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Teacher Towards New Digital Technologies

Nauczyciel wobec nowych technologii cyfrowych

Abstract: The changes that are currently taking place in the education process are to a large extent the result of technological transformation dynamically transforming the social space. A natural consequence of the continuously growing educational needs of modern digital students is the effective use of pedagogical innovations based on digital solutions. Despite the changing reality, the teacher is still largely responsible for preparing students to function in the modern knowledge society. The awareness of educators in this area is increasing and they are aware of the need to move away from ineffective models in favour of an active model by improving their own qualifications and using IT resources in the education process. The aim of the article is to present new technologies as a determinant of changes in the educational process and to present models according to which teachers can effectively improve their own digital competences, which are so important in the modern didactic reality.

Keywords: modern technologies; digital school; teacher's digital competences

Abstrakt: Zmiany, które dokonują się współcześnie w procesie kształcenia, w znacznym stopniu są wynikiem transformacji technologicznej dynamicznie przekształcającej przestrzeń społeczną. Naturalną konsekwencją stale rosnących potrzeb edukacyjnych współczesnych cyfrowych uczniów jest efektywne korzystanie z innowacji pedagogicznych opartych na rozwiązaniach cyfrowych. Pomimo zmieniającej się rzeczywistości, nauczyciel wciąż jest w dużej mierze odpowiedzialny za przygotowanie uczniów do funkcjonowania w nowoczesnym społeczeństwie wiedzy. Świadomość pedagogów w tym zakresie wzrasta i zdają sobie oni sprawę z konieczności odejścia od modelów nieefektywnych na rzecz modelu aktywnego poprzez podnoszenie własnych kwalifikacji i stosowanie środków informatycznych w procesie kształcenia. Celem artykułu jest przedstawienie nowych technologii jako determinanty zmian w procesie kształcenia oraz zaprezentowanie modeli, zgodnie z którymi nauczyciele mogą w sposób efektywny podnosić własne kompetencje cyfrowe, tak istotne we współczesnej rzeczywistości dydaktycznej.

Słowa kluczowe: nowoczesne technologie; cyfrowa szkoła; kompetencje cyfrowe nauczyciela

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INTRODUCTION

New technologies define today the way people function in all areas of social life. Digital space is becoming an element of everyday activity in very diverse ranges. In connection with this process, analogue thinking attributed to older media loses its relevance, and the most important skill is digital analysis of information. This redefinition of the way of functioning applies to everyone, but in particular affects younger recipients, who as so-called digital natives treat new technologies as a tool for implementation at almost all levels of life. Thanks to these tools, they become not only consumers of digital communication, but also its creators. Their digital processing activity is therefore far greater than among the older generations. Thanks to this, they also become largely co-responsible for creating artefacts of the culture they use on a daily basis (Jemielniak, 2019, p. 15). The progressive digitization of the social space, as well as the increasing use of new media by students, is a great challenge for teachers themselves. They must not only enrich their didactic workshop with new effective tools, but also raise their own competences to become a reliable guide in the world of new technologies.

SCHOOL AND TEACHER TOWARDS NEW DIGITAL TECHNOLOGIES

The dynamics of children's functioning in the modern world is evolving, entailing a change in the functioning of the environments with which children are associated. This also applies to a large extent to schools. Education and upbringing in the context of permanent adaptation to a specific reality is still the primary task facing the school. Despite the fact that these priorities have been established for a long time, they are also relevant today. The basis of the changes that we notice today is the technological transformation, which is the result of the development of new technologies. Questions arise about how to teach functioning in a world whose direction of development cannot be determined, how to educate social competences in a world we do not know, how to adapt education to the new realities in which the modern school operates?

These questions are open-ended and have been present since the beginning of education, but in the current reality they are of particular importance because they concern the functioning of the school in an extremely dynamic and blurring civilization of technology. Such an expansive space of modern technologies becomes an accelerator of many changes in the broadly understood educational process. They affect not only the school as an institution, but also teachers, who have to cope with the demands placed on them not only by the development of technology itself, but also by students who are modifying their previous models of functioning under

the influence of the digital revolution. This is a dynamic that the school had never experienced to such an extent before the intense digital development.

Despite the changing reality, the teacher is still largely responsible for preparing students to function in the modern knowledge society. It is still his experience and skills that are key elements that can determine the effectiveness of the education process. However, the strategy for working with students in which the educator increasingly plays the role of expert-mentor is changing. By using and constructing teaching resources based on modern technologies, he makes the teaching process he conducts adequate and more "accessible" for a student surrounded by the digital world.

The awareness of teachers in this area is constantly growing. They are aware of the need to move away from the recently functioning model, in favour of an active model that allows them to smoothly adapt to the current situation in which the didactic process takes place. An example of such a use can be seen in the times of the COVID-19 pandemic. This unique situation forced teachers, despite the difficulties of a substantive, methodological and technical nature, to implement new solutions. The widespread use of information and communication technologies required mastering e-learning solutions in a very short time, and thus acquiring competences in the field of modification and selection of media messages and its adequate selection dictated by the age and perceptual capabilities of students (Pyżalski, 2021, p. 14).

At the same time, the need to quickly adapt to such a dynamic reality forced a change in the perception of the role of the teacher. Even before the pandemic, there was a need to redefine the tasks presented to the teaching staff, whose previous tasks, often resulting from teaching in the traditional system, were already outdated. The need to move away from the teacher's vision as a person with a monopoly on knowledge towards a teacher who is aware that he ceases to be the main source of information for children and youth and should take on a new role – a guide to the world of information and an advisor in the process of learning using new media (Błaszkiewicz, 2011, p. 39).

Such a vision of the teacher is present in today's educational reality, in which he had to assume the above-mentioned roles in the situation of taking up work based on the wide use of modern technologies, including e-learning platforms. Nowadays, it is digital competences that translate into the formation of key social competences. Therefore, there is a strong correlation between the education process and modern technologies, which in a way forces the use of new teaching resources.

The use of pedagogical innovations is a natural consequence of the growing educational needs of students. They should be characterised by two constructive features, i.e. novelty and originality. They cannot at the same time be superficial and express themselves in insignificant changes in content, forms or methods. Their

main value should be the use of solutions that will be socially valuable and will bring measurable and more durable didactic and educational effects than the solutions preferred so far. As a result, the most valuable will be such innovations that will refer to the current needs of children and youth resulting from the needs of the developing world and will take into account the latest scientific achievements (Dudel et al., 2014, pp. 13–14). Undoubtedly, new technologies with their digital strategies to support broadly understood education fit into this trend today.

Modern solutions in the education process, the source of which is digital technology today, are a fact, but this state of affairs was already predicted by educators in the last century, when the vision of a computer as a learning machine was unrealistic for many. When creating classifications of teaching methods, next to the "classic" solutions, a significant role of digital devices as scientific aids in the education process was forecast (Okoń, 1988, p. 179; Kupisiewicz, 1984, p. 177). According to these concepts, it is modern technologies that now designate new key competences that should be achieved by students in order to consciously and fully function in a knowledge and information society.

This important role was also noticed by the European Commission, which already in 2006 pointed to the Key Competences of Education, which it defines as the most important elements necessary for self-development, active participation and integration into society. At the same time, it was noted that they combine both knowledge, skills and adequate attitudes in relation to various problem situations. The most important ones were: communication in the mother tongue, communication in foreign languages, mathematical competences and basic scientific and technical competences, IT competences, learning skills, social and civic competences, innovation and entrepreneurship, cultural awareness and expression (OJ EU L of 30 December 2006). The distinction in this list of the role of scientific, technical and IT competences emphasises only the importance of these issues in the contemporary educational space. A space that is inextricably linked to the school, which as a teaching institution enables the development and implementation of the above tasks for students.

Such broad requirements are necessary for implementation in modern society, whose most important good and product is knowledge, are placed before modern education. They are possible only thanks to the use of an appropriate didactic strategy supported by the most effective solutions based on IT resources. They are now becoming a key tool for learning about life and reaching the necessary information. At the same time, they allow for crossing territorial, temporal and biological borders, and in connection with such a wide area of influence, they create a media civilization. On the one hand, it definitely facilitates access to diverse information, but at the same time poses new challenges to practise and pedagogical thought (Tanaś, 2010, p. 283).

The current dynamic development of digital technologies – especially the Internet – allows for the removal of numerous restrictions that were a challenge for education only a few years ago. Thanks to this, a significant revolution took place in the process of learning about the world, which affects all educational entities. It can be concluded that the school is subject to constant evaluation and adapts to the reality created by the new digital environment. This constant process is inextricably linked to evolution as it takes place in the digital space. Therefore, three stages of the development of a school system based on technological development can be distinguished. The earliest is the so-called *old school* equipped with computer equipment with traditional classrooms, whose main goal is to acquire competences in the field of equipment and available technology. It is a school that teaches the use of equipment and technology. The current stage can be described as *a new school*, which is largely supported by technological development, used to solve tasks for students. The next stage may be *the lack of a school* that uses modern communication channels, i.e. Internet, telephone, for knowledge transfer and contact with experts. In this perspective, education can take place anywhere and at any time (Wasiołka, 2009, p. 43). It is worth noting that despite the fact that the school is currently in the second stage, the pandemic situation forced a very rapid transition to the third stage. However, it should be remembered that the changes that took place were forced and accelerated. Because of this, the end result was not sustainable, but it did bring tangible benefits in the form of the emergence of new solutions that showed a completely different vision for the school and opened up teachers to innovation.

DIGITAL COMPETENCES OF TEACHERS

The Internet and mobile technologies have provided an opportunity for the most adequate response to the needs of the teaching and learning environment. However, it should be noted that reaching a state in which teachers fully exploit the potential of innovative solutions was dictated by skills that had to be developed over the years. These competences were shaped by functioning in the world of technology, and the level of their acquisition could be very diverse and dependent on the already possessed digital competences.

The first stage of the acquisition of digital competences was *computer literacy*, covering basic knowledge and computer skills, but referring only to a narrow range of skills that did not give a chance to fully understand and use the full potential of tools related to new technologies. At the same time, the lack of broader knowledge in this area did not guarantee sufficient defence against the threats resulting from the development of the digital space. The next stage involved *proficiency in the use*

of new technology and it provided the basis for understanding not only how technology works in the basic scope, but also for understanding the higher degree of intellectual ability in the context of technology (i.e. abstract, problematic or design thinking). The last stage is *computational thinking*, including IT methods of modelling and solving problems, using heuristic models in the search for solutions to problems, as well as problem decompositions in order to find the most effective way to reach the goal (Sysło, Jochemczyk, 2009, pp. 6–7).

And it is the process of moving from computer literacy to computer thinking that we have been seeing more and more clearly lately. Over the last twenty years, we have observed a diametrical change in both the substantive and methodological scope of conducting classes. A teacher using new pedagogical theories, techniques and methods of working with a student is perceived as creative and open. The interdisciplinary nature of modernity places greater demands on the teacher than ever before. His task is to guide the teaching process so that the science is perceived as authentic and up-to-date (Remża, 2021, pp. 150–151). This adequacy can be clearly seen in the approach of teachers to new technologies, which are increasingly treated not as an obstacle to creating a workshop of their own work, but as an important component supporting this process. Actively going through the next stages of acquiring digital competences indicates acceptance of the fact that, with the development of new technologies, both the way they are perceived and the strategy of their use are changing. This generates changes in the way technologies are used, but also in the frequency of their use in the educational sphere.

Contrary to popular opinion, the educational process is susceptible to these changes and tries to create a reality that is as adapted to social realities as possible. However, for a long time, these modifications seemed insufficiently dynamic, and thus were not able to take into account the diverse needs of students, their capabilities, as well as individual goals, which may be different for everyone. The emergence of new digital technologies has significantly brought the subjective approach closer, because educational strategies based on these solutions more often take into account the individual preferences of the user-learner, i.e. the pace of material assimilation, frequency or time of learning. Therefore, it can be concluded that they allowed for the development of an individual educational path (Tadeusiewicz, 2020, p. 205).

However, the introduction of digital solutions that will permanently change the education process is a long-term and multi-phase process, and unification based on a model that takes into account the individual development of the teacher's competences in the implementation of solutions based on new technologies in teaching. It is characterised by a high degree of flexibility and modelling so that it can also be applied to the acquisition of competences by the students themselves.

It includes five levels in which already developed competences become an accelerator of subsequent skills. These include:

1. *Emergence and development of skills in the use of technology* – the teacher pays the main attention to learning the technical possibilities of technology and possible potential applications in education.
2. *The use of technology in various fields of education* – technologies enrich the teacher's workshop and enrich the existing teaching space.
3. *Incorporating technology to improve the level and organisation of education* – the teacher has the ability to fully integrate technology with the process of self-improvement, as well as with the most important aspects of his work.
4. *Transformation of teaching and schooling using technology* – technology becomes a tool supporting the work of the teacher to such an extent that it translates into the transformation of the entire school institution as an innovative educational institution in the local environment, aimed at shaping a knowledge-based society using digital innovations (Sysło, Jochemczyk, 2009, p. 8).

The presented stages present a certain scheme according to which the digital competences of the teaching staff in the implementation of solutions based on new technologies should be shaped. It also seems extremely important that it extensively takes into account self-improvement activities. What is worth emphasising is a scheme in which certain actions can be accelerated, but they cannot be omitted. As was the case with the previously characterised stages of the acquisition of digital competences by teachers. This may also explain the past failures of reforms that take into account the introduction of certain digital strategies into the education process. The mere determination of difficult to achieve goals, without taking into account the level of digital competences of the initial pedagogical staff, makes the proposed modifications in the didactic process often impossible to achieve.

The need for change in education should, on the one hand, be a response to the social, political and economic changes taking place, and, on the other hand, be considered as an important foundation underpinning sustainable transformation of strategies that are proving ineffective. They must definitely give priority to the pupil, because he or she, as the main subject of the learning process after leaving school, will become the creator responsible for shaping reality. The way school work is organised must therefore be a reflection of the present, but also a generator of future challenges. It is the foundation of contemporary changes in education (Błaszczyk, 2020, p. 94).

In this way, the use of new technologies as adequate teaching tools and resources used by teachers should also be considered. The acquisition of specific competences by them may cause that the ongoing changes will bring the assumed result.

However, new technologies pose challenges not only to the teaching staff, but also to the students themselves. Therefore, the role of the teacher is much broader and he must take care of both the high level of his own digital competences, but also of his pupils from the first stages of education.

TECHNOLOGY TOWARDS SCHOOL CHANGES

The current reality of young generations is a media reality, but it is not possible to clearly determine the level of their digital or IT competences. Modern students are characterised by a diverse level of IT skills, variable preferences for the use of interactive media, a diverse frequency, method and scope of their use, as well as motives for involvement in the space of new media. The fact of growing up in the digital world may create the possibility of acquiring certain technological skills and automation of specific activities, but it does not guarantee mastering the skills of critical thinking and effective learning through new technologies. Therefore, despite the fact that the school is trying to "catch up" with the reality in which digital natives operate, it still plays a key role in the education of the necessary attitudes and skills. It also equalises the chances of people exposed to social, economic or cultural marginalisation (Skibińska, 2015, p. 65).

Due to the fact that the use of technology alone does not guarantee the training of young users in IT and media competences, which would guarantee critical and effective use of them, a computer science teacher has already been introduced to the first grade of primary school. In the new curriculum, the proposed changes to the introduction of a new IT subject do not raise major objections and have been reasonably developed. However, they will not be able to be effectively implemented due to the low level of IT competence of early childhood education teachers, which will force the use of only the simplest, and at the same time the least cognitively engaging solutions (programs) in their classes. Teachers with insufficient IT competences will have difficulties in correctly recognizing the educational needs of their students in the field of information and communication technologies. This will imply problems in terms of meeting the growing digital cognitive needs, as well as the diagnosis of already possessed digital competences (Musioł, 2019, pp. 81–82).

That is why it seems so important to include media competences in all planned reforms and changes in the education process, and thus the ability of teachers to use new technologies. Teachers are the key to learning how to use new technologies wisely and effectively, but only their proper preparation can help shape a wise and effective education. The new teaching perspective, which is accelerated by the changing digital reality in which the subjects of the education process operate, refers to cooperation on many levels, as well as to the co-creation of educational

experiences. However, the effectiveness of these activities will be guaranteed by the appropriate digital competences of teachers. Guides in the world of norms, values and digital reality.

CONCLUSIONS

The ongoing changes in education are continuous, and their overriding goal is to create a school reality that will be the most adequate response to the needs of modern students. Models, styles and approaches to teaching and learning have changed over the years, influenced and still influenced by the political, economic and social situation in the world. Modern changes in education are largely related to the digital revolution, which, along with the dynamically progressing globalisation of society, occupies an increasingly important place in school. However, one should be aware that at this current stage, at which education is in transition, the process of change is permanently attributed to the teaching-learning process. The foundation guaranteeing the success of ongoing reforms, as well as high efficiency in working with today's students is a teacher. It is the high competence of the teaching staff that translates into the educational success of the pupils. This applies in particular to digital competences, the development of which, as indicated in the article, is a multi-level process. Only by taking into account the starting level of skills in handling new technologies and correctly going through the successive stages of acquiring new qualifications in the use of technology can a lasting change in the teaching process be guaranteed and the most appropriate response to the needs posed by the education of the 21st-century learner.

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