

Modern Didactics in Contemporary Education

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Abstract—The rapid development of information technology and telecommunications has radically changed the two most important social processes: access to information and communication, allowing the globalization of the economy, culture, education and other areas of society. Priority, undoubtedly, is education, which determines the pace of development in particular countries and the quality of life of individuals. Hypertext and episodic flow of information dramatically changes the way we think and learn. Today, the human cognitive process can no longer be based on the linear structure because shaping knowledge is based on the conscious use of information fragments and episodes that reach the contemporary man in a continuous and often unintentional way. In such conditions, methods and forms of education used for centuries are no longer effective, especially for digital natives who build their intellectual capital.

Keywords— modern education, ICT in education, media in education, digital didactics, methods and forms in modern didactics

I. THE TRANSFORMATION OF TECHNOLOGY AND INFORMATION IN MODERN SOCIETY

THE rapid development of information technology and telecommunications has led to a radical change in the two most important social processes: access to information and communication. The fragmentary and hypertext transfer of information and the specificity of virtual space is continuously changing contemporary reality in a fundamental way. Transformations become pervasive and concern almost all aspects of human life. The most important are definitely:

- civilizational changes – recently we hear about the emergence of a new category of information society; most of the modern theories define modern society through the prism of information processes, which became a product - goods driving the development of civilization. [1] The information sector based on production processes and redundant generating, collecting, processing and publishing information become dominant not only in the modern labor market, but also in generating national income. Information is not knowledge, but without information there is no knowledge, so in the information society a priority role is played by knowledge conditioned and determined by key and vocational competencies acquired and developed in the process of lifelong education. Information skills, among the key competencies, have become inalienable for the functioning in the new conditions.

- technological changes – digital information and communication technologies have offered the man a free access to unlimited resources of timely, reliable, strategic, useful, but also random, unreliable, false and harmful information. Safety and the scope of the usefulness of the information obtained from online sources is up to us and our information competencies. Time and space are no longer a barrier. Modern forms of social communication enable contact in the field of audio and video in every place and time, but on the other hand, giving up (consciously or not) with privacy, modern man remains continuously available in communication. Man can of course opt out of the communication accessibility, but must be aware that today it has its, mainly professional, consequences. In the globalizing media-saturated reality, the only constant thing is change. With an unequaled pace, economic conditions are changing, affecting situation on the local and global labor market. There are new professions and those already well known acquire a new meaning. The condition of professional activity are key and professional competencies are crucial for career and professional satisfaction. We are seeking experts specialized in narrow fields who are able to work in international teams, so beyond information and technology, language skills are today among the group of absolutely key competences.
- the transformation of social structures – autonomy of institutions and individuals, characteristic for globalization processes, translates into a progressive individualisation and coercion of constant progress within the Bauman meaning (In postmodernity the concept of progress was reinterpreted: *progress became a personal project and not, as it was before, the collective one*), [2] which is directly translated into changes in life style. The need for professional stability and the need for continuous competence updating absorb more and more time, dramatically reducing the possibility of family life. The traditional family model gives way to associations aimed at rewarding income, career and self-fulfillment. Young people give up or delay the decision to marry and start a family, because in general media coverage "to HAVE" is undoubtedly more meaningful than "to BE". The strength of consumerism and the right to meet their own needs determine decreasing significantly number of births and increasing the number of free relationships, same sex relationships and people living in a satellite way.
- cultural changes – modern man is a citizen of globalizing world. Thanks to new media and linguistic competence he may contact each, regardless of geographic location, and be a consumer of any culture. Ease of digital authoring and publishing in the cloud through a Web 2.0 tools created a new category of virtual societies, grouping around some

ideas or inspiring civilization challenges. [3] Ease of establishing and maintaining virtual contacts and increased geographical mobility stimulates the process of races and cultures mixing. A growing number of multicultural families gives you a chance to meet other customs and traditions, but at the same time is forcing new, hybrid cultures, as a combination of elements selected

II. CHILDREN AND YOUTH IN THE MEDIA REALITY

The rapid and continuous growth of information and communication technologies has led to the fact that almost every human activity is somehow marked or determined by ICT. As never before in history, the tool most strongly affecting the reality and society, needed just two decades, not only in order to become widespread, but to addict all coexisting generations. Youth growing up today had no chance to meet daily life without the Internet and the media; they are their natural environment and they cannot even imagine that we could live without these tools; naturally they move between the real and the virtual world, feeling "at home" in each of them. Many hours of media use resulted in behavioral changes, way of functioning and even in the structure of the brain. The specificity of fragmented, hypertext transfer of information and an online virtual space conditions necessitate a new way of exploring the world, learning and thinking. This social group and their adaptation to new technological conditions of everyday life had to be somehow described. One of the first expressions were "Children of the Network", i.e. "Siaciaki" [4] emphasizing the free and effective way of functioning of young people in a virtual world. In a particular way, they easily deal with the search for new information and learning materials using GOOGLE search engine. The term "thumb generation" refers to most commonly used way to communicate via short messages called SMS. This practice has its educational consequences, manifested in difficulties in formulating a long speech, or abuse of abbreviations especially developed for the needs of SMS. Another term - "Copy-Paste Generation" refers to a method of composing a written statement. The young generation, focused on quick results and a small amount of work, prepare essays using fragments of texts available on the network, ignoring the risk of plagiarism and borrowings. Regardless of the method of functioning, it is certain that it is a generation of homo mediens. [5]

Marc Prensky, american media researcher, presented an interesting concept of present generation. Analyzing the way of discovering the world and the use of new technologies, he detailed the group of young generation, which he described as "digital natives", while the older generation, growing up before the digital era, was called "digital immigrants". [6] This socio-cultural stratification is particularly apparent in the educational reality. For digital natives media are the natural environment, work and entertainment tool. They have no other experience and cannot function freely and efficiently without technology. For digital immigrants modern technologies have gradually emerged and aroused suspicion. They frequently use them under compulsion, often according to the instructions from the younger generation. They watched how the former "familiar" world of records, adapters and tape recorders has been forced out by higher generation device. M. Prensky noted that this generation has learned digital media language, because they had

to, but they are using it with many difficulties. They definitely prefer to use pre-digital language. [7]

This dichotomy applies not only to communication but is also visible in the perception of reality and creating constructs of knowledge. The young generation can read and understand virtual space, miniature tools do not bother them. They easily read and understand texts posted on the Internet, even if their content is fragmented or taken out of context, building their knowledge based on loosely related artifacts. They prefer free (hypertext and hyper-media) access to the sources enriched with picture and sound. At the same time they can process information from multiple sources. Digital natives are alumni of the culture of immediacy; they cannot focus their attention for a long time, unless the matter clearly interest them, represents a challenge for them and what's more - entails the need to experiment. They prefer short-term tasks that give quick results. The message based on a linear structure is too long for them and therefore difficult to read and understand. They most often learn incidentally, while performing other tasks, such as creating their own artifacts or playing computer games. Satisfaction delivers them to discover new possibilities for using digital tools in the world associated with the technology.

The world of digital immigrants is more static and orderly. Their upbringing and education is based on a linear, powerful transmission of content. They much easily read printed texts, than this displayed on screens. Image and sound is an addition to the text, but it also can be seen as a dispersing factor. While exploring the reality they use linear thinking and assimilate information in a structured, logical and referenced to previously held knowledge base; virtual space is unreadable for them and difficult in the exploration, usually seen as a chaotic creation. Digital immigrants can work steadily for a long period of time, patiently waiting for delayed effects. Partial results are not as important for them as for digital natives - they prefer to receive cumulative, overall result. Frequently they learn only the basic, essential functions of used ICT tools, not seeing the need to explore the rest. In this manner they not often get to know the real possibilities offered by the use of the device. Generally, they treat from a distance all modern media and all the technical innovations. [8]

III. TECHNOLOGICAL CONDITIONS OF MODERN SCHOOL

It would seem that the digital natives and digital immigrants is not the first intergenerational gap in the history of mankind . This time, however, the problem lies in the fact that the differences are too large and have, unfortunately, an upward trend. Additionally, this digital divide [9] affects educational process of young generation. School reality shows that technologically advanced Youth (digital natives) are taught in schools by digital immigrants. Technologically aware teachers who not only integrate new media into their activities, but also help their students to move in this dichotomous reality, constitute a small minority in schools. This reality, unfortunately, does not change, because despite repeatedly taken actions to reform the existing paradigm of education, teachers do not want to give up their superior position. They want to stay in the center of the educational process, have a decisive influence on it and control it. This creates a lot of tension, because the younger generation is accustomed to self-

exploring, creating and publishing in the network; young people want to be active and decide about their own development. Moreover, the interest of young people fail to match with what is proposed by modern school, which, according to experts, is frequently functioning parallel to the Internet and digital technologies, thus confirming that this is one of the most conservative of social institutions, for centuries functioning in almost unchanged form. [10]

Analyzing the image of contemporary schools in the context of modern technologies, we ask: how do digital immigrants teach? Even a cursory analysis shows clearly that teachers still use traditional teaching methods, which were created for the pre-digital generation. The transfer of knowledge is based on the workshop that is known and friendly for teacher. The needs of digital natives are pushed aside. But now, with the possibilities offered by new information and communication technologies, we can fully implement the postulates raised by the leading educators: Kupisiewicz, Okoń or Kruszewski. Technological tools allow the full use of some rules, like combining theory with practice and persistence of knowledge. Modern multimedia teaching materials open up teacher and student perspective. Although it happens that teachers bring ICT to schools, but their use is limited to the simplest of actions not necessarily integrated with the objectives of teaching. Treated, in many cases, as an additional element of teaching activities do not provide students with opportunities to develop their full potential, while methods and forms of teaching unsuited to the present conditions and the presence of digital technologies, often result in inadequate achievements or even school failure. It should also be noted that maladjustment of methods and forms of education to technological conditions and the needs of digital natives may lead to restrictions in the development of key competencies that underpin the functioning of the "society of the future".

IV. SEARCHING FOR THE PARADIGM FOR A MODEL OF MODERN EDUCATION

For years, in spite of accelerating social change in education, there is still present and still valid outdated paradigm of education model, paradigm referring to this one developed for the needs of the industrial revolution of the nineteenth century. The school resembles a factory, in which the individual grades are equipped with centrally planned and standardized package of knowledge, measured and - in case of a positive result - transmitted to the next assembly line. The basis for selection for different classes is the "the date of manufacture" - the age of the student. Other individual predispositions are treated marginally. [11] New paradigms referring to the strong current conditions and needs of the students, such as: cognitivism, constructivism, connectivism or "meta" e-learning has not been able to revolutionize this fossilized system. They introduced a breath of freshness to education, paying attention to the needs of next generations, but the strength of their arguments was not sufficient. Although all relate to the human cognitive process, each of them emphasizes different aspects and conditions.

Cognitivism draws attention to the learner, which is an entity actively absorbing the information provided in the school. If, therefore, we will provide more channels delivering relevant content, a chance to remember and gain knowledge should consistently grow. Modern information and communication

media allows to prepare and engage student in interactive multicode transmission learning, which activates the greatest possible number of senses. An additional advantage of multimedia teaching system is the individualization of the learning process, adapted to the capabilities and needs of the student. [12]

Constructivism, based on the principles of pragmatism, cognitive psychology and Vygotsky's theory, is the significant concept that puts more emphasis on the process of learning and on the student's cognitive activity than on learning outcomes. Constructivism "focuses on active student and the teacher organizing him an attractive learning environment", [13] because the cognitive process of the individual is conditioned by its personal experience and meanings that it gives to concrete content. Only active action allows to effectively build valuable knowledge structure. The role of the teacher is to inspire and provoke student cognitively, showing him a reliable source of information and creating conditions for independent exploring of the surrounding reality. In class, a lot of experiments are not possible. But today we can help ourselves with multimedia resources through which students can independently carry out even the most complexed experiments and visit virtually inaccessible places. Among teachers, one of the most popular methods of didactics technological support is Webquest, which allows you to implement the assumptions of constructivism to teaching practice. [14]

Connectivism, also known as the theory of learning in the digital age is a concept proposed by two Canadian scientists S. Downes and G. Siemens at a time when the rapid development of information and communication technologies surprised society with an offer of technological solutions, while limitations of contemporary pedagogical theories (i.e. behaviorism, cognitivism, constructivism) made it impossible to integrate them with modern information and communication technologies in education. The theory of learning in the digital era, developed by Siemens in 2005, refers to the process of learning / teaching in the digital age. According to this theory knowledge does not have to be absorbed by the student, but may be deposited in other carriers - not only the human brain. The most important competence a modern man should have is the ability to effective knowledge shaping. The learning process takes place in the moment of contact with the learner's knowledge resources, usually stored in devices or in the "cloud". Connectivism is based on the following assumptions: learning is the process of connecting to the selected nodes or specialized sources of information; creating and maintaining connections between individual nodes is an indispensable part of the process of lifelong learning; the purpose of educational activities is knowledge needed today; due to the "climate information state" you cannot predict what knowledge and skills will be needed tomorrow or in a few days time; learner's decision-making process is in itself a learning process. [15]

Contemporary socio-technological conditions and growing importance of non-formal education resulted in flourishing the concept of blended and distance learning. It assumes that students learn in a supervised location, at least partly by using online tools, with the ability to control their time, place, topic and / or pace of learning. This form of learning takes into account student's individual needs and abilities, making him responsible for the effects of learning and self-development; this is highly valued by employers in today's job market. Such forms

of learning are fully integrated with e-learning, understood as the technological support of any form of learning. Among the most important trends in this form of education R. Lorens include:

- educational games [16] which (what is important from the neuro-didactics point), combine learning with fun not only allowing the formation of new knowledge, but also acquiring all kinds of social skills;
- m-learning [17] based on the use of the technical potential of mobile devices, especially mobile phones and tablets; teachers' mental blockade reduces the frequency of using this method, and poor Internet bandwidth of mobile networks may be associated with decreased quality effects;
- virtual learning (VLE) takes place in a Virtual Learning Environment - on interactive educational platform, which is equipped with tools for creating and modifying educational materials, remote courses and synchronous and asynchronous communication; [18]
- rapid e-learning is a response to the conditions of instant culture society, also known as the supermarket culture; immediacy characteristic for modern society also applies to education, from which interested people expect fast solutions to their needs; rapid e-learning enables quick modification of courses (attaching interaction, audio components, video or animation); the modules themselves are short and feature self-fulfilling materials and some of the courses you can take in one day. [19]

Teachers at all levels of education are obliged by various supervisory authorities to use technological tools during classes. Unfortunately, in many cases, they incorporate them into classes with reluctance and artificiality sensed by students. In the scientific research environment, there are opinions (i.e. M. Prensky [20], R.M. Palloff & K. Pratt [21], C.J. Bonk [22], A. Collins & R. Halverson [23] and I. Jukes, T. McCain & L. Crockett [24] and authors of Digital Media and Learning research, financed by MacArthur's Foundation [25]), that the lack of integration of modern media and digital tools with the school and the academic model of education has a negative effect on the efficiency and quality of the teaching process. [26] Young people do not treat school as a place where they can develop their interests and passions. The school is perceived as a place where learning takes the form of a burdensome obligation. Shaping the knowledge and skills is still based on traditional methods, and technological innovation is too often associated only with the use of the classroom Power Point presentation.

Ken Robinson draws attention to the paradox of traditional teaching: the average young person every day is stimulated by the latest multimedia devices and as an active player he asks, he is looking for answers, he finds, he verifies, he decides and acts more or less successfully. At school - he is coerced to sit peacefully in the pew, focusing attention on statements of a teacher or peers, observe the array or the screen and systematically write some notes; in consequence, part of students interfering with the teacher indicates their lack of interest and need for activity. Some are admonished, punished or receive a judgment from psychological and pedagogical counseling. In the United States, there are cases that school discipline problems are solved by using sedatives. [27]

Experience shows that the optimal solution for this type of situation could be the blended learning, understood as a harmonious and complementary use of integrated traditional and multimedia methods and forms of teaching. Especially that the integrated education allows students to multi-sensual perception of multi-code transmission of information, interactive multimedia communication or stimulating visualization. [28] In addition, new media naturally make teacher an attractive inspirer giving students the opportunity to explore and document their successes or shortcomings that require replenishment. Classroom can become a place to create authentic educational community. [29] But for this - mentality and integrated system solutions need to change. As soon as possible the educational system should be revolutionized to avoid losses in human capital, generated by our fossilized system.. Didactics unsuited to the conditions makes human potential to be wasted and the school is regarded as a necessary evil. Huge funds used for the digitization of Polish schools tend to be wasted because the teachers do not want to or cannot effectively use equipment purchased.

The rejection of the old paradigm and existing models of education implies the immediate development of new, relevant to modern need, theoretical models suggestions, which should be supported by research and practice. This will provide a stable and internally coherent concept of new didactics. As noted by M. Kąkolewicz, previous reforms of the education system relied largely on small, fragmented modifications developed in the nineteenth century Prussian totalitarian model of education. Changes of mentality in people directly responsible for teaching are even heavier. Attachment to what is known and proven, and lack of openness to new ideas and solutions made it difficult to introduce these few changes. Only development and social acceptance of new paradigms will successfully implement new models in education. One of the key factors forcing the existing paradigm change is the development of information technologies and, based on them, digital media and the Internet. [30] They radically change functioning of the individuals and, what is important, they are a natural habitat for the young generation. The new model of education, should correspond to modern needs. According to many theoreticians it should be build on 10 pillars: self-learning, horizontal structures, the transition from the implied authority to collective credibility, decentered pedagogy, networked learning, open source education, learning as connectivity and interactivity, lifelong learning, institutions of learning as a mobilizing networks, flexible scalability. [31] It should also be based on multilateral theory of education; as noted by M. Tanaś after W. Zaczyński: „respecting this theory will allow to find educational path in the maze of information civilization (...) and protection against wandering within the meaning of the use of IT tools in the educational process”. [32]

V. METHODOLOGY OF THE RESEARCH

Today, almost every child uses modern multimedia tools (ranging from getting more attractive mobile phones) intuitively, very efficiently and effectively and the student has at its disposal a number of valuable materials in an educational open Internet resources, and school textbooks are supplemented with attractive multimedia materials. And although it might seem that school didactics makes effective use of the

possibilities of digital education, the reality looks completely different and leaves much to be desired. According to research cited on one of the web portals dedicated to school digitization, only approx. 20% of fourth graders and 30% of middle school students make use of such opportunities. And the main reason for this low rate is not the lack of access to appropriate teaching materials, but insufficient skills of teachers in effective and transparent use of multimedia teaching aids in achieving agreed learning objectives. Students definitely lack of support, suggestions and good examples from teachers. They cope well with the technological aspects of modern media and finding information, but do not know what to do with information acquired and how to turn them into knowledge and competence. According to the studies already referenced, schools have about 18 000 interactive boards, but an excessive number of them is not used. [33] Authors of research conducted in this area hypothesize that teachers don't have appropriate competencies, but also the don't feel the responsibility for the efficiency of the teaching process - students' competencies.

Similar conclusions arise from analysis of data collected as a result of the external evaluation carried out by educational supervisors and inspectors, published on the platform npseo2. [34] Under the latest order of the Ministry of Education, dated 14 May 2013, educational institutions are evaluated according to 12 requirements:

1. The school or institution implements the concept of work aimed at development of students
2. Educational processes are organized in a manner that encourages learning
3. Students acquire knowledge and skills defined in the core curriculum
4. Students are active
5. Social norms are respected
6. The school or institution supports the development of students taking into account their individual situation
7. Teachers work together in planning and implementing educational processes
8. It promotes the value of education
9. Parents are partners in school or institution
10. Resources are used and the school or the local community for mutual development
11. The school or institution, organizing educational processes takes into account the conclusions from the analysis of test results, lower secondary school exam, matriculation examination, vocational qualification examination and qualification examination in the profession and other internal and external research
12. Management of the school or institution serves its development. [35]

In point 2: „Educational processes are organized in a manner that encourages learning” research area was detailed: “School or institution use innovative solutions for the development of the student”. Taking into account the development needs of digital natives, it seems obvious that in this area we must take into account the extent of integration of modern information and communication technologies in education.

Analysis of the situation in this area, in the contemporary school, is enabled by research conducted in Krakow by inspectors of the Board of Education in collaboration with researchers from the Faculty of Education at the Pedagogical

University of Krakow (Co-operation agreement between the Board of Education and Rector of Pedagogical University of Krakow). The first stage of research was carried out by external inspectors of Board and their purpose was to gather information on the functioning of schools and assess the quality of their work. The new model of pedagogical supervision distinguishes between the three forms in which it is performed:

1. evaluation of educational activities in schools and institutions,
2. enforcement of the law and supporting the work of schools and institutions,
3. evaluation of teachers in their teaching, education and care as well as other statutory activities. [36]

The study used a quantitative strategy. The method of diagnostic survey was used, based on questionnaires and interview techniques. Surveys included questions open and closed. Inspectors did not participate in the development of research tools.

The second stage of the study, involving interpretation of results gathered on the internal platform npseo2, was carried out by teachers from the Pedagogical University of Cracow. Due to large amount of information collected, selected requirements and areas were analyzed. Modern information and communication technologies integrated in the teaching process in Polish junior high schools became subject of research, based on data from Małopolska Province, Mazovian Province and Lublin Province. The aim of the study was to analyze the scope and form of innovative teaching integrated with modern information and communication technologies implemented in secondary schools and to identify the differences that occur between the selected provinces. The main research problem: what is the scope of the integration of ICT in school teaching? To get the full reply, the various aspects of the main research problem were included in the detailed research questions: How many teachers in the last year implemented innovative teaching activities? What areas related to these activities? What innovative solutions integrated with information and communication technologies are applied in individual schools? The studies used a qualitative strategy. They used the method of analysis of individual cases, the technique of analysis of documents. They analyzed the results of the evaluation in the time from 06.01.2013 to 17.06 2015 in Mazovian Province, Małopolska Province and the poorest region - Lublin Province. Research focused on middle schools because students at this level already have technological competence in the field of efficient use of diverse information and communication devices. Besides, this age group is difficult to discipline to study, so attractive, inspiring, eye-catching teaching aids are strongly suggested. These students are not sufficiently independent, they need teachers to direct their own development using only reliable sources and materials; they need more support and examples in the field of conscious, responsible and effective use of digital resources, especially those “open” ones. Digital natives from high school already have more autonomy and can develop their interests and passions independently. Within the context of issues covered in this article, the analysis included only selected questions from the surveys and interviews conducted by inspectors.

VI. MODERN INFORMATION AND COMMUNICATION TECHNOLOGIES IN SCHOOLS – BASE ON ANALYSIS OF RESEARCH RESULTS

Teachers participating in the study were asked about adapting an innovative and dynamic educational process to changing circumstances - did they introduce innovations in their didactic workshop in the past 12 months? Due to fact that research groups from different provinces are varied numerically, comparison is limited to percentage data.

| INNOVATIVE SOLUTIONS INTRODUCED IN THE LAST YEAR* | | | |
|---|-----------------------------|--------------------------------|----------------------------|
| Type of answer | Mazovia Province for N=2571 | Małopolska Province for N=1930 | Lublin Province for N=1461 |
| Yes | 82.54% | 86.11% | 84.33% |
| No | 11.32% | 11.04% | 13.89% |
| Lack of response | 6.15% | 2.85% | 1.78% |
| SUM | 100% | 100% | 100% |

*Own calculations based on data from the platform npseo2

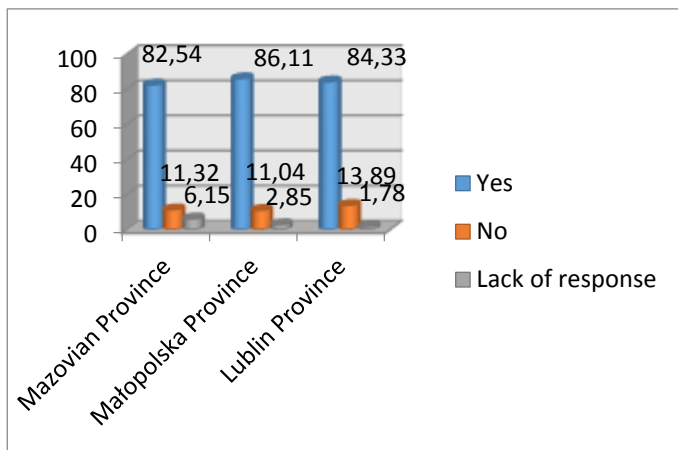


Diagram 1. Introduction of innovative solutions during the past year

As can be seen from the table and diagram above, 80% of teachers declared the introduction of innovative methods and forms of teaching in the last year. Such result may give rise to optimism that despite the stereotype of the immutability of school didactic, teachers are trying to modify and liven up didactic message, seeking a way to adjust it to the circumstances and social needs. This optimism, however, should be very moderate, because not all innovations meet the “here and now” needs, not all relate to the integration of new technologies for the needs of digital natives, and not all translate into quality improvement, although, of course, each attempt taken in this field is very valuable. The survey results do not differ from each other in selected provinces, although it is clear that the activity of teachers in this field in the Małopolska Province is the highest.

To more accurately refer to the innovative activity of the interviewed teachers, you should consider the areas of innovative teaching activities (declared by them earlier). This will allow to see the image of the integration of new media into school teaching. However, due to the fact that such information were contained in answers to open questions in the questionnaire, the following charts do not take into account the percentage distribution. But they clearly suggest that in all three analyzed provinces teachers attempt to modernize their teaching

methods and adapt to the new conditions. Open question recalled later shows that the modification of methods quite often takes into account the method pursued outside the school. This is undoubtedly very valuable, although we should ask whether this is the best form of innovation.

The following three diagrams show the areas of teachers activity marked by the novelty in the Mazovian, Małopolska and Lublin Province.

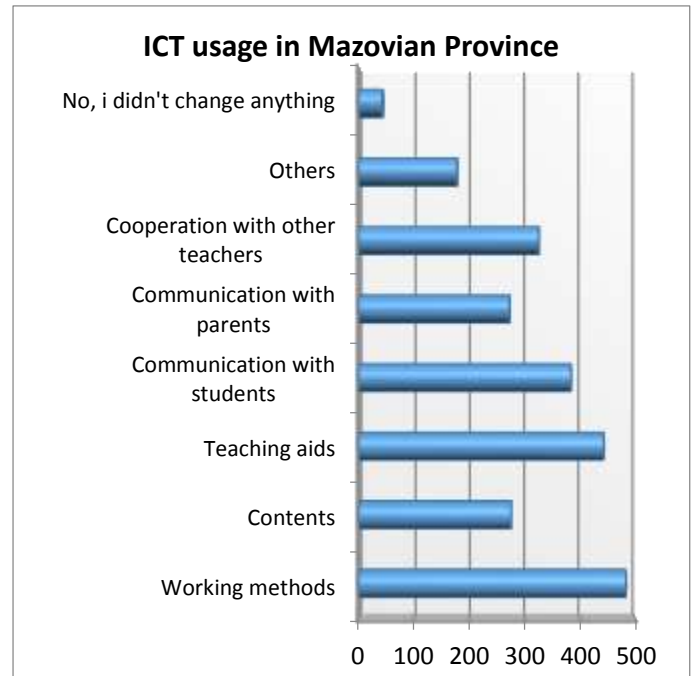


Diagram 2 Areas of teachers activity marked by the novelty in the Mazovian Province

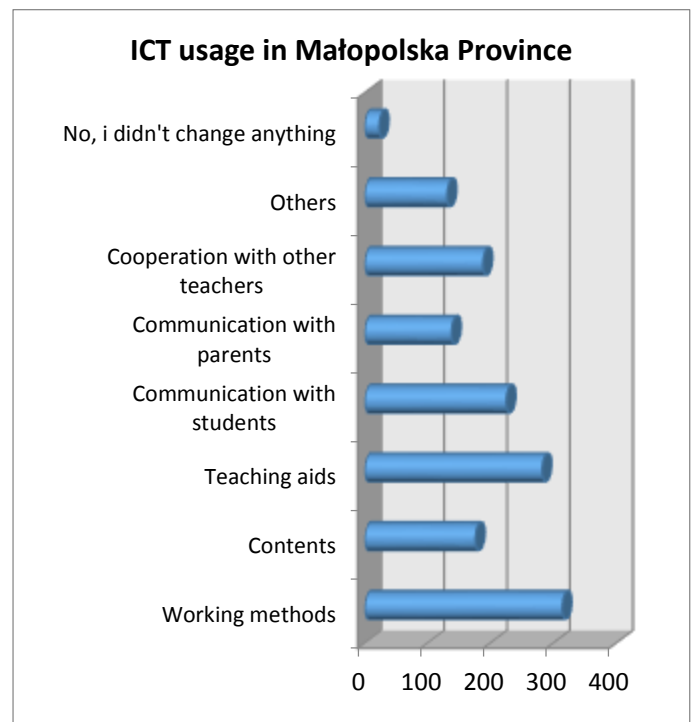


Diagram 3 Areas of teachers activity marked by the novelty in the Małopolskie Province

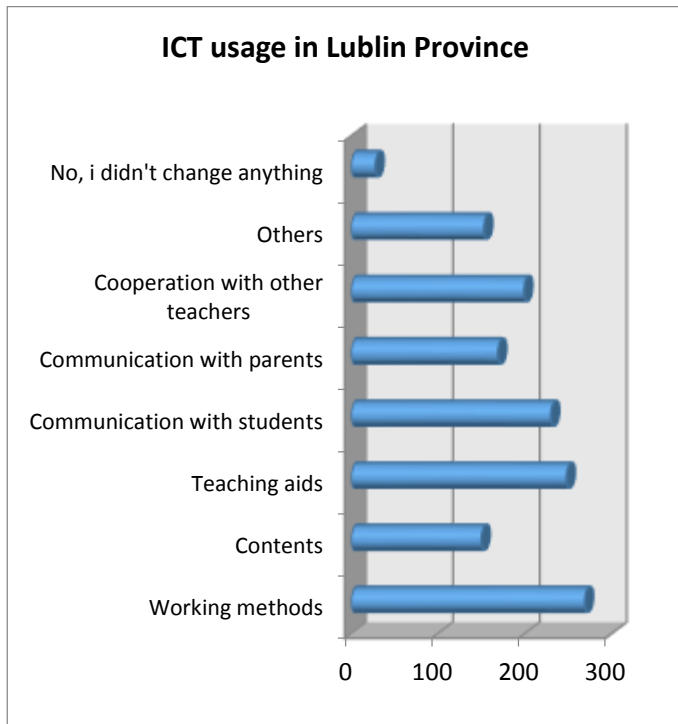


Diagram 4 Areas of teachers activity marked by the novelty in the Lublin Province

Teaching aids and communication with students - these are undoubtedly areas where it is easiest to find the presence of modern multimedia tools in school education. Digital media impose themselves in this regard. Teachers incorporate into their teaching activities various kinds of programs to prepare multimedia presentations, interactive teaching materials or teaching aids available on the Internet thanks to the experts and more experienced teachers. Observation of school reality, in field of communication, shows that e-mail and e-journals are now a standard. An increasing number of teachers work with students on their own website or interactive educational platform by placing there some teaching materials prepared by students or themselves. This is proven form of work with the weakest and most skillful students.

Teachers from researched groups rarely innovate in communication with parents, although it is recognized that these relationships are often marked by all sorts of tensions and properly matched technological communication tools can play a very positive role in the effectiveness of cooperation between teacher and parents. The high flexibility of modern forms of synchronous and asynchronous communication allows to customize contact supporting students development with time appropriate for teacher and parents.

For more detailed information on investigated range, researchers analyzed responses to open-ended question, where respondents were asked about examples of innovative activities carried out by the school in which they work. This question was answered by directors of institutions. More or less comprehensive answers have been chosen and collected in the following table, including only those examples of innovations that relate to the integration of modern information and communication technologies in the school's educational process.

SELECTED INNOVATIVE ACTIVITIES INTEGRATED WITH ICT AT SCHOOL FROM PAST TWO YEARS

| Mazovian Province N=111 | Małopolskie Province N=109 | Lublin Province N=62 |
|---|---|--|
| Interactive whiteboards, multimedia classrooms e-journal, e-Textbooks | Interactive whiteboards, multimedia classrooms e-journal, multitextbooks | Interactive whiteboards e-journal, multibooks |
| MOODLE Platform for pupils and parents | Working with students on educational platforms ex. Math.edu.pl, Gim.plus, Whiteboard, | MOODLE Platform implementing "Online Student" project |
| School promotion via Internet, GG, Facebook, blog | Creation and maintenance of a school blog and gallery. | For an interactive presentation and promotion of school a virtual tour on the school website, blog and school Facebook were developed |
| Contact with pupils and parents via SMS and Internet | Contact with parents via e-mail,, introduction of SMS notification system with "WIEM CO" portal | Contact with pupils via MOODLE Platform |
| Free access to the Internet under the project "Digitally Excluded" | WiFi at school | Broadband Internet access, WiFi |
| Implementation of the Digital School program Multimedia library as school media center | „Multimedia School” (project by POKL) Creation and maintenance (by students) of a school library website, media center Librus | Library blog |
| System of School Information The school enriches the technological base of modern audiovisual equipment | Computers, laptops, cameras, multimedia classrooms | Multimedia equipment (projects, cameras, scanners, televisions with high diagonal), computer classrooms |
| Course for teachers: e-Teacher | Courses: Prawa autorskie a Internet, Netykieta i jej znaczenie w portalach społecznościowych, Cyberprzestrzeń | ChemIQ course conducted in the context of Blended Learning |
| Several teachers working with the CEO (mentors and trainers in programs and online courses) | All of the teachers' council has been trained from the scope and use of modern technologies in teaching | The government program to develop competencies of students and teachers in the use of ICT and Digital School |
| Internet usage, ICT in lessons and audiovisual aids | Use of the Internet as a tool to support and ICT to exchange materials via e-mail, multimedia presentations, the introduction of Polish language classes and history using multibooks, e-books and e-learning platform, implementation of badges and awards for achievements on the | The use of on-line exercises, textbooks, multibooks Lessons in the computer lab using websites: geoportal.gov.pl, stat.gov.pl/gus and new.meteo.pl e-books |

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| | platform / graphic stamps to the account | blended learning method |
| Virtual PKO accounts – saving and entrepreneurship studies | SKO electronic book | |
| Editing the school newspaper, creating video clips, music videos to promote school | Editing a newsletter "School Echo", photo contest "School in Lens", video recording | School newspaper "School Echo", an online version of the newspaper, running a blog |
| Khan Academy Program, educational films from Khan Academy. GIMPLUS Platform (mathematics), „Mathematics with computer” Program | Mathematical competition "Logikonkurs" - reasoning tasks placed on the school website every month, online test of mathematics, "Mathematics in Computer" project, educational programs: Interactive Math plus exercise, Excel, Cabri, Logomocja | Khan Academy, GIMPLUS Platform (mathematics) Educational platform WSiPnet (mathematics, physics, chemistry) |
| „Bild des Anderen” project - e-mail communication with students from other countries, e-Twinning | Communication with students from other countries via epos, - eTwinning platforms | eTwinning |
| English language using SITA method | European platform, communication and cooperation between schools from different countries via electronic media - "eTwinning Label" project, School Photographic Community, Computer Games Tournament | Educational platform englishoxfordonline.pl, e-twinning in Comenius project, english on-line exercise |
| Contests "Become a master of computer games", "Construct a Polish language teaching games." | | LearningApps – a suite of applications for creating historical games Logic Games Club has its profile in the international website www.boardgamegeek.com |
| | School astronomical observatory (the use of modern computer program). | Eduscience - raising students' competence in the field of mathematics and natural sciences and engineering with the use of technologies |
| “Textbooks on the tablet” program, “Modern multimedia education preserving traditions and developing passion” project by FIO | Internet program of New Era Publishing house - “Klasa z Klasą”, “Textbooks on the tablet” program “Modern multimedia education preserving traditions and developing passion” project by FIO | The e-Academy of the Future, the project "Live creatively. Become M@T.e-MANIAC". |
| | Preliminary Diagnosis of students by the test "ODE ant on-line" | Diagnosing English competencies of students - by introducing diagnostic tests on Pearson platform |

After hearing the statements of the directors we could not resist a reflection that the innovative activities of schools, taking into account the latest capabilities of ICT, represent just a small part of their actions. Teachers prefer action and contact in direct reality, by engaging in initiatives with partners and organizations in the local community. Schools participating in the research are equipped with basic multimedia equipment, they have computer labs or multimedia libraries; mostly they use the internet on: Google Drive, the GIMPLUS platform, the Zamkor platform, placing their own documents, school promotion on social networks or in the form of blogs. The communication between teachers, parents and students is conducted using tools like: e-mail, e-journals, interactive educational platform and, more and more often, SMS. In the Małopolska province, ensuring the best possible transfer of information, schools use professional programs, such as Librus. Students communicate with each other (much less frequently with teachers) using instant messaging. It is worth noting that, as practice shows, increasingly, interactive learning platforms are also used to conduct evaluation and self-assessment activities of students.

Teachers more frequently use all sorts of platforms provided by the portals such as WSiP-net or Scholaris, they also use teaching aids like: interactive whiteboards, multimedia projectors, visualizers, cameras, GPS and educational films. It is worth wondering why the smallest, the most useful, constantly increasing its capabilities multimedia device - modern mobile phone, with so much difficulty finds its place in school teaching, although free range of applications of augmented reality gives an impressive learning opportunities outside school. Parents, but also teachers, should teach students, especially the younger ones, to use this device, which is no longer just a phone. Especially today, when in the lifelong development non-formal and informal education becomes increasingly important. Unfortunately, according to data collected by inspectors, it is difficult to determine what percentage of teachers use technological teaching aids every day.

According to statement of directors, modern technologies are used in schools most commonly for language learning (online communication with foreigners, e-Twinning platform, multimedia dictionaries) and science: physics, mathematics, chemistry, i.e.g. WHITEBOARD interactive application, computerized astronomical observatory (physics), Khan Academy, a virtual mathematical-logical classes called eMiL and run by the AGH e-Learning Center (AGH University of Science and Technology), EduROM (chemistry, geography) or GeoGebra program. When it comes to innovative methods and forms of teaching, PowerPoint presentations, webquests, e-portfolios and projects are clearly preferable. Teachers are increasingly aware that digital natives prefer the transfer of information on the screen of mobile multimedia tools and use e-books or multibooks in their classes. We should appreciate the fact that teachers are increasingly involved in all sorts of e-projects eg. e-Academy of the Future implemented by WSiP or the Class 2.0 program (under the auspices of CEO Warszawa). Modern applications, software and multimedia tools are also used to conduct various extra-curricular activities: school journals redaction, websites, radio shows, numerous contests, creating promotional, educational and personal films (i.e.g. Movie Maker program). With the right multimedia tools

students develop their intellectual skills, they can use: puzzle games on the international website www.boardgamegeek.com or chess online databases and servers to play on-line (on chess classes, students can use the FRITZ and CHESSBASE analysis programs).

School directors participating in the research very often emphasized the benefits of the ICT usage, especially methods and forms based on Internet technology. Respondents from Lublin Province highlighted this issue most strongly. Teaching integrated with e-learning platform allows students to not only to improve their information literacy, but also allows individual work at a pace and level of difficulty conditioned by his capabilities; student continuously receives feedback on the competence acquired. Students from Lublin schools, using interactive educational platform, „complement deficiencies and arrears in mathematics, solve math problems, learn to think logically and independently prepare for tests, creating their own tests to check” (Quote taken from one of the surveys). On-line e-journal enables constant access to current and comprehensive information about the student's educational process. Teachers emphasize the significant time savings obtainable by automatically generating statistical summaries on attendance and learning progress of students, which is required in the school documentation. The official websites of schools frequently offer multimedia tours for candidates, allowing to get acquainted with the infrastructure of the school, newspapers, pictures or reports hanging on the walls. Lublin Province introduced electronic form of documenting teaching staff meetings, which, according to directors, significantly improves administrative work at school.

VII. MODERN TECHNOLOGIES IN DIDACTICS OR MODERN DIDACTICS

Modern information and communication technologies and multimedia tools are used in schools both to promote institution in the web space and to support school educational process. The directors are trying to equip teachers and administrative staff in information and technological competence by organizing or using predefined remote or hybrid training. Schools willingly participate in digitization programs, so teachers and students can enjoy multimedia equipment and access to open resources. In each of the three surveyed provinces more than 80% of teachers applied innovative solutions in the past year, great part of it refers to modern information and communication technologies. Teachers use new technologies to improve and increase attractiveness of their classes because they are aware of fact that the available network platforms, multimedia software for learning a particular subject and simulation applications are definitely more attractive for students - digital natives. But can we already speak about the integration of ICT in the school's educational process, or still more appropriate term is: modern technologies in the didactic process? Does the modern didactics term clearly means the use of Internet technology and multimedia tools in the didactic process, whether it is synonymous with didactics, in which the assumptions (goals, methods and forms of education) are inscribed silently and transparently into media, new media and new new media? The difference in meaning is crucial. If by modern didactics we mean the presence of modern technology in the didactic process, it means that we still perceive didactics as old objectives,

methods and forms of education developed for the human cognitive process, referring to the linear structure of knowledge, where we try to add revolutionary new tools based on episodic, hypertext transfer of information, requiring new - modified way of thinking and learning, tailored to the hypertext structure of the Internet and media content. Neurological basis of changes taking place in our brain under the influence of modern media and fragmentary transfer of information is discussed in detail in Digital dementia book by famous German psychiatrist and neuroscientist - prof. Manfred Spitzer.

There is a need to revise the existing guidelines of the educational process and provide a paradigm basis taking into account the specificities of the technological conditions of modern man environment, and cognitive consequences of hypertext and fragmentary media coverage. It is relatively easy to agree with the thesis that today methods, such as monologue lecture is not only unjustified to unlimited resources on the Internet, but simply ineffective because young people - digital natives, are accustomed to short, hypertext forms of media. But the hardest part is to identify the most effective activating methods and define their foundation in reality heavily saturated with unpredictably accelerating and developing technologies. It is true that the change, which is a characteristic feature of a globalizing society, is not conducive to stability, but solid reference points prevent chaos and loss, often happening to modern, especially young man. Education is a priority area of activity of each society and each individual, because it determines development, so it's important to have solid base of the educational process, corresponding to technological and social determinants. Education is an indispensable condition for human development, just as information and communication technologies are now an integral and irreversible element in our life. It is evident that modern technologies are an inalienable part of modern education and modern didactics is synonymous with effective didactics, taking into account the consequences of technological conditions of all human activity - especially educational and cognitive activity.

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