# SMARTer EDUCATION - PREPARING A NEW GENERATION OF UNIVERSITY AND COLLEGE TEACHERS

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***Abstract:*** *Incorporating online resources and activities into a college or university course curriculum requires educators to acquire appropriate knowledge and develop skills necessary to supervise the educational process in a smart, i.e. technologically-rich and pedagogically innovative, environment. A move towards interactive, collaborative and active learning structured around e-learning components and Internet tools involves training teachers to gain comprehensive ICT and pedagogical competencies necessary for handling new education modes. The ideas presented in the paper are supported by opinions and attitudes expressed by staff from three higher education institutions, each with a different focus on technology and technology-based career paths: Poznan University of Medical Sciences (Poland), West College Scotland (United Kingdom) and Gdańsk University of Technology (Poland) in a survey conducted in 2017 and 2018.*

**Keywords:** teachers, e-learning, online resources, web-enhanced classes, ICT and pedagogical competencies, ICT

## INTRODUCTION

Research into the character of smart, i.e. technologically-rich and pedagogically innovative, education that has been conducted over the last decade has shown that new environments supported by online tools allow creating smarter courses that better satisfy the needs of Generation Z (Kirkwood, Price 2013; Zhu1, Yu and Riezebos 2016, Smyrnova-Trybulska 2016, Smyrnova-Trybulska 2017). With the emergence of new, more interactive web-based systems, instructivist teaching is gradually being replaced with student-centred paradigms, which more effectively engage course participants in learning experiences. New ways of knowledge and skills development through multi-layered interactions between and among teachers, course participants, course content as well as course structure and various smart technologies lead to very successful outcomes both from the teacher's and students' perspective. Innovative environments structured around pedagogies that incorporate Web 2.0 technology into the educational process provide a variety of methods and tools to build mental models in a smarter, more engaging, and, as research shows, more effective way than traditional, face-to-face classrooms (Seppälä, Yajima 2017).

However, the synergy that can be gained from smart, web-based education, which is highly interactive, personalised, collaborative, adaptive and technologically rich (Tikhomirov, Dneprovskaya, Yankovskaya 2015; Zhu, Yu, Riezebos 2016), can only be attained by staff who are equipped with appropriate knowledge about instructional design and understanding of its character. To be able to work effectively, university and college teachers should possess adequate pedagogical and ICT skills to supervise the learning process in such an environment (Mokwa-Tarnowska 2015; Morze, Kuzminska, Liakh 2017a; Roszak, Kołodziejczak 2017b; Smyrnova-Trybulska 2017). They can acquire them through self-education and/or training delivered by experienced online pedagogy and ICT specialists.

The paper aims to show how post-secondary school teachers and academics who are either involved in e-learning and web-enhanced teaching or are interested in developing an online component to upgrade the curricula of their courses perceive Internet-based classes and whether they will be able to provide smart teaching. Moreover, it tends to analyse what experience they have and what types of online interactions they would like their students to get involved in. The competencies necessary for educators to develop and run a smarter online programme are also addressed.

The comparative research presented in this paper targeted staff with a varied level of ICT skills, ranging from advanced to basic, who came from Poznan University of Medical Sciences (PUMS), Gdansk University of Technology (GUT) and West College Scotland (WCS). The presented hypotheses are supported by survey results and discussions with the staff. The data were collected from June 2017 to May 2018. The research on teachers and academics' understanding of the nature of web-

based education is in its initial stage (Noskova et al. 2017a). The findings achieved so far have clearly identified a range of areas that must be targeted to make online education a successful endeavour. One of them is competencies required to provide quality online education, and another one is willingness to deliver such programmes (Mokwa-Tarnowska 2015; Roszak, Kołodziejczak, Ren-Kurc, Kowalewski 2013).

## 1. COMPETENCIES TO DEVELOP AND RUN SMARTER, WEB-ENHANCED CLASSES

Enhancing education with online technologies can be beneficial for all the stakeholders – the institution, its staff and students. It creates a wide variety of opportunities that raise the quality of teaching, which in turn improves student outcomes and adds to the college's and university's reputation and recognition. High teaching standards should address teacher attitudes, pedagogical practices and skills that can support various needs and expectations digitally-minded students have (Noskova et al 2017a).

To work efficiently in a smart, technology-rich environment, course suppliers, instructional designers and online pedagogy specialists need to have competencies necessary to supervise the learning process which by nature is different from that in a traditional setting (Roszak, Kołodziejczak, Kowalewski, Ren-Kurc 2014; Kołodziejczak, Roszak, Kowalewski, Ren-Kurc, Bręborowicz 2015). Performing specialised tasks (Morze, Kuzminska 2017; Roszak, Kołodziejczak 2017b) requires staff to be able to handle multimedia and interactive components as the majority of web-enhanced materials now contain multi-format resources and activities. Thus, not only course developers, but also teachers who want to work with online materials must have adequate ICT skills. There are a number of technological competencies needed to develop engaging courses. They include: familiarity with technologies for streamlining software developers' work and machine communication; ability to use content creation technologies, online publication methods, as well as graphics and multimedia tools; and capability of learning group management in an LMS. Without specialised knowledge and considerable experience in those areas, further-education and academic teachers will not be skilful enough to use all the functionalities of the environment in which they work to its full potential.

But not only do educators need to develop their ICT competencies, they also must improve their pedagogical skills to be able to support their students so that they can meet the course aims and objectives. The areas of special expertise involve: stimulation of students to engage in the learning process (Becker et al. 2017; O'Callaghan, Neumann, Jones, Creed 2017), hard and soft skills development supervision, knowledge and skills evaluation, understanding of affordances of Internet tools to produce pedagogically well-designed web-enhanced resources and activities, as well as creating a community of learners

(Mokwa-Tarnowska 2017a, Mokwa-Tarnowska 2017b; Noskova, Pavlova, Yakovleva 2017).

ICT and pedagogical skills are not separate competencies when it comes to developing and supervising smarter online educational environments and Internet technology-based tasks to support traditional face-to-face classes. They are interconnected and inseparable. The teachers' ability to use advanced setting options and create multimedia educational materials can result in providing students with excellent resources and collaborative opportunities within a well-functioning community of learners. There is a wide variety of engagement levels for teachers and students on an online or blended course. They increase their experiences, but to achieve synergy from such education and education that benefits all participants, teachers must possess integrated ICT and pedagogical skills (Koohang, Riley, Smith, Schreurs 2009; Krajka 2012; Allen 2016)

Even the best Web 2.0 technology supported materials from a technical point of view, prepared by highly qualified ITC specialists who can apply innovative solutions and use modern, state-of-the-art technologies, are likely to be ineffective and cause a number of problems if their creators lack expertise and experience in online pedagogy. On the one hand, this may contribute to a high drop-out rate resulting from the environment not being pedagogically supportive enough and not well supervised (Mokwa-Tarnowska 2017b). On the other hand, a lack of the teacher's proficiency in ICT may lead to students developing a negative attitude towards e-learning and web-enhanced traditional courses. Thus, instructional designers who specialise in innovative pedagogies, and who do not possess advanced technical skills, should be supported by ITC specialists who are able to develop a well-functioning environment and tailor it to the pedagogical paradigm that will meet the learners' needs and the course aims and objectives. If instructional design does not include pre-emptive or responsive tutor support, learning outcomes may not be as assumed during the preliminary development phase (Krajka 2012; Kołodziejczak, Roszak, Kowalewski, Ren-Kurc, Bręborowicz 2015; Allen 2016).

Because technology-based environments are constantly developing, a great emphasis should be placed on the continuous improvement of educators' qualifications in teaching methods and technologies most effective in e-learning, blended learning and web-enhanced learning (Kołodziejczak, Roszak, Kowalewski, Ren-Kurc, Bręborowicz 2015; Roszak, Kołodziejczak 2017b). This means that courses for university staff must target various fields of expertise, helping their attendees to upgrade their skills and develop professionally to be able to address growing and changing demands and deliver smarter education. A range of training routes, for advanced academics, intermediate users and inexperienced staff willing to become online tutors, need to emphasise good practice in education, technology and innovation. If training courses are run by experienced educators and ITC specialists, they can also help staff become

themselves self-directed learners who will be willing to continuously upgrade their skills and knowledge.

## 2. DATA COLLECTION AND ANALYSIS

***Background.*** Poznan University of Medical Sciences (PUMS, Poland) is a leading Polish medical university that employs just under 1500 academics. The university's total student enrolment is 7000 students, including nearly 1,000 international undergraduates (Centre for Medical Education in English). In 2010 the Department of Pathophysiology and the Department of Computer Science and Statistics made available an exam platform to deliver online tests in pathophysiology and started implementing e-learning in university education.

Gdańsk University of Technology (GUT, Poland) has a domestic and worldwide reputation of being a significant scientific centre. Its nine faculties give opportunities to create a superior climate for intellectual and personal growth. They provide education for more than 25000 students offering undergraduate, postgraduate and doctoral courses. The total number of academics amounts to approximately 1200.

At PUMS and GUT, blended-learning and web-supported traditional classes aim to enhance student learning experiences. Both institutions offer traditional courses supplemented by online components, their inclusion into curriculum depends on course type and faculty's involvement in online ventures.

Created in 2013 by the merger of Clydebank College, Reid Kerr College in Paisley and James Watt College in Greenock, West College Scotland (WCS, United Kingdom) is a further education institution with 30000 students and 1200 staff, which makes it one of the liveliest educational institutions in Scotland. The college promotes distance learning and extends course offer by adding web-based components developed by its experienced and devoted staff from the Technology and Innovation Unit. Microsoft has accepted West College Scotland as a Microsoft Showcase School.

***Participants.*** The quantitative research whose results are presented in this paper involved surveys carried out in June and July 2017, and May 2018. It can be assumed that the composition of the study group (n=124) is quite homogeneous with respect to many factors: intellectual capacity, interest in innovative learning and quality teaching, and teaching experience. The respondents' ICT skills necessary to develop online materials differ substantially and depend on their qualifications. At Gdańsk University of Technology (n=44) eighteen respondents are ESP teachers, twenty six academics are science and engineering degree holders. Poznan University of Medical Sciences respondents consist of professors, assistant professors, senior lecturers, and assistants, all of them are academic teachers and none of them are clinicians (n=75). West College Scotland staff are teachers (n=5).

***Statistical analysis***. The data are presented as percentages or medians, interquartile ranges (lower quartile, upper quartile), minimum and maximum values, as appropriate. For comparison of the groups, the Mann-Whitney U test was applied. The nominal data were analysed with the Chi-squared test or the Fisher-Freeman-Halton test. All the results were considered significant at $p<0.05$. Statistical analyses were performed with STATISTICA 12.0 PL (StatSoft Polska, Kraków, Poland) and StatXact 11.0 (Cytel Inc., Cambridge, MA, USA).

## 3. RESULTS AND DISCUSSION

A two-stage analysis was conducted to clarify the findings. The first one involved a comparison of all the data collected at the three targeted institutions. The second one focused on a comparative analysis of the opinions expressed by the staff from the two Polish universities – GUT, which offers courses in science, technology and business, and PUMS, whose course curricula are structured around non-technical and non-ICT subjects. The questionnaire, the same for the two universities and the college, included 15 closed-ended and 6 open-ended questions. The analysis provided below is based on the answers to 8 close-ended questions which can be divided into four categories, labelled as follows:

- TEACHING IN AN ONLINE ENVIRONMENT – online tutor or supervisor of online collaborative projects (question 5 and 13) (Table 1);
- USING ONLINE EDUCATIONAL MATERIALS – web-enhanced traditional classes and blended learning, frequency of use in post-secondary school education (question 6 and 7) (Table 2);
- USING DIFFERENT TYPES OF E-LEARNING MATERIALS – division into resources and activities and willingness to use either type (question 10 and 12) (Table 3, Figure 1);
- DEVELOPING ONLINE AND E-LEARNING EDUCATIONAL MATERIALS – online resources and activities in web-enhanced traditional classes, as well as in e-learning and blended learning (question 8, 9) (Table 4).

Answers to other questions included in the questionnaire will be further researched and discussed in a different paper.

### *3.1. Teaching in an online environment*

The analysis of the data concerning the first category related to working in an online environment has not shown any significant differences between the three educational institutions: PUMS, GUT and WCS ($p>0.05$, Table 1). The experience of the teachers from the targeted institutions as online tutors is not substantial – only 13.6%-25% of the respondents declared to possess it (question 5). Another question where similar responses were given was question 13. Only 20%-25% of

the teachers stated that they had experience being a supervisor of online collaborative projects.

**Table 1**

**Analysis of the first category (question 5 and 13)**

| Teaching in an online environment<br>**No. Question** | *CB | PUMS<br>n=75 | GUT<br>n=44 | WCS<br>n=4 | p-value |
|---|---|---|---|---|---|
| **5.** Have you ever been an online tutor? YES [%] | 3 | 17.3% | 13.6% | 25% | 0.654 |
| | 2 | | | - | 0.595 |
| **13.** Have you ever supervised online collaborative projects with your students? YES [%] | 3 | 20.0% | 22.7% | 25% | 0.923 |
| | 2 | | | - | 0.724 |

*CB=Comparison between the institutions. If p>0.05, there is no significant difference between the institutions.

*Source: Own work*

*Regardless of the character of the institution the respondents work for and the subjects they teach, it can be stated that they lack sufficient experience teaching in an online environment to be able to supervise online collaboration effectively.* In order for the staff to get prepared for such challenges, different ways to raise pedagogic competencies in teaching web-supported and e-learning classes should be provided. Legal and organizational regulations as well as appropriate IT infrastructure, which support online work, are necessary.

### *3.2. Using online educational materials*

The analysis of the data concerning the use of online and e-learning materials (questions 6 and 7) has shown significant differences between the institutions ($p<0.05$, table 2). *It indicates more frequent use of educational electronic materials at GUT (technology university) than at PUMS and WCS, where education is not structured around ICT subjects*. Almost all GUT staff use online (93.2%) and e-learning (84.1%) materials to support traditional classes, unlike at PUMS, where the figures are lower and amount to 68.5% and 42.5% respectively. In the case of e-learning materials, there are significant differences between PUMS and WCS ($p=0.013$, $p<0.05$), however, p-value is at the limit of significance (0.05), one of the reasons being a small sample size from WCS. Thus, further research should be conducted.

**Table 2**

**Analysis of the second category (question 6 and 7)**

| Using online educational materials<br>**No. Question** | CB | PUMS<br>n=73 | GUT<br>n=44 | WCS<br>n=5 | p-value | Interpretation |
|---|---|---|---|---|---|---|
| **6.** Have you ever supplemented your face-to-face classes with e-learning materials? (e.g. online course materials that students could use either inside or outside class) YES [%] | 3 | 42.5% | 84.1% | 100% | **<0.001** | Difference between PUMS vs. GUT (p<0.001),<br>PUMS vs WCS (p=0.013) |
| | 2 | | | - | **<0.001** | Difference |
| **7.** Have you ever supplemented your face-to-face classes with web-enhanced activities? (e,g, using resources available online to enhance your lesson)?<br>YES [%] | 3 | 68.5% | 93.2% | 50.0%<br>(n=4) | **0.002** | Difference between PUMS vs GUT (p=0.002),<br>GUT vs WCS (p=0.007) |
| | 2 | | | - | **0.002** | Difference |

*Source: Own work*

*The research has shown that traditional, face-to-face classes conducted by the academic and college staff, regardless of the institution's specialization, are supplemented and supported by online and e-learning materials*. Therefore, it can be concluded that the staff have the teaching potential that may inspire them to take the next step which is creating their own electronic materials and conducting full-time e-learning courses. The awareness of the value of electronic materials is important, and the research has shown that this awareness is increasing, which is related to greater knowledge about and experience in e-learning and online learning, as well as willingness to work in a smart learning environment (Noskova et al. 2017a).

### *3.3. Using different types of e-learning materials*

An online course contains resources, which are text-, picture- and/or multimedia-based pages, and activities, which involve individual and/or collaborative tasks actively engaging students in different interactions. The distinction between them is often not clear-cut – they can be interconnected to a great extent, depending on course type, aims and objectives, as well as subject matter (Conrad, Donaldson 2011; Mokwa-Tarnowska 2017b).

Having analysed the data from the third category, i.e., using different types of e-learning materials, we can notice that the higher education institutions do not significantly differ in terms of using e-learning materials developed by somebody else (p>0.05, table 3, question 10). Using such materials is becoming more

frequent, regardless of the teacher's specialization (25%-72.7%). A detailed analysis of electronic materials, divided into resources and activities, has not shown any differences between the three institutions either (question 10a and 10b). Nevertheless, it has to be stressed that a lower number of teachers declared to use online activities, 0%-38.6%, in comparison with the general results obtained after the analysis of the question 10 responses ($p<0.05$). Using resources was more popular (25%-54.6%.), and the figures are comparable with the overall response to question 10 ($p>0.05$).

**Table 3**

**Analysis of the third category (question 10 and 12)**

| Using e-learning materials<br>**No. Question** | CB | PUMS<br>n=74 | GUT<br>n=44 | WCS<br>n=4 | p-value |
|---|---|---|---|---|---|
| **10.** Have you used e-learning materials developed by somebody else? YES [%] | 3 | 58.1% | 72.7% | 25% | 0.073 |
| | 2 | | | - | 0.111 |
| **10a.** RESOURCES<br>YES [%] | 3 | 49.3%<br>n=69 | 54.6% | 25% | 0.529 |
| | 2 | | | - | 0.585 |
| **10b.** ACTIVITIES<br>YES [%] | 3 | 37.7%<br>n=69 | 38.6% | 0% | 0.410 |
| | 2 | | | - | 0.919 |
| **12.** How often do you like to use e-learning materials? Scale: 0-4 | 2 | *Me= 2 every month | Me=3 every 2-3 weeks | - | **0.005** Difference |

*Me=Median. If $p>0.05$, there is no significant difference between the institutions.

*Source: Own work*

*To generalise, regardless of the character of the institution, the teachers supplement their teaching with e-learning materials developed by somebody else. They use various resources and activities,* which enable interaction, communication and cooperation. However, a further analysis of the frequency with which they would like to use e-learning materials has shown differences between GUT and PUMS ($p<0.05$). The WCS teachers did not provide any answers.

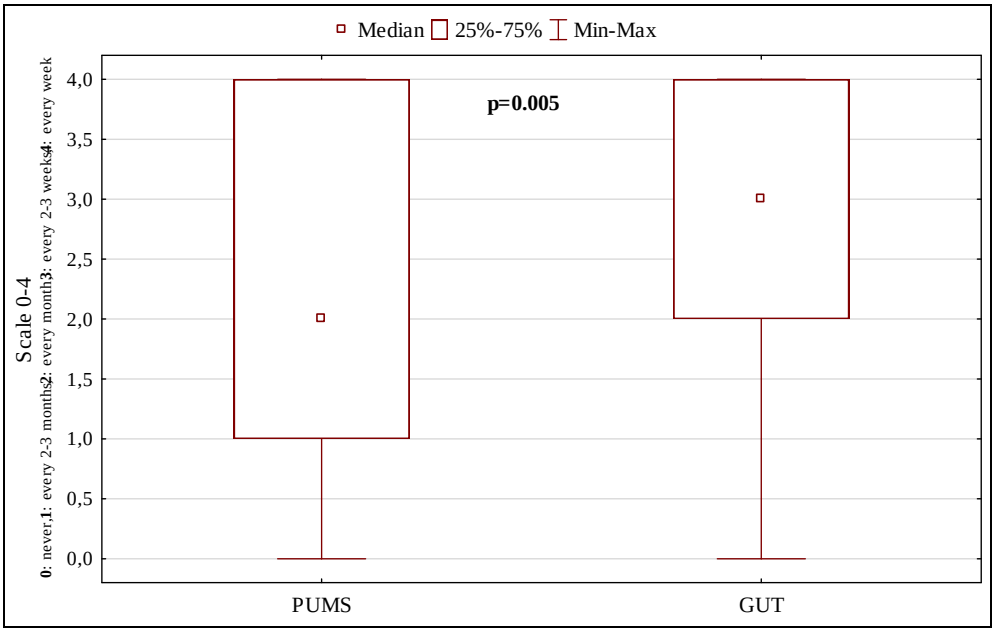


**Figure 1. Comparison of answers to question 12 between PUMS and GUT**

*Source: Own work*

*The technology university lecturers want to apply e-learning materials more often than those of non-technical and non-ICT subjects* (Figure 1). This difference may be related to a higher level of ICT competencies and willingness to use a technologically-rich environment for educational purposes in the case of the technology university versus fear of technologies in the teachers of non-ICT subjects from the non-technical institution. Regular trainings and technological support that may change such an attitude are required (Morze, Kuzminska, Liakh 2017a).

### *3.4. Developing online and e-learning educational materials*

The analysis of the data from the fourth category, i.e., developing online and e-learning educational materials (Table 4), has shown significant differences ($p<0.05$) between GUT and PUMS. In two cases (question 9a, CB=3 and question 9b), despite no differences between the institutions ($p>0.05$), p-values are at the limit of significance (0.05) and the data can show a similar trend. The percentage of GUT employees who create e-learning/online resources and activities ranges from 43.2% to 56.8%, whereas at PUMS it falls between 25.4% and 27.4%. There are no significant differences between the number of the staff from the targeted institutions who develop resources and those who create activities. The results are consistent with those obtained from the analysis of questions 6, 7 and 12, and confirm the fact that technical institutions have an advantage over other non-technical ones. Nevertheless, the number of staff creating electronic materials at GUT is relatively low.

The research has shown that the staff rarely create their own electronic materials (category 4) and more often use e-learning materials developed by other authors (question 10, category 3). Moreover, they often supplement their face-to-face classes with electronic materials (category 2). However, their goal is only to support traditional classes and not to replace them with e-learning. Therefore, the staff may not have sufficient experience to become online tutors and supervise the educational process in an e-leasrning environment (category 1). ***It can be stated that lack of high-value electronic materials is one of the factors that curb the development of e-learning and smart learning environments.***

**Table 4**

**Analysis of the fourth category (question 8, 9 – division into resources and activities)**

| Developing materials<br>**No. Question** | CB | PUMS<br>n=73 | GUT<br>n=44 | WCS<br>n=5 | p-value | Interpretation |
|---|---|---|---|---|---|---|
| **8a.** Have you developed your own e-learning materials (RESOURCES)? | 3 | 26.1% | 56.8% | 40% | **0.003** | Difference between PUMS vs GUT (p<0.001) |
| | 2 | | | - | **0.001** | Difference |
| YES [%] | | | | | | |
| **8b.** ACTIVITIES<br>YES [%] | 3 | 27.4% | 54.6% | 20% | **0.007** | Difference between PUMS vs GUT (p=0.003) |
| | 2 | | | - | **0.003** | Difference |
| **9a.** Have you developed your own web-enhanced materials (RESOURCES) to use in class? | 3 | 25.4%<br>n=71 | 45.5% | 25%<br>n=4 | 0.066 | No difference |
| | 2 | | | - | **0.026** | Difference |
| YES [%] | | | | | | |
| **9b.** ACTIVITIES<br>YES [%] | 2 | 25.4%<br>n=71 | 43.2% | 0%<br>n=4 | 0.053 | No difference |
| | 3 | | | - | **0.047** | Difference |

*Source: Own work*

The analysis of the 4th category has indicated that *the staff from the technical institution more often create their own electronic materials than those of non-ICT subjects from the non-technical ones. The respondents who create e-*

*learning/online resources also develop e-learning/online activities*, which is important for the quality of the teaching process.

*What the research has shown is that the number of employees involved in developing online or e-learning materials, regardless of the institution's specialisation, is not satisfactory*, and it should increase in the years to come. This can happen thanks to the new opportunities offered by e-learning and smarter learning environments. In order to increase this number, trainings focused on methodology of content creation (Mokwa-Tarnowska 2013; Durak, Ataizi 2016) and online pedagogy should be conducted, and teachers should be provided with IT support.

Moreover, lecturers and teachers should be financially remunerated for developing electronic materials. The process of creating smarter educational environments is time-consuming and not cost-effective in the short run (Roszak, Kołodziejczak 2017a). The learning materials must contain various types of multimedia and interactive elements (Roszak, Kołodziejczak, Ren-Kurc, Kowalewski 2013), which increases costs and working time, but it provides extraordinary potential for cost savings and effectiveness in the long run (Leszczyński, Charuta, Łaziuk, Gałązkowski, Wejnarski, Roszak, Kołodziejczak 2018). Purpose-designed educational materials guarantee better adaptation of content to meet teaching and learning needs (lower expenditures on proofreading, updating and maintenance).

In addition, online/e-learning content can be shared, which may be an incentive for educators to create multidisciplinary module-based resources of high substantive quality. This also shows that ***benefits from increasing the number of staff involved in online and e-learning content creation may be huge*** – staff will be active members of e-learning and smart learning environments, which in turn will help the institutions they work for compete with prestigious universities across Europe.

### *3.5. Summary of results*

1. Electronic materials have significant impact on the quality of learning and teaching, and using them is necessary for a new generation of specialists. Electronic materials must contain various types of resources and activities to be effective in smarter learning environments.
2. Regular teacher training and support for those who want to create electronic materials and teach online are required. A single training session on how to teach online for a person who has no experience as a participant of an e-learning course is not effective.
3. Teachers and lecturers using online/e-learning materials developed by somebody else or supplementing face-to-face classes with online/e-learning materials are a great potential for the institution they work for, which will have impact on the development of e-learning and smarter learning environments.

They are more aware of and more experienced in how to develop knowledge and skills in an online and e-learning environment.

4. Educational institutions should invest in increasing the number of staff involved in the creation of electronic educational materials, which may inspire other staff to become online tutors or supervisors of online collaborative projects.
5. Technical universities and higher education institutions have advantage over non-technical ones in terms of ICT competencies of their staff and IT infrastructure, therefore, they should be more involved in building innovative learning environments.
6. Educational institutions should increase their staff's ICT and pedagogic competencies. Working in an e-learning and smart learning environment means collaborating in multidisciplinary teams.

## CONCLUSION

Pedagogical and ICT competencies needed to develop and manage a smart, technology-enhanced learning environment, and supervise and support students working in it are often neglected and marginalized by decision-makers, lecturers and teachers. A lack of awareness of what can be achieved through well-designed web-based materials leads to improper implementation of new methods and techniques to be followed by creation of ineffective e-learning or blended learning courses.

A vast majority of academic and college staff in Poland and other countries have not yet had the opportunity to participate in any e-learning courses. Thus, for professionals who deliver classroom-based lectures, tutorials and workshops, it would be a valuable experience to immerse in educational programmes offered in an online environment. In this way they could gain hands-on experience and appropriate skills necessary to successfully engage in e-learning as developers and supervisors. Supported by a thorough introduction to online educational theory and practice, they would later be able to create materials tailored to their students' needs, monitor their progress and stimulate them to learn actively.

In the 21st century technological advances are broad, rapid and dynamic, which poses a number of challenges for educators. They have to reflect on their teaching continuously and self-direct their own development in order to be able to use a new, smart, i.e., technology-rich and pedagogically innovative, environment effectively. They need to identify areas for growth and improvement and upgrade their skills through self-education or training tailored to the needs and requirements of the new generation of students in smart and smarter learning environments.

## REFERENCES

Allen, M. (2016). *Guide to e-learning*. Hoboken, New Jersey: John Wiley & Sons Wiley, Inc.

Becker, S.A. et al (2017). NMC Horizon Report: 2017 Higher education edition. Austin, Texas.

Conrad, R. M. & Donaldson, J. A. (2011). *Engaging the online learner. Activities and Resources for Creative Instruction* (Vol. 31). San Francisco: John Wiley & Sons, Inc.

Durak, G. & Ataizi, M. (2016). The ABC's of Online Course Design According to Addie Model. *Universal Journal of Educational Research, 4*, 2084–2091.

Kirkwood, A. & Price, L. (2013). Technology-enhanced learning and teaching in higher education: what is 'enhanced' and how do we know? A critical literature review. *Learning, Media and Technology 39(1)*, 6–36.

Kołodziejczak, B., Roszak, M., Kowalewski, W., Ren-Kurc, A. & Bręborowicz, A. (2015). Participants academic distance education - case study. *Technics, Technologies, Education, Management*, *10 (2),* 242–249.

Koohang, A., Riley, L. & Smith, T., Schreurs, J. (2009). E-learning and constructivism: from theory to application. *Interdisciplinary Journal of E-Learning and Learning Objects*, *5*

Krajka, J. (2012). The language teacher in the digital age – towards a systematic approach to digital teacher development. Lublin: Maria Curie-Skłodowska University Press.

Leszczyński, P., Charuta, A., Łaziuk, B., Gałązkowski, R., Wejnarski, A., Roszak, M., & Kołodziejczak, B. (2018). Multimedia and interactivity in distance learning of resuscitation guidelines: a randomised controlled trial. *Interactive Learning Environments, 26(2)*, 151–162.

Mokwa-Tarnowska I (2017a) Higher interest, deeper concentration, more satisfaction – Web 2.0 tools to enhance technical English classes. In M. Sowa, J. Krajka & P. Lang P (Ed.), *Innovations in languages for specific purposes: present challenges and future promises* (pp. 156–167). Frankfurt am Mein: Peter Lang Edition.

Mokwa-Tarnowska I (2017b). *E-Learning and Blended Learning in Academic Education: Teaching Aspects*. Gdańsk: GUT Publishing House, [In Polish].

Mokwa-Tarnowska, I. (2013). Analysis of workshops on developing courses and interactive materials on Moodle, Report. Gdansk: University of Technology.

Mokwa-Tarnowska, I. (2015). How to engage students in online learning – web-enhanced and blended ESP classes. In E. Smyrnova-Trybulska (Ed.), *IT tools – good practice of effective use in education* (pp. 81–88). Katowice-Cieszyn: Studio-Noa for University of Silesia

Morze, N. & Kuzminska, O. (2017). Blended learning in practice of e-learning managers training (pp. 121–126). Proceedings from *Distance Learning, Simulation and Communication 2017*, M. Hrubý (Ed.). Brno: University of Defence, May 31-June 2, 2017.

Morze, N., Kuzminska, O. & Liakh, T. (2017a). Development of educational, scientific collaboration and project management with IC tools in universities. In E. Smyrnova-Trybulska (Ed.), *Effective Development of Teachers' Skills in the Area of ICT and E-learning* (pp. 347–364). Katowice-Cieszyn: Studio-Noa for University of Silesia

Noskova, T., Pavlova, T. & Yakovleva, O. (2017). *Electronic communication in education: a study of new opportunities* (pp. 127–135). Proceedings (Selected papers) from *Distance Learning, Simulation and Communication 2017*, M. Hrubý (Ed.). Brno: University of Defence, May 31-June 2, 2017.

Noskova, T., Pavlova, T., Yakovleva, O., Gutiérrez-Esteban, P., Martín-Espada, R., Cubo-Delgado, S., Arias-Masa, J., Delicado-Puerto, G., Alonso-Díaz, L. & Yuste-Tosina, R. (2017a). Some trends of ICT tools application by teachers: a comparative study of Russian and Spanish experience. In E. Smyrnova-Trybulska (Ed.), *Effective Development of Teachers' Skills in the Area of ICT and E-learning* (pp. 229–238). Katowice-Cieszyn: Studio-Noa for University of Silesia

O'Callaghan F.V., Neumann, D. L., Jones, L., Creed, P. A., (2017). The use of lecture recordings in higher education: A review of institutional, student, and lecturer issues. *Education and Information Technologies 22(1),* 399–415.

Roszak, M. & Kołodziejczak, B. (2017b). Teachers' skills and ICT competencies in blended learning. In E. Smyrnova-Trybulska (Ed.), *Effective Development of Teachers' Skills in the Area of ICT and E-learning* (pp. 91–103). Katowice-Cieszyn: Studio-Noa for University of Silesia

Roszak, M., & Kołodziejczak, B. (2017a). Building a course with multimedia resources – the working time analysis on the example of the pathophysiology course (pp. 161–170). Proceedings (Selected papers) from the *Distance learning, simulation and communication 2017*, M. Hrubý (Ed.). Brno: University of Defence.

Roszak, M., Kołodziejczak, B., Kowalewski, W. & Ren-Kurc, A. (2014). Academic blended learning – competences and tools. *Int. J.*

*Continuing Engineering Education and Life-Long Learning*, *24(3/4)*, 286–301.

Roszak, M., Kołodziejczak, B., Ren-Kurc, A., & Kowalewski, W. (2013). Designing and building of interactive content for distance education. In E. Smyrnova-Trybulska (Ed.), *E-learning & Lifelong Learning* (pp. 343–359). Katowice-Cieszyn: Studio-Noa for University of Silesia

Seppälä, J. & Yajima, K. (2017). Development of student-centred language learning environment. Paper presented at *the 9th International Conference on Information Technology and Electrical Engineering* (ICITEE). Phuket, Thailand, 12-13 October, 2017.

Smyrnova-Trybulska, E. (Ed.). (2016). *E-learning Methodology – Implementation and Evaluation*. Katowice-Cieszyn: Studio-Noa for University of Silesia.

Smyrnova-Trybulska, E. (Ed.). (2017). *Effective Development of Teachers' Skills in the Area of ICT and E-learning*. Katowice-Cieszyn: Studio-Noa for University of Silesia

Tikhomirov, V., Dneprovskaya, N. & Yankovskaya, E. (2015). Three Dimensions of Smart Education (pp. 47–56). Conference proceedings: *Smart Education and Smart e-Learning,* V.L. Uskov, R. J. Howlett & L. C. Jain (Ed.). Smart Innovation, Systems and Technologies 41. Switzerland: Springer International Publishing.

Zhu, Z-T., Yu, M-H. & Riezebos, P. (2016). A research framework of smart education. *Smart Learning Environments, 3:4,* 1–17.