Revista Românească pentru Educație Multidimensională
ISSN: 2066-7329 | e-ISSN: 2067-9270
Covered in: Web of Sciences (WOS); EBSCO; ERIH+; Google Scholar; Index Copernicus; Ideas RePeC; Econpapers; Socionet; CEEOL; Ulrich ProQuest; Cabell, Journalseek; Scipio; Philpapers; SHERPA/RoMEO repositories; KVK; WorldCat; CrossRef; CrossCheck

2020, Volume 12, Issue 1, pages: 176-184 | doi:10.18662/rrem/207

The Analysis of the Present State of Mobile Technologies using by Teenagers to Study Chemistry

Tetiana HRANOVSKA[1]

[1] Postgraduate at the Department of General Pedagogy and Pedagogical of Higher School H.S. Skovoroda Kharkiv National Pedagogical University, Ukraine, taniya20gran@gmail.com

Abstract: Today's students have many interests, such as playing computer and mobile games, watching movies and videos, social networking, messaging, santing photos and videos. Students create photos and videos on their own using computer software or smartphones. Modern teenagers are much different from previous generations due to several objective reasons, so there is a need to teach them in a new way, otherwise outdated classical teaching methods become ineffective.

As a rule, every teenager has his or her own personal mobile device that he uses mainly for entertainment. Often, students do not realize the great potential of the smartphone and its educational capabilities. The article analyzes the features of modern teenagers according to the theory of digital Generation Z. In the research participated 200 students from 7-9 grades of Kharkiv secondary schools. It is analyzed teenagers' attitudes to mobile technologies, as well as it is investigated the using of mobile technologies in the study of chemistry in the secondary school of Ukraine. The article highlights the problems that impede the application of mobile technologies for the study of chemistry and outlines the prospects for future research devoted to the use of mobile technologies in the educational process for teenagers learning. The expediency of using mobile educational applications to optimize the learning process is outlined.

Keywords: *educational process; teens; Generation Z; information and communication technologies; mobile technologies.*

How to cite: Hranovska, T. (2020). The Analysis of the Present State of Mobile Technologies using by Teenagers to Study Chemistry. *Revista Romaneasca pentru Educatie Multidimensionala, 12*(1), 176-184. doi:10.18662/rrem/207

1. Introduction

The speedy progress of information technology globally affects all areas of human life. The knowledge and skills previously acquired by high school pupils and students in higher education establishments become insufficient for quality work and full-fledged professional growth. The emergence of new information and communication technologies and a variety of software requires the training of specialists who could easily work with modern developments and acquire new ones. These include a variety of electronic resources, including mobile technologies that have easily entered the living space of both the older and younger generations. Modern teenagers are much more able to master new information technologies than the older generation. It is related to the fact that they were born in the Internet age and do not imagine life without computers, gadgets and other electronic devices. According to the theory Strauss & Howe (1991), they are the so-called Generation Z (digital generation) of teenagers born since 2000. The main differences of Generation Z in training are the following: pupils find quickly the easiest access to information, expecting immediate feedback; apply a hands-on approach to solving a problem situation; more adaptable to new technologies than any other generation; inclined to a better perception of visual information; teenagers are characterized by short-term concentration and short-term attention, they are prone to constant distractions during lessons.

The objectives of our article are to analyze the mobile technology application by modern pupils during the secondary school educational process by the example of study chemistry, as well as to pay attention to problems that impede the full application of mobile technologies in Ukrainian educational institutions.

2. Literature review

According to the research of Harvard Medical School, the attention duration in teenagers is only 7 seconds, this phenomenon is called "Attention Deficit Disorder" Ratey (2019). This is due to the frequent attention switch between short pieces of information when communicating on messengers, social networks, and the submission of material as a whole. There is a need to process as much material as possible in the short term. People are accustomed to the constant flow of information and feel bored with its absence irrespectively of the source: Internet, TV or mobile phone.

More often, pupils remember the source where they sought the necessary information than the content of the source itself.

Then it is important to consider the particularities of modern teenagers during the educational process, since they are difficult to be interested in by traditional teaching methods, and therefore innovative technologies like mobile learning tools should be applied.

In this context, there is a need to teach pupils to learn not just the theory by heart, but also to learn to use obtained knowledge to mastering new skills and to apply them in non-standard, completely unfamiliar situations. Mobile technologies are tools that can be applied in every area of life. These are unique gadgets that allow you to learn and to teach at the same time. At the present stage, Ukraine's education shows some skepticism about the feasibility of using these technologies, but there is a positive tendency to apply them in the blended learning process.

UNESCO (2015) studies highlight the need and the wide range of mobile technologies opportunities for pupils' study. UNESCO experts recommend the application of mobile portable gadgets in the training process, as they have many useful options: Internet access, multimedia files support, and they also allow to expand the range of solutions to various learning tasks and to overcome communication problems.

Mobile technologies are portable gadgets that include ebooks, mp3 players, GPS navigators, tablets and mobile phones. The mobile phones are multi-functions and you can apply them to different activities and at the different stages of lessons.

Foreign experience shows progress in the mobile technologies applied to improve learning effectiveness Dubendorf (2003). it is appropriate to apply mobile gadgets as an alternative to manuals, books Fojtika (2014), because they are always at hand, enabling you to study at any time. With mobile technologies, you can listen to audio and watch videos, 2D and 3D object models. Pupils could apply smartphones and tablets to record notes, work on homework, and search for information. The main thing is that it is easier for modern pupils to interact with a tablet or smartphone than with a PC. Therefore, there is a need to adopt mobile learning materials to improve student learning.

Avraamidou (2008) analyzes the capabilities of mobile technologies from different aspects in the learning process and proposes to apply portable gadgets for pupils' research, including field research and experiential research that can be captured, processed and transmitted the

data obtained employing mobile technologies. This activity increases the interest in learning.

In Ukraine, scientists recommend using mobile gadgets in lessons on a variety of subjects. To apply both tools already installed on your mobile device as well as a variety of the following sensors: GPS navigator, light sensor, noise meter, compass, magnifying glass, QR code scanner, etc. The most appropriate to apply these mobile gadgets for the study of physics, biology, chemistry, and geography.

3. Methodology

Participants. The survey "The feasibility of using mobile gadgets in the educational process" included 200 pupils from 7-9 grades of Kharkiv secondary schools. They give written consent for participation in the survey.

Instrument. The theoretical basis of the study was a set of general theoretical and empirical methods, included the analysis of theoretical information, generalization of the processed information, pedagogical experiment with mathematical and statistical processing of the obtained results.

Procedure. To conduct this research, pupils were asked to answer 4 questions devoted to the different ways of using mobile technologies in the study of chemistry, as well as to identify their attitude to the use of mobile technologies in the educational process.

The questions of the survey were as follows:

- Please indicate what apps are installed on your mobile phone (tablet)?
- Where do you apply to your mobile phone?
- Continue the sentence (you could choose several variants): If you would apply your mobile phone or tablet during study process, then: a) the lessons will become more interesting; b) I will understand the material better; c) I will be more comfortable with the tasks' solving; d) I will like that all lesson material available on the phone; e) I will be able to search for interesting material on the lesson's topic; f) be able to watch video demonstrations of chemical experiments; g) classmates will only play mobile games.
- Do you think it is convenient to apply a smartphone or tablet to perform the following tasks:

Yes ☐ No ☐ to watch video experiments on chemistry;
Yes ☐ No ☐ to read ebooks;
Yes ☐ No ☐ to read a chemistry textbook;
Yes ☐ No ☐ to solve chemistry problems;
Yes ☐ No ☐ to learn something new;
Yes ☐ No ☐ to participate in chemistry quizzes;
Yes ☐ No ☐ to play chemical games.

4. Results

The results of the study were as follows: the majority of 7-9 grade pupils use personal mobile gadgets to browse the web-pages (97%), the percentage of pupils who have a YouTube app to watch videos (entertainment, training, movies, etc.) is 90%. Many teenagers have mobile calculators, including mathematical (82%) and chemical (3%) for educational purposes. In addition, only 9% of respondents use e-learning chemistry study guides, but 7-9 grade pupils (35%) prefer e-book readers and download them online.

The survey showed that 47% of modern teenagers use smartphones for logic games and 10% use mobile gadgets for other purposes (social networks, messengers, photo editing, listening to music, mobile games, etc.). The survey of pupils by grades received the following indicators (table 1).

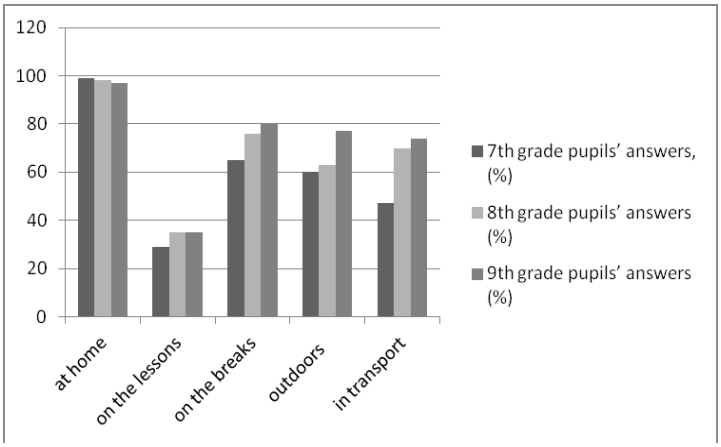
Table 1. The results of the students' answers to the first question

Please indicate what apps are installed on your mobile phone (tablet)?	**7th grade pupils' answers, (%)**	**8th grade pupils' answers, (%)**	**9th grade pupils' answers, (%)**
browser for web pages	94	96	100
YouTube	83	94	93
mathematical calculator	69	94	86
chemical calculator	4	2	3
logic games	49	44	45
e-learning chemistry study guides	8	7	12
e-book readers	29	31	45
other	14	11	3

The question about the places of mobile technologies use received the following results: most often 7-9 grades pupils use mobile gadgets at

home in spare time (98%), during lessons (33%), during the breaks (73%), outdoors or during relaxing time (67%), in transport (63%). The survey of pupils by grades received the following indicators (Diagram 1).

Diagram 1. The results of the students' answers to the second question



The results show a high level of use of mobile gadgets use by pupils in their spare time and a rather low level during their studies. Mobile gadgets are rarely used for reading literature both fiction and educational, they are often used to find non-educational information. In the authors' opinion, this trend requires teachers' control focused on the explanation of mobile technologies learning opportunities and recommendations for the educational mobile apps use.

Pupils were also offered to answer the question of how mobile gadgets could be useful in the study process. The answers were as follows: the use of mobile gadgets during the lessons will make them interesting (40%), mobile phones will help to understand the learning material better (26%), the use of mobile technologies for solving tasks is useful (18%), keeping all the materials on the phone is effective (23%), use of the mobile phone to find information during the lesson (59%), watching the experiments videos on YouTube (38%), but some pupils (40%) also noted that not all classmates would use mobile technology for learning purposes, some of them would just play mobile games (table 2).

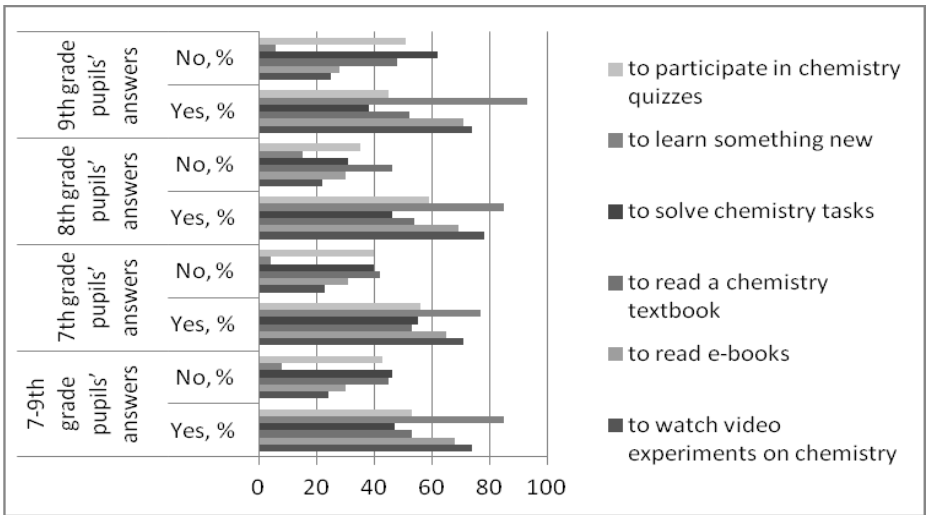
Table 2. The results of the students' answers to the first question

Continue the sentence (you could choose several variants): If you would apply your mobile phone or tablet during study process, then:	**7th grade pupils' answers, (%)**	**8th grade pupils' answers (%)**	**9th grade pupils' answers (%)**
The lessons will become more interesting;	36	54	33
I will understand the material better;	22	22	32
I will be more comfortable with the tasks' solving;	21	13	17
I will like that all lesson material available on the phone;	19	28	22
I will be able to search for interesting material on the lesson's topic;	55	52	68
I be able to watch video demonstrations of chemical experiments;	26	37	52
Classmates will only play mobile games;	43	35	39

The result of this block of the survey indicates pupils' desire to use mobile gadgets to learn chemistry, but their answers are a little bit restrained. The majority of respondents consider that the use of mobile technologies will do the learning process more interesting and pupils will be more active to find interesting information, to watch video demonstrations. However, pupils also mentioned that mobile technologies would abstract them from the learning process and tasks performing. To avoid this situation, in authors' opinion, it is necessary to plan the lesson carefully and to choose the educational material and tasks that must be done with the help of mobile technologies, so pupils won't have time to abstract and will have a cognitive interest in learning by performing the electronic tasks.

7-9 pupils were also suggested to describe the options of mobile phones and tablets which help to perform exercises and tasks during the lesson. The variants of answers were as follows: Yes – useful option, No – useless option. The results obtained are shown in diagram 2

Diagram 2. The results of the students' answers to the second question



The total result of this experiment showed that pupils more often use mobile gadgets for fun than for educational purposes. However, it is undeniable that pupils want to use their gadgets at school to study.

The reasons for not using mobile gadgets in learning process are as follows: the administration of some schools and teachers prohibit the mobile gadgets using during lessons; insufficient information on the mobile gadgets learning options by both teachers and pupils; prevarication of teachers due to the fear that pupils will only play mobile games and will not perform the tasks.

It is considered that greater awareness of the latest technology will allow teachers to learn how to use these modern and exciting technologies to teach pupils, because modern teens do not imagine their lives without mobile technologies, and the application of the mobile technologies will help to optimize the learning process.

The majority of mobile apps will provide the wide options for their use during lessons to perform the different types and levels of electronic tasks, to study theoretical material, to watch the video, to apply various sensors for research, which will make the educational process modern and interesting for pupils.

5. Conclusions

To summarize the above mentioned it should be noted that the application of mobile technologies in the educational process is a promising task that requires further research. Mobile technologies are not only learning tools, but also a subject of options study. It is necessary to create new techniques for using mobile technologies in the classroom, and sets of various tasks for pupils to help learn while playing to master complex material. We agree with V. Dubendorf and R. Fojtika that mobile technologies will help to optimize and to improve the learning process, as well as to increase pupils' activity at school.

The majority of mobile apps will be useful to get pupils interested in learning by performing different electronic tasks. Mobile technologies are the tools that will be interesting for pupils to learn. Because they provide opportunities to quickly find the information you need, perform calculations, capture the results (photos, videos), conduct experiments and share your results with classmates.

Further research will make more specific use of mobile technologies, including apps, specifically in the educational process of studying chemistry in 7-9 grade pupils to study the impact of mobile technologies on teenagers' learning levels.

References

Avraamidou, L. (2008). Prospects for the use of mobile technologies in science education. *AACE Journal*, *16*(3):347-365.

Ratey, J. (2019). *Generation Z and learning*. Prelude Consulting. Retrieved from Prelude Consulting https://www.prelude-team.com/articles/generation-z-and-learning

Dubendorf, V. (2003). *Wireless data technologies*. Massachusetts Health Data Consortium (MHDC), Mobile Healthcare Alliance (MOHCA) and The Council of Communications Advisors USA. 232 p.

Strauss, W., Howe, N. (1991). *Generations: The history of America's future, 1584 to 2069*. New York: William Morrow & Co. 544 p.

Fojtika, R. (2014). *Mobile Technologies Education*, *CY-ICER 2014 Procedia - Social and Behavioral Sciences*. 143, 342 – 346

UNESCO (2015). *Policy Guidelines for Mobile Learning*. Retrieved from http://iite.unesco.org/pics/publications/ru/files/3214738.pdf