



THE USE OF PORTALS AND LEARNING ENVIRONMENTS IN NON-ACADEMIC TEACHING

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***Abstract:** Preparation of future teachers for the efficient use of technologies and their inclusion into the teaching process is one of the major educational objectives in the pedagogical field. The aim of the article was to evaluate the use of portals and educational environments in non-academic teaching. In particular, the research focused on the level and purposes of the use and utility of these types of tools in school education. The article presents the results of a pilot study conducted among second and third year students of Mathematics and Computer Science Teaching at the Faculty of Mathematics and Computer Science, Adam Mickiewicz University in Poznan (AMU) and among experienced teachers. Research shows that teachers are increasingly willing to use IT tools to support teaching, but their knowledge of portals and ready-to-use learning environments is minimal.*

Keywords: learning portals, learning environments, ICT competences, teaching

INTRODUCTION

The development of technology has introduced many changes into the educational field. Although still popular, the traditional classroom with a blackboard and chalk is slowly becoming a thing of the past. School workrooms are now equipped with laptops, projectors, interactive boards, electronic textbooks and access to the Internet. Such are the requirements of the new educational standards and of the new generations of students growing up with the latest technologies. The next step are the integrated educational communities that are still associated only with distant education. They create an educational and communicative space that supports the development of both social competences and individualized

education. (Jukes, McCain, Crockett 2010; Kivunja 2014; Prensky 2010: 98-109).

1. LEARNING ENVIRONMENTS

1.1 Educational portals

An example of such environments are educational portals equipped with synchronous (chat, video conferencing) and asynchronous (e-mail, forum) communication tools (Kołodziejczak, Roszak, Ren-Kurc, Kowalewski, Półjanowicz 2015) that have mechanisms for creating and supervising project groups and tools for co-creation of educational content (Kołodziejczak, Roszak, Kowalewski, Ren-Kurc 2014). The built-in functionality of these applications allows evaluation of students' knowledge and the teaching process. It is also possible to track students' progress and provide feedback (Kołodziejczak, Roszak, Ren-Kurc, Kowalewski, Bręborowicz 2016). Besides, the possibility of adding simple educational games and a system of badges make the portals a tool of gamification (Krasnova, Cewińska 2014; Lee, Hammer 2011). Common access to the Internet allows free access to the portals not only in the school building but also outside. Attractive materials supplementing the content provided during the lesson, a system of tips and hints for homework, the ability to check knowledge before the test are just some of the uses of portals after lessons. As can be seen, the only limit is the teacher's imagination. In addition, platform hosts (e.g. Moodle) offer additional functionalities exclusively for schools, such as the printing of diplomas, an electronic diary and automated creation of schedules (An e-learning platform for schools).

1.2 Google Classroom environment

A tool for creating an educational environment that is easier to use both for the teacher and the student is Google Classroom – a free Google service for schools, colleges, non-profit organizations and individual users with a Google account (Manage teaching and learning with Classroom). Google Classroom allows the teacher to create virtual classes that reflect real-life classes, project groups or other teamwork depending on the need. Classes are built in a so-called stream that operates as an information board on which it is possible to create questions, post announcements and assignments that can be sent out, commented and evaluated by the teacher also in real time (Figure 1). The stream of classes also acts as a communicator between participants – the teachers and students. In addition, Google Classroom works with other Google services, such as Documents, Calendar, Gmail and Google Drive. An interesting option of this tool is the ability to add a "guardian" for each student individually. This functionality is created to enable parents to follow their child's progress on a regular basis. After confirming the invitation the parents will receive information about missed and upcoming assignments and the child's activity during the classes sent to their email address.

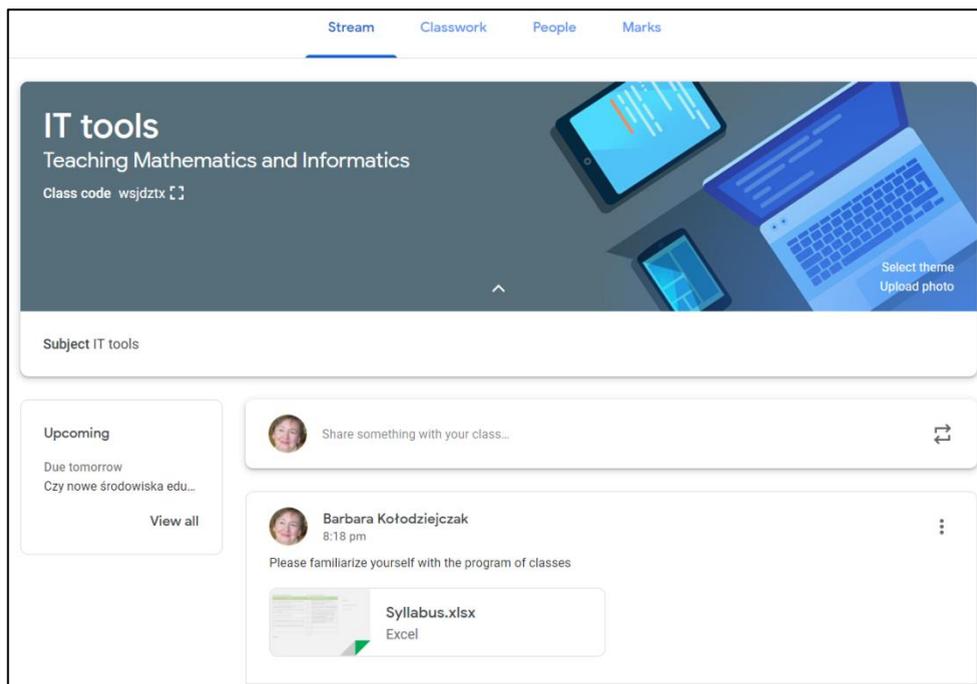


Figure 1. Classes in the Google Classroom environment

Source: Own work

1.3 Microsoft Teams environment

A similar, although slightly more extensive service, called Microsoft Teams is offered by Microsoft for Office subscribers (Microsoft Teams). This service was originally aimed at businesses, however, it is now also available with educational Office licenses (Tools for limitless learning). Access to MS Teams is possible through a Web browser, desktop or mobile application. The educational service offers the possibility of creating classes (app Teams), communicating using chat, audio and video conferencing (app Chat), managing private and shared MS Teams files (app Files), scheduling meetings (app Meetings), tracking changes in all groups, forums and other user activities (app Activity) and managing the assessed tasks (app Assignments for teachers).

The user community of MS Teams is divided into groups in which channels can be added. Their number and purpose depends on the needs. For example, channels can be created within a class for interest or design groups, or the teacher can create thematic channels within the subject taught, e.g. geometry or algebra. Teams and channels have their own work area equipped with three standard tools (available in separate bookmarks): *Conversations*, *Files* and *Notes*. *Conversation* is a forum type of group members with the possibility of sharing documents, multimedia and audio and video conferencing (Figure 2). *Files* is a repository of files shared by team members in a given channel. *Notes* is a place for notes,

attachments, links and audio-video files shared by students and teachers. The addition of other tools depends on the teacher or student's needs. In the General channel, which is obligatory for each team, the *Assignments* tool is available to build rated tasks and to send feedback to the student. After publication the assignment will be made available to students on a specific date and time as an element of the Conversation stream (Microsoft Teams for Education training videos and resources).

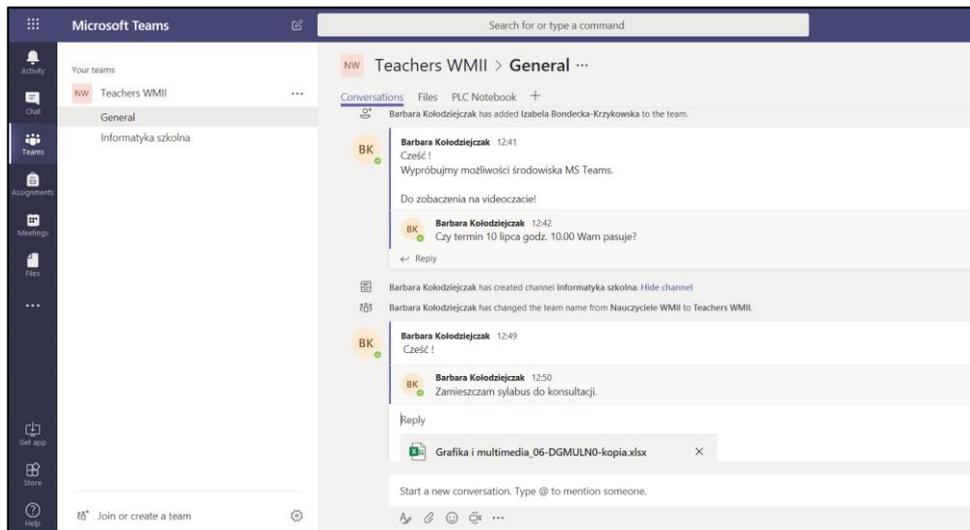


Figure 2. Classes in the Microsoft Teams environment

Source: Own work

The above-mentioned educational environments, although multifunctional and conducive to making creative and individualized learning conditions, have the undoubted disadvantage that they require higher competences from teachers and impose additional costs on the school for the development of an IT infrastructure, employing an administrator or paying for a license. It seems that these are barriers that will long prevent the implementation of these modern solutions into non-academic education. This is confirmed by the results of pilot studies conducted among school-teachers from the Wielkopolskie (Greater Poland) voivodeship and neighboring voivodeships.

2. THE CORE CURRICULUM AND MODERN TECHNOLOGIES

The core curriculum of general education in 2017 (Regulation of the Minister of National Education) clearly states: “The school should create conditions for students to acquire knowledge and skills needed to solve problems using methods and techniques derived from computer science, including logical and algorithmic thinking, programming, use of computer applications, searching for and using information from various sources, using a computer and basic digital

devices, and applying these skills in activities from various subjects.” (The core curriculum for primary schools , The core curriculum for secondary schools).

An important component of school education is the acquisition of social competences, such as communication and collaboration in a group, and the development of entrepreneurship and creativity skills in students through the participation and management of team or individual projects. For project implementation, information and communication technologies (ICT) should be used. The core curriculum also guarantees “...individual support for each student's development, according to their needs and capabilities.” (The core curriculum for secondary schools)

The educational objectives included in the core curriculum impose on the school the obligation to create conditions for their implementation by providing an IT infrastructure and the obligation to upgrade the ICT competences of the teaching staff (Smyrnova-Trybulska 2018). Teacher training is carried out as part of postgraduate studies preparing for teaching a second subject and various types of projects financed by local governments and European Funds, such as the project of the city of Poznań "Uczeń z pasją" (A Student with Passion). During the studies, young teachers should be equipped with substantive knowledge and professional competences that will enable them to meet the requirements set by the new core curriculum.

Are teachers with many years of experience and those who are just starting their teaching career prepared to use the latest technologies? Do they have knowledge and competences to build and use educational environments conducive to developing pupils' independence and creativity and enabling individualized teaching? To what extent do the study programmes include the acquisition of such knowledge and competences? The author tried to find the answer to these questions by conducting pilot studies among active teachers and students of mathematics and computer science.

3. ANALYSIS OF RESEARCH RESULTS

3.1 Research goals

The overall goal of the research was to diagnose the use of portals and educational environments in school education.

The detailed objectives of the research among teachers included such aspects as:

- whether schools have educational or social portals or websites,
- for what purposes they are used by the school,
- whether, and to what extent, teachers use them and

- according to the respondents, which portals, educational environments, social networks or educational websites would be worth implementing in the school in which they work.

With regard to students of the teaching faculty, the research was aimed to:

- diagnose the level of knowledge and skills needed to use the portals or the educational environment in the work of a teacher and educator,
- examination of the opinion on the usefulness of these types of tools in school education,
- to examine opinions on the degree of time-consumption and level of IT knowledge necessary to use these tools, and
- indicating by them, tools or applications for which they would need to complete their education in order to be well prepared for the role of teacher and educator.

3.2 Participants

The questionnaires were filled in by 14 teachers of postgraduate studies of mathematics and computer science – the participants of the project “Uczeń z pasją”. They were experienced teachers of various specialties from primary schools, mainly in the Wielkopolskie and Lubuskie voivodeships. Their average working time in the teaching profession was 18 years (range: 4 – 36 years).

The second tested group was composed of second and third year undergraduate students of Mathematics and Computer Science at the Faculty of Mathematics and Computer Science (FMCS) of UAM. The survey was attended by 18 second-year students and 15 third-year students, of whom 6 have already taken a job as a teacher. Average work time in this group was 11 months (range: 3 months – 2 years).

3.3 Data collection and analysis

The survey was conducted using an anonymous survey consisting of multiple, single choice and open questions. The survey questions were divided into two parts: the first part was addressed to active teachers, the second to students. Students who had already taken a teaching job, filled in both parts.

The data were analyzed using the Fisher's Exact Test and Mann-Whitney U Test. Calculations were carried out at statistical significance $\alpha=0.05$ in STATISTICA v.12.0 from StatSoft. Inc. (Tulsa, USA).

3.4 Analysis of results in the group of teachers

From the 20 schools whose teachers took part in the survey, 15 (75%) indicated the use of an internet application: 14 (70%) schools had their own website, and 10 (50%) had a profile on the Facebook social networking site.

None of the schools had its own educational portal or educational environment. The websites or profiles on the portal are used to promote the school and less frequently to communicate with parents and students. Only in 3 cases out of 15 were they also used for educational purposes. A detailed distribution of answers is presented in Table 1.

Table 1.

The manner of using the portal, social network service or school website.

For what purposes are the portal, social network, educational environment or website at your school used?	Number of schools n=15
for school promotion (news, galleries, school information, etc.)	15 (100%)
to communicate with students and parents	9 (60%)
to provide students with educational materials during the lesson	1 (7%)
to provide students with additional materials for independent work outside the classroom	2 (14%)
for testing students' knowledge	0 (0%)

Source: Own work

Only every third teacher often used the school's own website or profile on a social network. The others used it rarely or sporadically. Most often, teachers communicate with students and parents. Only every fifth teacher passed knowledge through this channel. A detailed breakdown of teachers' answers is given in Table 2.

Table 2.

The most common way teachers used the portal, social network site or school website.

Choose the most frequently used way of using the portal, social networking site, educational environment or website in your school.	Number of teachers n=15
I communicate with students and parents (organizational and educational matters)	9 (60%)
I use it to pass on knowledge during lessons	3 (20%)
It is used by the students outside the classroom to work independently (educational purpose)	3 (20%)

I use it to check students' knowledge	0 (0%)
I lead a special interest group	3 (20%)
I add photo reports, reports on outings and school trips	3 (20%)

Source: Own work

Three out of five teachers whose schools did not have any of the mentioned internet applications, indicated that it would be worth having a Moodle educational portal at school to pass on knowledge during the lesson, for the student's independent work outside the lesson, to test the students and conduct special interest groups. One of the teachers thought these types of applications such as Internet portals, services and websites are unnecessary in school education.

3.5 Analysis of results in the group of students

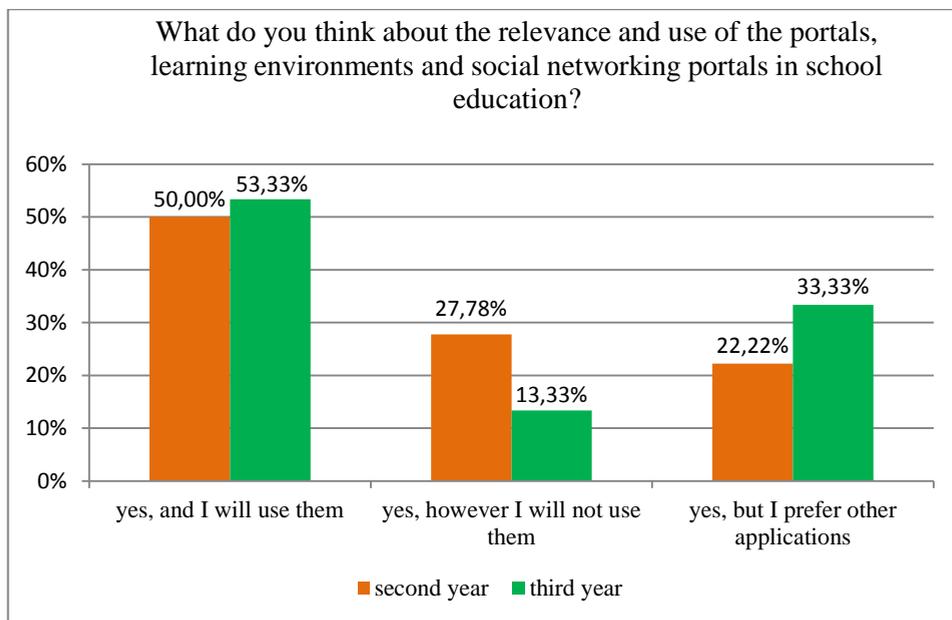


Figure 3. Distribution of answers to the question about the relevance and use of the portals, learning environments and social networking portals in school education

Source: Own work

Most students declared they were familiar with open-source educational portals such as Moodle (21 out of 33) and Online Learning And Training (31 out of 33), because at FMCS they are used by lecturers to support classes. On the other hand, their knowledge of educational environments such as Google Classroom (4 students) or Microsoft Teams (3 students) was minimal. The students strongly

agreed regarding the usefulness of portals, educational environments and the use of social networking portals in education (100%), and there was no significant difference between students of the second and third years of studies ($p = 0.593$, Fisher's Exact test). However, only half of the students declared that they would use them in practice. The distribution of answers to the question is illustrated in Figure 3.

Students asked about the time-consumption and the level of IT competences necessary to use the portals and educational environments stated that it is time-consuming, however it brings a lot of satisfaction to the teacher and students (55%) and does not require high IT competences. It should be remembered that this is the opinion of students who have IT preparation to the extent necessary to teach computer science in primary school. Students in the third year have a higher awareness of the benefits of using educational environments (67% vs. 44%), but they also are aware of the increased amount of time and work needed to prepare materials for students (40% vs. 28%). However, no significant dependencies were found between the year of study and the answers provided. Detailed results are presented in Table 3.

Table 3.

Evaluation of time-consuming and level of IT competences necessary to use the websites and educational environments

The use of portals, educational environments and social networks in the educational process is:	Second year n=18	Third year n=15	p value*
simple and requires little time	3 (17%)	1 (7%)	0.607
simple and does not require extensive IT skills	10 (56%)	7 (47%)	0.732
time-consuming, but the benefits of use bring much satisfaction to students and the teacher	8 (44%)	10 (67%)	0.296
time-consuming to learn about the possibilities of the environment	6 (33%)	4 (27%)	0.722
time-consuming to prepare materials	5 (28%)	6 (40%)	0.488
necessary to have IT knowledge and skills that go beyond the capabilities of the average teacher	2 (11%)	2 (13%)	1

* Fisher's Exact Test

Source: Own work

One of the survey questions concerned the degree of preparation (on a scale of 1–5, where 1 meant "definitely not" and 5 "definitely yes") to use the possibilities of current technologies in the work of a mathematics and computer science teacher. The responses of students in both groups ranged from 2 to 5. Students of the third year were definitely more confident ($p=0.011$, Mann-Whitney U Test) confident in their preparation ($Me=4$, $IQR=3-5$) than students of the second year ($Me=3$, $IQR=2-4$). When asked which tools or applications they would use to expand their own education, students often mentioned the Moodle portal, the Google Classroom educational environment and the GeoGebra application.

3.6 Limitations

The research was conducted on a group of students and teachers in the academic year of 2018/19. In order to increase the representativeness of the results, the study should be continued in the following academic years by expanding the group of students to include student teachers of other specialties.

3.7 Discussion

In most primary and secondary schools there is still a lack of support for teaching through portals or environments dedicated to education. Schools often have internet websites or profiles on social networks and use them to promote the school and for the purpose of keeping in contact with parents. Teachers rarely use them, and if so, for organizational rather than educational purposes. Teachers' ICT competences are still at an average level, and their heavy workload is not conducive to self-education. Therefore, rather than portals or educational environments, ready-made materials offered by publishing houses, such as Gdańskie Wydawnictwo Oświatowe (https://gwo.pl/strony/2732/seo_link:dla-nauczyciela), Nowa Era (<https://sklep.nowaera.pl/category/multimedia>) or thematic websites (e.g. Megamatma, <https://www.megamatma.pl/>) are more popular. There are commercial companies on the Polish market that offer schools integrated education and educational environments, combining educational functions with the management of the institution (support of the school office, library, arranging timetables, printing school diplomas) and platforms with a built-in school register as well as tools for creating interactive assignments for pupils (Librus, Learnetic). They even compete with the free educational environments.

Students in the field of mathematics and computer science at the Faculty of Mathematics and Computer Science, Adam Mickiewicz University in Poznan were aware of and recognized the usefulness of educational and social portals, although only about half plan to use them in their professional work. Knowledge of learning environments like Google Classroom was rare. Only a few students were of the opinion that the use of portals and educational environments is difficult and requires knowledge and IT skills beyond the capabilities of the average teacher. The vast majority were aware that both the creation of materials and the use of portals and educational environments is time-consuming, although they can be satisfactory for both the student and teacher.

About 20% -30% of students declared that they prefer to use applications to quickly build educational materials and verify knowledge, such as the LearningApps, GeoGebra, Kahoot, Quizizz or Plickers. Research shows that the young generation of teachers of mathematics and computer science is not afraid to use new technologies and they select tools to minimize the time spent in the preparation of lessons. Therefore, that is why they do not always place importance on moving education into educational environments, which they consider to be time-consuming.

CONCLUSIONS

Subsequent reforms of education in Poland have changed not only the content, but also the methods of education, adjusting them to European standards and the changing technological possibilities. Goals posed by the current school core curriculum include raising students' social skills, developing their entrepreneurship and creativity and employing individualized teaching in order to adapt it to the needs and abilities of the individual students. This creates conditions for the implementation of educational environments at schools, which will efficiently support the implementation of these goals. On the basis of the pilot studies, it can be said that most primary schools do not currently have such an environment, and changes in this area must be preceded by raising teachers' ICT competence. It is also important to equip new generations of teachers with the knowledge and skills in freely selecting educational tools. Negligence in this area will exclude from the education process the possibilities offered by current technologies and consequently fall short of expectations of students who will seek knowledge and support on the Internet.

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