



WEB-ENHANCED SECONDARY AND ACADEMIC EDUCATION STRUCTURED AROUND EXPECTATIONS AND LEARNING PREFERENCES OF GENERATION Z

Iwona Mokwa-Tarnowska

Gdańsk University of Technology

Gabriela Narutowicza 11/12, 80-233 Gdańsk, imtarn@pg.edu.pl

Viviana Tarnowska

Secondary School No. 2

Pestalozziego 7/9, 80-445 Gdańsk, vivianatarnowska123@gmail.com

***Abstract:** Students from Generation Z prefer online text and image-based learning and they use online resources to learn real-world skills. In order to successfully teach them, educators should shape subject curricula around their behaviours, expectations and needs, which can differ from those of the previous generations. Studies indicate that teachers in Poland understand that web-based education can improve learning outcomes but their instructive, mostly traditional teaching does not result in a synergistic effect. These ideas are supported by secondary school students' attitudes expressed in the survey conducted in the Gdansk region in May and June 2019.*

Keywords: Generation Z, web-enhanced learning, online tools, e-learning, secondary school education

INTRODUCTION

E-learning technologies, i.e. Web 2.0 tools, can help educators deliver engaging programmes with various interactions, resulting in students developing new knowledge and skills. Secondary school lessons and university courses are more likely to arouse interest and stimulate to work, thus leading to satisfactory outcomes, when they are run in environments structured around pedagogical methodologies based on active learning and collaborative achievements (Mokwa-Tarnowska, Roszak, Kołodziejczak 2018, Mokwa-Tarnowska 2018). When the focus in education shifts from an instructivist approach, distribution of information and rote learning, to a constructivist one, which consists in collaborative, problem-based learning and complex skill development,

an educational environment will be responsive to challenges posed by a new generation of learners. With capacity for versatile interactions, web-enhanced programmes can better satisfy the needs, expectations, and learning preferences of the cohort, i.e. Generation Z (Beall 2016).

By adding variety to the curriculum through an environment structured around mobile technology and online tools, educators can develop programmes and teach classes that better motivate students and engage them in learning. Such instructional design may contribute to improving the quality of education, both at the secondary level and the academic one. New opportunities can help develop different competencies and literacies.

The paper aims to show how secondary school students that belong to Generation Z perceive web-enhanced education, what Internet technologies they use to support their learning, and how often they use them at school and beyond it. Moreover, it attempts to investigate what expectations they have about an academic learning environment and whether they want it to be traditional or web-enhanced. The presented hypotheses are confirmed by survey results. The findings will be compared against other studies on the use of online tools and mobile technology in Polish secondary schools and higher education institutions.

1. GENERATION Z - LIFESTYLES

There are different terms to describe the generation of people born from the 1990s onwards – post-Millennials, iGeneration, Gen Wii, Net Gen, Homelanders, centennials and Generation Z, the last one being the most widely used (Dimock 2019, Garver 2019, Searle 2019). Researchers agree that a new generation has emerged, and although the oldest and youngest members can differ to a great extent, they share certain attitudes, behaviours and expectations. It is on this basis and not on the span that the classification has been made.

According to Universum, originally a Sweden-based company that now has offices worldwide and which provides market insights to help employers understand career preferences and build strategies, the cohort consists of 100% digital natives. In 2015 its researchers surveyed 49000 members of Generation Z across 47 countries to find out what plans for school and work they had, and what they expected to achieve in their future careers (Dill 2015). Over half the respondents (67%) stated that they were motivated by curiosity when choosing a course of study. The majority considered formal education to be very important and wanted to get a university degree. When it came to career goals, around 50% placed autonomy, leadership opportunities, dedication, creativity and self-employment high on the priority list.

In 2016 the global Randstad and Future Workplace researched ten markets (U.S., UK, Germany, Mexico, Poland, Argentina, India, China, Canada and South

Africa) and surveyed 1965 22-year-olds in full-time employment (Randstad 2016). Their study found that members of the Generation Z cohort would like their employers to use new technologies such as virtual reality, augmented reality and wearables in the workplace (31%, 18% and 30% respectively). Almost 50% of their respondents wanted to have technology-related professions.

Vision Critical and MARU/VCR&C (2019) conducted research on the preferences and attitudes of Millennials and Generation Z. They claim that the new cohort consists of true digital natives who feel very positive about different technologies that surround them, but at the same time they are aware of their limitations. Just under three quarters have a Netflix subscription (71%), and less than half watch cable television. They are keen on Internet of Things, artificial intelligence and job automation (36%, 19% and 20% respectively). More than half the respondents agree that science and technology can solve many of the world's problems. Generation Z rarely reads paper-based information – prefers reading online and using online video to learn real-world skills. It is the first generation who does not have to use other media channels than the Internet, and the first one who is fully immersed in an on-demand world available through interactive technology. Their attention span is largely reduced, even to eight seconds, which may result from them racing from information to information distributed in a visually rich environment. They are also quick online researchers when it comes to information on every aspect of their lives, including finance and health issues. They expect to find treatment possibilities, payment methods and appointment schedules online, in which they and Millennials are alike.

2. GENERATION Z – LEARNING NEEDS AND PREFERENCES

The characteristics mentioned above may have influenced the way employers perceive the needs and learning preferences of the emerging generation. According to the research conducted on LinkedIn in 2018 (Spar, Dye, Lefkowitz, Pate 2018) Generation Z, unlike Millennials, highly assesses independence and its members are relatively worse at collaboration. This can pose a challenge for companies that value collaborative skills of their employees. One-third of the respondents believe that members of Generation Z will be more difficult to teach numerous soft skills than current workers, particularly communication and collaborative ones. The large proportion of the managers who participated in the survey think that soft skills are more important than technical ones or equally important (92%) and that it is difficult to find them in young candidates (89%). For 90% executives, learning and development of their employees is their priority. The study shows that 68% of the members of Generation Z would like to learn at work, 58% would rather do it at their own pace, and 49% would do it when the need emerged, which is consistent with their likeness of on-demand web services. Moreover, the survey demonstrates that talent developers use online learning solutions to provide content and to evaluate learning outcomes more

and more often. Taking the cohort's preferences into consideration, companies are now investing more money into online training, which now equals traditional one.

In order to successfully teach members of the new generation, educators should shape subject curricula around their behaviours (Preville 2018). First of all, learners must be encouraged to collaborate and do assignments from home, because for them learning does not take place in libraries but in online chat rooms. Moreover, teachers need to understand that mobile devices do not dissuade students from learning— they assist them in knowledge development. A shift in the perception of their usability to support university education can be seen in the policy of Ohio State University that in 2018 equipped incoming students with 11000 iPads. The fight against smartphones at school and university will hopefully be over soon, as they can be used as an educational tool whose affordances allow for various interactions beneficial to all involved. Thirdly, universities should adopt personalised learning strategies built on group needs assessment (Zi-Gang 2019), and choose such e-learning environments which do not have detrimental effects on students' academic performance (Feng, Wong, Wong, Hossain 2019) and which best suit their needs (Boczkowska, Bakalarski, Sviatoslav, Leszczynski 2018). The importance of e-learning in professional improvement of emergency nurses. Digital collection of data can speed the analysis of students' experiences and learning needs necessary for improvement. Furthermore, online tools will enable teachers to support their students beyond office hours, which means that consultations will be delivered at a time convenient to both staff and students. Finally, more focus should be placed on peer-generated content. Power and control are more likely to be shared in a university classroom in the years to come.

Just over half of the members of Generation Z (52%) use social media websites to do research, which according to Pareto Law (2019), a UK company specialising in sales recruitment and sales training, shows their willingness for self-control and self-education. The company's study (Pareto Law 2019) reveals that almost the same number of the respondents prefers blended learning methods (51%). However, only 47% of employers currently use this type of teaching, and universities and higher education institutions fare even worse. It is expected that more training will be delivered online in the near future to accommodate the needs of new workers.

3. POLISH TEACHERS' ATTITUDES TOWARDS ICT AND THE USE OF ONLINE TOOLS IN EDUCATION

Secondary school teachers in Poland are trying to adapt to more pragmatic, "tech-savvy" Generation Z by incorporating new technologies into curriculum design. Many classrooms are equipped with interactive whiteboards and virtually all have one computer with Internet access on the teacher's desk,

and a TV or a projection screen. Moreover, each school has a computer lab, which is primarily used to teach IT and technology education, and sometimes to support language classes. This presents tremendous opportunities for a shift towards web-enhanced learning. However, many teachers lack knowledge and skills to efficiently use online tools to improve curriculum design, which has been reported in different studies (Polak 2017, Piecuch 2019). Research has shown that there are a number of obstacles to educators being unwilling to use Internet technologies in class:

- insufficient training provided by school authorities and supervising institutions, including governmental ones such as Boards of Education;
- no IT support staff in schools, who can instruct and help less experienced and less skilful teachers;
- teachers' attitudes towards technology-rich educational environments such as reluctance, disapproval, aversion to change, and resentment to new methods;
- longer preparation time for class activities structured around ICT, which means more outside school hours for teachers that increase non-teaching duties;
- lack of money in the school budget for buying mobile devices, computers and apps (Penszko, Zielonka, Trzeciński, Cyndecka 2015, 46).

Studies indicate that teachers in Poland understand that school curricula must change to reflect the lifestyles and habits of Generation Z (Plebańska 2017). A majority of teachers treat Internet technology as a relatively good educational tool and they think that they have introduced a sufficient number of web-based activities into the classroom. However, a deeper analysis of their teaching methods has shown that instructive teaching and passive learning dominate in secondary schools and little emphasis is placed on engagement, collaboration as well as different learning styles and needs. Educators teach with ICT but not through ICT.

4. ATTITUDES OF SECONDARY SCHOOL STUDENTS FROM THE GDANSK REGION TOWARDS INTERNET TECHNOLOGIES USED FOR EDUCATIONAL PURPOSES

4.1 Research Design and Implementation

The research presented in this paper targeted secondary school students attending schools in the Gdansk region, both general education and vocational ones, and was conducted in May and June 2019. It consisted in analysing data collected

through an online questionnaire that included nine close-ended questions. Some had open response-options and all of them finished with a request to justify the chosen answer. Most of them were Likert scale questions. Information about the survey questionnaire was distributed through social media, chat rooms and in person. As many as 160 questionnaires were analysed, incomplete ones were not taken into consideration.

It can be assumed that the composition of the study group was homogeneous with respect to many factors: age (adolescents aged 15-19), intellectual capacity (students preparing for secondary school leaving examinations), interest in learning (on successful completion all can enrol on a university course) and frequent use of Internet technologies. It can be expected that most of the respondents will enrol in one of Polish higher education institutions if they choose to continue formal education, because, as statistical data show, only a limited number of school leavers decide to study abroad and are accepted to a foreign university.

4.2 Research Questions

The qualitative and quantitative research into the attitudes to Internet-based education and learning preferences of young people in Poland of which part is presented in this paper was initiated five years ago. The previous stages consisted in analysing the nature of web-enhanced language classes offered by Gdansk University of Technology and their impact on an increase in students' hard and soft skills, as well as the attitudes of university staff and students towards online tools to support academic education and their competencies to teach and learn in an e-learning environment. The most recent stage focuses on secondary school attendants and their approach to online learning in and outside the classroom. Secondary school students' opinions also reveal their expectations about the learning environment that they would like to encounter at the academic level. Moreover, they will help uncover some trends to be further tested in the next research stages. The research questions targeted in this phase were as follows:

- What are the secondary school students' attitudes to using online tools and mobile technology to support learning at school and at university?
- What are their learning preferences and how do they relate to technologies pervasive in their lives?
- What are their basic expectations about the nature of an academic learning environment?

4.3 Findings and Discussion

A majority of the secondary school students who participated in the survey want to continue formal education and enrol to university (81.3%), only 5.6% are interested in finding a job, and 13.1% have not decided yet. Half of them are in year 2, 12.5% in year 1, and the same number in year 3, and 25% have just finished school. All of them use different online technologies in

everyday life, website creation tools being the least popular (13.5%) and sharing tools have been used only by 16.5% (Figure 1). It is, however, surprising that only 25.6% of the respondents ticked the communication tools box, which may mean that they did not understand the label, because it is unlikely that students who live in a region with easy Internet access do not use such technology – the results of different studies presented in the literature show that only 3.5% of young people aged 11-17 in Poland have never used a mobile phone with Internet connection, and 82.5% use it at least once a day (Pyżalski, Zdrodowska, Tomczyk, Abramczuk 2019, 19-20).

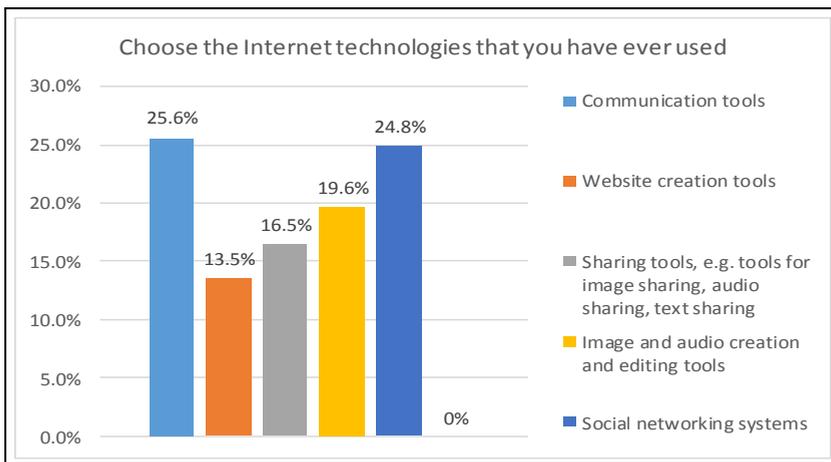


Figure 1. Familiarity with Internet Technologies

Source: Own work

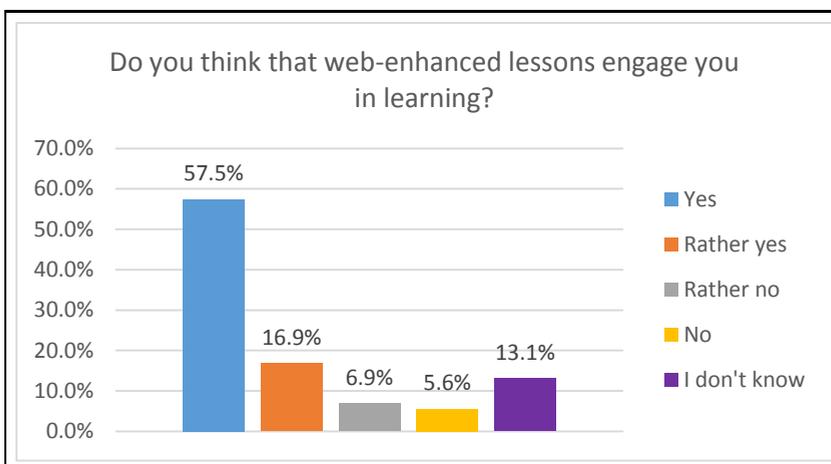


Figure 2. Impact of the Internet on Engagement

Source: Own work

Almost three quarters of the respondents (74.4%) think that web-enhanced lessons are an engaging way of learning, and only 5.6% are of the opposite opinion (Figure 2). This is consistent with other recent studies that have revealed that students often use the Internet to search for information they need for their school activities (Pyżalski, Zdrodowska, Tomczyk, Abramczuk 2019, 45-46).

According to the secondary school students who participated in the survey, teachers rarely support their classes with online materials or do it only from time to time (29.4% and 26.3% respectively) (Figure 3). The only types which were mentioned were quizzes, particularly Kahoots.

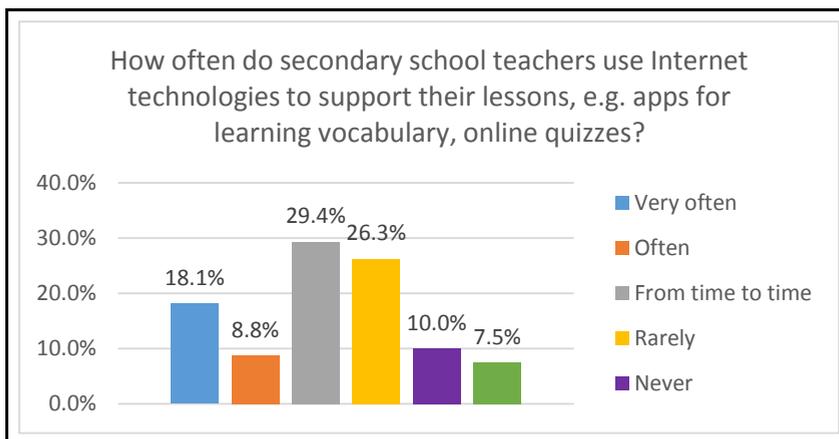


Figure 3. Frequency of Internet Technology Use at Secondary School Level

Source: Own work

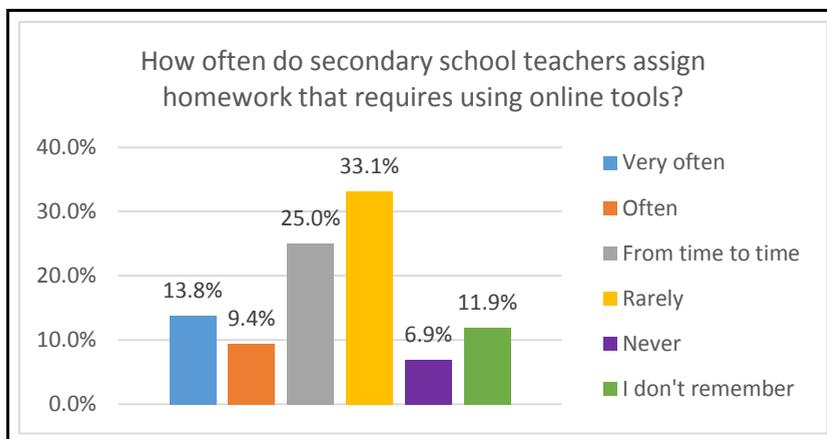


Figure 4. Frequency of Online Tools-Supported Homework

Source: Own work

Similar responses can be seen in the case of the question about the use of online tools to support homework (Figure 4). Only a small percentage of the students stated that their teachers frequently required them to use Internet technology

to do homework. More than 30% rarely were asked to do so and 11.9% did not remember if they had been assigned such tasks.

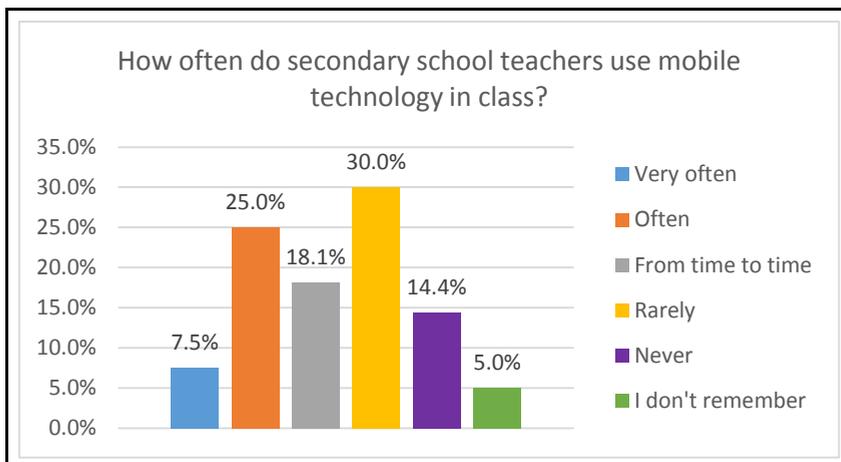


Figure 5. Frequency of Mobile Technology Use in Class
Source: Own work

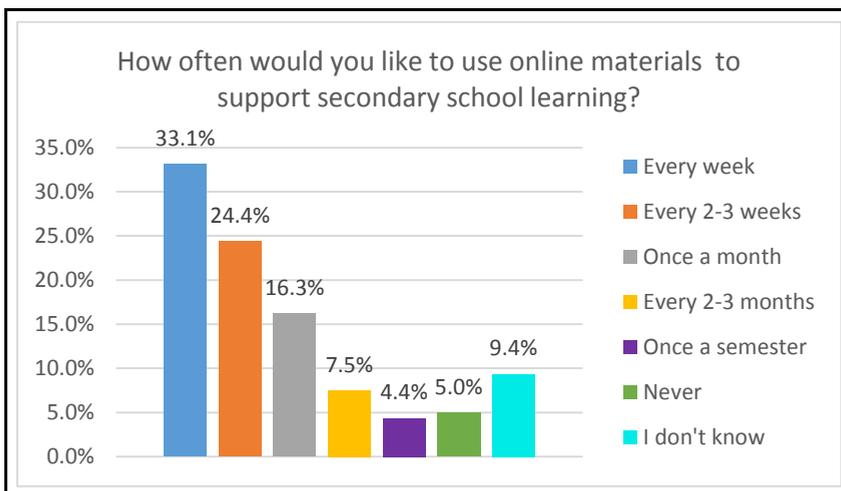


Figure 6. Online Materials – Frequency of Use Preferences
Source: Own work

When it comes to using mobile devices in class, altogether just over 30% of the respondents often had lessons enhanced by such technology (Figure 5). The same number of students rarely needed it and more than 10% had never been asked or required to support their learning with mobile devices. Recent findings presented in the literature have shown that Polish secondary school teachers are rather reluctant to allow their students to use smartphones in class. According to Pyżalski, Zdrodowska, Tomczyk, Abramczuk (2019, 50) as many as 27% of students reveal that Polish teachers want them to have their mobiles

switched off during lessons, and 25% report that their mobiles have been confiscated by their teachers. Plebańska's research (2017, 20) shows that only 29% of secondary school teachers in Poland allow using smartphones in class, and only 12% sometimes teaches with tablets.

The members of Generation Z who completed the questionnaire would like to frequently use online learning materials (Figure 6), which is congruous with the understanding of the preferences of the cohort described above. The most popular answers that they selected were 'every week' and 'every 2-3 weeks' (33.1% and 24.4%). Only 5% stated that they did not want to learn from Internet-based resources or activities.

More than 70% of the respondents showed interest in web-enhanced academic education (*yes* and *rather yes* answers) (Figure 7). A minority (4.4%) would not like to use either collaborative tools, communication tools or learning platforms if they become university students.

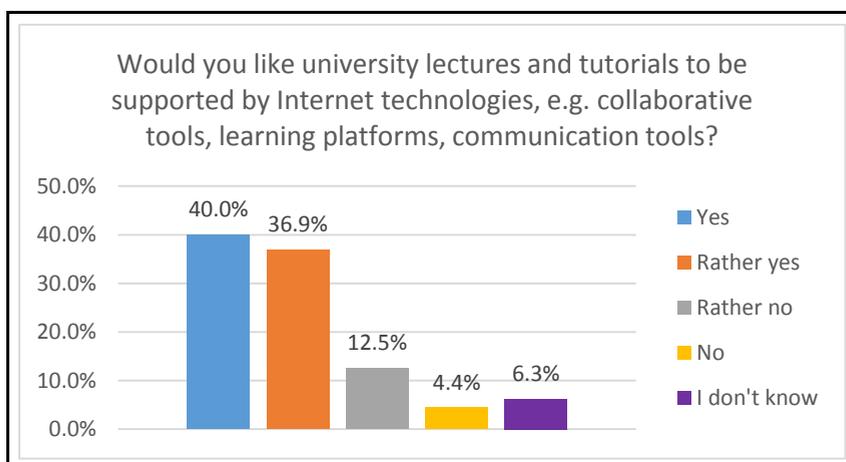


Figure 7. Internet-Supported University Classes

Source: Own work

According to the students, university staff should teach from both traditional textbooks and online materials (Figure 8). Just over 30% of the respondents regard Internet-based resources/activities as more convenient to learn from than paper-based ones versus 41.9% who think just the opposite. These responses are consistent with their answers to question 2, which confirms that they perceive web-enhanced learning as engaging (Figure 2).

When it comes to the frequency of use of online materials at university, the answers also show consistency with those to question 6, which was about using them at the secondary school level (Figures 9 and 6). The most frequently selected options were 'every week' and 'every 2-3 weeks' (24.4% and 35% respectively). Only 11.3% did not have an opinion and 5.6% would not like to use them at all.

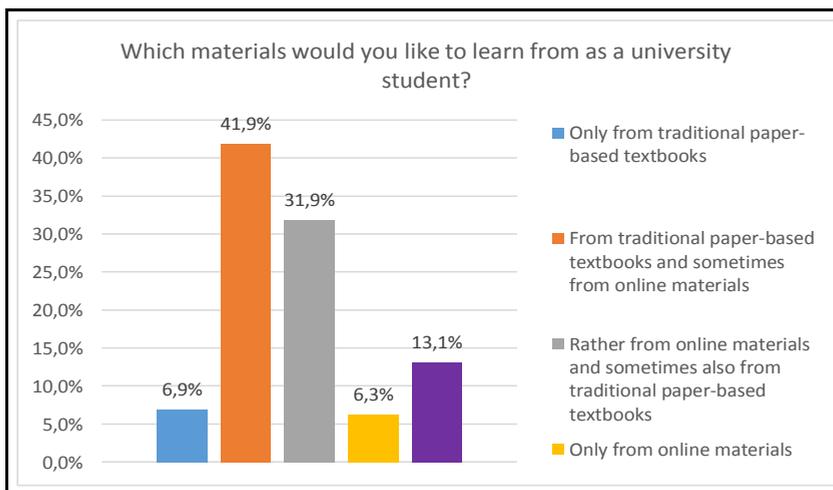


Figure 8. Online Materials in University Education – Preferences
Source: Own work

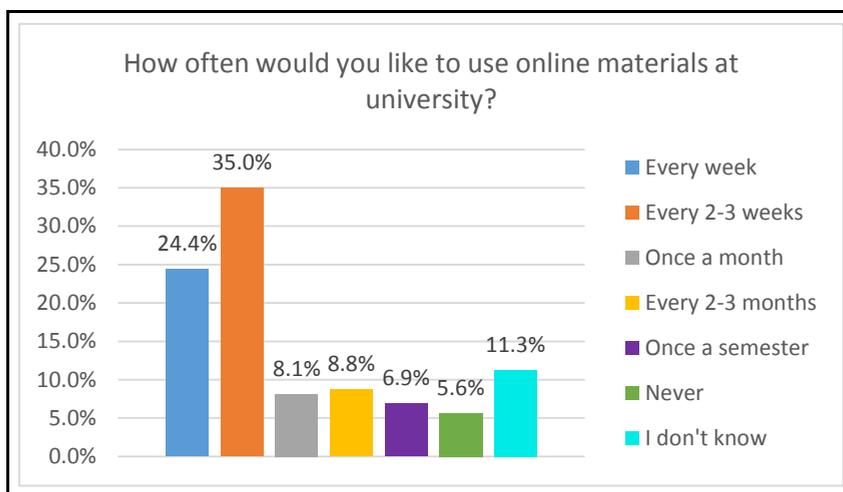


Figure 9. Online Materials in University Education – Frequency of Use Preferences
Source: Own work

Figure 10 shows the distribution of the attitudes to the question of mobile technology use in academic education. More than half of the respondents think that mobile technology should support university courses. Again only 7% cannot see its value, and 5.1% has no opinion. The answers indicate that young people expect higher education institutions to structure their curricula around the technologies they use in everyday life, and that they would like to have more opportunities to learn from Internet-based materials than they have at the secondary school level.

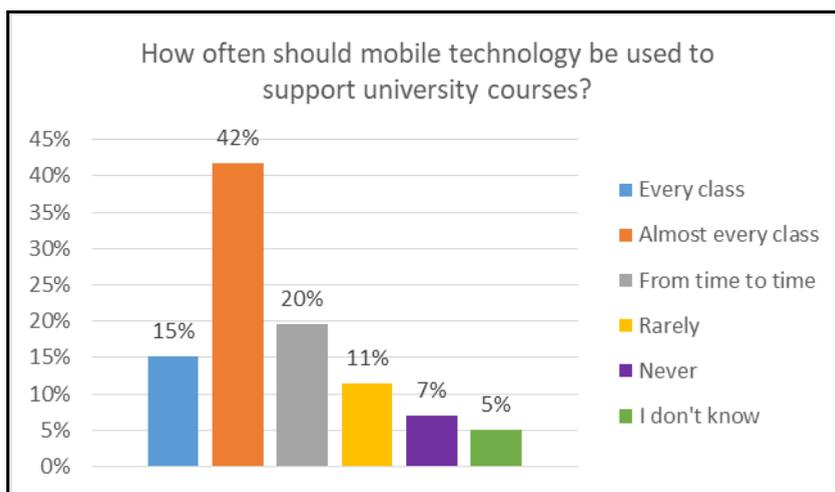


Figure 10. Mobile Technology in Academic Education – Frequency of Use Preferences

Source: Own work

CONCLUSION

The research has shown that Generation Z members are looking forward to educational programmes supplemented by web-based tasks, which may stimulate better engagement in course activities. They can motivate them to develop various hard skills, but also soft ones, which other phases of the research have revealed (Mokwa-Tarnowska, Roszak and Kołodziejczak 2018). Online projects can help improve collaborative, analytical and critical thinking competencies, which has been observed in the students of Gdansk University of Technology participating in classes supported with online tools over the last three years. It has to be emphasized that it is not web-based education itself that stimulates young learners but it is the nature of the online environment introduced that contributes to students' satisfaction with being engaged in an innovative learning experience (Mokwa-Tarnowska 2017). It is the structure of the assignment, usually of analytical and collaborative character, that adds value to learning and teaching. Instructivist education no matter in which environment it is conducted, whether traditional or online, will not engage a new generation of digital natives. They should be encouraged to build mental models in a constructive classroom, which focuses on personal preferences and adapts to learning needs.

Since using Web 2.0 tools to enhance secondary school education is a relatively new phenomenon, only limited research has been conducted on their impact on knowledge and skills development. One of the most thorough research that has been done focuses on an increase in language competencies,

and it has shown that online tools engage students in learning and help them build vocabulary and improve grammar proficiency (Kaprocka-Gral 2019, Meier 2019, Łukasik 2018). The research findings presented in this paper show that a majority of secondary school students treat web-based activities as a valuable addition to regular traditional classes, both at the level at which they are studying now and at the academic one, and they would like to be involved in them on a regular basis.

A carefully structured educational environment based on a constructivist approach can result in better learning outcomes, measured in a traditional way or by instruments available through the use of online tools. However, it is not sufficient to add some online activities in class and beyond it. Teachers should learn how to use Web 2.0 tools and activities developed with them to achieve a synergistic effect. Most of them are still using an online environment in an instructive way, usually by adding some text and picture-based components to traditional, paper tasks, and/or to test students' knowledge – prior to what they are expected to learn in class or the one just developed in class. Pyżalski, Zdrodowska, Tomczyk, and Abramczuk (2019, 44-45) in the analysis of their findings state that a majority of the students they surveyed, from 90 Polish schools, could not describe an interesting lesson supported by ICT which they remembered. They also stress that rarely are teachers' competencies to use Internet technologies, mobile technology or even interactive whiteboards evaluated, and little research into this field has not been done (2019, 43).

Secondary school students have high expectations about online tools and mobile technology to support university courses. Research has shown that web-enhanced academic education in Poland is still a novelty (Roszak, Mokwa-Tarnowska, Kołodziejczak 2019, 2018). Like secondary-school teachers, university and college staff use Internet-based resources to provide additional information and data, and to communicate with students. All higher education institutions have learning platforms, but they are frequently used as information boards and for self-tests. Hardly ever are they used for collaborative tasks that focus on developing hard and soft skills (Mokwa-Tarnowska, Roszak and Kołodziejczak 2018). Moreover, the number of academic staff involved in developing e-learning materials and web-enhanced education, regardless of university type, is not satisfactory. Training programmes on content creation and online pedagogy should be conducted, and teachers should be provided with IT support. Having advanced skills in online-based education and knowledge about new learning and teaching environments, academic staff will be able to meet the needs and expectations of Generation Z. Currently many courses offered by Polish universities are still of instructive, uncollaborative nature, and they are run in a traditional environment.

REFERENCES

- Beall, G., (2016). 8 Key Differences between Gen Z and Millennials. Retrieved from: https://www.huffingtonpost.com/george-beall/8-key-differences-between_b_2814200.html?guccounter=1 (accessed 14 July 2019).
- Boczkowska, K., Bakalarski, P., Sviatoslav, M., Leszczynski, P.K., (2018). The importance of e-learning in professional improvement of emergency nurses. *Critic Care Innov.* 2018; 1 (1): 16-24.
- Dimock, M., (2019). Defining generations: Where Millennials end and Generation Z begins. *Fact Tank*. Retrieved from <https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/> (accessed 14 July 2019).
- Feng, S., Wong, Y.K, Wong, L.Y., Hossain, L. (2019). The Internet and Facebook Usage on Academic Distraction of College Students. *Computers & Education*, June 2019, 134, 41-49.
- Garver, Z. (2018). What Generation Comes After Millennials? Meet Gen Z. Retrieved from <https://communityrising.kasasa.com/who-are-gen-z/> (accessed 16 July 2019).
- Kaprocka-Gral, K. (2019). The Role of Multimedia Technology in Teaching English to Students Studying Tourism at ZSHG. Unpublished MA thesis. Ateneum – Szkoła Wyższa.
- Łukasik, M. (2018). Mobile applications as a learning tool for EFL students. Unpublished MA thesis. Ateneum – Szkoła Wyższa.
- Meier, A. (2019). Efficiency of the Use of Mobile Applications at English Classes. Unpublished MA thesis. Ateneum – Szkoła Wyższa.
- Mokwa-Tarnowska, I. (2017). *E-learning i blended learning w nauczaniu akademickim: zagadnienia metodyczne [E-Learning and Blended Learning in Academic Education: Teaching Aspects]*. Gdańsk: Wydawnictwo Politechniki Gdańskiej [Gdansk: GUT Publishing House].
- Mokwa-Tarnowska, I. (2018). Rozwijanie umiejętności miękkich na zajęciach wspomaganych narzędziami online – kurs języka angielskiego technicznego [Developing Soft Skills during Web-enhanced Classes – Technical English Course]. *Zeszyty Naukowe Wydziału Elektrotechniki i Automatyki PG [The Scientific Papers of the Faculty of Electrical and Control Engineering, Gdańsk University of Technology]*, 58 (pp. 51-56).
- Mokwa-Tarnowska, I., Roszak, M. and Kołodziejczak, B. (2018). Online Collaborative Projects to Enhance Soft Skills. In E. Smyrnova-Trybulska (Ed.) *E-learning and Smart Learning Environment for the Preparation of New Generation Specialists*. „E-learning“, 10, (pp.443-464). Katowice - Cieszyn: Studio NOA for University of Silesia.

- Pareto Law. (2019). Digital Learning and Gen Z Who they are and how they'll change your business. Retrieved from <https://www.pareto.co.uk/uploads/genzuknewlogo-min1.pdf> (accessed 16 July 2019).
- Penszko, P., Zielonka, P., Trzeciński, R. and Cyndecka, M. (2015). Średnioterminowe efekty programu „cyfrowa szkoła” [Mid-term Effects of the ‘Digital School’ Project]. Retrieved from <http://produkty.ibe.edu.pl/docs/raporty/ibe-ee-raport-cyfrowa-szkola-srednioterm.pdf> (accessed 16 July 2019).
- Piecuch, I. (2019). Teachers’ Perspective on Using Quizlet and Kahoot as Tools for Supervised Learning of English. Unpublished MA thesis. Ateneum – Szkoła Wyższa.
- Plebańska, M. (Ed.). (2017). *Polska szkoła w dobie cyfryzacji. Diagnoza 2017 [Polish School in the Digital Age. Diagnosis 2017]*. Warszawa: Wydział Pedagogiczny UW [Warsaw: Faculty of Education, University of Warsaw]. Retrieved from <https://www.nck.pl/upload/attachments/319726/RAPORT%20CYFRYZCJA%20SZK%C3%93%C5%81%202017.pdf> (accessed 16 July 2019).
- Polak, M. (2017). Kilka refleksji o technologiach w edukacji [Some Reflections on Technologies in Education]. Retrieved from <https://www.edunews.pl/edytoriale/3993-kilka-refleksji-o-technologiach-w-edukacji> (accessed 16 July 2019).
- Preville, P. (2018). The world seems to revolve around the Millennial generation. But Generation Z is serious-minded, success-focused and steeped in technology from kindergarten—and now, they’re taking over higher education. Retrieved from <https://tophat.com/blog/generation-z-teach-classroom/> (accessed 16 July 2019).
- Pyżalski, J., Zdrodowska, A., Tomczyk, Ł. & Abramczuk, K. (2019). *Polskie badanie EU Kids Online 2018 [EU Kids Online 2018, Polish Perspective]*. Poznań: Wydawnictwo Naukowe UAM [Poznan: Adam Mickiewicz University Press]. Retrieved from https://fundacja.orange.pl/files/user_files/EU_Kids_Online_2019_v2.pdf (accessed 16 July 2019).
- Randstad. (2016) Gen Z and Millennials collide at work. Retrieved from http://experts.randstadusa.com/hubfs/Gen_Z_Millennials_Collide_Report_Dec_2016.pdf (accessed 16 July 2019).
- Roszak, M., Mokwa-Tarnowska, I. & Kołodziejczak, B. (2018). Smarter Education - Preparing a New Generation of University and College Teachers. In E. Smyrnova-Trybulska (Ed.) *E-learning and Smart Learning Environment for the Preparation of New Generation Specialists*. “E-learning”, 10, (pp. 97-112). Katowice - Cieszyn: Studio NOA.

- Roszak, M., Mokwa-Tarnowska, I. & Kołodziejczak, B. (2019) E-learning Competencies for University and College Staff. In E. Smyrnova-Trybulska, P. Kommers, N. Morze, J. Malach. (Eds.), *Universities in the Networked Society. Cultural Diversity and Digital Competences in Learning Communities* (pp. 185-200). Cham, Switzerland: Springer.
- Searle, B. (2019). Millennials, Gen X, Gen Z, baby boomers: how generation labels cloud issues of inequality. Retrieved from <https://theconversation.com/millennials-gen-x-gen-z-baby-boomers-how-generation-labels-cloud-issues-of-inequality-106892> (accessed 16 July 2019).
- Spar, B., Dye, C., Lefkowitz, R. and Pate, D. (2018). 2018 Workplace Learning Report. Retrieved from <https://learning.linkedin.com/content/dam/me/learning/en-us/pdfs/linkedin-learning-workplace-learning-report-2018.pdf> (accessed 16 July 2019).
- Vision Critical and Maru/VCR&C. (2019). The Everything Guide to Generation Z. Retrieved from <https://cdn2.hubspot.net/hubfs/4976390/Ebooks/English%20ebooks/The%20everything%20guide%20to%20gen%20z/the-everything-guide-to-gen-z.pdf> (accessed 16 July 2019).
- Zi-Gang G. (2019). Does mismatch between learning media and received negative effect on Academic performance? An experiment with e-learners. *Interactive Learning Environments*, 2019. DOI: 10.1080/10494820.2019.1612449 Retrieved from <https://www.tandfonline.com/doi/abs/10.1080/10494820.2019.1612449>