

ICT INFLUENCE ON PUPILS' LEARNING (NOT ONLY IN MATHEMATICS TEACHING)

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ABSTRACT

The article is concerned with the influence of modern technologies on learning mathematics and other subjects. It presents Marc Prensky's theory of digital natives and digital immigrants in the roles of the present-day pupils and teachers. The article includes opinions with regard to the necessary change in the educational process, especially in the approach of teachers to the present-day pupils and students.

1. INTRODUCTION

The human society has always been under constant development. This development is influenced not only by the change of the environment, social aspects and scientific knowledge, but also by the continually developing technology around us, as a matter of course. After the arrival of the first computers, no one expected that computers would one day be so small and (relatively) cheap that nearly everybody would be able to purchase one. A few years later, as home computers started to develop and be used by the general public, hardly anyone could imagine that we would all have mobile phones by means of which we would always be able to stay in touch nearly anywhere in the world. All these technological inventions have gradually become natural parts of most of us, and we cannot imagine our lives without computers, mobile phones or the Internet. However, this relatively rapid change has also brought about a change in many other areas. The above-mentioned technologies are primarily supposed to help us and facilitate both work and entertainment. It is thus obvious that such technological innovations have altered various aspects of our lives, including education.

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2. MAIN RESULTS

According to Prensky (Prensky, 2001), the present-day students have not only changed the way in which they behave, dress and communicate; they have also altered the way in which they think and perceive things, which is strongly dependent on modern technologies that surround them ever since they are born. Today's high school graduates spend twice as much time playing computer games and four times as much time watching television as they spend reading. This is a significant change which Prensky calls discontinuity, thus expressing the difference between the present-day students and previous generations. The new approach to this generation of students is based on the fact that they are different. Some authors call them the N-generation (Oblinger, Oblinger), others call them the D-generation (Palfrey, Glaser); however, according to Prensky, the most accurate term is "digital natives", that is to say those who were born in the digital world of computers, video games and the Internet. Prensky calls the other group "digital immigrants".

Digital natives are people who grow up in an environment full of modern technologies, such as computers, digital music players, video cameras, web cameras and mobile phones. The main difference between generations lies in the way people think and process information. Digital natives are used to receiving information very quickly and prefer parallel activities and multi-tasking; they also prefer graphic depiction over text and play over "serious" work. They like network cooperation and chance access to information (hypertext). They expect immediate praise and frequent appreciation of their work. They do not see computers, mobile phones or the Internet as modern digital technologies; to them, such technologies are an integral part of their lives.

Digital immigrants are members of older generations, who learned to use the above technological devices only later in life. To them, therefore, technologies are something new, unnatural and even unnecessary. Immigrants try to adapt to the new environment but they always retain a part of their original environment (accent). The digital accent of digital immigrants is manifested in various ways, for example: they use the Internet as a secondary source of information (they still prefer printed materials), they study manuals and instructions first instead of just operating devices intuitively, they print out e-mail messages and documents, they make phone calls to ask whether the person has received their e-mail message etc. Digital immigrants do not use the possibilities and ways of work like natives. They do not believe that digital natives can learn properly while watching television or listening to music because digital immigrants never did so themselves.

Teachers wrongly assume that today's students are not any different from themselves at the time when they were students, and can therefore use the same well-established methods by means of which the teachers themselves used to learn. Flexible digital immigrants will understand that their students will always be better in this respect, and will use this situation to introduce a higher-quality educational process. Others will be dissatisfied with the participants of the educational process and with the process itself, and will just criticize the new ways and think back to their own student years. The approach will never change, though. Therefore, if we want to educate digital natives in an adequate manner, the issue must be addressed. With respect to the methods and content of learning, this means that today's teachers should be able to communicate in the language and style used by today's students without changing the content of lessons or the time-proven way of thinking. Teachers should learn to proceed faster, multi-task, apply randomly obtained information and gradually break away from always working logically small step by small step (Prensky, 2001).

As regards the contextual aspect of competencies, there are two types – the past content and the future content. The past content, required in the past and inherited from the past, includes reading, writing, counting, logical reasoning, and understanding the content of a written text and ideas relating to the past era, that is to say everything that is part of the traditional curriculum. Such content is still important but is associated with a different time period. Some of it will always be crucial (such as logical reasoning); nevertheless, the importance of other areas (such as Euclidean geometry) will decrease, just as it was the case with Latin and Greek. The future content, designated for the present-day and future students, is digital and technological. It includes not only software, hardware, robotics, nanotechnology etc., but also ethics, politics, sociology, foreign languages and other related areas. The future content is highly interesting to students. However, the question is how many teachers, digital immigrants, are able to use it or apply it in teaching practice (Prensky, 2001).

“Every teacher should take into account the environment in which their students live. Teachers in general should realize that students have changed in a certain way, that they live in a perfectly interconnected network with lots of outside contacts, and that it is difficult for students to understand why they should learn by heart something which can be found within seconds. Therefore, it is necessary to connect teaching with practical issues which interest pupils and students. This approach should be prevalent in all components of education and the entire school environment. Only then will students have their own initiative and understand the need for life-long learning, i.e. the 21st-century competency” (Brdička, 2009).

As teachers, we must think of new ways to teach the past and future contents simultaneously and at the same time use the language of the digital natives. In practice, this means we should considerably change the methodology, content and way of thinking. It is hard to say whether it is more difficult to teach new content or to apply new methods to teaching old content. It is thus necessary to find ways to achieve this objective (Prensky, 2001).

3. FINAL REMARKS

It goes without saying that the difference between these groups of people – digital natives and digital immigrants – is manifested in many aspects of life and affects a number of factors. It is therefore essential to address this issue and incorporate these changes and development into the educational process so that it remains up-to-date and takes into account the current trends and needs of the society.

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REFERENCES

- [1] B. Brdička, *Jak učit ve všudypřítomném mraku informací?* In Sojka P., Rambousek J., Sborník 6. ročníku konference o elektronické podpoře výuky SCO 2009. 1. vyd. Brno: Masarykova univerzita, 2009. s. 5-13. ISBN 978-80-210-4878-2.
- [2] M. Prenský, *Digital Natives, Digital Immigrants*, On the horizon [online]. 2001, vol. 9, no. 5, ISSN 1074-8121. Available: <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>.
- [3] M. Prenský, *Digital Natives, Digital Immigrants, Part II: Do They Really Think Differently?* On the Horizon [online]. December 2001, Vol. 9, No. 6. Available: <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part2.pdf>.

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