologies contributes to the emergence of new forms and methods of work of teachers. The search for new learning technologies in the digital educational environment contributes to the motivation of teachers to improve themselves in their professional activities. The authors investigate the impact of the use of electronic teaching tools on the motivation for professional activity of college teachers. In the course of research activities, the authors have created a number of courses on a digital educational platform that can be used by teachers of various disciplines. The article describes the advantages and disadvantages of working with these digital resources. The survey results obtained in the course of the study indicate that the majority of teachers are satisfied with their work in college, but they note the insufficient equipment of pedagogical activities with digital means. Also, almost two-thirds of the respondents strive to use innovative teaching aids in their activities. Using the methodology of K. Zamfir in the modification of A. Rean, the authors revealed an increase in the high and medium level of motivation of professional activity among teachers.

1. Introduction

There are irreversible changes in all spheres of life are taking place in modern society. These changes affect the social, economic, political and spiritual components of human existence. The spiritual sphere is undergoing changes in the field of education under the influence of other spheres of society. These changes are taking place under the influence of scientific and technological progress, which contributes to the emergence of new fundamental methods and approaches to the transmission, processing and control of information [1]. One of these modern methods is digital technology.

Digital technologies in education are a way of forming an innovative educational environment, which is based on the use of digital technologies [2]. It implies the transfer of knowledge, skills and abilities, the implementation of knowledge monitoring through the use of computers, smartphones and tablets.
The questions of studying digital and information technologies were asked by such researchers as S. G. Grigoriev, V. V. Grinshkun, S. V. Panyukova, M. Yu. Rodionov, I. V. Robert [3]. M. E. Vaindorff-Sysoeva, V. V. Serikov, V. V. Sokhranov, and L. V. Zagrekova deal with the problems of motivation of teachers to professional activity [4].

The aim of our research is to study the impact of the use of digital technologies in education on the motivation for professional activity of teachers.

Traditional teaching methods are becoming a thing of the past, time is moving forward, scientists are coming up with new ways of acquiring knowledge that can increase the cognitive interest of students [5]. It is no secret that total computerization is taking place everywhere in all spheres of life. Should be noted several directions in the development of modern information technologies, which make it possible to characterize their state in the most complete way [6].

First, there are databases that store a wide range of information on various areas of public activity;

Secondly, information resources are becoming more accessible due to interactivity and technologies that allow the end user to use them;

Thirdly, functional capabilities are created and developed, information systems of a multifunctional problem-oriented type, which can be variably used. This applies to personal computers which have enough power and local area networks.

Fourth, various technological tools, specialized interfaces and expert systems are able to interact.

Today, the state uses not only domestic information technologies, but also refers to the experience of developed foreign countries [7].

As information technologies are developing by leaps and bounds, and the education system does not stand still, modern teachers are trying to improve and simplify the process of transferring knowledge, which is caused by the emergence of new digital technologies in education.

2. Materials and methods

The experimental base for our research was the International College of Technology in Moscow. Sixty teachers, fifty-one women and nine men took part in the research. The age category of the teaching staff is from 22 to 65 years old. Since all teachers in the college are required to use the electronic information system "E-learning MGUPP", the division into experimental and control groups was not carried out. The study was carried out in three stages: ascertaining, formative and control.

At the ascertaining stage, based on the analysis of theoretical material, we have chosen the following methods: questioning, the method of K. Zamfir in the modification of A. Rean "Motivation of professional activity" [8].

It is advisable to use the questionnaire(survey) in order to identify the age category of teachers, their satisfaction with wages, the equipment of the workplace, and also in order to check the interest of teachers in innovative activities [9].

The methodology of K. Zamfir in the modification of A. Rean "Motivation of professional activity" can be used to diagnose the motivation of professional activity, including the motivation of professional and pedagogical activity. It is based on the concept of internal and external motivation.

The internal type of motivation should be talked about when the activity itself matters to the individual. If the motivation of professional activity is based on the desire to satisfy other needs external to the content of the activity itself (motives of social prestige, salary, etc.), then in this case it is customary to speak of external motivation [10]. The external motives themselves are divided here into external positive and external negative. External positive motives are undoubtedly more effective and more desirable from all points of view than external negative motives [11].

At the formative stage of the experiment, we conducted practical and lecture classes with college students using digital technologies. We created courses in the "E-learning MGUPP" system. Each of these courses contained topics, tutorials, workshops, intermediate tests, assignments, video lectures, links to sources.
The teacher - the creator of the course, he has the ability to build the structure of the course in the form that is most convenient for him. The created course must meet the requirements of the work program and the thematic plan.

If we talk about such a method of testing knowledge as a test, then the range of actions is quite wide, it allows the teacher to create tests consisting of questions of different types: multiple choice, true / false, correspondence, short answer, numerical [12].

The system allows you to create tests that provide students with several attempts to pass, test questions can go in the same order or be selected randomly from a bank of questions. The teacher can set a time limit for passing the test.

The process of evaluating each student's attempt occurs automatically, with the exception of the "essay" questions, this type of question requires the personal participation of the teacher. The student's grade is recorded in the gradebook. The system allows you to choose whether there will be any prompts, feedback, correct answers and when they will be shown to students.

The teacher can use tests in the course exams, as well as mini-tests at the end of a topic, in the final exam, using questions from the midterm exams for self-control and immediate feedback on the work done. The results of the passed test are displayed for both the student and the teacher, only the teacher has full information about the mistakes made.

This platform is very convenient and efficient to use. Of course, it takes a lot of time to create a particular test or presentation, but the comfort of such a system is obvious. It should be noted that such an innovative approach simplifies the teacher's activities: there is no need to waste time checking the test, all homework is fully accessible on the site, there is no need to search among the pile of papers for the desired one.

At the formative stage, the methodology of K. Zamfir in the modification of A. Rean "Motivation of professional activity" was also repeated.

At the control stage, we analyzed the results of diagnostics of the motivation of the professional activity of teachers.

3. Results
The survey conducted at the ascertaining stage showed that 65% of those surveyed enjoy working in college. The teachers also rated the degree of equipment of the educational institution for the implementation of their pedagogical activities on a scale from 1 to 10: 45% noted the equipment at 3 points, 20% - at 5 points, 15% - at 4 points, 10% - at 6 points, 10% - by 8 points.

When asked whether teachers use innovative methods and teaching aids in their pedagogical activities, 75% answered positively, 25% negatively. The reason for the negative answer was in 45% of cases inadequate equipment of the audience, in 30% - not knowing how to use them, in 25% - ignorance of how to use them.

Also, we asked college teachers if they were satisfied with their wages, 45% answered that they were partially satisfied, 40% were not happy, 15% were satisfied.

In addition, teachers noted what could contribute to their innovative activities: in 70% of cases - a salary increase, 60% - an order from their superiors, sufficient college equipment is important for 55%.

After conducted a study according to the method of K. Zamfir in the modification of A. Rean "Motivation of professional activity" among teachers, we found out that the majority of teachers have a high level of internal motivation (45%), an average indicator of external positive motivation (50%) and a low level of indicator of external negative motivation (75%).

The data obtained is a rather pleasant aspect, since teachers are more interested in improving their professional skills based on their own interest. Their motivation is less related to the external aspect of their activities, which is social prestige, salary, or anger from management. These methods are clearly presented in figure 1.
The ascertaining stage of the experiment showed that for teachers one of the most important motivational moments for the use of digital technologies were: high wages, orders from the authorities, and sufficient equipment of the educational institution.

After conducting this method among teachers repeatedly at the formative stage of the experiment, we found that the majority of teachers have a high level of internal motivation (55%), an average indicator of external positive motivation (45%) and a low level of an indicator of external negative motivation (75%).

The data obtained showed that teachers are more interested in improving their professional skills, this opinion is based on the fact that the indicator of intrinsic motivation is quite high. Their motivation is less related to the external features of their profession, which is characterized by prestige, wages, or anger on the part of management. These methods are clearly presented in figure 2.

A comparison of the results obtained from the research at the ascertaining and formative stages of the experiment indicate that the use of digital technologies in professional activities, namely the "E-learning MGUPP" system, contributes to the growth of internal motivation and external positive motivation by 10%.
4. Discussion
The innovative activity requires the availability of appropriate products and learning systems for the use of these technologies [13]. Therefore, in order to globalize a particular innovative product, the management needs to apply certain actions, for example, to implement courses to train teachers for this product [14]. Such training is undertaken primarily for those teachers who find it difficult to perceive new information due to their age.

In the course of the research, we identified the advantages and disadvantages of using such a digital product as "E-learning MGUPP".

The advantage of the educational platform "E-learning MGUPP" is an instant verification of the results, which motivates them to answer correctly. In addition to all this, the teacher does not need to print the text of the test and spend money on paper, this method of monitoring knowledge is quite economical. Also, if a student is sick and cannot attend the lesson, he will still be able to take the test, all that is needed is an electronic device (smartphone, computer, tablet) and the Internet. The advantage of the educational platform is also the variety of functions and capabilities: textbooks, lectures, workshops, presentations, images, diagrams, tests (with closed and open answer options, with tasks for matching, etc.), polls, video clips.

In addition to the positive aspects, the educational platform "E-learning MGUPP" also has its drawbacks. The main disadvantage is that not all students and teachers have the opportunity to access the Internet, and not all mobile operators have a fast Internet connection, or the phone is simply discharged, and therefore there are delays. The disadvantage of "E-learning MGUPP" is that it is a little difficult for the teacher to create questions for the tests due to the fact that there are many unnecessary settings that only complicate the teacher's activities.

Listing all the disadvantages and advantages, it should be noted that after the introduction of innovative technologies into the educational process, the students studied the disciplines taught by them with great interest, they began to attend classes more often. According to them, this format of conducting classes is very informative and effective.

5. Conclusion
The leading role in any pedagogical process belongs to the teacher, and in the application of digital technologies, his contribution is undeniable. However, it should be noted the features that it brings to the educational environment. The primary focus here will be the innovative activity of the teacher, which is a type of activity that is associated with the transformation of ideas (usually the results of scientific research and development or other scientific and technical achievements) into a new or improved product introduced on the market, into a new or improved technological process used in practice.

Digital technologies today serve as the most important components of the foundation for building a successful career, as there is widespread informatization of the spheres of human activity. Based on the results of the study, we can conclude that the use of digital technologies in education has a positive effect on the motivation of teachers' professional activities. Expands their professional skills and expands professional boundaries. It is also worth noting that the digital educational resources created in the course of work on the E-learning MGUPP" platform can be used by teachers in their future professional activities.

References
[1] Lopatina N V and Sladkova O B 2016 Measurement of objects of the digital cultural space in analytics of the socio-cultural sphere. Scientific and Technical Information Processing 43(3) 131-135
[2] Markova S M, Tsyplakova S A, Sedykh C P, Khizhnaya A V and Filatova O N 2020 Forecasting the Development of Professional Education. Lecture Notes in Networks and Systems 91 452-459
[3] Andryushkova O V and Grigoriev S G 2019 Calculation of the negentropy and weight
coefficients of multicriteria estimates on the basis of fuzzy sets. Informatics and education 1 40-49

[4] Serikov V 2017 The teacher and pedagogical science: How to overcome the barrier? Espacios 38(40) 36

[5] Kormakova V et al 2019 Formation of ICT Competencies of Postgraduate Students of Teacher Education Based on Interactive Techniques. CEUR Workshop Proceedings SLET-2019 – Proceedings of the International Scientific Conference Innovative Approaches to the Application of Digital Technologies in Education and Research 11-21

[6] Parfenov D, Zaporozhko V, Lapina M and Sora D 2019 Development and Research of Algorithms for the formation the Individual Educational Trajectories of Students in the Digital Educational Platform. CEUR Workshop Proceedings SLET-2019 - Proceedings of the International Scientific Conference Innovative Approaches to the Application of Digital Technologies in Education and Research 258-265

[7] Privalov A N, Bogatyreva Y I, Romanov V A and Kormakova V N 2017 Safe information environment as a quality indicator of educational institution management. Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu 140-144

[8] Salifu I and Agbenyega J S 2013 Teacher motivation and identity formation: Issues affecting professional practice. MIER Journal of Educational Studies, Trends and Practices 3 58-74

[9] Linkov A Y and Klinkov G T 2018 Person-oriented learning based on its sociological derivation. Scientific Vector of the Balkans 1 5-7

[10] Selivanova N L and Stepanov P V 2018 Preparation of a future teacher as a social and moral educator: A theoretical underpinning. Education and Self Development 13(2) 46-52

[11] Zimmerman W A and Kulikowich J M 2016 Online Learning Self-Efficacy in Students With and Without Online Learning Experience. American Journal of Distance Education 30(3) 180-191

[12] Tsarapkina J M et al 2020 Application of Zoom and Mirapolis Virtual Room in the context of distance learning for students. J. Phys.: Conf. Ser. 1691 012094

[13] Cirdan A P 2019 Innovative technologies of professional training of future economists in the continuous education system. Humanitarian Balkan Research 2(4) 27-30

[14] Nikonova N P, Vaganova O I, Smirnova Z V, Bystrova N V and Markova S M 2019 Providing partnerships and promotion of additional educational services. International Journal of Applied Exercise Physiology 8(2) 347