Formation of the Digital Generation in a Distance Learning Environment

Levchenko Nataliia,[1†] Sukhostavets Nataliia[2††], Zelman Lesia[3], Kulichenko Alla[4], Balabanova Kseniia[5]

n.levchenkod@gmail.com, n.sukhostavec@gmail.com, zelman_lesya@ukr.net, alla.kulichenko@gmail.com, myrary17@gmail.com

[1]Department of Social Education and Social Work, Faculty of Social and Psychological Education, Pavlo Tychyna Uman State Pedagogical University, Uman, Ukraine

[2]Department of Obstetrics, Gynecology and Family Planning Academic and Research Medical Institute, Sumy, Ukraine

[3]Department of Social and Humanitarian Disciplines Institution of higher education «Lviv University of Business and Law», Lviv, Ukraine

[4]Department of Foreign Languages International Faculty No. 2, Zaporizhzhia State Medical University, Zaporizhzhia, Ukraine

[5]Department of Psychology Faculty of Humanities and Law National Aerospace University «Kharkiv Aviation Institute», Kharkov, Ukraine

Summary

This article is devoted to the study of the process of formation of the digital generation in a distance learning environment. With the introduction of quarantine due to the spread of COVID-19, opponents of digital technologies were forced to turn to relevant resources, while supporters identified new opportunities for the development of didactics and education in general. The irreversibility of the former educational reality became apparent and only the scale of the vision of potential change by interested and disinterested groups differed. Using a comprehensive approach, the authors consider the issues related to the direct and indirect impact of distance learning on children and young people born after the beginning of the XXI century. The article reveals the prerequisites and implications of distance education for the interaction of participants in the educational process. IC technologies during the educational process in the primary grades, in addition to identifying the student's learning deficit, should provide the transmission of non-verbal signals, which are important for children of this age. At the same time in the secondary school IR-technologies are designed to replace frontal learning during the assimilation of knowledge and at the same time not to worsen the quality of the educational process. Formation of students in the HEI takes place in the political science format, constant discussion of problem situations, so the task of introducing IC technology in this process is the accurate transfer of the content of the discussions. Individualization and autonomization of the educational process, its dependence on the results of the choice of educational content, and the use of pedagogical management tools change the philosophy of education for children and youth. The authors conclude that the formation of a digital generation, characterized by an increased level of digital literacy of children and youth, the possession of a certain level of digital capacity requires the use of strategies aimed at optimizing the learning process in a digital educational environment.

Keywords:

Digital generation, digital, distance learning, educational process, IR-technology.

1. Introduction

This event is the emergence of the so-called "digital generation. The novelty of this phenomenon is evidenced, by the way, by the fact that there is still no established definition and name for it. Some call this generation “I-generation” or “I-generation”, others use the name “gadget generation”, etc. The term “digital generation” was proposed by M. Prensky, a futurist and popularizer of educational technology. Actually, the term itself was coined by analogy with the English word native, which in English means “native inhabitant”, “aborigine”. M. Prensky offers an expert view of education in the twenty-first century. His approach combines the use of the cell phone in the traditional education system and is supplemented by students' and pupils' perceptions of their own educational needs [13]. An alternative to this view is the approach of N. Howe and W. Strauss called “Generation Theory”, which appeared in the early 1990s, describing generations X, Y, Z, successively changing in the historical arena. The authors, unlike M. Prenski, do not look to the future, but rather analyze the past of the United States of America. N. Howe and W. Strauss described the history of the United States as a sequence of biographies. Building historical analogies between generations of

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different times, the authors derived the pattern that every fifth generation has similar values. That is, these values become dominant about once every 80 years in the new generation. The change of generations entails a change in educational needs, particularly for the Internet generation born from 1995 to 2003, whose representatives attend kindergarten, receive secondary education, and begin entering higher education institutions [18].

The digitalization of education, which has recently been taking place in educational institutions around the world, is causing significant changes in the organization of the educational process. It is obvious that learning in a digital environment has many advantages, but the digitalization of education also raises certain problems that require timely solutions. The purpose of this study is to study the process of formation of the digital generation in a distance learning environment, consideration of best practices, identify ways to optimize the learning process in a distance learning environment for representatives of the "digital generation".

The main premise of our analysis is the fact that the Internet generation, children born in the era of the large-scale spread of Internet technology (in Ukraine at the beginning of this period - from 2003-2005, tend to undivided perception of digital and physical reality and are fairly easy to absorb) new formats of education, in particular mixed learning [21]. The characteristics of Generation Z make them maximally adapted to distance learning, and most of them prefer distance learning because of the possibility of being in an online space, well-developed skills of working with technology, emphasis on visual perception of information, etc. However, there are caveats to the dominance of distance education over the traditional educational process. The main concern is the prevalence of digital eye strain among children in the current COVID pandemic scenario and the impact of the learning model on children's eye health [12].

2. Theoretical Consideration

By the COVID-19 pandemic, the limitations of the traditional educational process had become apparent. Until now the priority in the education system remains explanatory-illustrative and reproductive methods, adequately correlated with the structure of teacher and student activities in the classroom: introduction of new material (teacher); its consolidation (under the guidance of the teacher), reproduction (memorization) and application. Some authors argue that the ratio of activities was adequate to form obedient performers with the physical presence of the teacher [7]. According to the trend established in modern didactics, aimed at the implementation of the task of forming a digital generation, striving for free disclosure of own creative potential, in the learning process, in which the student is not an object but a subject of cognitive activity, the priority should be an independent activity, that is, independent search, elaboration, comprehension, and application of necessary information. The way out of this situation is seen in the introduction of new means of information technology into education, the selection of educational content by new directions of education taking into account the didactic properties and functions of new information technology; the influence of expert systems of artificial intelligence on the nature of thinking of students and teachers; ways of combining, integrating new information technology with traditional and mass media; ways of managing the cognitive activity of students in such broad information and subject area.

The move to distance learning during the COVID-19 pandemic can be seen as a natural pedagogical experiment that has become more manageable for everyone involved in the learning process in the fall of 2020. Some researchers [11] reflecting on the spring experience and information and communication technology (ICT) learning show that it allows the teacher not only to empower themselves when working online but also to experiment with using different digital tools, analyzing the success of their use and the reasons for difficulties. Younger students have fewer positive perceptions of online learning and have less satisfaction with the teacher's use of digital tools that provide an interactive experience. High school students note more positive aspects of distance learning and are as satisfied as

High school students note more positive aspects of distance learning and are as excited as students of the studied generation about the use of ICT by the teacher to organize interaction in the learning process.

The authors recommend paying further attention to overcoming problems of insufficient (loss) of information when using ICT, overcoming limitations in the transfer of personal knowledge, studying the influence of group dynamics when organizing interaction using ICT.

The development of the digital educational environment in education is the subject of numerous studies in various fields of knowledge. The concept of digital technologies is related to them but refers to long-established information and communication technologies. It is actualized in connection with the digital transformation of the economy and education in the 2000s and involves the introduction of models and technologies of digital interaction and service production in educational processes, which inevitably leads to the specific socialization of the digital generation. The transfer of learning to a format in which the teacher reports the assignment by phone or where the main source of educational content was television, is more in line with the preliminary application of distance learning [3]. The shift to an online learning model or interaction through chat and

email means the use of digital technology, but since the pedagogical process is exclusively done remotely, it is not just about digital tools, but about distance e-learning. It is a learning technology that relies on the power of digital technology to keep the learner and instructor interacting at a distance.

Distance learning and digitalization have been used in education for a long time; the question is how much they will change education now.

Based on observation of current trends in education, the World Economic Forum envisions the following possible changes: 1) unique innovations will emerge in the forced pedagogical experiments in the field (traditional classroom teaching will be supplemented by new methods, from live broadcasts to experiments with virtual reality); 2) partnerships between the private and public education sector will increase (activation of various stakeholders in the further use of digital technologies - from publishers and television to technology providers and telecommunication networks);

3) the digital divide will increase (the quality of education will largely depend on access to digital technologies) [20].

Foreign experts have expressed fears that the COVID-19 pandemic will lead to a crisis for educational institutions, primarily private ones, to closure or merger due to the fall in demand for their services [10]. These fears are exacerbated by the fact that the pandemic is occurring against the background of an economic recession, and it is well known from the example of the 2008 crisis that this leads to severe cuts in income, which are most easily accomplished through closures and staff reductions. However, using higher education as an example, it can be argued that the problem of COVID-19 will create favorable conditions in the development of didactics. American education manager J. Kim makes three predictions of how our post-pandemic pedagogy will change in the higher education ecosystem [8]: the development of blended distance learning, online education, and related partnerships. It is worth examining his theses in more detail.

1. A leap in the development of blended learning and distance education. The author assumes the restructuring of the content of higher education programs using blended technologies: theoretical information will move to the segment of home learning, the experience of which teachers have already gained by moving the content of their courses to the Internet, and the precious classroom time will be more productively used for discussions, debates and guided practice [8]. The question of optimizing the pedagogical process in the face of the development of technical means has arisen to save time. Currently, almost any topic of the educational program can be found and studied by the student independently, at home, even without the participation of the teacher. However, the paradox is that with the growth of educational opportunities and resources, the very desire to use them independently decreases.

2. Online education as a strategic priority for all educational institutions. Before the quarantine, educational institutions were fully using appropriate IC technologies; where these technologies were used, the degree of importance of online education in the strategic development planning of the institution differed. After the pandemic, however, this importance will increase everywhere, and it will be widely recognized as the core of institutional development programs because of its "institutional sustainability and academic continuity" [8]. Moreover, first and foremost, decentralized distance education will be centralized in single-institution planning and integrated into existing educational management structures. At the quarantine opponents of digital technologies were able to see the relevant resources, and supporters identified new opportunities for the development of didactics and education in general. Gamification using artificial intelligence technologies helps in the development of massive online courses for online learning. An intelligent system can help mitigate student task assessment and identify teacher-student gaps [9]. The irrelevance of the former educational reality is evident, only the scale of vision of potential change by interested and disinterested groups differs.

The temporary closure of educational institutions has led to the need to use a distance format with digital learning tools. We are convinced that when educational institutions are fully functioning, the need for distance learning is greatly reduced (satisfying only certain groups of students, such as those with special educational needs [15]), while digital technologies, on the contrary, should receive new development by intensifying their use in classroom teaching. In addition, it should be noted that the mass inclusion of duplicative offline distance learning courses in the structure of educational content threatens to reduce the teaching force, especially for private educational institutions and for the countries whose economies have been most affected by the epidemic.

Although for the generation we analyze, these problems become secondary.

Clear algorithms for translating and assimilating knowledge come to the fore.

3. Another prediction is a rethinking of existing and possible partnerships in online program management. Institutions dependent on online program management providers have had a harder time making the transition to distance learning, so going forward they must take this deficit into account when investing in digital courses, resources, etc.[8].

The forced abandonment of classroom learning has already been called the beginning of a revolution in higher education. On this basis, some researchers see online learning not as a possible but as an inevitable prospect.

Saving for such changes, they explain that because of the crisis triggered by the epidemic, educational institutions are rapidly implementing innovations that at other times took years to overcome administrative obstacles and resistance [19]. This is positive news for a digital generation unaccustomed to hierarchies and subordination with other participants in the educational process.

However, there are opposite forecasts. Some doubt that there will be a revolution in university education, although the use of distance learning will increase significantly, and teachers' resistance to this technology will also decrease (the crisis showed them the advantages of this form). Some authors do not idealize the transition to online learning and believe that after the COVID-19 pandemic is over, conservative higher education will remain largely unchanged, and innovations will rather touch the financial side than the technological[1].

At the same time, all experts admit that higher education will no longer be the same. The pandemic has created an unexpected and unique opportunity for the widespread and spontaneous introduction of digital technologies in education within entire states. What had previously been actively discussed suddenly became an educational reality in a matter of days, without prior preparation or resistance from opponents of digitalization - so highly recognized was the threat to the lives of their nations by the authorities. In fact, in many countries an unexpected large-scale experiment in the digitalization of education was launched, the positive results of which will be consolidated in the system.

Undoubtedly, digital progress is useful for schools, vocational training institutions, kindergartens, the system of additional education, non-professional education, training of children, etc.

3. Materials and Methods

The methodological basis of the study is general scientific and theoretical methods of pedagogical research: historical, monographic, generalization to highlight the conceptual approaches to the characteristics of distance learning and the formation under its influence of the modern digital generation; holistic approach, induction, deduction - to determine the essence of the basic concepts; system-structural analysis, comparison - to improve distance learning technologies with children and young people of all ages; abstract-logical; empirical.

4. Results

Distance learning, which has been used primarily in narrow categories of students to ensure equality of educational chances, has proven useful, so the COVID-19 pandemic and the traits of the digital generation may accelerate the advancement of this technology. There are concerns about whether the school will eventually be overhauled to a home-based format, as the ability to connect the institution to the family through digital technology has been massively tested. However, these fears seem to be exaggerated. Unlike professional education, general education is not threatened by serious distance reformatting, which is primarily due to the specifics of schooling.

Schools are hubs of social interaction. Only in the format of the classroom presence it optimally satisfies all subjects: teachers who are able to fully organize the educational process (using digital technology), parents, of who perform organizational and pedagogical functions and additional financial burden, as well as students, if they are interested in quality and accompanying education (psychologists have found that the lack of personal contact with classmates, friends, and teachers had a negative impact on children and adolescents during the quarantine[5]).

The classroom-taskwork system in schools has long been criticized in various countries, although no alternatives acceptable to mass formal education have yet been found. The blackboard, chalk, and frontal teaching are increasingly being called a relic of the past, an atavism of the “chalk” period. However, while traditional blackboards are gradually being replaced by electronic ones, frontal learning is not going anywhere, even if the school is striving for individualization. And the feasibility of replacing the board in favor of electronic is questionable because each of them has its own features and its own advantages. On a chalkboard you can make mistakes without fear of logging and evaluating them, you cannot be afraid of losing data, it does not freeze and does not depend on software and electricity. The blackboard is a kind of symbol of digital progress: how to choose for a school classroom? Should you choose the time-tested convenience or automation? This is a difficult and ambiguous choice, which is why classes where an interactive whiteboard is installed, often keep chalk (or marker). In any case, the choice is up to the teacher who works in that classroom. The same applies to criticism of frontal teaching. In a remote mode, its importance became especially obvious: an explanation of a new theme or discussion is used in all lessons, and it is opportunities for frontal training are optimum for these tasks.

The value of traditional education is in the lively interaction of its subjects. The scarcity of distance learning is the limited nature of this interaction. Digitalization offers the means to organize interaction in a remote form, but it should be understood that their possibilities are different. How can we organize sports games, martial arts, swimming, and other sports in supplementary education without direct interaction between subjects? No digital

progress cannot and should not solve this problem, so lamentable was the attempts of individual institutions to bring training or coaching consultations in a remote form. There are their own, specific opportunities in real learning in school. For example, in the early grades is important every look, every gesture of the teacher and timely stroke of the student on the head as a sign of approval or pleasure is sometimes no less important than when you find his learning deficit.

In higher education, the contact is different, but even there it is the real interaction between the important subjects. Teachers who recorded video lectures faced the "weight of emptiness" - the physical absence of the audience for whom their lecture was intended - and very few were able to conduct it in an empty room and looking at the camera lens as if there were a full audience in front of them. In a lecture, a good instructor doesn't hold on to his notes and turns the monologue into a polylogue, thus seeing the feedback, the reaction to his words, and guiding the students' thought process. Video lectures and even online lectures (where interaction is extremely limited) are incomparable to classroom lectures in terms of the possibility of this live communication. The same applies to the discussion of students, the full-fledged organization of which online is impossible.

It is the direct interaction between the teacher and the student that is a condition for quality education. It explains, for example, the difference between the effectiveness of full-time and distance education. Acknowledging the opposite or affirming the equivalence of distance education calls into question the very need to retain the entire infrastructure of the educational system if it can be limited to software, a computer, and a remote educator.

Reflection on distance interaction in education, as well as the practice of quarantine weeks leads to the conclusion that if distance learning in case of extreme necessity or desperation is acceptable, in relation to education its resources are meager (and the use of artificial intelligence, perhaps, at all) impossible.) The personal characteristics of the teacher, his humanity, and direct interaction with students are valued in upbringing.

After the pandemic, digital technologies will be more actively promoted in educational practice. The question is in the framework of their introduction and further combination with distance education: in the pursuit of building a digital economy, they should not automatically destroy the important and positive things on which education is based. And the measure of these boundaries should be the values of education - the established absolute characteristics of educational systems that underlie their goals, content, principles, forms, and methods of operation.

Undoubtedly, digitalization is useful in education. There are a number of interest groups actively promoting the digitalization of education, supported by foundations, grants, and related technology companies. It's no coincidence that major IT companies are investing in education. Apple funds about 400 educational institutions around the world. The idea of digital schools is actively promoted in the West. For example, in Holland, there are the so-called Steve Jobs-Schools, whose practice is based on a combination of individualization and digitalization of education in the elementary school setting. The main learning tool they have is the iPad, with which children spend half of the school day. Responding to the demands of the times, businesses are actively bringing their technology to schools.

The Western media repeatedly published information on the opposite trend in Silicon Valley: programmers and top managers of IT companies for their children prefer schools with traditional and health-saving technologies of education. Waldorf schools, for example, are very popular in the valley, the ideology of which is not compatible with computers. In this regard, there are even predictions that analog, "digital-free" schools will turn into elite schools as technology enters education. The university sector is similarly predicted, but already because of the discriminatory nature of distance technology: the entrenchment of online learning is linked to distance education offerings, which will lead to classroom teaching gaining elite status and, consequently, a gap between students. For a variety of reasons, students and teachers will favor face-to-face education, and it risks becoming a privilege.

It is interesting that EB. Gates and S. Jobs, the creators of Microsoft and Apple, did not allow their children to use gadgets as children. Gates' daughters got their first cell phones at age 14, and Jobs forbade his children iPads, explaining in his last interview: "At home, we limit the use of technology by children" [4].

Some studies have found that the use of IR technology in the classroom does not correlate with improved educational outcomes for students but can have negative effects on the success [14]. A 2017 book with the high-profile title, The Learning Screen: Two Long-Term Teachers Expose How Overuse of Technology Dulls Our Children, explains the problems of lobbying for digitalization in schools and the consequences in the form of cognitive and social deficits in students[6].

It does not follow at all from the warnings of the psycho-educational strategies of IT producers that computers are exceptionally harmful for children and education. But it does reassure us, first, that digital technologies require limited and controlled use by children [22], and second, that the digitalization of education has its interest groups, its supporters, and its opponents. It is also clear that the sharpness of criticism will not prevent this process because of its global nature - both geographically and in the socio-economic sense. Digital technologies, as the worldwide quarantine has shown, can be a good thing for educational institutions. It is important to remember

that they are a convenient but not the primary means of learning, and it is important to consider the problems and consequences that their overuse entails. According to the educational standards, the priority should be the student's own work, not the teacher's or the computer's. Therefore, digitalization should take place against the background of thorough scientific and methodological support to find ways of integrating digital technologies into the school with optimal prevention of possible negative impacts. The task of reducing harmful risks, of course, involves limiting the use of digital technology to the objectively necessary and convenient.

5. Conclusions

Digital technologies have been gradually entering formal education since the 2000s, empowering educators to organize a productive, interesting pedagogical process and cognitive opportunities for students. However, it should be remembered that everything traditional and old is subject to renewal. An example of this is the principle of visualization in mathematics lessons. In ancient cultures, numeracy and computational activities were taught with the help of the abacus. They originated as early as the 3rd century B.C. but are still used in schools in a number of nations as a valuable tool and teaching method. One such country is Singapore, a recognized leader in school education and at the same time, the frontrunner in digital modernization of education; another is India, which is famous for its IT specialists. In other words, the millennia-old tradition of teaching numbers, which has proven valid in Asian states, is not being supplanted by computers as obsolete. An even simpler example is counting sticks. Before the invention of counting, people made calculations with objects - stones, grains, shells, etc. Thousands of years have passed since then but counting with objects is a popular method of learning in first and preparatory classes. It is so simple and accessible to the child, that it loses out in comparison with the corresponding sentences. And rightly so because digitalization should not and cannot be total.

There is no doubt now that a new era is dawning in education, as well as in culture in general, the reason for which has been laid since the early 2000s. thanks to the development of the Internet and the emergence of the concept of the digital economy, whose unexpected sharp acceleration was added by the pandemic. In many countries, there are very favorable preconditions for a serious digitalization of public institutions and the construction of the digital economy. However, when implementing future transformations, it is very important to understand how profound and revolutionary these changes should be, what their ultimate justifiable goal is, and what innovations are expedient. Proving the ability of states to implement education in the conditions of abandonment of classroom learning actually translates further strategies of educational policy into the possibility of choosing between evolutionary and revolutionary paths of development. At the same time, this transition has demonstrated the many risks and challenges of using digital technologies, as well as the disadvantages of distance learning technology compared to classroom-based learning.

Historically, the education ecosystem has been slow to adapt. But faced with unprecedented urgency, educators are now being forced to adapt en masse. Some have made the most of digital technology, while others have limited themselves to distance learning technologies, minimizing their recourse to technology and digital resources. The subjective factor has always been very powerful in inhibiting innovation, ensuring the conservative nature of the system. Based on the analysis, primarily based on the limited possibilities of distance learning and the subjective factor, we can predict the limited development of distance education in the future. Moreover, it will not be widespread: it is obvious that countries and educational institutions with more financial resources will invest in it more than others, and it will affect school education to a lesser extent. Predicting the development of educational philosophy in the next decade, we can say that during the periods of quarantine in 2020-2021 education, represented by its different subjects in the field, will come to the understanding that distance learning cannot serve as a full replacement for traditional education, but is valuable for teaching certain groups of students (its possibilities should be in maximum demand, primarily in vocational education, in pedagogical support of gifted and handicapped).

At the same time, digital technologies will be recognized as a modern and promising tool that can not only expand educational opportunities for all categories of students but also advantageously modernize existing classroom technologies with adequate management by the teacher based on an understanding of the negative effects of this technology. Important conditions for digital modernization of educational institutions will be the development of digital resources, informing teachers about the possibilities of these resources, improving their ICT skills, but at the same time giving them freedom of methodological expression and freedom of choice in the implementation of the pedagogical process in the context of the educational institution. At the same time, it is important to remember that it is only a tool, not a form of learning and that the possibilities of digitalized distance learning are very limited.

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Levchenko Nataliia, Candidate of Pedagogical Sciences, Associate Professor of Department of Social Education and Social Work, Faculty of Social and Psychological Education, Pavlo Tychyna Uman State Pedagogical University,
Sadova str., 2, Uman, Cherkasy region, Ukraine, 20300, n.levchenkod@gmail.com
ORCID ID: http://orcid.org/0000-0002-5479-1907

Sukhostavets Nataliia, Candidate of Medical Science, Asisstant of the Department of Obstetrics, Gynecology and Family Planning Academic and Research Medical Institute, Sumy State University, 2, Rymskogo-Korsakova st., 40007 Sumy, Ukraine, n.sukhostavec@gmail.com, ORCID ID: 0000-0002-2132-5037

Zelman Lesia, Candidate of Pedagogical Sciences Lecturer, Department of Social and Humanitarian Disciplines Institution of higher education «Lviv University of Business and Law», Lviv, vul. Kulparkivska St., 99, Ukraine, zelman_lesya@ukr.net, ORCID ID: 0000-0002-2497-7292

Kulichenko Alla, Candidate of Pedagogical Sciences, Associate Professor of Department of Foreign Languages
International Faculty No. 2, Zaporizhzhia State Medical University, 69035, Maiakovskyi avenue 26, Zaporizhzhia, Ukraine, alla.kulichenko@gmail.com, ORCID ID 0000-0003-1469-3816

Balabanova Kseniia, Candidate of Psychological Science (comparable to the Academic Degree of Doctor of Philosophy)Senior Lecturer Department of Psychology Faculty of Humanities and Law National Aerospace University «Kharkiv Aviation Institute» Kharkov, st. Chkalov, 17
myrary17@gmail.com, https://orcid.org/0000-0003-3300-0042