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FLIPPED TEACHING AND GAMIFICATION AS A CONNECTIVISTIC APPLICATION OF CYBERSPACE RESOURCES IN EDUCATION

NAUCZANIE ODWRÓCONE I GRYWALIZACJA JAKO KONEKTYWISTYCZNE ZASTOSOWANIE ZASOBÓW CYBERPRZESTRZENI W EDUKACJI

ОБРАТНОЕ ОБУЧЕНИЕ И ГАМИФИКАЦИЯ КАК КОННЕКТИВИСТСКОЕ ПРИМЕНЕНИЕ КИБЕРПРОСТРАНСТВЕННЫХ РЕСУРСОВ В ОБРАЗОВАНИИ

Abstract

The article focuses on the issue of the possibility of using cyberspace resources in education based on connectivism. The practical application of tools available in cyberspace to implement the flipped teaching method is presented. The games, educational programs and applications containing elements of gamification available in cyberspace are characterized. The issues raised in the article can be an inspiration and information for teachers, enriching their didactic workshop in the educational process.


Keywords: *teacher, student, connectivism, gamification, flipped teaching, cyberspace, education*

Streszczenie

Artykuł koncentruje się na problematyce dotyczącej możliwości wykorzystania zasobów cyberprzestrzeni w edukacji opartej na konektywiźmie. Przedstawiono praktyczne zastosowanie dostępnych w cyberprzestrzeni środków umożliwiających realizację metody odwróconego nauczania. Scharakteryzowano dostępne w cyberprzestrzeni gry, programy i aplikacje edukacyjne zawierające elementy grywalizacji. Poruszane w artykule zagadnienia mogą stanowić wartość dodaną oraz źródło inspiracji i informacji dla nauczycieli, wzbogacając ich warsztat dydaktyczny w procesie edukacyjnym.

Słowa kluczowe: *nauczyciel, uczeń, konektywizm, grywalizacja, nauczanie odwrócone, cyberprzestrzeń, edukacja*

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Аннотация

Статья посвящена вопросу использования киберпространственных ресурсов в образовании, опираясь на коннективизм. В ней представлено практическое применение доступных в киберпространстве средств для реализации «перевернутого» метода обучения. Охарактеризованы игры, образовательные программы и приложения, содержащие элементы геймификации, доступные в киберпространстве. Вопросы, поднятые в статье, могут представлять собой ценность, а также быть источником вдохновения и информации для учителей, обозначающая их дидактические ресурсы в образовательном процессе.

Ключевые слова: *учитель, ученик, коннективизм, геймификация, перевернутое обучение, киберпространство, образование*

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Statement of the problem in general outlook and its connection with important scientific and practical tasks.

With the free will, one can make both good and bad choices in life. Cyberspace is a collection of inspiring, creative and developing resources, and at the same time cyberspace is a place of many dangerous threats and harmful content. As Maciej Tanaś points out (...) Digital media have become a factor determining not only social, civilizational and cultural transformations, but also (indirectly or directly) life of almost every human being, and which is particularly important for a pedagogue - lifestyle, social relations, types of cognitive, creative and even ludic activity of children and young adults (Tanaś, 2015, p.11). Leading a teenager around the world of Internet and connected devices, the enormous value added in the education process is showing his positive sides and focusing activities in

this area on creative work, knowledge acquisition, shaping and developing new skills, as Józef Bednarek rightly states the expanding phenomenon of participation in cyberspace should be important subject of interest for teachers, pedagogues, psychologists and representatives of other disciplines dealing with upbringing, as well as representatives of other humanities, social and cybernetic sciences "(Bednarek, 2009, p. 24).

The subjects of the analysis in this article are:

1. Connectivism in teaching - learning process.
2. The use of cyberspace in the flipped teaching method
3. The educational idea of gamification through cyberspace.


Analysis of latest research where the solution of the problem was initiated.

Problems in this article is the implication of the use of the flipped lesson method and elements of gamification in digital didactics in the field of connectivism, which was initiated by Georg Siemens (Siemens, 2004,

online resource, access: 02/11/2018). Many didactic methods used in education were created on this base. The publication proposes the use of selected resources of cyberspace in the flipped teaching method,

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pioneers of which were Jonathan Bergmann and Aaron Sams (Bergman, Sams, 2012; 2014). The article also contains an overview of educational portals and applications based on the idea of gamification,

the essence and modern application of which has been updated by Kai Huotari and Juho Hamari. (Huotari, Hamari 2017).).

Aims of paper. Methods.

The flipped class method, which is the leit-motif of this article, is based on two contemporary teaching theories - constructivism and connectivism. The constructivist model assumes that the student is an active subject responsible for learning and has control over it. Student's knowledge and experience is the basis for further independent learning. The teacher plays the role of adviser and moderator of students' development. Constructs research tasks, raises questions, feeds curiosity, motivates to act and provides feedback on learning outcomes. Constructivist learning concepts have their historical roots in the works of Lva Vygotski, Jean Piaget, and Jeromy Bruner (Bruner 1961, Piaget 1980, Vygotsky 1962).

As a starting point to the theory of connectivism, created by George Siemens, is the

fact that information and communication technologies have a significant impact on people lives, the way of communication, work and learning (Siemens, 2004, online resource, access: 02.11.2018). The metaphor of teaching in connectivity is the use of technical and interpersonal networks with its various nodes and connections. Connectivism assumes that knowledge is based in internal resources, such as the Internet, social media, electronic literature, blogs and does not have to be stored in the students memory (Renda, Kuys, 2015, pp. 15-19). Skilful connection with these sources starts learning processes. The key competences in this theory are the search skills, collecting and critical interpretation of information available in external cyberspace databases.

Exposition of main material of research with complete substantiation of obtained scientific results. Discussion.

The use of cyberspace in the flipped teaching method

One of the main didactic problems for a Polish teacher is that teacher often fails to fully implement the planned material during one lesson. Limited time of classes, numerous distractors appearing during them, extensive requirements of the study program, consequently making teachers difficult to interest students about lesson subject. Focusing on the theoretical aspect of the subject, the extremely important elements of practical exercises are omitted. Students often declare that not everything from the lesson is understandable to them,

which causes students frustration and thus make teacher helpless. The use of alternative teaching methods can help to solve this problem. As part of this article, the concept of flipped teaching (which is synonymous with a flipped lesson) was analyzed,.

The flipped teaching theory is the results of many years of empirical teaching experiments conducted by American teachers Jonathan Bergmann and Aaron Sams. They described the model of the flipped lesson and the ways of its implementation in didactic reality (Bergmann, Sams 2012).

The effectiveness of this idea has been empirically confirmed in American schools as

an excellent alternative to everyday study routine. It is a strategy that allows applying additional activating methods and stimulating students to personalized development. This method finds a wide application in the implementation of humanities, mathematics, technical and natural sciences

A study conducted among 450 teachers by the portal Classroom Window showed that teachers who used Flipped Learning noticed better results and attitudes of students and higher job satisfaction. 66% of the surveyed teachers, said that the standard test results increased after the introduction of this method. Eight out of 10 people saw an improvement in students' attitudes towards learning. Almost 90% reported improvement in their own job satisfaction, and 46% of respondents described it as significant (online resource (a), access: 28/10/2018).

Other surveys conducted among students and teachers in the 2012 confirmed that nearly 80% of students experienced more frequent and positive interactions with teachers and other students, thanks to the flipped class method. 79% of students have more opportunities to work at their own pace. 70% of students have become more prone to critical thinking and problem solving. All 26 surveyed teachers agreed that since they "flipped" their classes, teaching became more interactive. The surveyed students said they had more access to training materials and instructions; they have become more inclined to teamwork and making decisions in the team; they have more opportunities to present the effects of their learning and more often perceive learning as an active process (online resource (b), access: 21/10/2018).

Parents of fifth-grade math students who participated in a flipped-class pilot project at one of the Minnesota state schools found that their children became better at math and wanted the flipped method to continue (online resource (c), access: 28/10/2018).

Educational benefits from introduction of the flipped class method:

1. Breaking the mood of school routine.
 2. Lessons available online, let students to repeat material as much as students need.
 3. Improving students' skills of self-education.
 4. Enabling the adaptation of the learning process to the individual learning pace.
 5. Activating and stimulating personalized educational development.
 6. Improving regularity and a sense of responsibility in the students' self-preparation for the lesson.
 7. Didactic materials can be used remotely by students who cannot attend lesson.
 8. Flipped lessons enable students to learn at the most convenient time and place, not only in a school building in a traditional form.
 9. Flipped lesson creates an educational bridge between learning taking place at school and outside of it.
 10. The teacher gains the opportunity to individualize the teaching process and the time to conduct practical exercises, experiments and workshops with students.
 11. Lessons designed in the network may be an element of preparing students for a test or project.
 12. Opportunity to carry out experiments in natural sciences (augmented reality) impossible to implement at school due to technical barriers.
 13. Parents receive a better insight into the work of the teacher and children
- Flipped teaching breaks the stereotype of traditional transmission teaching, in which the teacher - is the main source of information. In the flipped class methodology, students relatively sooner (up to several days), through the Internet resources and

multimedia content, can learn about the subject of the next lesson Student take the responsibility for mastering the theory and preparing for classes, taking into account their own learning pace. Then, during the school lesson, they deepen and consolidate the acquired knowledge, experimenting with new skills and solving group problem tasks coordinated by the teacher. They participate actively in class discussion; interaction with the class and teacher based on the mutual provision and reception of information and creative involvement in team work (Bergmann, Sams, 2012; Millman 2012, pp. 85-87, Tucker 2012, pp. 82-83).

The teachers role is to provide students with the necessary materials to study before the lesson; adapting the appropriate technology to the subject of the lesson and teaching conditions; arranging the cognitive character of classes allowing students to practice analyzed theoretical knowledge; provoking discussion and stimulating interaction between students; correcting and responding to questions, inaccuracies, doubts; becoming a guide facilitating and supervising the learning process; providing feedback to students through pedagogical strategies (Bergmann, Sams 2012, Bergmann, Sams 2014, pp. 24-29, Millard 2012, pp. 26-29).

Below selected portals, programs and applications that constitute the resources of cyberspace, are presented; these examples are valuable and helpful tools for teaching based implementation of the concept of flipped lessons in Polish schools:

1. Social media - Facebook, Twitter, Instagram, Youtube or Pinterest are a great means of communication between the teacher, the students and their parents. Through the Facebook, teachers can create a class fan page and post important updates on the life of the school community; inform about the tests and homework; create a

closed group dedicated to the classroom, on which the teacher publishes educational materials in the form of links to virtual lectures on YouTube, engaging students to read articles and literature connected to the lesson, and sharing files with homework assignments; send aggregate information to the class in order to inform and remind about important projects; send links to interesting educational content and provoke students' discussions. Because of available group discussion forum, students have the opportunity to support and complement themselves in learning by sharing materials on the topics they are working on, and teacher can discuss important issues before the lesson if necessary. Facebook is also integrated with the Messenger and Skype applications, which allows the teacher to communicate outside the classroom and talk to students in the form of text chat, video calls and organizing video conferences.

By using Twitter, teacher can share with students, information about discussed topics and encourage them, to follow the activity, and watch tweets of scientists, journalists, politicians related to the topics discussed on the lesson. Social network sites such as Instagram and Pinterest (for sharing visual content) are a great tool for creating group walls and share the information with students and parents; creating virtual tours, iconography, student work galleries, cataloging a class library and sharing educational content in an audiovisual form.

2. Khan Academy - a non-profit organization; main mission of Khan Academy is to enable education and high-level education for everyone and everywhere. Khan Academy website, because of its interactivity, is enabling not only passive reception of information, but above all the co-creation of the knowledge base by specialists from around the world associated with education at every level. On the Khan

Academy website there are about 10,000 mini-lectures in the form of YouTube videos; videos are concerning mathematics, history, medicine, physics, chemistry, biology, astronomy, economics and computer science. On the KhanAcademyPoPolsku channel on YouTube over 3 400 films in Polish are available, they were watched already more than 5 million times. Khan-Academy is undoubtedly irreplaceable in the individual course of lecture mastering and preparation for classes. The portal's resources are systematically growing.

3. TeacherTube - a social network dedicated to sharing audiovisual materials based on the structure of YouTube. Online videos are created and shared by teachers. The teacher can create the original material, which is a supplement to the subject of the lesson, a repetition before the test, or laboratory experience, which due to technical limitations cannot be carried out in the school classroom. These possibilities work well in the flipped lesson procedure.

4. Edmodo - a free platform, integrating students, teachers and parents, facilitating common communication and cooperation. Teachers receive access to class management, communication and e-learning tools. The platform enables creating an educational social network equipped with an e-register and a function for creating tests and quizzes online. Edmodo is a great place to create groups and micro blogging for teachers and students. They can share through it teaching materials, tasks, links, files and information about important events.

5. Kahoot - a popular web portal, also available in the form of a mobile application downloadable for free on tablets and smartphones integrated with iOS and Android systems. It allows teachers to share audiovisual materials, prepare tests, tests, quizzes and homework assignments. It provides a detailed statistical analysis of


the test conducted in the classroom, taking into account the number of views, attempts, mistakes made, the most difficult and easiest questions. It provides access to transparent feedback on learning outcomes.

6. Udemy - a mobile application and web portal, containing a big collection of online courses from international sources. It is a professional education resource in such areas as coding, design, foreign languages, music, IT and software, health and fitness or photography. Many courses posted through Udemy are free, and those that are paid are often offered at affordable prices. The application is not available in Polish language.

7. Explain Everything - an educational application for creating presentations, uploading movies and photos, drawing, and taking notes. It has many pragmatic didactic applications for teacher's cooperation with students. It works perfectly at the stage of repeating material before tests. Teacher on the flipped lesson, recommends students working with textbook at home. When student finds content hard to understand, which may appear on the exam, marks it, takes a picture and upload it on the application. Using the program's functions, students can edit a picture, draw on it, highlight words or entire sentences with different colors, cut out fragments, rearrange them, paste them in other places, sign pictures or add text. In this way, students can not only better master and repeat problematic content but also give a information to the teacher about the effects of their work or complications resulting from it. Through social media, they can send back an image edited in Explain Everything with fragments of content that are difficult, requiring a teacher to discuss it more closely in the lesson.

8. iMathematics - a useful application for smartphones and tablets, supporting the teaching and educational process to

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be used during lessons and by students individually. It contains a compendium of knowledge, useful formulas, definitions and theories from many different fields of mathematics, ie arithmetic, algebra and geometry. The whole is completed by a large number of quizzes, thanks to which student can quickly and easily verify knowledge. The application is adapted to all levels of mathematics teaching in Polish schools.

9. Storyboard - an interesting web application for creating interactive comics. Works well in the study of humanities and literature analysis. Students can do their homework, or prepare scenarios for lessons, in a computer lab or on tablets. By creating a story, students can repeat the material or selected fragment of literature discussed during a lesson.

The educational idea of gamification through cyberspace

The expansion of computerization, information and communication systems and new technologies in life, affirms the popularization of the implementation of modern methods and ways to support its activities in the social, individual and professional areas. In recent years, more and more interest has been placed in the concepts used to strengthen human motivation for various activities undertaken by him. One of these concepts is the idea of gamification. (Hutari, Hamari 2017, pp. 21-31; Robson, Plangger, Kietzmann, McCarthy, Pitt 2016, pp. 29-36).

The essence of gamification is motivating and activating people to act through the mechanisms found in games. This allows you to identify yourself with the hero of the game located in the world of real challenges - social, professional, educational and many others.

Gamification has big potential in the field of education. It helps not only to improve existing skills, but also to gain new and constantly develop. By maintaining a high

level of motivation, gamification significantly facilitates learning. Game-based education in confrontation with traditional education is more cost-effective, has a greater involvement of students and helps to adjust the pace of work to individual preferences. It allows immediate feedback and a simpler and more enjoyable transfer of knowledge

Cyberspace provides a wide range of opportunities, adequate to the implementation of the concept of gamification in the field of education. Opportunities relate to the use of computer games, web portals and mobile applications based on elements of game mechanics such as: rivalry, tasks and challenges, rankings, level acquisition, points (virtual currency for completed tasks), score tables and a system of bonuses and rewards, a communication system between participants - forums, e-mails, chats (supporting the building of social network between participants), cooperation to achieve a common goal, reward systems, raising the status of particular player in the ranking. Probably in the coming years, gamification will be one of the leading trends in the world of education. The author's intention in this part of the publication is to discuss selected tools helpful in applying the gamification in Polish schools:

1. Brainly.pl - an international, educational web portal available in 12 language versions. The website is based on the question & answers platform, which allows student help each other with solving problems concerning all school subjects, both the level of primary and secondary education. Users mutually solve the tasks, problems, tests, uploaded by other members of the website. Students can search for information, and receiving points, which are kind of web currency. If student wants ask a question, he has to use his points. A user who asks other users to solve a task or

search for a definition must choose the number of points devoted to it. The more point student sacrifices, the bigger is a chance that someone will quickly answer the question. Earning points and ranking of the most competent users who provide the best advice are the key elements of gamification. This system motivates students to engage in the study subject which are hard to them, or which are less interesting and then share the knowledge with others students in need. In this way they win virtual currency and higher positions in the ranking.

2. Squla - a modern platform that offers interactive games, quizzes and educational films encouraging independent and systematic learning. Squla offers a collection of over 60,000 educational games, quizzes, interactive games, designed for early school education, based on the educational program of the subjects being carried out. Participation in games and competitions, and the achievement of positive results in them is rewarded with virtual coins. After converting the acquired knowledge and skills into collected coins, platform users can exchange coins for attractive and real rewards through this platform. The reward system, as an element of gamification, motivates the student to achieve the best results, which can be achieved through systematic work and effective learning..

3. Duolingo - a free website for learning 27 foreign languages based on the gamification system. It is also available as a mobile application for users of mobile devices, which allows the education to be adjusted to the comfortable for student location and time. Course participants receive daily tasks to be solved, every student individually setting the goal, level of proficiency and time of learning. Through modules and tests, student learns new vocabulary and grammar rules. Achievements are

remembered in the user's profile. The effectiveness of Duolingo has been confirmed by many independent studies. The website has a virtual currency "lingot", by which course participants can buy, for example, additional language lessons or tests. Lingots can be earned only by actively participating in the course and by solving its subsequent modules. The website allows teachers to create virtual classes.

4. Pisupisu.pl - a friendly portal designed to learn the alphabet, writing, grammar and using the Polish language through play. The website includes educational games, adapted to the pace of development of pre-schools students as well as grades 1-6 of the elementary school. It is adapted for independent use by children with the support of a parent or moderator of the site. One of the portal attractions are quizzes with prizes.

5. Matematyczne Zoo (Mathematical Zoo) - a service designed for primary school students in order to develop mathematical skills, launched on behalf of the Foundation for Mathematical Education. In a colorful graphic setting, hundreds of practical exercises, tasks and materials divided into classes are included, based on currently use in schools mathematic program. Users participating in quizzes earn points for correctly solved tasks, establishing their own records by repeatedly solving exercises. Records are compiled in the ranking. In order to improve ranking position, the student motivates himself to deepen his mathematical knowledge and practical skills.

6. CodeCombats - a game designed to learn programming. Coding and programming in Javascript and Python have been combined with the typical gameplay and mechanics of the fantasy RPG. The characters controlled by the student gain experience levels, new items, valuable crystals, defeat opponents and perform

missions that give bonuses. In order to develop character and move to the next stages, the player must complement the next lines of code, by programming the hero's actions. The game is available in the Polish language version and offers various missions, levels and virtual worlds suitable for primary and secondary school students, enabling the rate of acquired programming skills to be adjusted to the student's intellectual predispositions. In addition, CodeCombats also provides courses on creating websites using HTML, CSS, jQuery, and Bootstrap.

Conclusions.

Education is an important and complex socio-economic factor of every country. Countries whose education can quickly adapt their offer to the requirements of the continuously changing labor market and the challenges of the modern world, are countries with the fastest and most dynamically developing global economies. The development of education is an important goal of the policy of Poland and the European Union as a whole (Dahl M., Gwoździewicz S.). Flipped teaching and gamification as a connectivistic use of cyberspace resources in education is gaining

7. Voki - useful application available for mobile devices, developing creative competences of students in the field of literature, history and culture. The program allows student to create virtual avatars. Using the application for educational purposes, for example, in Polish or history lessons, we can encourage students to translate the studied knowledge of literary heroes or biographies of important historical figures into a fun interactive adventure with the participation of computer avatars.

more and more popularity in Western countries. However, these didactic methods are poorly applied in the realities of Polish education. Internet portals, interactive applications, mobile applications and educational games presented in the article are only a selective fragment of tools available on the market that support the idea of flipped teaching and gamification. It should be emphasized that the teacher is the initiator of these didactic methods and his creativity and knowledge are indicators of the effective application of these concepts in teaching.

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