

NATIONAL RESEARCH UNIVERSITY HIGHER SCHOOL OF ECONOMICS

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**USING MOBILE AND SOCIAL NETWORK TECHNOLOGIES IN
SCHOOL EDUCATION**

SUMMARY OF THE PHD THESIS

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INTRODUCTION

The development of education is one of the most important aim of the Russia's social and economic policies. Therefore, according to this scenario, the education quality improvement at any level is a priority. Nowadays, the most appreciated method to reach this goal is based on the activity approach (Federal State Educational Standard).

During the latest decades, Russia's process of school modernisation as a key part includes information and communication technology (ICT) implementation. The fast process of Internet technology evolution led to the replacement of the "ancient" computer into modern devices, for example tablets or smartphones.

Information society offers new opportunities for the teaching and learning methods upgrading. Those can include a transfer of everyday practices, supported by ICT usage, to education environment.. Researchers provide a spotlight on how ICTs can help to improve the quality of education (O.V. Akulova, A.A. Andreev, A.A. Akhayan, N.S. Anisimova, V.I. Bogoslovsky, L.L. Bosova, E.I. Bulin-Sokolova, V.V. Laptev, V.P. Merkulov, T.N. Noskova, G.K. Selevko, V.A. Sitarov, G.V. Tarakanov, A.I. Shutenko, etc.) The research of the latest years has revealed the present-day acute need for innovative education approaches. Federal State Educational Standard sets out the formation and development of comprehensive basic ICT competency as the expected metasubject outcome.

According to Russian and international studies schoolers own and actively utilize smartphones for a broad array of communicative purposes (G.U. Soldatova, D. Holloway, S. Livingstone.) This fact changes the whole design of educational environment. Nevertheless, research on the potential of mobile technologies in school education constitute on case studies and do not describe the situation comprehensively (I.B. Gosudarev, M.A. Grigoryeva, O.B. Golubev, T.A. Makarchuk, O.Yu. Nikiforova, etc.)

Social media is one of the most commonly used types of websites for teenagers. Students use social media services for communication as well as for information search and self-education (O.A. Gurkina, D.V. Maltseva, I.B. Gorbunova, I.O. Tovpich, etc.).

The use of mobile technologies as a unique element of education reform is under active consideration by the researchers (V.P. Andreev, A.S. Voronkin, S.G. Grigoryev, V.V. Grinshkun, O.A. Klimenko, T.N. Noskova, E.D. Patarakin, A.V. Feshchenko, A.I. Shutenko, N. Ellison, S. Manka, etc.) Therefore, the use of mobile and network technology application in the educational activities is being deeply developed due to its high practical importance. However, this is still an underexplored field.

Thus, Russia's education system faced with a question: Can technical innovations lead the educational innovation? United Nations Educational, Scientific, and Cultural Organization (UNESCO) are the following: "In a world that is increasingly reliant on connectivity and access to information, these devices are not a passing fad. As mobile technologies continue to grow in power and functionality, their utility as educational tools is likely to expand and, with it, their centrality to formal education." (M. West, S. Vosloo, 2013, P. 42.)

These factors indicate the high relevance of the chosen research area-the use of mobile and network technologies in the modern school for upgrading the educational process.

STATE OF THE ART

The role of information communication technology (ICT) in education has been explored by many authors (V.I. Bogoslovsky, S.G. Grigoryev, A.D. Ivannikov, K.K. Kolin, A.A. Kuznetsov, V.V. Laptev, V.S. Lednev, I.V. Robert, A.L. Semenov, A.N. Tikhonov, A.Yu. Uvarov, etc.) However, the latest large-scale studies related to processes of ICT implementation in Russian education and school informatization, date back to 2001 to 2011 and are devoted mainly to computer technology usage (S.M. Avdeeva, A.G. Asmolov, K.B. Vasilyev, S.G. Grigoryev, I.V. Robert, A.L. Semenov, A.Yu. Uvarov, I.D. Frumin, M.S. Tsvetkova, etc.)

Furthermore, technology is evolving rapidly, and from 2010 to 2016, there have been major changes in the students daily practices to the use of ICT (M.V. Zagidullina, V.N. Ilmukhin, G.Kh. Azashikov, N.E. Khagurova, etc.) Although, the issue of transforming these daily practices to education technology is still to be fully embraced.

The analysis of the studies related to the research problem revealed the following contradictions:

- On the one hand there are changes in the environment in which modern students - representatives of the "digital generation" (active users of smartphones, social networks, Internet), grow and live. On the other hand, the education system denial of any changes, failure to use opportunities provided by new technologies for upgrading the education process.

A research problem consists in the necessity to identify the factors that allow eliminating the barriers between the potential and realizable possibilities of using mobile and social network technologies in school educational. The aim of the research is to identify these factors.

Following research questions are investigated in this study:

- What are the main components of current stage of school informatization?
- What is the educational potential of mobile and network technologies?
- How can be mobile and social network technologies be transferred to educational technologies?

The following tasks have been set to achieve the aim of the study:

1. *Determine* the main objectives of modernization of education in the information society.
2. *Explore* the actual usage of mobile and social network technologies by students in both their learning and daily activities;
3. *Discover* the mobile and social network technologies potential to modernize student's learning activities;
4. *Identify* the hurdles for mobile and network technology appliance in students's learning activities, and suggest how to develop a strategy to overtake them.

The theoretical and methodological approaches of the study are:

- **Modernization of education** (E.D. Dneprov, A.G. Kasparzhak, O.E. Lebedev, A.A. Pinsky, N.N. Surtaeva, M. Barber),

- **Social development theory** (T.P. Voronina, E.P. Semenyuk, A.D. Ursul, D. Bell, F. Machlup, Y. Masuda, A. Touraine, A. Toffler),
- **Computerization and informatization of education** (A.A. Akhayan, A.G. Asmolov, L.L. Bosova, S.G. Grigoryev, V.V. Grinshkun, A.P. Ershov, A.D. Ivannikov, K.K. Kolin, A.A. Kuznetsov, I.V. Robert, G.K. Selevko, A.L. Semenov, A.N. Tikhonov, M.S. Tsvetkova),
- **Innovation theory** (V.I. Zagvyazinsky, M.V. Klarin, V.M. Polonsky, A.P. Tryapitsina, O.G. Khomeriki, V.A. Yasvin, E.S. Phelps, E.M. Rogers, G. Seyfang, J. Schumpeter, G. Tarde, A.H. Van de Ven, S. Rizvi),
- **ICT in teaching and learning** (F.A. Belov, L.A. Gabitova, I.B. Gorbunova, V.A. Krasilnikova, M.B. Lebedeva, I.V. Robert)
- **Cognitive development** (A.G. Asmolov, L.S. Vygotsky, V.V. Davydov, A.N. Leontyev, D.I. Feldshtein, G.I. Shchukina, D.B. Elkonin.)

The mixed methods design was chosen to conduct this research:

The following quantitative research are used in this study:

- Document Analysis (printed and electronic documents belonging to period 1980 – 2016 including organizational or institutional reports, regulations, survey data est.);
- Meta-analysis (Analytical review of empirical studies);
- Survey among Moscow students (Stratified random sampling, N=3,194, gender representative);
- Survey among students from different regions (Moscow, Krasnoyarsk, Achinsk, Bolshaya Murta settlement, N=252, gender representative).

The following qualitative research are used in this study:

- In-depth key informant interviews (respondents N=8);
- Secondary school students interviews (respondents N=20);
- Schoolteachers interview and focus group (N = 35);
- Public schools principals interviews (respondents N=15).

Key statements:

1. At the present stage of information society development there is a new opportunity to improve the quality of education by increasing the use of ICT in student learning. The previous stages of informatization the innovations were driven from the top down: the first wave of education informatization went underway in 1980s, when Decree No. 13-XI “On the Reform of General and Vocational Education” was passed in April 1984. The second wave of education informatization, which spanned a period from the late 1990s and through 2010, was marked by a surge in the number of initiatives to facilitate ICT-supported learning at both federal and various regional levels. The *third wave* of informatization characterized by botton-up innovation implementation. The drivers for changes in teaching and learning in school education are students. The transition of everyday practices related to the use of ICT into education processes leads to its the transformation. Therefore, education quality can be increased via support of the “grassroots” innovation.M

2. Mobile technologies and social networks have a high educational potential. New technologies comprehensively cover the education process and personalize it.

Personification of education occurs through the increase of individual work and students proactive role stimulation. Another important goal of new technologies implementation is an effective formative assessment.

3. The conditions for the successful realization of the potential of new technologies in education include: development and implementation of new approaches and procedures of education quality evaluation, promotion of “grassroots” innovation in education (administrative level); training course for teachers and education staff on contemporary ICT skills (practical level).

The scientific novelty of the study includes:

- Adaptation of diffusion of Innovations model in the context of Informatization of education;
- Identification of the transformation driver among the subjects involved in organization of the educational process;
- Understanding the education transformation processes as a transfer of everyday practices, supported by ICT usage, to education environment.

Theoretical significance is supported by its novelty in the sphere of modern education theories and concepts development; it concludes that, when developing such theories and concepts, one should discover and analyze changes in ICT as well as schoolchildren’s daily practices of their usage.

Practical significance is ensured by the potential of the study’s results usage for development of normative documents; module programmes for teacher development courses on mobile and network technology integration to the teaching process; and methodical recommendations for education process changes projecting.

Key theoretical and practical results of the study were regularly discussed at the meetings of the Centre for Contemporary Childhood Research Institute of education National Research University Higher School of Economics; seminars of the Institute of Education National Research University Higher School of Economics; and Post-Graduate School seminars.

The results of the study are presented at Russian and international conferences: XXIV International scientific Conference “Practices of Development: Individual Initiative and New Education Space” (Krasnoyarsk, 2017); International Symposium “What Vygotsky can teach us about young children”, National Research University Higher School of Economics and Moscow State University of Psychology and Education (Moscow, 2016); 8th International Conference on Computer Supported Education (Rome, Italy, 2016), awarded for the Best PhD research; International Conference “Education Development Trends”, the Moscow School of Social and Economic Sciences, the Russian Presidential Academy of National Economy and Public Administration, National Research University Higher School of Economics (Moscow, 2016); International Conference on New Educational Technology EdCrunch, National University of Science and Technology (Moscow, 2015); XXI Russian Scientific Conference “Practices of Development: Individual, Corporate, Institutional Freedom and Limitations” (Krasnoyarsk, 2014); seminar “Modern Childhood: Theory and Practice”, Moscow State University of Psychology and Education and National Research University Higher School of Economics (Moscow, 2014).

DISSERTATION SUMMARY

The introduction part includes the relevance of the research topic, reveals the research problem and research questions, identifies the purpose and objectives of the study, characterizes the scientific novelty, theoretical and practical significance of the work, formulated provisions for protection.

Chapter 1 “Education transformation in and for the information society” examine the modernization of education through various actors of the system. It is shown that during the education in the period of Early–Soviet the central element with the help of which was planned to achieve the desired results was the textbook. In the period of 1960s, the focus has shifted to the upgrading of teaching through the redesigning the lesson (K. A. Moskovento, 1959). In the 1980s the emphasis was on the optimization of the educational process (Y. K. Babanskiy, 1983), the change in the relationship of teacher and student (S. L. Soloveichik 1976). In the 1980s the emphasis was on the optimization of the educational process (Y. K. Babanskiy, 1983), the change in the relationship between students and teachers (S. L. Soloveichik 1976). During the Post-Soviet period (1990s), educational institutions was diversified as well as subjects programmes, what led to an idea of education individualization (V.V. Serikov, 1994; I.A. Skopylatov, 1994; E.V. Bondarevskaya, 1996; I.S. Yakimanskaya, 1996; and G.M. Anokhina, 2003). Thus, the tasks of modernization of Russian education have been repeatedly revised. At different stages of the development of the education system, the driver of the changes were different actors and processes. Nowadays, the most appreciated method to reach this goal is based on the activity approach (Federal State Educational Standard).

One of the central issues for modernization of education is the formation of innovative mechanisms, which leads to development of education. For these purposes, education modernization process has been reviewed in the innovation theory context. Literature analysis shows there two types of innovation implementation. Top-down innovation has the advantage that the stakeholders set the pace - they set the targets and the objectives and provide the funding. The implementation is left to the appropriate personnel. According to research a significant limitation of top-down innovation is the resistance to change, which leads to a number of difficulties at the stage of its implementation, including misunderstanding and lack of motivation. (V.A. Bolotov, A.E. Volkov, A.G. Kasprzhak, D.V. Livanov, A.A. Fursenko, I.D. Frumin, M. Barber, K. Donnelly, etc.)

According to E. Rogers, the higher the level of centralization and formalization of organization activities, the easier it is to make a decision on innovation implementation and the harder it is to really implement it (E.M. Rogers, 1962.)

On the other hand, there are bottom-up, or grassroots innovations. Generalizing the definitions by different authors (G. Seyfang, A. Smith, 2007; M.F. Hilmi, 2012; E.S. Phelps, 2013), grassroots innovations are rhizomatic (non-linear, chaotic, nonstructured) processes of development, implementation and expansion of novel methods and products happening at various hierarchy levels down to the lowest ones. This innovation type arises as a reaction to external changes.

When considering the formation of the information society and the requirements to change the organization of the educational process at school Informatization of education is described as a tool for modernization. A model has been introduced for the array of external and internal factors influencing the informatization process (A.G. Asmolov, A.L. Semenov, A.Yu. Uvarov, 2010) (Figure 1).

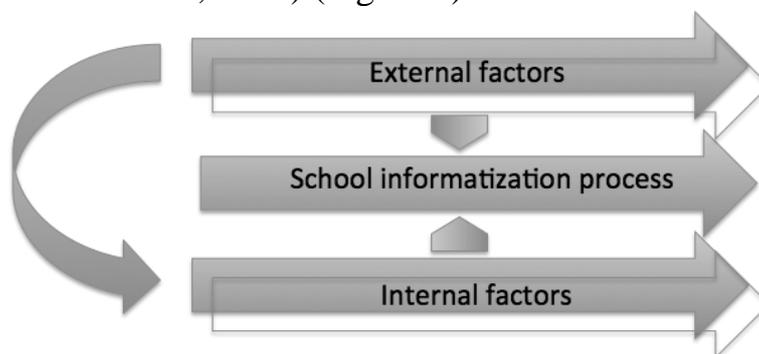


Figure 1. Inter-relationships between external and internal factors of school informatization process

The existence of these factors leads to the possibility of large-scale changes. First, the emergence and spread of new information technologies is inevitable (external factor). Secondly, it is necessary to develop and disseminate new educational technologies based on new information technologies (an internal factor determined by the system and associated with the level of development of pedagogical science and practice, readiness to support innovative processes, the ability to respond to emerging requests).

Key stakeholders interviews were taken to reach an information from a wide range of people—including community leaders, professionals, who have first hand knowledge about the process of education informatisation in Russia (S.M. Avdeeva; E.I. Bulin-Sokolova; V.V. Grinshkun; S.P. Kalashnikov; E.Yu. Kulik; M.E. Kushnir; A.Yu. Uvarov; and D.E. Fishbein).

Since the mid-1980s, Russia has seen a vast number of policy initiatives aimed at fostering various aspects of ICT integration into national learning environments.

The first wave of education informatization went underway in 1980s, when Decree No. 13-XI “On the Reform of General and Vocational Education” was passed in April 1984. As a result of this policy step, Russian schools and universities were equipped with the essential computer infrastructure enabling access to basic ICT. In terms of the curriculum, a new course, “Computer Science,” was introduced in secondary schools, and some STEM teachers received special training in IT and computer operation to be able to give appropriate instruction in this new subject. Also, some training in computer basics was organized for teachers in other subject areas as well as for school administrators. At the same time, a number of disincentives and downside factors of various scale and socioeconomic nature dampened this reformative momentum. For one, there was a huge gap between urban and rural schools in Russia; for another, educators themselves would often counter the reform and the ICT transitioning processes it had prompted amidst then meagre awareness of the new role that ICT was soon to obtain as a major competitive driver in technology and human capital. The fall of the Soviet Union embroiled Russia into

a situation of persisting socioeconomic disarray where education-related objectives long remained outside the state executives' top-priority agendas. It was not until the late 1990s that education informatization came back to broad public and government attention.

According to innovation theory the first wave of informatization was consistent with the principle of *top-down innovation*: decision-making was centralized at higher levels of the system, excluding lower-level in the change planning process; innovation implementation was a time-consuming and deliberate process. Default of acceptance and lack of cooperation from the educators side was the main barrier for top down innovation implementation. Education system saw a period of reforms which gradually prepared schools for innovation.

The second wave of education informatization, which spanned a period from the late 1990s and through 2010, was marked by a surge in the number of initiatives to facilitate ICT-supported learning at both federal and various regional levels. These were complemented by a series of non-government endeavours run by international foundations and other organizations, such as World Bank, Intel and Microsoft, among others. For educators, training & development programs were deployed that sought to advance ICT literacy within a broader multidisciplinary cohort of instructors, unlike in the first wave of informatization when only limited teacher corps received such IT-focused professional upskilling. The above-mentioned measures to boost ICT integration into the educational perimeter have yielded noticeable enhancements in the overall ICT infrastructure. Thus, schools have been procured with more comprehensive background hardware, including computers and related IT systems, laptops, e-boards and other multimedia, which has facilitated the creation of mobile classrooms, hybrid libraries and media centers with access to various electronic learning resources, etc. In higher education, a number of massive state-run programs have also been implemented to spur sector digitization and ICT-assisted networking for more effective administrative and academic operation. Taking stock of the said period, as noted in the OECD's "Measuring Innovation in Education" report, Russia has achieved a major progress in transitioning to a digitally supported educational model thanks to the improved availability of computer and internet infrastructure across the country's institutional landscapes (OECD, 2014).

The second wave of Informatization, in comparison with the first wave, was more associated with new electronic technologies. Technology drove the educational process. The second wave of Informatization is also a *top-down innovation* example.

Definition and characteristics of education informatization after 2010 is complicated by the lack of reliable data. Statistical research on ICT accessibility in Russian schools (Zair-Bek, 2016) suggests there was one computer available on average per seven students in 2014, almost a 10-fold improvement on what was recorded in 2001. Similarly, according to this report, 95.8% of Russian schools had stable internet connection in 2014, whereas the respective indicator was zero in 2001. In recent years, many schools have been carrying out local programs to expand and renew their ICT infrastructure, which involve procuring modern desktop PCs, server and network equipment, as well as portable and tablet devices that have received growing popularity among an ever-expanding population band in today's settings of

ubiquitous mobile communication and networking. These modernization initiatives are typically financed on a multilateral basis, including schools' own funds, parental donations and corporate sponsorship. However, the quantitative metrics, for example number of computers and Internet access speed, do not automatically insure positive attitudes towards the teaching process. According to the IEA Second Information Technology in Education Study (SITES), the extent of ICT use depended not only on school-level conditions, however, but also on national curriculum policies, as evidenced by large differences in the use of ICT among mathematics and science teachers within the same schools in some countries. (E.I. Bulin-Sokolova, 2016).

While computers purchased during the second wave of Informatization become obsolete, school environment is saturated with smartphones. The drivers for changes in teaching and learning in school education are students. The transition of everyday practices related to the use of ICT into education processes leads to its the transformation. This is a bottom-up innovation.

Analysis of the research results, which is the subject of chapter I, showed the replacement of the “ancient” computer into modern devices as tablets or smartphones. The grassroots innovation beetroots out the top of education system, indicate new emerging requirements that society will sooner or later present to education. Thus, *the third wave of Informatization* is brewing, which should bring information technologies and approaches used in education into line with the modern needs of society.

Chapter 2 “The Use of mobile and social network technologies in everyday life of modern students“ presents data that explain the possibilities of using new technologies in the educational process.

The survey included 16–18-year-old students of Moscow schools was conducted in order to assess how the Russian schools use mobile technologies and social media in the learning process. Stratified random sampling was chosen for the study, the sample covered 3,194 respondents with percentage 45.2% of males and 54.8% females. The results showed that 97 % of urban teenagers have their own mobile devices. Despite official school bans students use their cell phones or tablets while at school both for the entertainment (70%) and self- education purposes (70%). (Figure 2).

While technologies such as BYOD (Bring Your Own Device) are not welcomed by teachers, analysis of intensity and scope of unauthorized Internet usage during the learning process among adolescent and their academic performance did not give statistically significant correlations.

Speaking about school computer equipment, more than half of respondents (56%) noted that access to school computers or other devices (laptop, tablet, etc.) is limited. Students can visit computer class only in special hours and usually during the “Computer science” course.

Despite the school network does not allow connection, among others, to social media, they have become one of the novel channels for student-teacher connections. A third (33%) of respondents have noted that they are used to writing to their teachers via social media, while 41% of them stated they can also communicate on mobile.

It was assumed that usage of modern technologies in schools and availability of personal devices for schoolchildren in Moscow and other big cities are ahead with respect to small towns in the province. For this reason in the parallel with the key study was conducted the study with smaller sample to examine the actual stage of modern technologies usage for educational purposes in different contexts. The survey included 16–18-year-old students who live and study in Moscow, Krasnoyarsk, Achisk and Bolshaya Murta. The study covered 252 respondents.

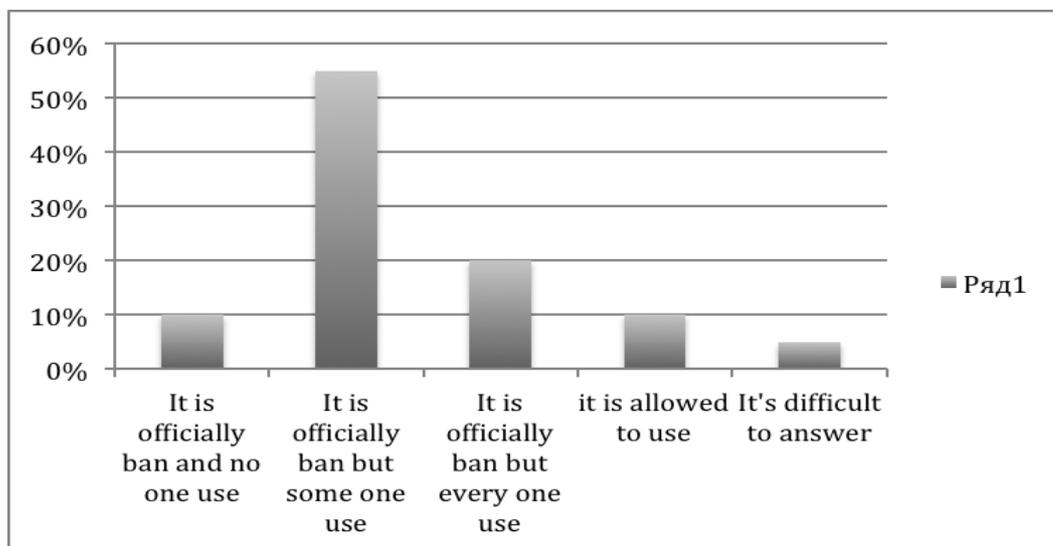


Figure 2. Students' perceptions of personal mobile devices in the classroom (N=3,194), %

The vast majority of ninth-graders (98%), regardless of where they live, have smartphone with Internet connection. For sixth-graders in the settlement, their desktop computers is their main tool for Internet connection (71%), while Achinsk teenagers use mobiles and desktops in equal shares. For teenagers living in Krasnoyarsk the smartphones is their preferable tool for Internet connection (46%) (Figure. 3). Did not obtain the votes such variants, related to Internet connection as “school computer”, “office computer”, “friend’s smartphone”, “parent’s smartphone”. Modern teenagers have two main tools for Internet connection - home desktop computer and smartphone.

Between account registration and the beginning of active use of social networks identified a six months gap. In addition, was found a shift in the age of enrolment and use of social networks between urban and country students. Teenagers from the village registered in social networks almost a year later than students from Moscow.

The teenagers described their teachers’ presence in social media in the following way: 55% ninth-grader respondents stated that less than a half of their school teachers have accounts in social media, while 40% six-graders insist that more than a half of their teachers can be found in social media. For the settlement school, the percentage of teachers having accounts in social media is much lower than that in urban schools. About half of all sixth-graders said they are ‘friends’ with their parents or teachers online, while the percentage is lower among ninth-graders.

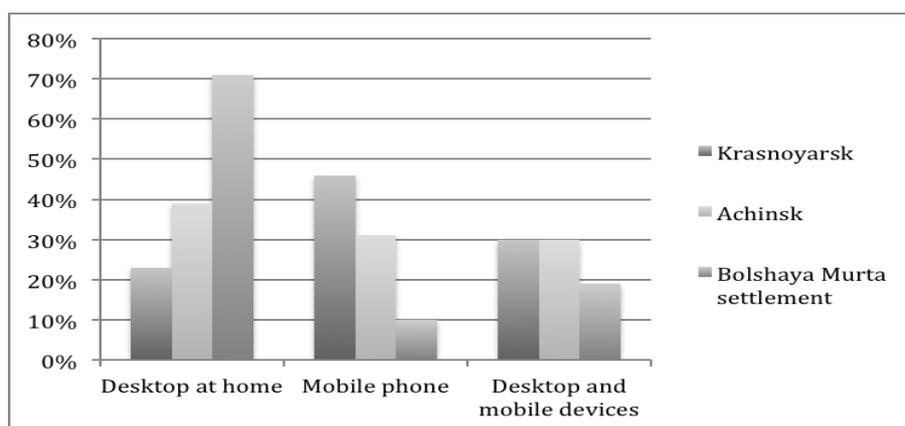


Figure 3. 6th grade students preferences mobile phone vs. desktop computer (N=105), %

The aim of the interview was to find out how modern teenagers use mobile phones and social networks while at school, how they switch between online and offline activities, and if there any resources associated with education in the social networks. 20 semi-structured interviews were conducted (N=20, age 14-17, 11 girls and 9 boys).

The interviews confirmed the data obtained in the previous survey. Students say that they use mobile phones while at school almost all the time, usually when they experience emotional or psychological state as boredom (when the subject is not interesting, when there is a lecture material, and when they are not required to participate). At the same time adolescents go online to find educational information too. It is important to note that such practices often appear without teachers knowing: *“When we do some projects, we create a chat online, add most classmates and all our relevant friends there, and talk it over. Most teachers don’t even really know it can be done”* (interview with a ninth-grader (male)).

Many students noted that they are glad to add their teachers as “friends” in social networks and often turn to them with questions or get a feedback. Teens also claimed that usually there are younger teachers in social networks: *“We normally have projects for two people or independently. We use chat for two-person projects. We also have a class chat. We call it a Secret Community where we usually share and discuss our homework”* (interview with a ninth-grader (female)). This statement and many others provides a clue about an importance of group work and student project activity taking place in social media.

Teachers use social networks in education process mainly as an "Bulletin Board" - for announcements and documents providing. Less often social networks use for teacher-student interaction. *“Our math teacher is also on vk [social network]. She helps us with our homework by uploading the information we need, she also publish some information on the upcoming academic competitions, meetings, and lessons”* (interview with an eighth-grader (female)).

In the meantime., almost every interviewer mentioned teachers using social media platforms for educational purposes. Student’s attitude to the idea of using mobile and network technologies in education is quite positive.

These observations have also been confirmed by evidence drawn through a series of interviews and focus group with public school teachers on how they assessed the achievements, perils and shortcomings in transitioning to ICT-supported educational practices. The sample included 25 teachers (mean age = 37,3) from the various Russian cities. The interviews were conducted between 2014 and 2015.

Respondents mostly mention new possibilities for collaborative learning and independent learning possible thanks to new technologies. Group work occur as a result of students grouping in social networks (often without the teacher) on the subject matter and moderating such groups. Teachers emphasize high interest of pupils in such forms of educational work: their independence and initiative in the organization of groups, communication, creativity and collaborative work. All teachers, however, point out this requires additional time and effort. *“This is a whole separate work, to support learning groups online. I had three groups. This takes really much time”* (interview with a Moscow school teacher).

As a rule, respondents state that such forms of education work appear at their own initiative. They also stress their lack of knowledge and practical skills for online work: *“How did I know how to use Vk for education purposes? Well, no-one really told me about it. I registered there when I was a student. Then I started working at school and I just thought I could try to use it for academic reason. Well, I started with a group, and then organized a chat. My method is trial-and-error”* (teacher focus group).

The role of principals' attitudes and behaviors as facilitators of ICT integration into school teaching using a diffusion of innovation model were discovered within a series of interviews with public schools principals. The sample included 15 principals (10 women and five men; mean age = 47) from the Russian cities of Moscow, Saint Petersburg, Vladivostok, Chelyabinsk, Yekaterinburg, Samara, Kaliningrad, and Voronezh. The interviews were conducted in October 2016.

The analysis of the interview shows that there is a strong headwinds have this far been confronting the Russian educational system when it comes to the teacher's motivation and willingness to go digital and to better align their strategies with ICT choices and expectations of modern learners. While the Russian Federal State Educational Standards emphasize the active use of digitally assisted teaching techniques as a key component in nurturing adequate ICT literacy and skills with students at various training levels, the existing institutional landscape is often unresponsive or literally resistant to this important imperative. It turns out that achieving a more sizeable and uniform progress in harnessing ICT-supported instructional best practices is hindered by the operational environment of patchy institutional policies & procedures where decision-making on whether to go digital, and to encourage others to do so, virtually remains at arbitrary discretion of individual administrators and teachers themselves:

“Things have been pretty fine in terms of equipment, but teachers' willingness and choice of information resources are crucial. It's not about the absence, for example, of a device, it is actually not a problem at all. We can apply for a funding award to get it procured, to ask parents for a financial hand after all, but it all just doesn't work unless the teacher is willing to engage. Just as an example, we've got a

mobile classroom equipped with laptops, but they're barely ever used at all. At the same time, there are smart boards up in every room, and using them to add vividness and interactivity to daily classroom activity has become an increasingly widespread practice." (Principal at a public school in Yekaterinburg)

Chapter 2 concludes with the discussion of divergent viewpoints with respect to new technologies among all players in the educational system. The research conducted allows distinguishing several groups among the participants of the educational process:

Students with no access to mobile and social network technologies (about 3%); students who use new technologies daily - the dominant group; students who use new technologies for education reason (about 70%).

Three groups of teachers were identified: teachers with no access to mobile and social network technologies are the dominant group; teachers using new technologies randomly group are fewer; and innovative teachers group are fewer still.

School principals demonstrate the following breakdown: administrators supporting innovations are the smallest group; those who banning new technology is the next one; school principals with neutral position (leaving decision to teachers) is the largest group.

Among the barriers to the use of mobile and network technologies in schools pointed out by managers is the lack of modern criteria for assessing the quality of the educational process, tools to promote and support educational initiatives, difficulties in involving teachers with experience in innovative practices. For school teachers, the lack of uniform and understandable rules and recommendations on these practices, as well as special training programs, is a serious restriction on the use of mobile and network technologies in the educational process.

4. In a nutshell, the undertaken quantitative and qualitative studies prove mass diffusion of mobile and social network technologies in modern school. This fact can be considered as a prerequisite for the appearance of *the third wave of informatization* that will be focusing on implementation of modern ICT in the education process. However, to shift from potential to real prospects of mobile and social network technologies use in school education, certain hurdles must be overcome. The conditions for the successful realization of the potential of new technologies in education include: development and implementation of new approaches and procedures of education quality evaluation, promotion of "grassroots" innovation in education (administrative level); training course for teachers and education staff on contemporary ICT skills (practical level).

Chapter 3 Chapter 3 "Mobile and social network technologies educational potential" describe the potential use of new technologies in education and based on the reviews of local and international practices in the use of such technologies.

A review of contemporary ICT trends in education has led to the conclusion that most of them are related to mobile and social network technologies. The most renowned trends include

1. Using student mobile devices, e.g. BYOD method when students are able to use their smartphones during classes to search for information, do the test, or watch relevant videos. Another example is interactive electronic books which could be

uploaded to mobile devices (L.L. Bosova). The idea is not merely to digitize printed books but to produce an interactive book with the hypertext, video and multimedia embedded.

2. Using social media in learning and teaching (A.V. Feshchenko, O.A. Klimenko, S.H. Kim, S. Manca, M. Ranieri and more). Social networking sites are emotionally attractive and convenient environment for teenagers (M.A. Balandina, 2012). Students satisfy their information needs, while remaining in the environment of Facebook or Vkontakte, they use social media for collaboration and interaction with the peers and teachers.

The review of the literature provided descriptions of social media as a potential new resource, which provides the organization of teacher-student interaction, students' group communication, and increases student's involvement in the learning process. The analysis showed that social media is used in two main ways: 1) as service for support and operationalization of existing forms of teaching and learning, and 2) for upgrading the educational process. Positive aspects of the use of social networks for education are associated with a variety of activities of students, and negative aspect included low ICT literacy and higher workload of teachers. It also confirmed the presence of the «digital gap» between students and teachers.

For students - assignments can be fulfilled at any convenient time, moreover social media support self-education, increasing interest in learning (involvement), and develop creative thinking and ICT competences.

For the teachers: less time for individual work (social media allow making teacher's reply to a certain schooler available for everyone, helping students to analyze the situation autonomously and find the solution for their problem), project activities and collective work.

Limitations of social media usage in education include increased teacher's effort mainly caused by lower Internet connection speeds or resource blocking in the educational organization. Moreover, there is no methodology for the teacher's related to social media and mobile technologies; there are no tools to assess the quality of the of education. Students in social media face the risk of distraction.

Based on the results of the study the educational potential of mobile and social networking technologies is:

Realization of one student – one computer model, enabling individual education. Students gain the experience of choosing their individual education track, projecting the current activity to the planned result, getting immediate feedback. this is consistent with the meta-subject results stipulated by Federal State Education Standard.

Education process can be also individualized by the *emotional attractiveness of the environment* realized in the social media. Research suggests that users find an environment more attractive if it contains their personal data, enables communication with other users on non-work or non-education topics, and allows distractions (Q. Huy, A. Shipilov, 2012; P.A. Argenti, 2015). Despite the 'distracting' content, an emotionally attractive environment increases involvement in the project or group work, and positively influencing the education results.

Individualization opportunities mean more *independent work and initiatives*. Transferring learning tasks to the cyber environment students know well and use extensively allows encouraging independent projecting of learning activities, e.g. via maintaining groups or blogs, which also matches the **personality results** stipulated for by Federal State Education Standard.

Project activity or cooperative learning give students the chance to share the responsibility to make choices, solve problems among themselves, and deal with conflicts of ideas. According to developmental theory this type of activity consistent with the Interpersonal communication - the leading type of activity for adolescents (D.B. Elkonin, 1971). The project activity involves problem articulation, creation of algorithms, monitoring and evaluation, pivot, est. that stimulates cognitive development.

New technology provides new opportunity for formative assessment. Teachers can create a multi-modal performance that requires students to write, draw, read, and watch video within the same assessment. Other tools allow for automatic grade responses, question-embedded documents, and video-based discussion. In addition to simplifying formative assessment, the use of these tools has been shown to amplify student engagement (Hwang & Chang, 2011). Digital footprint make students progress visible and can help to develop a self-assessment skills.

New technological advances in information and communications technologies can help to build students digital skills.

In Chapter III, based on the findings, proposed conditions for the successful realization of the potential of new technologies in education.

Referring to the administrative level, the education process quality assessment criteria should be amended. Beside the absence of any proof that the education innovations have valid effect on the academic results (Hattie, 2009), it reasonable to presume that the main goal of mobile and network technology implementation in the education is align the education system with information society needs and opportunities. Education process must be up-to-date and match the interests of modern students. As participants in the educational process, students should have the opportunity to choose educational technologies.

Considering the introduction of mobile and network technologies as innovations, the creation of conditions for the dissemination of "grass-roots innovations", has to be considerate as the support of educational initiatives in the education system for "soft" modernization. Therefore, the strategy should be as it follows: the first step is necessary to identify such practices; the second step is to promote their diffusion (through teacher communities, courses, etc.); the third step to promote their adoption (through the removal of barriers as could be the blocking services of social networks on school computers).

Among the possibilities of modern technology usage for schoolchildren teaching, it is possible to find out a large number of relevant methods.

Development of general rules and methodological recommendations on modern technology usage in schools would 'legalize' usage of the technology by teachers as well as simplify their work. It is necessary to develop and implement training programs for teachers and general courses ideas, as it was done in the

previous stages of informatization, but does not find response in modern programs. It is also important to organize the collection, evaluation and replication of the best pedagogical practices, which will create a "core" of pedagogical ideas, which, thanks to network technologies, will ensure equal access of teachers to new technologies.

The series of interview with school principals were carried out for verification of the developed administrative and pedagogical conditions of realization of potential of new technologies. The sample included 15 principals (10 women and five men; mean age = 47), participants of the competition "School leader" 2016.

The study confirmed that for school principals at the stage of implementation of new educational technologies it is extremely important to solve such administrative tasks as: development of modern criteria for assessing the quality of the educational process, implementation tools to promote and support educational initiatives, involvement teachers with experience in innovative practices.

In conclusion summarized the data obtained during the research. It found that the aim of the study is achieved. The answers to the research questions were received. New facts were established, and new terms were introduced. Promising directions for future studies in the sphere of modern ICT integration in the educational process were identified.

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