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# ICT enabled education: ethical and axiological competence formation

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## Abstract

Today, information and education technologies are actively used in education. However, more attention is paid to the formation of practical rather than ethical and axiological skills. In this regard, the objectives of the study have been defined: to conduct a survey among the teachers of Russian universities to determine their socio-ethical ICT literacy; to conclude whether teachers are able to form ethical competences in students when implementing ICTs in their classrooms. According to the survey results, the teachers have a high level of ethical literacy, but they do not fully understand the importance of developing such skills when using ICTs.

**Keywords**: ICT, ICT in education, Ethical ICT use, Ethical skills, Axiological skills.

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# Educación habilitada por las TIC: formación de competencias éticas y axiológicas

**Resumen**

Hoy, las tecnologías de la información y la educación se utilizan activamente en la educación. Sin embargo, se presta más atención a la formación de habilidades prácticas en lugar de éticas y axiológicas. A este respecto, se han definido los objetivos del estudio: realizar una encuesta entre los docentes de las universidades rusas para determinar su alfabetización socio-ética en TIC; para concluir si los maestros pueden formar competencias éticas en los estudiantes cuando implementan las TIC en sus aulas. Según los resultados de la encuesta, los maestros tienen un alto nivel de alfabetización ética, pero no entienden completamente la importancia de desarrollar tales habilidades cuando usan las TIC.

**Palabras clave:** TIC, TIC en educación, Uso ético de las TIC, Habilidades éticas, Habilidades axiológicas.

## 1. INTRODUCTION

The development of information and communication technologies (ICT) has changed the way people think and communicate. People are gradually becoming the so-called “information society” and print publications are paling into insignificance. This brings benefits and new opportunities - for example, greater informatization and electronic media make it possible to preserve nature. On the other hand, the development of ICT is also associated with new risks and problems, which are largely related to communication and ethics. Information and communication technologies create ethical problems by changing the tools of human activity.

> According to SEMBROK (2003), in a world where information and communication technologies determine the way people live and work, as well as seriously affect culture and values, it's important for us to consider ethical issues as well as the social responsibility associated with these changes.

Arguably, the ethical problem of ICT is unique - it provides new types of traditional moral issues raising serious ethical problems for individuals and organizations. Various educational institutions ranging from schools to universities are one of these organizations. The goal of modern teachers is to educate an informational person in a child (SHAMIR-INBAL AND BLAU, 2017). They should encourage and model digital citizenship and responsibility in students, as well as understand local and global social issues in the developing digital culture and demonstrate ethical behavior in their professional practice.

According to the UNESCO program on information ethics, developed in 2006 (UNESCO, 2006), it is necessary to understand and observe the legal practice of using technologies, as well as to recognize and implement them both at a personal and professional level. Equitable access to technology that incorporates learning, social and cultural diversity should be provided. The study is relevant due to the fact that the use of information and communication technologies in education has become widespread throughout the world. However, there are not many studies devoted to the ethical and axiological aspects associated with the use of ICT in education.

According to Hilbert and LÓPEZ (2011), information and communication technologies (ICTs) have fundamentally changed various social and economic aspects since the end of the twentieth

century; they have provided society with the ability to manage digital information. In this context, new organizational models based on the intensive use of ICTs provoke the growth of non-standard tasks, which forces educators to develop advanced skills.

In their study, CARTER et al. (2016) argue that from a pedagogical perspective, educational institutions are introducing new ICT-supported pedagogical tools to maximize student learning. The world of online education has also responded to educational factors and goals related to participation, employment opportunities, digital media or culture. Thus, several educational approaches have been introduced: simulations, interactions, social software, new media and digital games.

Several studies (INAYAT et al., 2013; UPADHYAYA and MALLIK, 2013; Boyle et al., 2016; RAJOVIC et al., 2018) analyzed the competences developed through the use of ICTs in the learning process. In this case, academic and professional competencies were discussed. In particular, the study analyzes the way distance learning helps to develop student collaboration skills. KUO & CHUANG (2016) highlight the benefits of collaborative practice between students and teachers regarding the ICT experience and learning outcomes. Digital technologies help to develop teamwork skills due to their advantages, levels, involvement and motivation.

The use of ICTs in education is also considered from the perspective of their accessibility. Research results (TONDEUR et al.,

2011) show that students from families who are used to higher education are more likely to use information and communication technology (ICT) tools in more advanced ways than students from families who are not used to to higher education. However, none of these studies consider ethical or axiological competences. All of them are focused on practical skills that can be acquired by students when using ICTs in their learning process.

SHAKEEL AHMAD KHAN, BHATTI & AQEEL AHMAD KHAN (2011) argue that the goal of ICT in education is usually to familiarize students with computers, as well as with relevant social and ethical issues. Therefore, teachers should possess the necessary skills in order to properly and efficiently guide students. KERKULA (2011) concludes that teachers must be technologically competent, but not necessarily be interested in technology. MOORE & ELLSWORTH (2013) believe that there is a low level of ethical integration of educational technologies.

According to EHRICH et al. (2011) in recent decades, ethics has been a major focus of interest in education. This is explained by the fact that education is a moral and ethical activity that is largely determined by value imperatives, which brings up to date the axiological aspects of gnosis and information competences. In the ethical aspect, many standards related to ICT enabled education emphasize confidentiality, right to information, intellectual property rights, ethical policies, the digital divide, poverty, piracy, cybercrime, human rights, as well as gender equality (DE-MARCOS et al., 2016).

MARCIAL (2017) argues that the integration of ICTs in teacher education, especially social and ethical aspects, is multifaceted and affected by many related variables. The level of ICT social and ethical competence depends on the age of the teacher, status, type of institution, and total years of education. A desktop computer, a smartphone, laptop and Internet access also influence the competence. From a social and ethical perspective, the integration of ICTs has not been completed (OLIVA, 2008). Teachers are not necessarily experts in working with the tool, but they must be familiar with its concepts.

However, based on the literature analysis, it can be concluded that the ethical aspect of the use of information and communication technologies in education has been little studied.

The ethical and axiological competences of using ICT in education have not been sufficiently addressed. Thus, it was decided to conduct the study in order to collect information that will help determine the level of socio-ethical ICT literacy of teachers, as well as to assess whether they are able to form ethical competencies in students by using information and communication technologies. This requires the collection of statistical data and their subsequent interpretation. Based on the results obtained, it will be possible to formulate a possible problem, as well as the solutions. In addition, this will create the basis for further more in-depth research, which may involve school and college workers, as well as students of various educational institutions.

Thus, the following research objectives can be distinguished:

• To conduct a survey among the teachers of Russian universities to determine their socio-ethical ICT literacy;

• To conclude whether teachers are able to form ethical competences in students when implementing ICTs in their classrooms.

## 2. METHODOLOGY

The survey was based on the quantitative research methodology as it was aimed at the collection of statistical data. The information obtained was analyzed in the STATISTICA system. The software allows visualizing data in the statistical analysis.

The teacher questionnaire was compiled based on "The Structure of ICT competence of teachers. UNESCO Recommendations" (2019).

The survey involved teachers from five Russian universities.

Table 1: Teachers participating in the survey

| Educational institution | Number of the teachers surveyed |
|---|---|
| Lomonosov Moscow State University | 250 |
| Higher School of Economics | 200 |
| Novosibirsk State University | 150 |
| Saint-Petersburg State University | 250 |
| Tomsk State University | 100 |
| Total | 950 |

A total of 950 teachers were interviewed. The universities participating in the study are located in Moscow, Novosibirsk, St. Petersburg and Tomsk. Due to the fact that the situation in different federal facilities may vary, it was decided to interview educators from different cities in order to expand the coverage of the study. In addition, the survey involved representatives of different disciplines, both humanitarian and technical. The number of female and male participants was approximately equal: 54% of women and 46% of men. Before conducting the study, the invitations were sent to all universities to be filled in by the teachers who were interested in the study. The survey was also conducted online as the respondents were in different cities - the files with the polls were sent by email.

The questionnaire consisted of two parts. In the first part, the teachers were provided with various statements related to the ethical use of ICT in education. They were associated with copyright, piracy, plagiarism, legal use of software, etc. The teachers were asked to note which of the proposed aspects seemed the most important to them for the ethical use of ICT in education. The purpose of the first part of the questionnaire was to determine how well the respondents are aware of the importance of ICT ethics in education, at least at a theoretical level. The first part of the questionnaire also considered universal human values covered by axiology. Thus, the results made it possible to assess the possibility of developing axiological competences (for example, the equality of people regardless of their position in society).

The second part of the study was a brief questionnaire, in which the teachers were asked to more specifically express their opinion on

the development of ethical and axiological skills in students when using ICT. The questionnaire consisted of eight questions. The respondents were asked to agree or disagree with the proposed statement. Each question was somehow related to the ethical use of ICT in education: some of them were general questions applicable to information and communication technologies and some of them were associated with personal experience of teachers.

The analysis of this questionnaire helped us determine whether teachers consider it possible to develop ethical and axiological competences through the use of ICTs. In addition, combined with the results of the first part, this questionnaire allowed us to determine the overall attitude of teachers to the ethical use of ICT and how it can be applied in practice.

## 3. RESULTS AND DISCUSSION

When analyzing both parts of the questionnaire, the results obtained were conveniently tabulated. The results were presented both in percentage and in quantitative form.

Table 2: Survey of teachers on the ethical use of ICTs in education

| **Statements related to the ethical use of ICTs in education** | **Total** | |
|---|---|---|
| | **Yes** | **No** |
| I understand the legal consequences of a violation of the user agreement and fair use | 95% (900) | 5% (50) |
| I understand the concept of intellectual property rights | 88% (837) | 12% (113) |

| | | |
|---|---|---|
| I am always able to identify plagiarism in student work | 74% (701) | 26% (249) |
| I do not approve of students attempting to mask plagiarism in their work. | 100% (950) | 0 |
| I am committed to the responsible use of various technologies | 60% (566) | 40% (384) |
| I keep a close watch on how students use a computer, including the Internet | 26% (250) | 74% (700) |
| I promote and implement the rules for the proper use of computers | 13% (120) | 77% (830) |
| In case of equipment malfunction, I inform about it in a timely manner | 56% (529) | 44% (421) |
| I promote the introduction of ICTs to all categories of students | 63% (595) | 37% (355) |

The results presented in the table make it possible to conclude that the teachers surveyed understand the legal aspects of the use of ICTs: they advocate intellectual property rights, have a negative attitude to plagiarism, know the consequences of a violation of the fair use agreement. In all questions related to these aspects (the first five questions), the percentage of positive answers was more than 60%. However, only 26% of the respondents reported that they monitor how students use computers. And only 13% said that they contribute to the promotion and implementation of the rules for the proper use of computers. This may indicate that the teachers surveyed have theoretical ideas about the ethical use of ICTs in education. However, in this case, it is impossible to draw an unambiguous conclusion - the respondents may consider these functions as going beyond the scope of their responsibilities.

The results of the last two statements were also quite positive. The majority (56%) of the respondents monitor the equipment health

and report to the competent departments about malfunctions. Also, 63% of the teachers reported that they contribute to providing students with ICTs; this supports their right to e-learning, regardless of social status, nationality, gender, etc. The results of the last question allow us to argue that teachers are aware of the importance of the axiological aspect.

Table 3. Possibility of developing ethical skills through ICT

| **The development of ethical skills through ICTs** | **Total** | |
|---|---|---|
| | **Yes** | **No** |
| Do you think that ethical skills can be developed through ICTs? | 45% (427) | 55% (523) |
| Do you think that axiological competences can be developed through ICTs? | 44% (421) | 56% (529) |
| Do you think that compliance with technology law is a method of developing ethical competences? | 66% (624) | 34% (326) |
| Do you advocate intellectual property rights when using ICTs? | 69% (652) | 31% (298) |
| Do you think that equal access to ICT is a human right? | 95% (900) | 5% (50) |
| Have you ever encountered cybercrime by your students? | 100% (950) | 0 |
| Can you say that your students use ICT tools ethically? | 84% (798) | 16% (152) |
| Do you think that educational institutions need to pay extra attention to the ethical use of ICT and explain it to students? | 87% (822) | 13% (128) |

The second part of the study showed that the teachers are not fully aware of the possibility of developing ethical and axiological competences through ICT. Less than 50% of the respondents agreed that it can be possible. This may be explained by the lack of awareness: more attention is paid to the formation of practical competences, while the ethical and axiological ones are not

sufficiently discussed. This can be considered a problem as these competences play an important role in teaching. In order to address this problem, special courses for university, school and college teachers explaining the importance of developing ethical and axiological competences through ICTs can be organized. In addition, such courses can provide work-related training to help teachers apply knowledge in their teaching practice.

Information and communication technologies are actively being introduced into the educational process. Thus, research devoted to ICT in education is carried out all over the world. In 2011, there was study on the ethical aspects of the use of ICTs, which relate to both everyday life and education. ROGERSON (2011) identified several moral aspects regarding the use of ICT in his study. They were: confidentiality (interference with privacy through ICTs is one of their earliest problems), property rights (as it has been mentioned in our study, copyright infringement is one of the moral issues of ICTs) and cybercrime.

In addition, according to another study, particular attention should be paid to those society groups who are at high risk of exclusion due to a wide range of reasons, such as location, age, gender, disability and literacy. Despite many new opportunities to improve the daily lives of people with disabilities, there is a risk that ICTs can separate such people, create new barriers and increase social exclusion. Therefore, maximum availability of technologies to all population groups should be one of the ethical aspects of ICT (NAIBEI, 2016).

There was a similar study in 2016. It examined two different approaches to the educational challenges of information and communication technologies. The first aproach is the constructivist theory of "accumulation of knowledge"; the second one is a pragmatic point of view based, in particular, on the ideas about learning as a natural part of a person's social actions (KIVINEN et al., 2016).

The second theory was of great interest. It claimed that all knowledge, including scientific theories or even all conceptual artifacts, are tools of action. Knowledge can only be obtained in action, which can be evaluated from a moral point of view. Advanced ICTs make information available to people. To access this information and turn it into knowledge, people need appropriate habits. The reverse side is that no information is knowledge; it must be transformed into habits in order to be considered knowledge. The point of education is that school education should not be separated from practical connections and potential uses, as well as the transactions that people have with their environment (KIVINEN AND KAARAKAINEN, 2014).

Learning is the development of appropriate habits that work in our environment; education should facilitate the development of universal habits to solve or prevent a wide range of potential problems that people may encounter in their social activities, different environments, whether natural or digital ones. In addition, the moral aspect of acquiring knowledge is emphasized when students have to assess the necessity and practical value of their knowledge (CHEE,

2016). Despite the fact that these studies are different from ours, they have some common aspects in terms of the importance of the ethical aspect in the use of ICTs.

In their study, GÖKÇEARSLAN, GÜNBATAR & BERIKAN (2015) argue that the ethics of information technologies focuses on the right and wrong behavior associated with the use of ICT tools. They examined the correlation between the ICT skills of secondary school students and some variables, such as class, gender, parent education, duration of attendance of information technology and software courses. The study involved surveying students of 5-8 grades.

According to the results obtained, the level of IT ethics among students is high. In addition, it differentiates with gender and class level; however, it does not correlate with the education of parents and the duration of information technology and software courses. The students surveyed recognize the importance of the ethical use of ICTs and also have ethical skills that they can put into practice (ARIKAN and DUYMAZ, 2015). It was also found that the views and behavior of information technology teachers related to ICT ethics determine student behavior. In this study, students' perceptions were measured using real-world scenarios (ÇELEN and SEFEROĞLU, 2013).

## 4. CONCLUSION

The study involved a survey of 950 teachers from four Russian universities. The universities participating in the study are located in

Moscow, Novosibirsk, St. Petersburg and Tomsk. It was decided to interview educators from different cities in order to expand the coverage of the study. The survey consisted of two parts and was conducted online. In the first part, the teachers were provided with various statements related to the ethical use of ICT in education. The teachers were asked to note which of the proposed aspects seemed the most important to them for the ethical use of ICT in education. The second part of the study was a brief questionnaire, in which the teachers were asked to more specifically express their opinion on the development of ethical and axiological skills in students when using ICT.

The analysis of the two parts of the questionnaire was aimed at clarifying the attitude of teachers to the ethical use of ICT in education and its practical application. The results of the first part of the questionnaire showed that the teachers understand the legal and ethical aspects of the use of ICT in education, as well as promote their use and support the students' right to equal access to technical facilities. The second part of the study showed that the teachers are not fully aware of the possibility of developing ethical and axiological competences through ICT. This may be explained by the lack of awareness: more attention is paid to the formation of practical competences, while the ethical and axiological ones are not sufficiently discussed.

In order to address this problem, special courses for university, school and college teachers explaining the importance of developing ethical and axiological competences through ICTs can be organized.

Following the theoretical learning, it is possible to organize practical activities for teachers to help them implement the knowledge obtained. Further research can involve school and college educators, as well as students of pedagogical specialties. It can also be expanded or carried out in other countries to determine the development of ethical and axiological skills through ICTs in the world. The practical value of the study is to increase the importance of the development of practical and ethical skills when using information and communication technologies in education.

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