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# The Opinion of the Russian Teachers on the Use of Information Technology in Teaching

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## **Abstract**

Teachers' opinions on information and communications technology (ICT) utilization in teaching determine the acceptance and promotion of information technologies in schools. Many aspects of the study of teachers' attitudes toward and evaluation of ICT have been studied worldwide. For Russia, the study of teachers' opinions is important due to the existing gap between good provisions of schools with computers and the weak introduction of ICT in teachers' practices. The question arises: Why are Russian teachers not active in utilization of ICT? In the proposed paper we studied the attitudes of Russian teachers to ICT in relation to various profiles: qualification level, residence location (city, village), duration of professional occupation and the subject being taught. A special survey was created for the purpose of studying the opinions of Russian teachers in the use of ICT in education. We found an important result, which indicates that the volume of ICT use is different depending on the subject, and we also found that the use of ICT resources by the Russian teachers is quite insignificant. Finally, it was discovered that teachers are in dire need of specialized training in acquiring competence in working with ICT.

*Keywords:* information and communication technologies (ICT), Russian teachers, opinion, evaluation, profile, competence.

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## **Introduction**

The range of opinions of Russian teachers in the use of information technology is very broad, from skeptical to enthusiastic. Some teachers, who are viewing the use of computers positively, actively implement them in teaching activities, while others show resistance, reasoning that computers deprive a student of face-to-face interaction, affect their health and the development of cognitive function: memory, attention, and thinking. However, the general consensus is that in modern education, information and computer technology (ICT) undoubtedly need to be introduced in schools. The International Society for Technology in Education (ISTE) recognizes that ICT is important to a modern teacher's successful performance.

The efficiency of ICT use in school education in many respects is defined by the teacher's attitude towards new technologies.

## **Purpose and objectives of the study**

The study of teachers' opinions in Russia regarding ICT is the purpose of this article.

## **Literature review**

There are a number of international strategic documents within the European Union aimed at monitoring studies in the field of ICT in education. Thus, the European platform E-Skills (European E-competence Framework. Version 2.0., 2010) is especially recognized among them.

Questionnaires are typically used for monitoring the status of ICT use by teachers. In reviewing some of these works, the study by Tondeur et al. (2016) of more than 600 teachers in Belgium have shown that use of computers, according to the teachers, enriches lessons and enhances student feedback. In addition, the polling of teachers in the form of self-reports has shown that those who had a high degree of technological readiness in the use of a computer were more positive about integration of ICT into education (Tondeur et al., 2016). The study of more than 200 elementary school teachers in Turkey determined a dependency of technology readiness of ICT use in education versus factors of teachers' attitudes towards these technologies, their gender and demographic status, innovation, and confidence (Summak et al., 2010). In Turkey, in general, much attention is paid to training teachers for work with ICT which is described in detail in the review article (Usun, 2009).

In the course of studying teachers' opinions on integration of ICT into education, an absolute agreement of teachers was observed in many countries of the world that the application of ICT is directly related to the intention of a teacher to be trained in working with computer technology (Brun & Hinostroza, 2014; Christensen & Knezek 2008; Lee & Lee, 2014; Petko, 2012; Sadaf et al., 2012; Snoeyink & Ertmer, 2001).

In Australian education the researchers had the intention of revealing conditions of efficient use of ICT by teachers at school and described those methodical exercises which increase active utilization of ICT in schools (Banas & York, 2014; Bate, 2010). Many studies in the world are conducted with the purpose of identifying factors which influence the desire or unwillingness of a teacher to use ICT in education (Badia et al., 2014; Drent & Meelissen, 2008; Perrotta, 2013).

New technologies require new expertise and great effort by a teacher to pursue additional education in the field of information technology. In recent years, new didactics and the new teacher of the XXI Century have emerged with new

competence, invariably connected with information technology. This point has been reviewed by many authors who are engaged in the analysis of education development tendencies (Brun & Hinostroza, 2014; Volante, 2004; Windschitl, 2003).

In the post-Soviet states, the countries which emerged after the Soviet Union dissolution, utilization of ICT in education began later than in Western Europe and the USA. The ICT integration process and teachers' attitudes towards ICT in these countries has been studied by different researchers.

Very detailed studies were conducted on ICT utilization in schools of the Baltic States: Latvia, Lithuania and Estonia (Grundspenkis, 2004; Soroko, 2014). Russia and the above-mentioned countries had identical education programs in schools up to the beginning of the 90's. However, due to European integration of the Baltic States, implementation of ICT in education was carried out more actively than in Russia. In the Baltic States much attention is paid to monitoring of training and utilization of ICT by teachers and their opinions on ICT use in the classroom. Due to the weak ICT skills of teachers, these countries joined European projects aimed at providing assistance for ICT use in schools. In Russia, unlike the Baltic States, less attention is paid to monitoring the attitude of teachers towards ICT and the methodical training for work with ICT. Russian teachers are not integrated into international projects on ICT competence monitoring, which complicates the assessment of matters in this field, while schools, including remote rural schools, are adequately provided with computers and internet access.

In order to use ICT effectively, whether a teacher utilizes ICT by passive or active means is important. Some teachers use ICT passively only for content demonstration, while others view the use of technology on a much wider basis, considering it an active development tool of the cognitive function of students. Passive use of ICT has no impact on students' progress, which has been demonstrated (Kim & Reeves, 2007; Tamim et al., 2011). In 2013, the Gallup institute in their teachers' survey found that only 11 percent of respondents felt that ICT improves creativity in the teaching process, and only 7 percent of participants completely agreed that technology improves students' learning performance (Scott, 2013). Therefore, it is necessary to consider the ability of ICT in developing students' thinking and their creative abilities. It is important to look for a resource of personal-oriented teaching through use of ICT in schools.

An interesting longitudinal study was conducted by American scientists (Wang et al., 2014), who studied reports of 25 teachers on the use of ICT for a period of four years. The purpose of this study was to determine the teacher's position on the use of ICT as an active development tool of students' cognitive function. A teacher's mindset was aimed at the use of ICT for development of such parameters as a student's ability to identify, find, evaluate, and generalize and to optimize the level of a student's cognitive function development.

Many teachers, in their position on ICT utilization, point out a mismatch, in that computer capabilities and methodical competence of a teacher in the use of ICT in education have different levels. Computer capabilities expand very dynamically, and the development of ICT techniques for use in the classroom as didactic teaching aid is progressing very slowly. A branch of science aimed at the development of new techniques of ICT use in teaching named "cybernetic pedagogics" or e-didactics was created for such reasons (Choshanov, 2013). Many authors nowadays point out an extremely low support for ICT techniques in teaching. Osin (2010) writes that "as of 2010 satisfaction with methodical support of modern educational technology in Russia does not exceed 5%".

Taking into account the low degree of knowledge of the pedagogical scientific community and experts in the field of efficiency of ICT use in education in Russia, we developed a special selective teacher survey questionnaire on the use of

information and communication technology. The purpose of this questionnaire is to reveal the opinions of Russian teachers on the use of ICT in education, depending on the participant's profile: pedagogical work experience, geographical location of the school (city or rural area), qualification level and the subject being taught. The questionnaire also implies collection of results on the level of the teacher's competence in working with ICT.

### **Methodology**

A special selective survey questionnaire was created for the purpose of studying the opinions of Russian teachers in the use of ICT in education. It consists of ten points. Questions in the questionnaire are devised in such a way that on the basis of its results it would be possible to form an overall analytical picture of the attitudes of the teachers in the use of ICT.

First, the questionnaire contains questions concerning the skill level of the teachers. We believe that the higher the qualification of teachers, the more positively they view the use of ICT. Teachers with high qualification are, as a rule, open to innovation and introduce many experiments and implement new methods and techniques of in-class work to improve efficiency of their work. In Russia teachers are classified into categories depending on the quality of their work. The categories include the highest, first, and second categories based on expert assessment of the results of the teacher's performance at school. Therefore, the questions regarding qualification allow the division of selection of respondents by categories.

Second, we were interested to know the duration of the work experience of the teacher. We believe that the experience gained over the years influences the opinion of the teacher in the use of ICT, because conservatism comes with the experience in the choice of teaching aids. Therefore it is possible that young teachers use ICT in their work more actively than teachers of the senior generation.

Third, we assumed that subject specialization can also influence the attitude towards ICT and the use of information technology in class. Findings indicate that chemistry, biology, and physics teachers use ICT more frequently, and literature and Russian teachers use it less frequently. Therefore, we have specifically identified the influence of the subject taught in the use of ICT.

Fourth, in our study of teachers' opinions, we included in the questionnaire questions regarding the types of work in the use of information technology in education, as these types of work are very diverse and demand competence of a different complexity, from the simple use of the internet as the source of information to complex types of work on maintaining an educational website.

Fifth, we compared the attitude of rural and city teachers towards ICT, which is also important, as city schools are better equipped with computers, and their supply of equipment began much earlier than it did in rural schools, though internet access in Russia is available in every village.

Sixth, it was of interest to us to know how teachers view the influence of ICT on development of students' cognitive processes, i.e., attention, memory, thinking, imagination. The question regarding the revealing of the opinion of teachers on this point was also included in the questionnaire. Below is the full version of the questionnaire of teachers' opinions on use of ICT in teaching:

"Dear teacher! You are offered the opportunity to answer questions regarding the 'use of ICT in school teaching' questionnaire.

1. What subject do you teach?
2. How many years have you been working at school?
3. What is your professional category?
4. Which type of school do you work at: rural or city?
5. Do you use a computer in the teaching process?

If you do, please include what types of activities.

6. Point out which of the cognitive processes develop most effectively with the use of ICT: memory, thinking, attention, imagination.
7. Are you computer proficient sufficient to use it in teaching?
8. What types of computer activities necessary for teaching would you like to master?
9. What percentage of classes on your subject do you conduct with the use of ICT, including preparation for the class?

"Thank you for your contribution to our work!"

## Results

In total, 133 teachers of Russian schools participated in the study. Characterization of the profiles of the study participants follows:

From the point of view of *duration of pedagogical work* (experience) all respondents were divided into four subgroups (See Table 1).

Table 1. Respondent selection distribution by work experience

<b>Duration of pedagogical work</b>	<b>Number of respondents</b>	<b>Percentage</b>
up to 5 years	42	32%
5 to 10 years	6	5%
10 to 20 years	20	15%
over 20 years	65	49%

By *pedagogical work performance* profile (professional categories) the respondent selection was divided into three groups, ascending from low to high: second category, first category and the highest category. Categories in Russian

schools are assigned to teachers by expert commission based on the results of their professional work. The category determines the salary of the teacher. The category is assigned for a period of five years; the teachers must then prove their qualification for the assigned category. Distribution of the study participants by categories is shown in Table 2.

Table 2. Respondent selection distribution by "professional category" profile

Professional category	Number of respondents	Percentage
Category 2	52	39%
Category 1	43	32%
Highest category	38	29%

Geographic location profile (location area) of the school in which the study participants worked; city or rural area was an important profile for us. The rural school, as a rule, is the only one in the settlement; hence, the teacher works separately from the community of the colleagues, and there is a certain deficit of professional communication. The city offers more opportunity for professional dialogue with colleagues and participation in various seminars and discussions, which is good ground for professional growth. With regard to the location area profile the participants were distributed almost equally, which is visually presented in Table 3.

Table 3. Respondent selection distribution by "location area" profile

Location area	Number of respondents	Percentage
City school	61	46%
Rural school	72	54%

One of the most important profiles of the study participants' distribution, in our opinion, is the *subject* taught by the teachers. This factor can have significant impact on their attitude towards the use of ICT in teaching. Distribution of the teachers' selection by the subject taught is shown in Table 4.

Table 4. Distribution by subject profile

Subject	Number of respondents	Percentage
Junior classes	38	29%
Russian language and literature	38	29%
Chemistry, biology	37	28%
Physics, mathematics	20	15%

One of the main goals of our study was to research the influence of different factors on the volume of the use of ICT in teaching. We considered the duration of professional experience, professional category, subject and geographic location. The influence effect was measured by the method of one-way analysis of variance (ANOVA) which is provided in Table 5.

Calculation results demonstrate that the extent of ICT use is influenced by only one factor, which is the subject taught. Duration of work, professional category and geographic location, as shown by the calculations, do not influence the extent of ICT use by the teacher.

Table 5. Results of one-way analysis of variance of "subject taught" profile influence on the extent of ICT use by teachers in preparation and conducting of the classes.

ANOVA

	<b>Sum of squares</b>	<b>Degree of freedom</b>	<b>Mean square</b>	<b>F</b>	<b>Value</b>
<b>Between groups</b>	6464.387	3	2154.796	7.616	.000
<b>Inside groups</b>	36499.387	129	282.941		
<b>Total</b>	42963.774	132			

Biology and chemistry teachers are among the most active users of ICT by mean value indicators, as shown in Figure 1.

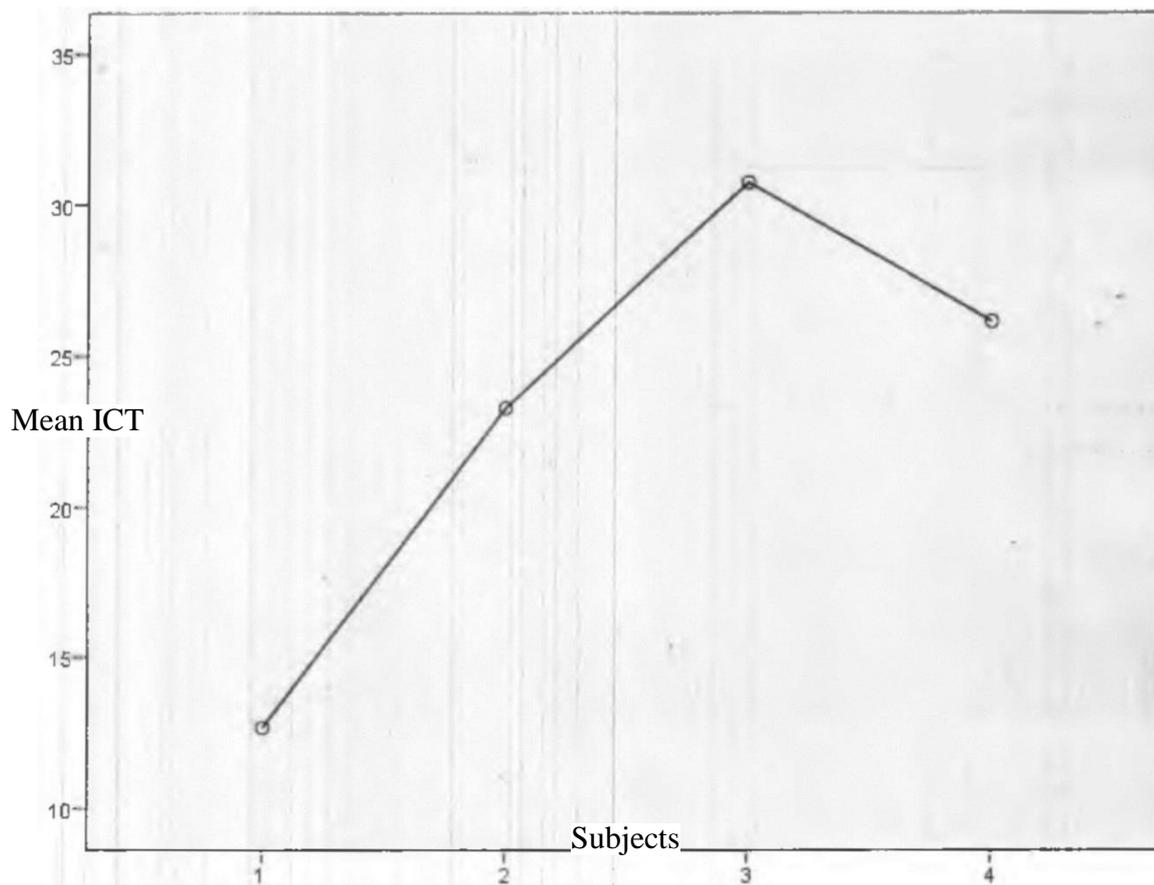


Fig. 1. Mean values of volume of ICT used by teachers of different subjects.

In Figure 1, numbers on the horizontal axis represent profiles of participants by the subjects taught: 1 - elementary school teachers; 2 - physics and mathematics teachers; 3 - biology and chemistry teachers; Russian language and literature teachers. The vertical axis represents the volume of ICT use in percentages.

Only 65 percent of respondents gave a positive answer to the question of how proficient teachers are in the use of ICT in teaching. This means that part of the teachers require additional training to work with ICT. In the questionnaire, we polled teachers on the types of work in preparation and conducting classes which they practice using the computer. The results indicated that predominantly all point out the use of internet resources as the source of information, using Google and Yandex search engines (Figure 1); 64% percent of the respondents do not use any other types of work with the use of computer aside from the internet.

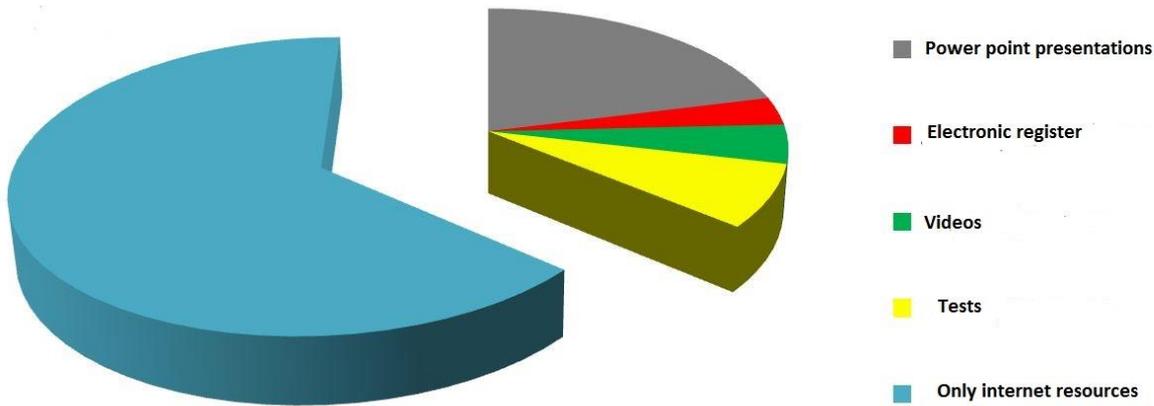


Fig. 2. Distribution of types of work on ICT use by teachers.

Results indicated that the types of work with the use of ICT are not diverse, which is attributed to low competence of teachers in the use of computers. Therefore, we decided to ask a question about what would they like to learn in working with the use of ICT. Answers are presented in Figure 3.

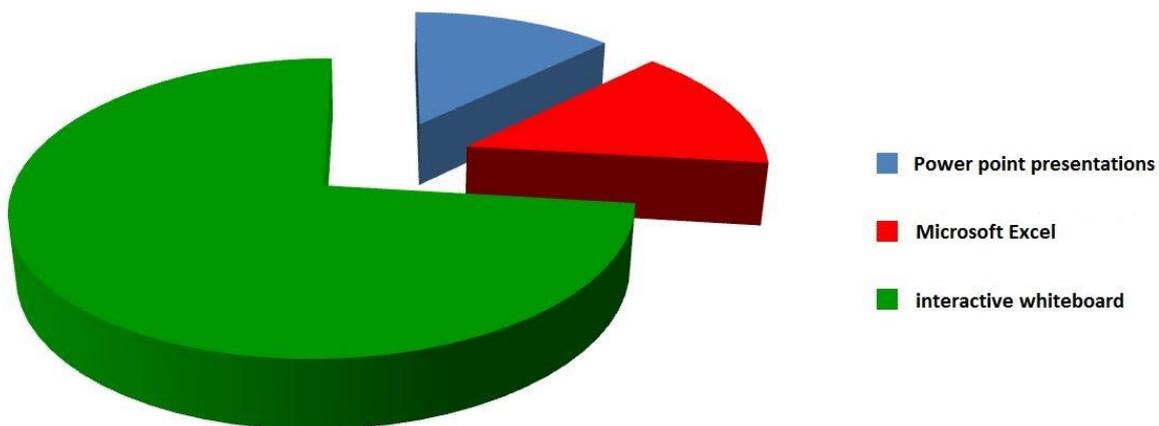


Fig. 3. Distribution of types of work in which the teachers want to gain competences

Most of the teachers wanted to learn how to work with SMART interactive whiteboards. Some of the teachers wanted to gain competence in the preparation of presentations. Some wanted to master skill in working with MS Excel (making diagrams, charts, doing calculations, etc.). Of interest are the question results, which are connected with how teachers estimate the influence of ICT on students' cognitive function. In general, the opinion of the teachers is that ICT develops these functions

It was found that most of the teachers in all subject profiles believe that ICT influences the development of attention and memory; to a lesser extent, development of thinking and imagination. Thus, only 15 of the teachers felt that ICT develops students' imagination. This is 11.2 percent of the respondents. Opinions of 18.7 percent of the polled teachers is that ICT develops thinking. While influence of ICT on development of attention (84.2%) of respondents and on memory development is highly valued, and 73.1 percent of the teachers believe that ICT develops memory.

## Discussions and Conclusion

Results of the study on the opinion of Russian teachers regarding different aspects of ICT use are relevant, as attitude towards computers serves as the background of efficiency of their use in schools. We found an important result, which indicates that the volume of ICT use is different depending on the subject. Thus, biology and chemistry teachers are the most active ICT users; elementary school teachers resort to ICT to a lesser extent. Under international projects on monitoring of ICT use in teaching, it was found that teachers of art, history, foreign language, IT, geography, chemistry, and biology in Europe are among frequent users of ICT (Soroko, 2014).

It was also found that the use of ICT resources by Russian teachers is quite insignificant. It includes only internet resources as sources of information, demonstration materials i.e., presentations and video films. A small number of teachers use an electronic log book, which is an electronic version of the class log book, where grades for students' performance in the classroom are recorded. The log book is intended to enable parents to monitor their children at school. Access to the electronic log book is limited; it is normally used by parents and school administration. A small number of teachers use this. Finally, only a few use ICT for testing.

Teachers are in dire need of specialized training in acquiring competence in working with ICT, since only 65 percent of them are satisfied with their ability in using ICT in their work. Russian teachers need the support of a special fund, similar to the Estonian Tiger Leap Foundation, which is responsible for developing innovative learning environments, initiating and supporting virtual teacher networks, creating a remote teacher training system using ICT methodologies, creating teaching aids and guidelines for using ICT for teachers, and the creation and support of nationwide teacher training in use of ICT in professional activities (Soroko, 2014).

In general, the analysis of the attitude of Russian teachers to ICT indicates that there is a discord between the rich provision of schools with computers and the poor range of teachers' competence in using ICT in teaching. As teachers themselves point out, they need to develop their abilities to work with ICT. This conclusion suggests that those organizations that determine the ICT development strategy in Russian schools, such as the Ministry of Education and Science of the Russian Federation, teacher training institutes, and universities where future teachers are trained, should introduce special training programs aimed at the development of expertise in working with ICT in schools.

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