

ENSURING QUALITY IN THE CLASSROOM: EVALUATING TECHNOLOGY ENHANCED LEARNING

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***Abstract:** Web 2.0 and 3.0 tools can be incredibly successful in teaching and learning at the tertiary level when they are used to support traditional in-class activities. Providing students with the chance to use technologies pervasive in their non-academic lives can result in better educational outcomes. Technology-enhanced programmes can also better prepare students for self-directed lifelong learning that will enlarge their opportunities in their future workplace. Thus, it can be assumed that designing academic classes not only around participants' preferences, needs and interests, but also around useful technologies will improve the quality of education. The ideas presented above will be supported by students' opinions and attitudes expressed in surveys.*

Keywords: web-enhanced learning, Web 2.0 tools, student-centred teaching, e-learning

INTRODUCTION

With a traditional approach to teaching through lecturing structured around teacher-centred pedagogies and formal, behaviourist tests, universities offer courses which can be perceived by 21st century students as monotonous, boring and uninteresting. Different preliminary studies show that such education is ineffective particularly in the case of learners who are accustomed to using varied sources of knowledge, and who can easily get distracted. In a world where books, papers, written documentations were the main source of learning, traditional teaching was very successful. However, over the last decades students have been exposed to an entirely different environment, rich in visual stimuli, interactive activities, and social sharing of information and knowledge. What is more, university classrooms in many countries are now populated with a large number of students, and lectures constitute the core part of many university programmes, the main reason being the lower cost of such education. Unfortunately, that means that teaching has become more impersonal and relies too much on passive transmission of knowledge, i.e.,

on presenting important ideas verbally or visually by means of slide shows. Only very few students, mostly those sitting in front rows, have the opportunity to interact with the teacher by asking simple questions, and engaging in discussions over unclear or interesting aspects. Additionally, traditional lecturing in order for it to be effective involves a high degree of concentration on the part of the participants, who have to focus their attention on the presented topic for the whole duration of the lecture, i.e., for sixty minutes or more. Recent studies have shown that average attention span seems to range from eight to ten minutes (Statistics Brain Research Institute 2015, Richardson 2010, Wilson and Korn 2007: 85–89), some present even more shocking data, claiming that it can be as low as eight seconds (National Center for Biotechnology Information 2014).

To satisfy the needs of the new generation of learners, teachers are trying to incorporate not only interesting topics into the subject curricula, but are also looking for innovative ways of structuring the learning and teaching environment. Blending face-to-face methods with e-learning technologies, i.e., Web 2.0 tools can lead to a successful outcome if the blend of approaches, activities and media is carefully thought out by course developers and tutors (Mokwa-Tarnowska 2015a).

The paper aims to show how to enhance university classes with web-based e-learning, how to create simple e-learning modules that can raise students' interest, concentration and satisfaction, and thus effectively engage them in developing their knowledge and skills; and what is more, how to prepare undergraduates to increase their professional competence by learning online (Roszak et al. 2015). The presented hypotheses are supported by survey results, observation of students' behaviour in class and during online activities, as well as comments made by students and teachers participating in web-enhanced and online programmes (Wilczyńska and Michońska-Stadnik 2010: 145-174).

1. NEW GENERATION OF STUDENTS

A number of researchers claim that young people who nowadays enrol on university courses are a new generation of learners (Jones and Shao 2011, Huang and Yang 2014: ch.1). The main reason why educators and theoreticians perceive them to be unlike their parents is that today's students have been raised in a different way. Since early childhood they have been immersed in the world of technology, which has substantially influenced the way they gain information, develop knowledge and acquire skills. Although generally they are thought to rely greatly on various Internet tools, mostly communicative and social, and to be good at multitasking, they lack the ability to concentrate while receiving highly-structured information passed on in verbal communication. Therefore, they seem to prefer active rather than passive learning (Freeman et al. 2014), e.g., task-based learning rather than lecturing.

Several different terms have been coined to refer to the new generation of learners. All of them show a change in their generational characteristics, which mostly has resulted from technological advances. First, people born between 1982 and 2004 were described by Howe and Strauss (1991, 2000, 2003) as Millennials, that is people who easily adjusted to IT technologies and who readily performed computer-based tasks. Another term first appeared in 1997. Its author Don Tapscott (1998, 1999, 2009) referred to young people, born approximately in the same period, as the Net Generation, because they had lived all their lives being surrounded by digital media. Then Marc Prensky (2001a, 2001b) named them Digital Natives. He compared them to native language speakers who did not necessarily possess the same competence, but could use their language in a natural manner. According to him young learners born in the digital world, interacting with technology at an early age, living in a media-rich environment, can use IT tools like native speakers use language: on instinct, fluently and productively. He contrasted them with digital immigrants who would never see IT technologies as natural tools. They will always have to adapt to using them no matter how professional their competence is.

The new generation is understood by the researchers to require a new learning environment. The changes brought about by the latest technological advances have had a direct impact on ways of teaching. According to Tapscott they must influence the model of pedagogy and force a change, from a 'teacher-focused approach based on instruction to a student-focused model based on collaboration' (2009: 11). This will result in higher education institutions introducing redesigned programmes, adapted to the needs of the new generation of learners. They will be more likely to do it if the teaching practice of their educators is incompatible with the students' expectations.

Today's students, with low attention span, and with the inability to self-direct their learning, exposed to IT technologies and the razzmatazz of the Internet in everyday lives, will require more guidance and more stimuli to be able to benefit from mass education offered by universities. Their teachers, mostly digital immigrants, will definitely face the challenge posed by institutional changes colleges and universities will probably have to introduce. Changing the educational environment from strictly instructive to collaboratively active, enhanced by web-technologies, may contribute to raising the quality of teaching and learning. It is worth stressing that decisions about the use of online technologies should be based on students' and teachers' understanding of their educational value, and how they could improve the learning environment. If course participants are satisfied with the way online technologies have been incorporated into university education, they are more likely to better engage in learning, which can lead to anticipated outcomes. Thus, student satisfaction can be a factor that affects the quality of the education process.

2. WEB 2.0 AND 3.0 TOOLS

A number of online tools can be used to support academic education in order to satisfy the needs, expectations, learning styles of the new generation, who seem to gather and retain information in a different way from those born before the 1980s. Even if not every student is a digital native, every one in the cohort should benefit most from the opportunities offered by the university. By adding variety to the curriculum, by creating a web-enhanced environment, educators can develop a programme that will better motivate, and thus engage, students in learning difficult professional subjects. Whether cohort members are digital natives or digital immigrants largely depends on the way they have been raised by their family or guardians, the community in which they have lived, social interactions in which they have participated and many other factors. No matter what their competence is, all students are now immersed in technologies that can improve the way they obtain knowledge and skills.

The term Web 2.0 was coined by DiNucci (1999), and then popularized by O'Reilly at the *Web 2.0 Conference* in San Francisco in 2004 (O'Reilly 2005). It refers to the new possibilities that the traditional World Wide Web offers in the second stage of its development. Originally, the interaction that took place between users and web content was quite static, which means that data which were posted on websites could be viewed and downloaded to the user's computer. Average people were simply readers, and could not add content to the Internet, only specialists possessed the necessary skills to create webpages. Over the last ten years World Wide Web has undergone a number of changes that have transferred its nature and scope.

Web 2.0 is now not only a vast source of different data, but it is also a highly interactive environment. It allows users to share information, communicate, create a multi-purpose content and collaborate. That is why, it is often referred to as user-generated web, read-write web or social web. The services it offers foster a variety of social interactions. Now users are encouraged to contribute through social networking sites such as Facebook, Twitter and LinkedIn. Their collaborative efforts to share content can be seen on social curation sites, e.g., Pinterest and Instagram. Cloud computing allows storing large quantities of data that can be accessed by users from distant locations. User-generated content, made freely available online by its developers, supports learning and teaching, both formal, non-formal and informal. These and many other services offer a range of opportunities to meet varied users' demands that are rapidly emerging in the modern world. At least some of them could be used to redevelop or support university lectures and other classes.

There are many different categorizations of Web 2.0 tools. According to Crook (2008), who takes into consideration human dispositions, they fall into four categories, some being in more than one as they serve different purposes:

- expressive tools: tools for creating, including editing and mixing, and sharing as well as for storing and publishing,
- reflective tools: tools for commenting, blogging, collaborating and social networking,
- exploratory tools: tools for social bookmarking, for delivering regularly changing web content such as news, and for tagging information,
- playful tools: tools for educational gaming and using virtual worlds.

A more comprehensive taxonomy is provided by Bower (2015), who, having identified 212 current Web 2.0 technologies, proposes 37 types arranged into 14 groups. His clusters are as follows:

- text based tools: tools for synchronous text discussion, discussion forums, note-taking and document creation,
- image based tools: tools for image sharing, image creation and editing, drawing, online whiteboarding, diagramming, mindmapping, mapping and word clouds,
- audio tools: tools for audio sharing, audio creation and editing,
- video tools: tools for video sharing, video creation and editing and video streaming,
- multimodal production tools; tools for digital pinboards, presenting, lesson authoring,
- digital storytelling tools: tools for online book and comic strip creation, animated videos,
- website creation tools: tools for creating individual websites, wikis, blogs,
- knowledge organization and sharing tools: tools for sharing files, social bookmarking, aggregating, republishing,
- data publishing tools: tools for conducting surveys, collaborative spreadsheets, infographics,
- timeline tools: tools for organising text and images according to timelines,
- 3D modelling tools: tools for designing, storing, manipulating and sharing 3D objects,
- assessment tools: tools for creating online quizzes with automatic grading and performance tracking,
- social networking systems: tools for sharing pictures, video and text and polls via personal profile pages,
- synchronous collaboration tools: tools for sharing text chats and audio and video by means of webcams via browsers.

No matter what typology one prefers, one thing is certain, Web 2.0 tools allow users to produce highly interactive, multi-purpose, multi-format content, which can be used to satisfy individual and collaborative needs.

The emergence of new technologies can cause online education to be even more versatile, and thus more useful for a redeveloped learning and teaching process. Machine-facilitated understanding of information, i.e., data-mining, artificial intelligence can at least in some fields help educators create an environment which will enhance the professional development of their students. The next step in the evolution of the Internet, called Web 3.0 or the intelligent web, can be seen in the way information about users is gathered and passed on to them. Today search engines are able to search for actual individual preferences and interests, and display a range of suitable options. As some researchers say, in the future the Web 3.0 browser will act like a personal assistant that helps to find answers to complicated questions phrased in a natural language, and provides excellent outcomes. This and other opportunities can substantially transform learning and teaching and move the classroom beyond the four walls into completely new territories.

3. STUDENTS' OPINIONS ON WEB-BASED ENHANCED CLASSES

Web 2.0 that support collaboration, communication, productivity and sharing such as image based tools, assessment tools and multimodal production tools can serve a number of purposes in a face-to-face classroom enhanced with online components. They can help in the shift from an instructivist paradigm to a constructivist one, which, among other things, changes the role of the teacher, who passes control to students in order for them to demonstrate understanding and better engagement in the learning process. Moreover, with their various functionalities, Web 2.0 tools can stimulate students' interest through learning by doing.

3.1 West college scotland

West College Scotland is a further education institution, which offers a wide range of full-time, part-time, evening and distance learning courses to accommodate the needs of its diverse learners. The college was created in 2013 from Clydebank College, Reid Kerr College in Paisley and James Watt College in Greenock. In the early 2000s Reid Kerr College in Paisley started offering a variety of e-learning courses. Since then many classes have been supplemented with top quality short e-learning modules, designed by very experienced college staff and JISC specialists. Some online courses have also been offered, including an optional course on Health and Safety at Work Regulations; and compulsory introductory courses such as Copyright Law, Online Searching, Study Skills and Touch Typing Tutor.

In 2015 the authorities conducted a survey which targeted students from the college's three campuses. The questionnaire was completed by 685 course participants, females constituted 70% and males 30%. The questions covered various topics related to technology and innovation. The respondents expressed their opinions regarding the type of equipment they would like to use in class and outside, the activities and amount of their course-work they want to be technology supported, as well the type of courses they would like to attend.

Table 1.

How important is it that you are able to do the following activities from a handheld mobile device (e.g., smartphone or tablet)?

Activity type	Not at all important	Not very important	Moderately important	Very important	Extremely important	Total
Access library resources	14.73% 90	15.22% 93	28.31% 173	22.42% 137	19.31% 118	611
Check grades	9.17% 56	8.02% 49	23.73% 145	31.75% 194	27.33% 167	611
Register for courses	7.86% 48	6.71% 41	19.31% 118	34.21% 209	31.91% 195	611
Use Moodle	11.13% 68	10.15% 62	17.68% 108	31.26% 191	29.79% 182	611
Access information about events /activities	9.66% 59	11.29% 69	27.50% 168	30.11% 184	21.44% 131	611
Communicate about class-related matters	8.51% 52	8.18% 50	16.86% 103	32.90% 201	33.55% 205	611
Look up information while in class	9.82% 60	10.64% 65	19.64% 120	30.11% 184	29.79% 182	611
Capture images of course activities	10.64% 65	14.24% 87	24.55% 150	27.33% 167	23.24% 142	611

Record audio/video of course activities	18.00% 110	20.46% 125	20.95% 128	21.44% 131	19.15% 117	611
Participate in interactive class activities	15.55% 95	14.24% 87	26.68% 163	24.55% 150	18.99% 116	611
Other	62.19% 380	8.35% 51	10.64% 65	8.51% 52	10.31% 63	611

Source: table courtesy of George Johnson, Director Technology and Innovation, West College Scotland

The analysis of the responses presented in Table 1 shows that the majority of the students would like to use technology to carry out different college activities. Depending on the type, the *Very important* and *Extremely important* answers range from 40.59% (Participate in interactive class activities) to 66.45% (Communicate about class-related matters). If the percentage of the *Moderately important* responses is added, then it can be assumed that to satisfy the needs of the WCScotland students, the college should introduce more technology-enhanced activities. The course attendants will probably benefit from incorporating the technologies they enjoy using outside the classroom into their coursework. As communication about class-related matters by means of commonly used online tools, particularly by means of social networking, was viewed as a big positive, which was also seen in responses to other questions, it may be concluded that the WCScotland students will appreciate more activities supported by collaborative tools. This hypothesis can be supported by the percentage of the respondents who regarded interactive class activities as important (70.22%).

Table 2.

What type of learning environment do you prefer?		
Activity type	Responses	
Courses with no online components	11.21%	52
Courses with some online components	62.72%	291
Courses that are completely online	5.60%	26
No preference	20.47%	95
Total		464

Source: table courtesy of George Johnson, Director Technology and Innovation, West College Scotland

Table 2 shows that technology enhanced learning appears to be popular among the respondents – more than half (68.32%) stated that they would prefer to attend courses delivered online or with an online component. This proves that the inclusion of web technology can become a decisive factor to evaluate the quality of the education offered by colleges and universities.

3.2 Gdańsk university of technology

Over the last two academic years different online components have been developed by the E-learning Team at the Language Centre of Gdansk University of Technology. Web 2.0 has been used in order to enhance the learning opportunities for students of various faculties attending regular courses in English. The aims of the shift from a traditional classroom based on coursebook activities and supplementary written exercises to a web-enhanced environment were as follows:

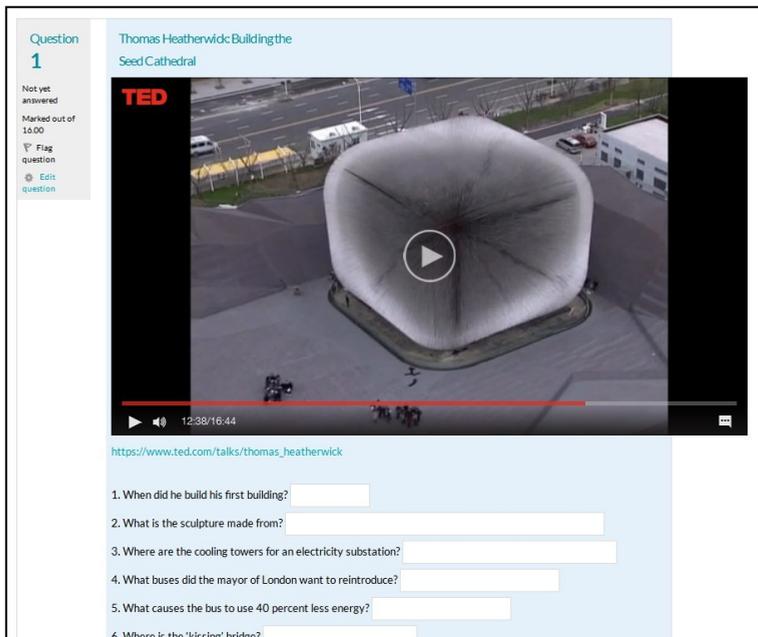
- to introduce variety into teaching and learning English for specific purposes,
- to teach students professional English in authentic context,
- to prepare attendants for blended programmes,
- to facilitate self-directed learning,
- to test potential advantages of web-enhanced classes for university education,
- to assess to what extent students can benefit from e-learning incorporated into classwork.

The survey analysis presented in this subsection attempts to investigate how the respondents perceive classes enhanced by various Web 2.0 tools. Their evaluations show whether they like working in an e-learning environment, how engaging such learning is, and whether, in their opinion, the environment can help them make better progress in technical English. The research into the nature of web-enhanced language classes at GUT and their impact on an increase in student competences is its initial stage and may include subjective results.

Different technologies have been applied to develop new activities for students of science and engineering. A variety of courses have been designed in Moodle, which is the main learning platform at Gdansk University of Technology (Fig. 1). There is an ongoing discussion whether the LMS is a Web 2.0 technology or not. If it is used only as a document repository or an information board, it is definitely not. However, if its user-centered design, collaborative, text and image based tools are taken into consideration, and if they are applied accordingly, then by definition it is.

The analysis presented in this paper is based on the questionnaires completed by the great majority of the students who attended traditional classes during the following periods:

- the second semester of the academic year 2014-2015 (276 out of 288 enrolled on the courses: 55 out of 57 students of the Faculty of Architecture, 63 out of 65 students of the Faculty of Civil and Environmental Engineering, 42 out of 43 students of the Faculty of Electronics, Telecommunications and Informatics, 23 out of 24 students of the Faculty of Electrical and Control Engineering, 25 out of 27 students of the Faculty of Applied Physics and Mathematics, 47 out of 50 students of Mechanical Engineering, and 21 out of 22 students of the Faculty of Management and Economy),
- the first semester of the academic year 2015-2016 (69 out of 73 enrolled on the courses: 24 out of 24 students of the Faculty of Architecture, 23 out of 26 students of the Faculty of Electrical and Control Engineering, and 22 out of 23 students of Informatics),
- the second semester of the academic year 2015-2016 (178 out of 185 enrolled on the courses: 23 out 25 students of the Faculty of Architecture, 67 out of 68 students of the Faculty of Civil and Environmental Engineering, 14 out of 20 students of the Faculty of Electronics, Telecommunications and Informatics, 56 out of 62 students of Mechanical Engineering, and 18 out of 22 students of the Faculty of Management and Economy).



The screenshot shows a Moodle task interface. On the left, there is a sidebar with the text 'Question 1', 'Not yet answered', 'Marked out of 10.00', 'Flag question', and 'Edit question'. The main content area features a video player with a play button in the center. The video title is 'Thomas Heatherwick: Building the Seed Cathedral' and the URL is 'https://www.ted.com/talks/thomas_heatherwick'. Below the video player, there are six numbered questions with input fields for answers:

1. When did he build his first building?
2. What is the sculpture made from?
3. Where are the cooling towers for an electricity substation?
4. What buses did the mayor of London want to reintroduce?
5. What causes the bus to use 40 percent less energy?
6. Where is the 'kissing' bridge?

Figure 1. Part of a Moodle task based on https://www.ted.com/talks/thomas_heatherwick

The majority of the respondents, who completed questionnaires in the second semester of the academic years 2014/2015 (276) and 2015/2016 (178 respondents),

stated that web-based materials with online activities based on documentaries, uploaded to Moodle, should be used in class. The answers are grouped in Table 3. The students themselves specified their preferences, no suggestions were given in the questionnaire. Almost 60% would like them to support face-to-face classes 3-4 times a semester, which means that approximately once a month an online component should be added to traditional tasks performed in class. Slightly less than a quarter would prefer to learn from them more regularly – almost twice a month. The data are similar across the semesters.

Table 3.

Frequency of web-based tasks						
How often would you like to do online activities in class?	Number of students	Percent age	Number of students	Percent age	Number of students	Percentage
	Summer 2015		Winter 2015		Summer 2016	
Every class (15 per semester)	13	4.71%	3	4.35%	10	5.62%
5–8 times per semester	58	21.01%	12	17.39%	41	23.03%
3–4 times per semester	160	57.97%	43	62.32%	106	59.55%
1–2 times per semester	38	13.77%	10	14.49%	17	9.55%
Never	7	2.54%	1	1.45%	4	2.25%

Source: Own work

Since the first semester of 2015/2016, the free learning platform Kahoot has been mainly used to increase concentration during online productions and in-class presentations (Figs. 2 and 3). Class activities in a web-enhanced classroom are structured around constructivist ideas, which means that some control over the learning process is shifted onto the learner. That is why, most of the kahoots were developed by the students. To introduce the task, the first kahoots for each group were prepared by the teacher, but they were based on students' productions. Besides their main goal, which was to increase students' concentration, all of them aimed to test peers' engagement and learning outcomes.

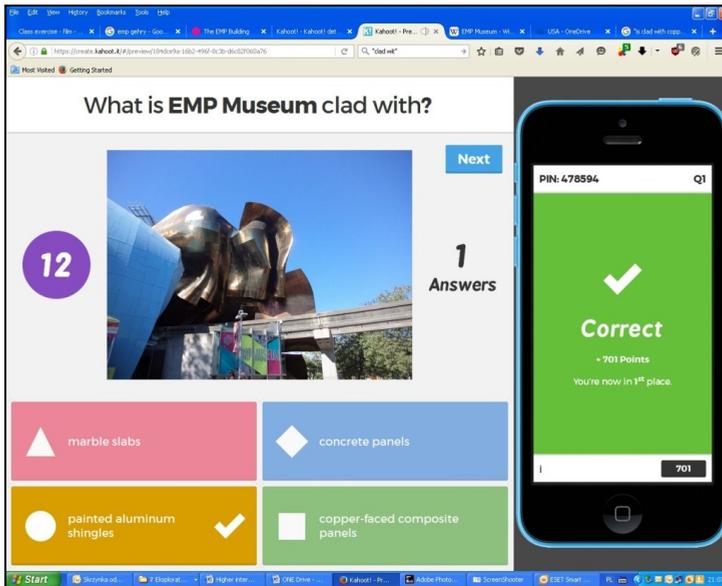


Figure 2. Kahoot: Ugly buildings – teacher-developed kahoot

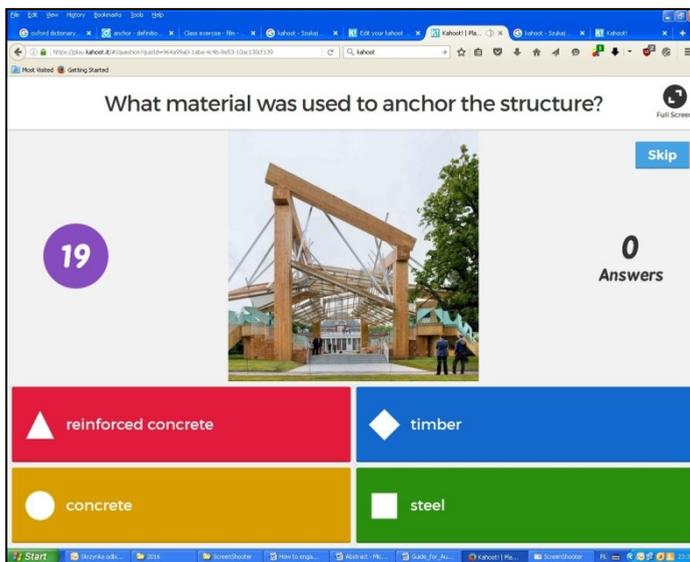


Figure 3. Kahoot: Ugly buildings – student-developed kahoot

Knowing that there was going to be a kahoot after a video task or a presentation, students admitted, both verbally during conversations in class and in the surveys, to better focus on their subject matter. I observed an increase in the students' concentration in class, which resulted in deeper engagement. My observation was later confirmed by the students' opinions expressed in the surveys. The vast majority, 70% - 80%, stated that kahoots made them concentrate and be more

active in class¹. Besides, when there was a kahoot in class, the atmosphere was more positive, friendlier and livelier.

Table 4.**Kahoots to enhance ESP face-to-face classes, academic year 2015/2016**

Do you want to do kahoots in class?	Yes (%)	Rather yes (%)	Rather no (%)	No (%)	I don't know (%)	Total number of students
Architecture	53.19	42.55	–	4.26	–	47
Civil Engineering	52.24	41.79	2.99	-	2.99	67
Electrical and Control Engineering	56.52	30.43	8.7	–	4.35	23
Informatics	27.27	27.27	18.18	4.55	22.73	22
Mechanical Engineering	48.21	32.14	5.36	12.5	1.79	56

Source: Own work

The observed popularity of kahoots can also be seen in the answers to the question about their occurrence during other faculty courses (Table 4). There is a difference in the opinions the respondents provided – approximately 90% of both Architecture, Civil Engineering, Electrical and Control Engineering, and Mechanical Engineering students often would like to do such quizzes in class. In contrast, only 54.54% of the Informatics students expressed the same attitude, the reason probably being the nature of the classes that are predominant in their specialisation. Some of the respondents from this group stated that they did not like that exercise type, because they did not feel the need to do them – they explained that most of their faculty classes were not traditional lectures but hands-on laboratory exercises and projects. Learning by doing which seems to dominate their learning process in their opinion does not require supplementing with additional web tools.

Collaborative tools like *wiki* and *Thinglink* were used to encourage students to work in groups and explore the assigned topics in depth, so they helped to develop both language and non-language skills. Tasks supported by them involved creation and recreation of knowledge, critical thinking, reflective thinking and collaborating to achieve the best possible outcome. It is also understood that classes enhanced by website creation and data publishing technologies can prepare students for the

¹ A detailed analysis of the collected data will be provided in a paper on students' concentration and engagement.

increasingly collaborative nature of tasks they will have to undertake in work context (Fig. 4).

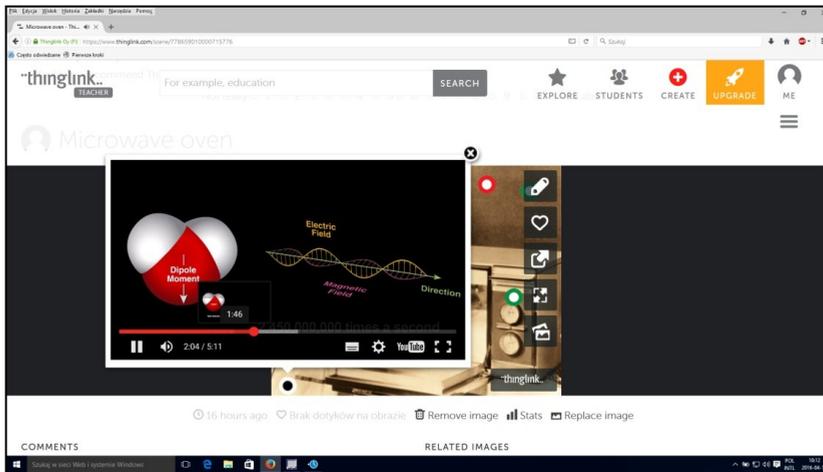


Figure 4. Interactive poster on inventions: microwave ovens – project by a group of Electronics students

The collaborative aspect of learning technical English is shown in table 5. It provides the comparison of the opinions on the use of *wiki* and *Thinglink* to support collaboration during projects. Not many students used *wiki* in my English classes in the previous academic year, and only 52 out of 86 (60%) completed the surveys. They came from the Faculty of Mechanical Engineering, the Faculty of Civil Engineering and the Faculty of Electronics, Telecommunications and Informatics. All of them, however, stated that this tool had been useful to collaborate on specifications. In the second semester of 2015/2016 two groups of students, 18 students of Electronics and 28 students of Mechanical Engineering, wrote specifications in the form of a wiki in Moodle. The questionnaires were completed by 14 students of Electronics (77%) and 27 (96.43%) students of Mechanical Engineering.

Unlike the students doing a wiki, the ones preparing interactive posters had no experience using Thinglink. Therefore, it is worth stressing that all the projects done with this tool were of excellent quality, and the follow-up presentations in class were a great success. Many students discussed the results, so engagement was higher than during traditional classes with PowerPoint presentations, where only a few students or none usually want to share their opinions.

The projects in the form of a wiki were simpler and required less time to complete. The final results were interesting, but not very complicated. All of them were prepared in a text-based format with an addition of a few drawings or pictures. The students were asked to write a specification of an existing device/appliance or of an invented one. They had to follow the example given in the coursebook as far the structure and type of information were concerned. In

contrast, those preparing an interactive poster were advised to look for data on the Internet. The subjects ranged from accidental inventions and discoveries to Business Analytic issues. Most of the students used only one tool, either *Wiki* or *Thinglink*. Thus, it is difficult to hypothesise why there were substantially more *Yes* answers from the wiki users (Wiki: 72.04% and Thinglink: 40.74%). The total of the positive answers given by both groups is very high – 94.62% and 72.59%, and the discrepancy is smaller².

Table 5.

Suitability of Wiki and Thinglink for collaborative projects

Did the e-learning environment enable preparing collaborative projects?	Wiki October 2014 – June 2015, February – May 2016	Percentage	Thinglink February – April 2016	Percentage
Yes	67	72.04%	55	40.74%
Rather yes	21	22.58%	43	31.85%
Rather no	5	5.38%	16	11.85%
No	0	0%	13	9.63%
I don't know	0	0%	8	5.93%

Source: Own work

4. FINAL REMARKS

E-learning has changed over the years and focuses now more on the best possible ways of enhancing education rather than on technology itself, which keeps changing and developing (JISC 2004). There are a number of advantages of using web-enhanced materials in class and outside it. Tools for their creation allow for personalisation, collaboration and knowledge sharing, to name the most important activities. Moreover, because of their nature, they provide various ways of engaging students in learning tasks, thus increasing their interest, concentration and motivation (Mokwa-Tarnowska 2015a).

Classes during which students have the opportunity to share control over the teaching process seem to be more engaging not only for the most active creators of

² More detailed comparative research will be conducted next year and its results will be published in due time. The questionnaire included also other questions concerning the suitability of *Thinglink* to learn technical English. On the basis of the input it can be stated that there is a correlation between using Web 2.0 and creating a better environment for learning technical English.

educational material but also for the whole cohort. Both profession-related content and new types of classroom activities are major factors in achieving satisfactory progress in acquiring different skills and knowledge as many researchers have found out (Krajka 2015, Mokwa-Tarnowska 2015b, Póljanowicz et. al 2015, Kalamarz 2014, Crook 2008).

An online component has to be incorporated into the syllabus in a meaningful way so as to enhance and improve the learning experience. If the combination is successful, students will willingly attend face-to-face classes supplemented with online tasks uploaded to an LMS, e.g. Moodle, and developed with Web 2.0 tools. If course participants are attracted to the environment, and feel partly in control of what is being done in class and beyond it, they will concentrate more during difficult activities. This may result in them meeting their professional needs more efficiently, which in turn will increase their satisfaction with their achievements.

The data presented above show that the majority of the respondents treated the online activities they had participated in as a valuable addition to traditional classes. The Thinglink interactive posters exhibited during the regular face-to-face meetings included a variety of information on different professional subjects. Most of them were linked to online animations, short documentaries, funny films explaining serious technical problems, and lectures on innovations. The content of each poster increased students' interest and concentration. It was easy to notice it during the follow-up discussions, which engaged more students than ever. The Kahoot quizzes increased student workload – they had to be created in advance, and added an element of gamification, which built excitement among all the participants. As a result, their engagement in learning was deeper.

There was also a noticeable increase in the language skills of the GUT students. They had an excellent command of vocabulary related to the topics covered in the online environments, which they demonstrated in discussions and mid-semester tests. The Thinglink tasks helped them prepare deeper analyses presenting multi-layered problems from different angles. Thus, they engaged them in more active learning resulting in better language profession-related competence in English. In comparison with the students who had earlier discussed similar topics in a traditional environment, structured around textbook exercises and online texts, the ones who used Thinglink and Kahoot produced more advanced sentences both in oral and written productions, and they scored higher in paper-based tests. Extensive research on an increase in language competence will be presented when more quantitative and qualitative data is collected.

There is much discussion of what quality in higher education means. At least one of the ways to assess it is to measure the learning outcomes, that is to evaluate the students' skills and competences during the whole education process. Measurable improvement in student performance can be achieved by creating a proper educational environment, in which teaching and learning techniques are effectively blended with new tools for pedagogic gain. Research into students' progress,

achievements with respect to their expectations and attitudes will certainly help educators to reach this goal.

REFERENCES

- Bower, M., 2015: *A Typology of Web 2.0 Learning Technologies*. [online] at <https://webcache.googleusercontent.com/search?q=cache:tMb4Q21kMZMJ:https://library.educause.edu/resources/2015/2/a-typology-of-web-20-learning-technologies+&cd=1&hl=en&ct=clnk&gl=us> (accessed 21 July 2016)
- Crook, Ch., 2008: *What are web 2.0 technologies, and why do they matter?* In: *Education 2.0? Designing the Web for Teaching and Learning: A Commentary by the Technology Enhanced Learning phase of the Teaching and Learning Research Programme*, eds. E. Carr et al. University of London, London, 2008, pages 6-9, [online] at <http://eprints.ioe.ac.uk/6217/> (accessed 19 July 2016)
- DiNucci, D., 1999: *Fragmented Future*, *Print* 53 (4): 32, 220-222, [online] at http://darcy.d.com/fragmented_future.pdf (accessed 21 July 2016).
- Freeman, S., et al., 2014: *Active Learning Increases Student Performance in Science, Engineering, and Mathematics*. *Proceedings of the National Academy of Sciences of the United States of America*, vol. 111 no. 23, 8410–8415, ISSN: 1091-6490
- Howe, N., and Strauss, W., 1991: *Generations: The history of America's future*. Quill, New York, 1991, pages 544, ISBN: 978-0688119126
- Howe, N., and Strauss, W., 2000: *Millennials Rising: The Next Great Generation*. Vintage Books, New York, 2000, pages 432, ISBN: 9780375707193
- Howe, N., and Strauss, W., 2003: *Millennials Go To College: Strategies for a New Generation on Campus*. Lifecourse Associates, Grat Falls, VA, pages 228, ISBN: 9780971260610
- Huang, R., Yang, J., 2014: *The Framework and Method for Understanding the New Generation of Learners*. In *The New Development of Technology Enhanced Learning*, Part of the series *Lecture Notes in Educational Technology*, eds. Huang, R., Kinshuk, Ch., Nian-Shing, Springer-Verlag, Berlin 3-25, ISBN: 1007/978-3-642-38291-8
- JISC. 2004: *Effective practice with e-learning*. JISC, Bristol, 2004, pages 56
- Jones, Ch. and Shao, B., 2011: *The Net Generation and Digital Natives: Implications for Higher Education*, A literature review commissioned by the Higher Education Academy, [online] at http://oro.open.ac.uk/30014/1/Jones_and_Shao-Final.pdf (accessed 20 July 2016)

- Kalamar, R., 2014: *Blending foreign language learning with key competences. Does e-learning do the trick? International Journal Continuing Engineering Education and Life-Long Learning*, 24(1), pages 77–95, 2014, ISSN: 1741-5055
- Krajka, J., 2015: *Analiza potrzeb w planowaniu kursów języków do celów zawodowych – o roli technologii społeczeństwa informacyjnego*. In: *Nauczanie języków obcych na potrzeby rynku pracy*, eds. M. Sowa, M. Mocarz-Kleindienst, U. Czyżewska, Wydawnictwo KUL, Lublin, 2015, pages 221-237, ISBN: 978-83-80610063-7
- Mokwa-Tarnowska, I., 2015b: *How to engage students in online learning – web-enhanced and blended ESP classes*. In *IT Tools – Good Practice of Effective Use in Education*, ed. E. Smyrnova-Trybulska, Studio Noa, Katowice, Cieszyn, 2015, pages 81–88, ISBN: 978-83-60071-82-3
- Mokwa-Tarnowska, I., 2015a: *E-learning i blended learning w nauczaniu akademickim: Zagadnienia metodyczne*. Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2015, pages 178, ISBN: 978-83-7348-613-3
- National Center for Biotechnology Information, 2014: U.S. National Library of Medicine. The Associated Press. January 1, 2014
- O'Reilly, T., 2005: *What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software*, [online] at <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html> (accessed 04 July 2016)
- Półjanowicz, W., Roszak, M., Kołodziejczak, B. and Bręborowicz, A., 2014: *An analysis of the effectiveness and quality of e-learning in medical education* In: *E-learning and Intercultural Competences Development in Different Countries, Monograph*, Edited by Eugenia Smyrnova-Trybulska, University of Silesia, Studio-Noa, Katowice-Cieszyn, 2014, pages 177-196, ISBN: 978-83-60071-76-2
- Prensky, M., 2001a: *Digital Natives, Digital Immigrants. On the Horizon*, 9 (5), 2001, 1-6, ISSN: 1074-8121 Richardson, H., 2010: *Students only have '10-minute attention span'*. News.bbc.co.uk. January, 2010. [online] at http://news.bbc.co.uk/2/hi/uk_news/education/8449307.stm (accessed 19 July 2016)
- Prensky, M., 2001b: *Digital Natives, Digital Immigrants, part 2: Do they really think differently? On the Horizon*, 9 (6), 2001, 6, ISSN: 1074-8121
- Rozsak, M. et al., 2015: *E-learning Portal Tools for Medical Education. Studies In Logic, Grammar And Rhetoric*, 43 (56), 177-193, ISSN: 2199-6059
- Statistics Brain Research Institute, 2015: *Attention Span Statistics*. [online] at <http://www.statisticbrain.com/attention-span-statistics/> (accessed 19 July 2016)

- Tapscott, D., 1998: *Growing up digital: The rise of the Net generation*. McGraw-Hill, New York, 1998, pages 336, ISBN -10: 0071347984
- Tapscott, D., 2009: *Grown up digital: How the Net generation is changing your world*. McGraw-Hill, New York, 2009, pages 384, ISBN-10: 0071508635
- Tapscott, D., 1999: *Educating the Net generation*. *Educational Leadership*, 56, 5, 1999, 6–11, ISSN: 0013-1784
- Wilczyńska W, Michońska-Stadnik A. 2010: *Metodologia badań w glotodydaktyce. Wprowadzenie*, Avalon, Kraków, 2010, pages 295, ISBN: 978-83-60448-06-9
- Wilson, K. and Korn, J. H., 2007: *Attention during lectures: Beyond ten minutes*. *Teaching of Psychology* 34, no. 2, 2007, 85–89, ISSN: 1532-8023