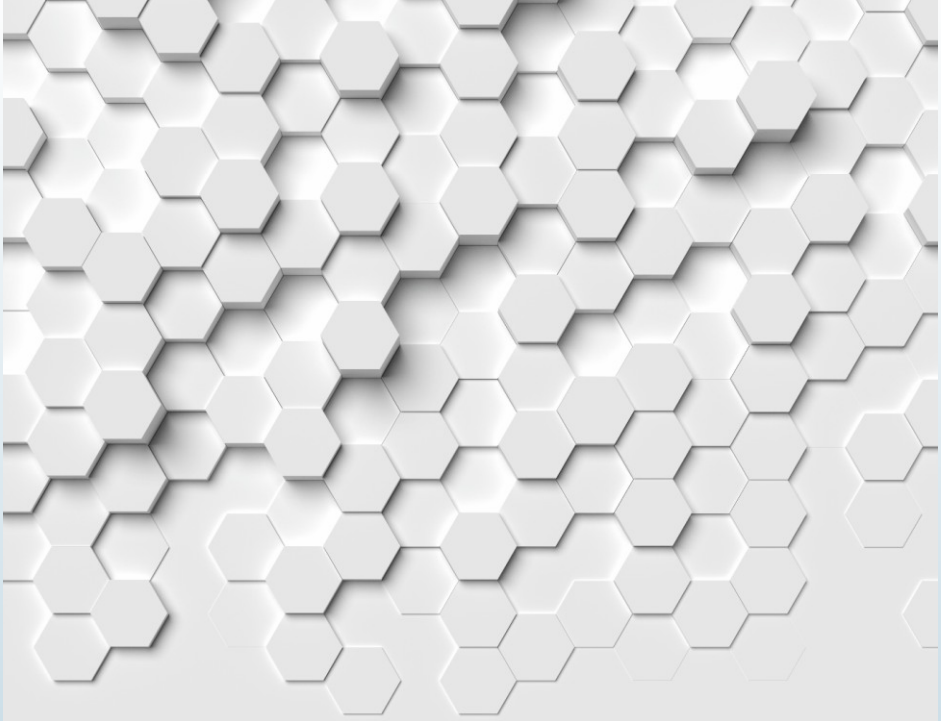

INNOVATIVE TEACHING METHODS

E-learning in Poland and Belgium

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Lidia Pokrzycka
Bruno De Lièvre

Maria Curie-Skłodowska University Press

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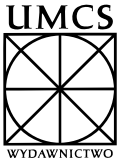
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Lidia Pokrzycka
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Lublin 2022

The project is co-financed by the Polish National Agency
for Academic Exchange

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Part II. **BELGIUM**

POLISH NATIONAL AGENCY FOR ACADEMIC EXCHANGE

The project is co-financed by the Polish National Agency for Academic Exchange

Introduction

Nowadays, e-learning has become the basic form of education at all teaching levels. This has been a pandemic necessity, but a question arises whether the trend towards the development of online teaching methods will be constant, or whether this process will be continued only by innovators, whereas teachers will be relieved to return to classical education in the post-pandemic period. The project "E-learning and ICT in Education in Poland and Belgium. A Comparative Study" (Poland-Wallonia bilateral exchange program) was implemented under a grant of the Polish National Agency of Academic Exchange (NAWA). During the project implementation, researchers carried out numerous interviews and questionnaire surveys, and participated in a seminar and a conference devoted to the development and the future of distance learning and innovations in teaching at all education levels. The research results are presented e.g. in this publication and will be regularly published in scientific journals after finalization of the project. The first part of the e-book deals with the problems of e-learning implementation in Poland, the second – in Belgium. The issues connected with e-learning development in both countries are outlined, evolving interest of scientists in online education is discussed, and practical implications of distance learning are presented.

A major problem related to e-learning is stress experienced by students to a much greater extent than during full-time study. Working on one's own, only with lecturer's support (without direct contact), can generate emotional tension, especially when a student does not work systematically, is unable to work more frequently, and leaves tasks, projects as well as material to study at the last moment. No wonder then that a vast amount of knowledge to master in a short time causes stress. Hence, much depends on a student's appropriate attitude to learning (without restrictive supervision of a lecturer), ability to cooperate in online groups (regular contact with other learners provides greater motivation), and support received from the environment (including family). Therefore, it is crucial for a student to work on a regular basis, divide large chunks of material

into smaller parts, as well as to plan learning stages appropriately and stick to the planned schedule. It should also be considered that all forms of e-learning involve search for information, its interpretation and analysis. It is necessary to evaluate usefulness and credibility of the information obtained, compare it with other sources, and check whether it is up to date, which is not easy under time pressure. Students who approach e-learning appropriately acquire the skills of critical thinking and text synthesis. All forms of teaching can typically create stress. In order to get rid of a nervous approach to acquisition of knowledge in e-learning, the stress-causing factors should be identified (e.g. accumulation of tasks to deal with) and limited. The basis is self-control (taking responsibility for own learning) and evaluation of own progress. Good motivators are also individual summaries of work, sent by lecturers as part of the tasks performed. In e-learning the greatest emphasis is placed on asynchronous communication, with special focus on various applications. After all, e-learning offers a flexible choice of place and time of studying. However, synchronous communication can be additionally used, in the form of videoconferences, chats or discussion forums.

It is important not only to implement e-learning consistently in the teaching practice of the higher education, but also to notice how important it is to look at distance learning from the perspective of corporations and companies who use e-learning in increasingly effective and profitable ways. Appropriate implementation of distance learning at all levels of education gives future employees of state enterprises and commercial companies opportunities to use their knowledge. Thus, e-learning is the future of education and of companies' development, which ought to be remembered by lecturers themselves who should upgrade their professional qualifications on a regular basis, in order not to disappoint students' expectations.

In the Polish part of the publication, the researchers deal with the history and current situation of e-learning at Polish universities and the popularization of online teaching in scientific journals (Lidia Pokrzycka), as well as selected didactic applications used in higher education as part of classes with Erasmus+ participants (Marlena Stradomska). It also describes the characteristics of digital tools that support innovative asynchronous teaching methods. The analyzed applications and programs allow the creation of various multimedia materials, including audiovisual ones, such as educational films and interactive presentations (Ewa Bulisz). Katarzyna Hałas reads the opinions of students about e-learning trends, while Jolanta Dyndur and Marlena Stradomska describe e-learning issues on the example of selected applications – Evernote, Lumosity, Pomotodo. Publications written by Polish e-learning researchers are finalized

with an article related to the future of e-learning. Paulina Niedziółka forecasts what the trends in the coming years will be and what we can expect in the future.

The Belgian contributions focus on three dimensions that are essential for a good understanding of how e-learning can be effective. The first relates to the preparation and design of distance learning systems. Indeed, before any implementation, it is necessary to define the solid foundations that will enable the construction of environments that are adapted to the audience, focused on the objectives and offering activities that are meaningful for the learners. The first model proposed by Housni, Descamps, Kumps, Marchal, Temperman and De Lièvre makes it possible, on the one hand, to define techno-pedagogical innovation in a socio-centric vision and, on the other, to propose a model to help the various actors involved in the dynamics of change to make their techno-pedagogical innovation projects sustainable and durable. This model is illustrated through three case studies. The second article (De Lièvre, Temperman and Decamps) proposes a model centered on the modalities of use of audio and/or video resources (podcasts) in order to show that it is the integration of the tools in the distance environment that is important and, consequently, not to attribute any intrinsic value to the tool as such. Indeed, it is the pedagogical use that will be made of it that will give it its qualities and determine its effectiveness. This model reinforces the focus on the sociocentric vision of the design of distance devices rather than on a technocentric vision.

The second emphasized dimension is the necessary pedagogical support that distance learners need to benefit from to lead a majority of them to success. Much criticism is levelled at all e-learning provisions when an assessment is made of the number of those who complete the course. One of the factors that helps to counter defections along the way is the tutoring, the support that learners can receive. A third article (Boumazguida, Kumps, Temperman and De Lièvre) focuses on the personal and professional characteristics and motives for entering training of learners enrolled in a MOOC. As it is discussed in the article, it is relevant to describe individual characteristics of learners as they can modulate their behavior. This proposal describes and compares the individual characteristics of two types of learners: on the one hand, registered students (N = 357) for whom participation in the MOOC is mandatory and, on the other hand, spontaneous learners who are free to register for the MOOC. The latter are the most numerous (N = 2,175) and therefore theoretically register for the MOOC by personal choice. The fourth article (Descamps, Marchal, Temperman and De Lièvre) aims to provide feedback on the use of Trello, a task management tool, in a context of supporting teachers in the design of online training. As part of

this research, focus groups were conducted with the design teams to analyze the usability and usefulness of the Trello tool in this context. Our results show that Trello is a fast, efficient and easy-to-use tool for managing a project remotely, visualizing progress, encouraging collaboration and supporting design teams.

The third dimension relates to the effects of e-learning devices on the quality of learning. the question asked here is if the distance device allows learners to learn effectively. The fifth article (Dragone, Temperman and De Lièvre) aims at analyzing the effects of formative assessment on the performance of the certificate assessment on the quality of practical work carried out at a distance by 3rd year university students. For this purpose, an experimental group was formed and subjected to a formative evaluation. A control group, exempt from the latter, is formed to prove the effect of our device. The analysis of our results indicates that the formative test has a real regulatory function. The sixth and last article (Temperman, Vandenplas, Giotis, Boumazguida and De Lièvre) deals with the integration of digital badges in a MOOC-type distance learning environment. By comparing two sessions of the same course (without badges vs. with badges), we observe that participants in the session with badges have a higher level of engagement than participants in the session without badges. From a questionnaire offered at the end of the course, the positive opinion of the students regarding the badges shows that badges can influence the motivational level and be beneficial in the implementation of self-regulation strategies during their learning process.

All our articles reflect the scientific rigor that we believe is essential to discuss the effectiveness of e-learning devices: firstly, a solid foundation in terms of design and integration model; secondly, the implementation of modalities to support learners and teachers in these distance devices and, finally, the analysis of the effects of these environments on the quality of learning in order to ensure their pedagogical effectiveness. This is our core business, of scientists, to rigorously mark out and evaluate the e-learning systems we design, and of teachers, to ensure the pedagogical alignment between our objectives, our implementation methods and our qualitative and quantitative evaluations of the expected effects.... for the benefit of distance or face-to-face learners.

Lidia Pokrzycka, Bruno De Lièvre

Part I

POLAND

E-learning in Poland. Origin and Popularization

ABSTRACT

The article presents the development of e-learning in Poland in individual research centers, which are leaders in this field, as well as scientific journals related to online learning. Characteristic projects that contributed to the development of e-learning research in Poland were described, as well as initiatives thanks to which e-learning is popularized and disseminated at all levels of education. The aim of the article is to present a story about trends in the development of e-learning research in Poland and initiatives that have a chance to popularize distance learning. In addition, the summary presents the current situation in research centers that are not leaders of distance learning but have been forced to use e-learning due to the pandemic situation.

Keywords: Poland, e-learning origin, e-learning popularization, e-learning science centers.

Introduction

Distance learning has a long tradition in Poland. It dates back to the year 1776 when the university of Kraków (first named the Academy of Kraków, later the Jagiellonian University) launched correspondence lectures for craftsmen. Then the Flying University in Warsaw was established in 1886 (since 1907 called the Society of Science Courses). Subsequent institutions dealing with distance education were founded at the end of the 19th and beginning of the 20th century. They focused on dissemination of knowledge on a larger scale (these were: the Society for Academic Courses for Women and the Public University Lectures). At further stages of remote learning development, elec-

tronic media were introduced. In 1960, "School programs" were launched on educational television. The TV University of Technology has been operating since 1966, actively promoting remote learning methods and focusing on teaching students and candidates for higher education studies. Interest in e-learning was gradually increasing in Poland after universities noticed the opportunities for development of education via the internet, while corporations spotted a chance to upgrade qualifications of their employees without incurring high costs (Mokwa-Tarnowska, 2020).

Development of e-learning in Poland

E-learning caught on in Poland in the 1990s when schools (including higher education institutions) were equipped with personal computers for the first time. At that time, it was hoped that the equipment would be used to educate adults who did not have time to commute to universities but could study part-time or at postgraduate courses in the future. Nevertheless, remote learning was associated for years with either self-study or very limited participation of a teacher in the educational process. When elements of distance education were introduced for the first time, academic teachers' knowledge of the issue was rudimentary. E-learning was referred to as distance, flexible or open learning (Green & Brown, 2017). The terms of e-learning, as an expression referring to all forms of learning and teaching process via the media, and blended learning (alternate use of remote and traditional teaching) were introduced when the development of distance learning in Poland had already been advanced (Sowa, 2009; Kuźmicz, 2015; Mikulski, 2015; Mokwa-Tarnowska, 2020).

In 1992, on the initiative of the Ministry of National Education, the Nationwide Extramural Education Centre (OCEN) was founded. Its goals included: development of distance education through training of teachers – experts in the new field, and, what seemed the most important from a university's perspective, production of materials and teaching aids tailored to the new form of education. A promotional campaign, conducted by the Ministry of National Education via OCEN, within the framework of the Phare Multi-Country Program for Distance Education, resulted in the establishment in 1996 of three Continuing Education Centers (CKU): in Krosno nad Wisłokiem, Bytom, and Zielona Góra, and five university units – at the AGH University of Science and Technology in Kraków, Gdańsk University of Technology, Warsaw University of Technology,

Kielce University of Technology, and Wyższa Szkoła Biznesu – National-Louis University in Nowy Sącz (Miszke & Stanisławska-Miszke, 2020).

In 1996, each of the above-mentioned centers had a different starting position and was situated at various places in the structures of educational institutions, for example the Extramural Education Centre (CEN) at Gdańsk University of Technology started operating within the structure of the Education Centre of the University Computer Network (a teaching unit), whereas the Continuing Education Centre (CKU) at the AGH University of Science and Technology in Kraków, which later changed its name to the Extramural Education Centre (OEN) and is currently called the e-Learning Centre, is subordinate to the Vice-Rector for Education and operates as a central administration unit. On the other hand, the Continuing Education Centre at Kielce University of Technology was included into the PHARE program. Furthermore, all units which dealt with e-learning as part of the first PHARE program also joined the "Mission" program, which contributed to significant internationalization of distance learning. An online bank of teaching materials with software for their management was created. Moreover, local educational needs were examined, and a cooperation network was built between the centers participating in the project. Consequently, it was possible to implement the ideas of other international projects aimed at development of innovative distance learning. Even though this cooperation did not produce far-reaching effects, e.g., due to cultural differences, diverse approaches to innovative teaching methods in particular countries, communication difficulties (English language used during all project meetings created a certain barrier) and organizational problems, it nevertheless demonstrated that distance education should get internationalized.

A number of international projects implemented later proved that Poland was lagging far behind with respect to distance learning but caught up gradually (also thanks to participation in projects and conferences all over the world). In 2001, by decision of the Ministry of National Education, the Nationwide Extramural Education Centre (OCEN) was transformed into the National Centre for School Curriculum Development, which deprived universities of an institution coordinating e-learning on the national scale (such central institutions are widespread in West European countries). It was also a clear signal that university employees were not interested in implementation of modern methods of distance learning because they were used to traditional teaching. Academic teachers focus on science and perceive teaching as an addition. Exploration of technological innovations was considered a waste of time. Nevertheless, along with the centers founded under the PHARE program, other university centers

connected with the development of distance learning were established one by one. At the beginning of the 2000s the following centers were opened: the Interdepartmental Centre for the New Media and Distance Learning at the University of Łódz, the Distance Education Centre at Warsaw University of Technology, the Centre for Open and Multimedia Education at the University of Warsaw and the University Centre for Distance Education and Open Courses at Maria Curie-Skłodowska University. Another significant institution dealing with the popularization of e-learning was the Extramural Education Development Centre at SGH Warsaw School of Economics. However, there was no coherent strategy for e-learning development in Poland. There was not much interest in educational institutions supporting innovativeness in distance learning, functioning in Western Europe, or in ideas connected with e.g. open universities or e-learning courses available to anyone interested. The situation was not much improved by seminars or international conferences with the participation of researchers from selected European countries, who had considerable achievements in popularization and management of modern e-learning methods. Individual actions could not be successful. It was necessary to consolidate actions for the support of e-learning in higher education. This task was entrusted to the Polish Virtual University (PUW) established by the Conference of Rectors of Academic Higher Education Institutions (KRASP). Originally, the Polish Virtual University was directed at public institutions of higher education, but it was later privatized (Szabłowski, 2009; Miszke & Stanisławska-Miszke, 2020).

The initiatives on the coordination of works connected with implementation and popularization of e-learning were not successful, mostly due to the inclusion of private higher education institutions into projects and related problems with organization of consortia structures and their financing. As a consequence, e-learning was implemented in Poland by innovation enthusiasts, typically IT specialists and foreign language teachers. However, university authorities viewed the innovators' efforts without much enthusiasm. Furthermore, distrust of other lecturers made the introduction of e-learning work methods a very arduous task. Each university had its own strategy on how to convince people to use technology in higher education. There were also attempts made by e-learning enthusiasts to organize knowledge related to distance learning and to start an association that would support academic teachers who used e-learning in practice. First, the Seminar of e-Education Practitioners was established, and in 2006 some of its members founded the Academic e-Learning Association (SEA). At the beginning SEA continued the initiatives of the Seminar of e-Education Practitioners, including works on evaluation of distance learning

quality. The efforts of people committed to e-learning popularization resulted in the formulation of the criteria for evaluation of online course quality and the standard competences for distance learning methodologists and teachers using online technologies in their courses. Furthermore, at the request of the Polish Accreditation Committee, recommendations were developed on how to monitor and evaluate the quality of distance learning systems at higher education institutions during accreditation of majors of study. Moreover, SEA gave opinions on decisions of the Ministry of Science and Higher Education.

A crucial project for the development of e-learning in Poland was a grant funded by the Ministry of National Education in 2006, entitled "The development of teaching curricula for distance education". The grant contributed to the development of innovative e-learning materials for undergraduate and graduate programs in economics, information technology, tourism and agriculture. What is important, the largest universities in Poland took part in the project (including the University of Warsaw, the Jagiellonian University, Warsaw University of Technology and Warsaw University of Life Sciences).

On the other hand, the Digital Competence Centre at the University of Warsaw and the e-Learning Centre (later the e-Learning Team) at Kraków University of Economics focused on effective communication between a lecturer and students, drawing on a conclusion that even the best teaching aids are not able to replace professionally designed courses. It is also important to offer tasks and exercises that can be solved by a student on his or her own or by learning how to work in a group. Owing to the work of experts from the University of Warsaw and the Kraków University of Economics, original models of distance learning at a university level were developed. The work of the teams is also recorded in the form of research and scientific publications. A practical approach to distance education at many universities in Poland stems also from the cooperation with a training company Edukacja-Online.pl which promotes an original model of improvement of lecturers' teaching skills, with special emphasis on designing remote courses based on the principle of learning through acting (Rak, Galwas & Piwowarska, 2008; Miszke & Stanisławska-Miszke, 2020).

Gdańsk University of Technology has become an important place on the map of e-learning centers in Poland. It has a tradition of distance education, primarily at engineering courses, but recently it has also been involved in open education of lecturers from outside Gdańsk University and of primary and secondary school teachers. Gdańsk University of Technology has extensive experience in implementing distance education. The Autodesk Authorized Training Centre at Gdańsk University of Technology (ACSA PG) was established

as early as 1995. Despite financial problems, the Centre operated very efficiently owing to participation in international projects, including the Leonardo da Vinci program (1998–2001). Furthermore, Gdańsk University of Technology supports the development of professional qualifications in the Pomerania Province through remote learning (2005–2007), including e-learning projects for senior citizens (2001–2020), financed from external sources on a regular basis. A project entitled "e-University – development and implementation at Gdańsk University of Technology of a platform with eServices for the information society of the Pomerania Province" was implemented in 2012–2013 within the framework of the Regional Operational Program for the Pomerania Province for 2007–2013. The primary objective of the project was to form the foundations for the development of information society. For this purpose, an interactive platform was created, containing several modules related also to e-learning and e-science. The eNauczanie (e-learning) module was intended not only for students but for all citizens of the Pomerania Province who were interested in lifelong learning. Access to educational materials was provided and an opportunity to organize remote examinations was introduced. Currently, eNauczanie platform is updated on a regular basis, integrated with university systems, and its resources are validated. During the first years of the platform's operation, contests were organized for the best courses created with eNauczanie resources. Lecturers were regularly trained on the methodology of designing e-learning courses and on copyright-related issues. Training courses were taught by external specialists. Typically, EU projects ensure the initial efficient functioning of e-learning platforms and courses, in order to guarantee durability of project effects and continuity of initiatives. The eNauczanie platform of Gdańsk University of Technology, consistently developed, testifies to the fact that EU projects bring lasting effects. The platform is closely integrated with other University systems and properly supervised (Dąbrowicz-Tlałka & Grabowska, 2020).

It should be emphasized that the initiative of education for people not connected with Gdańsk University of Technology is particularly valuable. Regular, free and certified training courses are used by lecturers and other teachers not dealing with sciences, as well as school students for whom such workshops are a helpful supplement to remote education introduced during the pandemic.

Polish e-learning journals

Journals devoted to e-learning are important elements illustrating the development of research on this issue. An analysis of articles published in a prestigious scientific journal "E-mentor", issued by SGH Warsaw School of Economics with the participation of the Foundation for Promotion and Accreditation of Economic Majors, demonstrates scientists' interest in online teaching and in conducting research on this area. "E-mentor" was created in 2003 when enthusiasts got interested in modern teaching and in broadening their knowledge of diverse aspects related to the application of technology in education. Thus, the origin of the journal is based on the global research on e-learning and popularization of the effects of foreign solutions implemented in Poland. Another stage encompassed publication of the results of research conducted already by Polish scientists who implemented e-learning at their universities. As a result, substantial comparative material has been gathered and trends in the development of distance education can be identified. However, it is noticeable that the period of fascination with new technologies was followed by a certain crisis. After a number of e-learning centers had been opened at Polish universities, it turned out that there were formal obstacles connected with limitations on teaching courses mostly online. The first issues of "E-mentor" comprised mainly articles prepared by foreign authors and translated into the Polish language. It was due to the fact that e-learning developed in Poland later than e.g. in West European countries. The idea of open access to all articles is valuable, because it additionally contributes to the promotion of the modern teaching methods, new technologies and distance learning at Polish universities. A Regulation of the Minister of Science and Higher Education of 2007 hindered the development of online higher education courses. Online credits and examinations were prohibited and the proportion of online courses to traditional ones was specified. These regulations effectively discouraged lecturers from further involvement in distance education. Even though the percentage limits on online courses were later modified, the general image and lack of development trends in distance education at universities remained unchanged. What is more, university authorities and lecturers were convinced that e-learning or blended learning were not conducive to enhancement of teaching quality, and only traditional methods of education were effective. Hence, the development of innovative teaching methods was significantly restricted. "E-mentor" started publishing articles on knowledge management, sustainable development and technology in business. On the other hand, articles of foreign authors still dealt mostly with e-learning.

Moreover, some texts were connected with implementation of projects within the framework of Erasmus, Erasmus+, or Horizon 2020 programs. E-learning became a permanent element of numerous international projects, and research results were published in "E-mentor". Nowadays, we can observe a tendency for the return to writing articles and conducting research on e-learning. The majority of publications discuss the use of specific applications in practice or analyze effectiveness of online teaching. It can also be noticed that publications on e-learning are written by innovators and enthusiasts of this topic. On the other hand, this is not a consequence of actions of particular universities which would implement e-learning and research on online teaching in an orderly and functional manner (Zając & Dąbrowski, 2020).

Figure 1. Journal "E-mentor" – front page
Source: www.e-mentor.edu.pl/czasopismo/najnowszy-numer (retrieved September 11, 2022).

Another journal connected with e-learning was established in 2010. "Edu@kcja" (later "EduAkcja") was created in the environment of the Polish Scientific Society for Internet Education (PTNEI). This initiative enabled integration of a very dispersed scientific environment dealing with research on e-learning and its promotion in Poland. Furthermore, the journal was supposed to be

a certain link between the world of science and online teaching practices. Another fundamental principle of "Edu@kcja" was to offer free access to all its resources. During its first years, the journal was issued only in the electronic form. "Edu@kcja" published articles both in Polish and in English. However, the editorial team emphasized their later focus on publishing mostly English language articles. Very ambitious principles of the journal were quickly verified. Initially, it was assumed that the basis for the publication would be "Virtual University" conference, and it was planned that one issue of the journal would comprise 20–30 articles. Furthermore, there were plans to publish special issues devoted to particular topics related to e-learning. In June 2011, PTNEI decided to extend the editorial team to include the employees of the Centre for Open and Multimedia Education at the University of Warsaw. With the support of the Centre, the journal became more widely available on the internet, and the procedures of accepting articles for review were professionally designed. Responsibilities were divided between particular members of the editorial team. The program council was extended to include three representatives of universities from abroad, "EduAkcja" was registered in international bases of journals, new layout was designed, and the publication frequency was changed to biannual. In 2012–2018, there were 118 articles published. A forum for sharing best practices was created, and it was shown how e-learning was developing at various universities in Poland and in educational institutions in general. In 2013 during the General Meeting of PTNEI it was decided that the Centre for Open and Multimedia Education at the University of Warsaw would still be the leading publisher, but in cooperation with PTNEI, Warsaw University of Technology and Gdańsk University of Technology. An open call for articles to the journal was also announced but it did not arouse much interest. As a consequence, publication of the journal was entrusted first to PTNEI, and then to Warsaw University of Life Sciences. In November 2019 "EDUAkcja" files were transferred to OKNO Centre at Warsaw University of Technology from the Digital Competence Centre at the University of Warsaw. The lack of interest in publication of articles in a general journal devoted to e-learning suggests that this topic is no longer a novelty in education and scientific research, and the majority of experts who used to publish articles in the journal now focus on narrower specialist issues, directly connected with their scientific disciplines (Landowska & Wilkin, 2020).

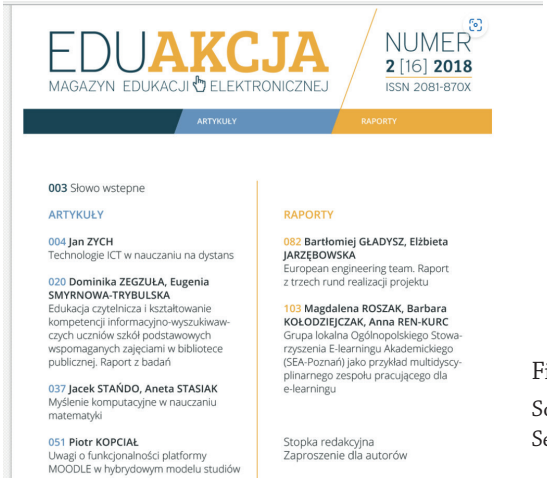
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Figure 2. Journal "EDUAkacja" – front page
Source: eduakcja.eu/index.php/pl/ (retrieved September 11, 2022).

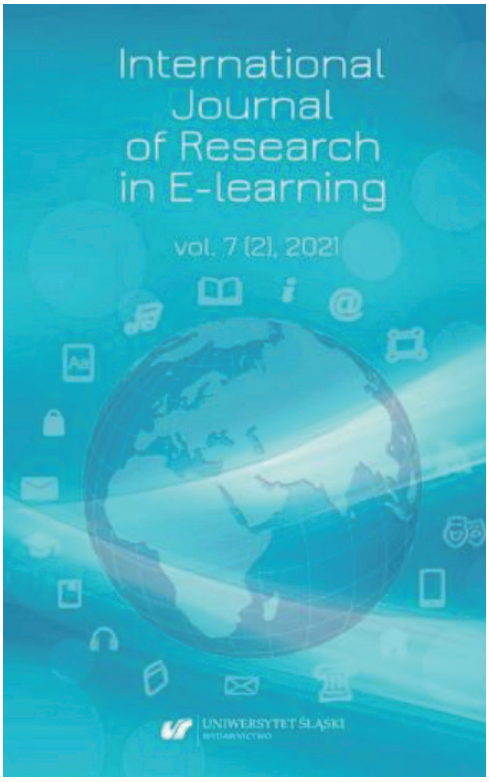
International Journal of Research in E-learning
vol. 7 (2), 2021
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Figure 3. "International Journal of Research in E-learning" – front page
Source: http://www.ijrel.us.edu.pl/archive (retrieved September 11, 2022).

Among journals devoted to e-learning issues, it is also worth mentioning "International Journal of Research in E-learning" (IJREL) published in the English language since 2015 by the University of Silesia. The journal deals with the educational, cultural and technological issues connected with distance learning. A particular emphasis is placed on the theoretical, methodological and practical aspects of distance education, lifelong learning in the remote form, and shaping the key competencies through the implementation of e-learning. It is also important to study multimedia measures and tools in e-learning. The focus is also on the role of distance education in the development of multicultural competencies, as well as on the legal and social problems connected with the implementation of e-learning in various countries (Smyrnova-Trybulska, 2020).

Conclusions

The approach to e-learning in Poland is quite specific. Not enough people focus not only on the multimedia techniques of education, but also on appropriate, motivating contact between a student and a lecturer. It is crucial to teach effective online communication, to motivate learners and to use a relevant system for grading students' works or final effects of distance learning in general. Despite the fact that an increasing number of researchers are interested in writing monographs on e-learning and many methods and techniques of distance education are implemented, most university authorities still treat e-learning as an addition. There are no relevant procedures that would guarantee the coexistence of traditional and remote methods and forms of teaching. The role of university employees in designing e-learning courses is very unclear, there are problems with copyright which is infringed e.g. by students. There are not enough professional methodologists, IT specialists, programmers, graphic designers who would coordinate publication of subsequent training modules on university e-learning platforms. Furthermore, the approach to the working hours in remote education is very stereotypical: the necessity to prepare materials and check students' works for many hours is often ignored. It frequently happens that the time devoted to designing and checking asynchronous tasks, which are indispensable elements of e-learning, is not counted as online classes. All these weaknesses of the implementation of distance learning in academic practice became evident during COVID-19 pandemic in 2020 and 2021. It turned out that lecturers typically focused on transferring lectures prepared in a traditional form to the internet. However, it is not that simple. E-learning consists in introducing students to a given issue and not offering them theory, because they can easily find it on their own on the internet. It is necessary to apply the discussed issues in practice. In distance education the lecturer should be able to teach skills of translating theory into practical realities of the market. Due to the lack of experience in e-learning and fundamentals of distance teaching methodology, lecturers approach this form of education with substantial doubt and distrust. Moreover, the need to concentrate on lectures in front of the computer screen for many hours is not conducive to the popularization of e-learning among students themselves.

Research related to e-learning is still rare, especially in the field of social sciences. The lack of journals specializing in e-learning in Poland is also not conducive to popularizing online teaching among teachers at all levels of education. It is necessary to popularize e-learning, conducting free courses for

online learners-teachers, and to promote effective distance learning, also thanks to the emerging e-learning centers, cooperating with business and obtaining new grants related to e-learning research.

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Innovative Multimedia Tools in E-learning

ABSTRACT

The article describes functional aspects of digital programs and applications which can be used to create various types of multimedia materials supporting innovative teaching methods. The choice has been limited to tools which are free of charge and can be used in asynchronous learning, i.e. in the non-real time, when it is the student who decides when to start learning and how long it will last. Final conclusions concern the advantages and threats of using modern multimedia tools in e-learning.

Keywords: e-learning, visual communication, interactive communication, innovative teaching methods.

Introduction

Remote teaching has a long tradition (Marciniak, 2022). However, researchers notice that its advancement levels and application vary from country to country (Pokrzycka, 2013; 2018). The COVID-19 pandemic has increased global demand for e-learning at all stages of education; not only in elementary, primary, secondary and higher education (Pokrzycka 2019; 2021; 2022), but also in other fields, including public institutions and organizations as well as enterprises and private companies. Digital tools are also used to support the teaching process in offline lectures, seminars, courses and training sessions. Online education has become a natural environment for pupils and students. Therefore, one can observe a dynamic development of applications and tools used for teaching in the virtual space.

In e-learning, we distinguish two forms of the learning process: synchronous (in real time), in which participants meet the tutor in the virtual space at the same time, and asynchronous (in non-real time), in which participants use teaching materials previously prepared by the tutor and shared elsewhere.

The aim of this article is to review and characterize digital tools that support innovative methods for asynchronous teaching, i.e. one that can be used repeatedly, at the time convenient for the student, and in which they can decide how much time they want to devote to studying and how much for a break. The analyzed applications and programs allow the creation of various multimedia materials, including audiovisual ones, such as educational films and interactive presentations. I am skipping the form of a webinar possible to be watched at a later date. The multimedia programs described can be used in synchronous teaching as well. Asynchronous teaching with the presence of the teacher implies subsequent interaction via e-mail, phone call or other instant messaging services, such as those belonging to social media. The article describes activities related to new technologies, so it can serve as an instruction for e-learning practitioners.

Programs and applications used to create educational videos

Video didactics is a teaching method based on the use of video production (Duszyk, 2013). The teaching process may involve using a teaching material developed by the teacher. Additionally, lecturers and teachers recommend to their students certain educational videos to watch on the Internet or activities to do as a task to prepare on their own (Marciniak, 2022).

As in any production, also in the case of video didactics, there are stages of pre-production, production, and post-production. However, unlike media or cinematographic production (Wiącek, 2005), the preparation of an educational video must always be preceded by a teaching needs diagnosis based on the teaching goals and learning outcomes. When creating a video, the teacher must first define its purpose and functions to make it useful. "Before recommending a video to participants, the instructor must necessarily watch it and ask themself whether it will allow the achievement of the didactic goals, or at least approach it" (Marciniak, 2022, p. 230). The next stage is research and documentation, which means searching for materials in internet sources, libraries, archives, and museums. Also, searching for content involves consulting experts. In analogy to the concept of "oral history", I propose the term "oral science" which is an audiovisual recording of statements made by researchers in a given discipline.

The quality of materials is of great importance, as too low quality may discourage students from getting familiar with the video. The next stage is preparing the script and deciding what genre the production is going to be. At this stage, a decision should be made whether the tutor (lecturer or teacher) will appear in the video and who will be speaking (it can be the voice of a professional voice actor). An educational video can take the form of animation, column, reportage, or documentary. The selected genre determines the length and the cost of the production. The only limitation can be the author's creativity and financial aspect. If an educational film is enriched by fictionalized scenes, one should take into account the setting, actors, extras, characterization, and space arrangement. Such a complex production should involve a production manager who will coordinate the work at all stages, as well as (besides the production manager and the author) a camera operator and an editor. This kind of production may go beyond the capabilities of educators.

Many academic lecturers, however, declare their willingness to acquire the ability to create and edit didactic videos. Out of 30 surveyed lecturers (20 from Maria Curie-Skłodowska University, Poland, and 10 from University of Mons, Belgium) who were asked the question: "Do you want to learn to create videos?", 28 responded "Yes". It implies that among academic teachers there is a demand for knowledge, skills and competences in creating multimedia materials.

Making educational videos includes the following stages:

1. Pre-production: selection of the topic/problematics of the video, research and documentation of the material, preparing the script and the shooting script;
2. Realization: recording statements of interlocutors, film characters and/or text read by the voice actor, shooting pictures, including scenes to cover the cuts;
3. Editing, i.e. coding: selecting the appropriate parts of statements, inserting titles, sources, info cards (captions), closing credits, selecting soundtracks;
4. Post-production: publication and distribution of the video using, for example, an e-learning platform, a website, a blog, social media, or sending a link.

The main purpose of a didactic video is to provide information on a selected topic, issue, about a single problem or several events, phenomena, or problems. The dominant function of a didactic video is the informative function, which is presenting some facts. The broadcaster of a didactic video should always strive for the maximum objectivity of the message, although a didactic video is not free from evaluations and opinions formulated by researchers and scientists. Apart from the informative function, the stimulating function (stimulating reflection

or exploration of the topic) plays a crucial role. The most important medium in a didactic video is the image – there is no film without it, although there can exist a film without verbal communication. It can be, for example, a presentation of a phenomenon or a place. The picture itself can therefore provide complete information (Jamieson, 2007).

In the virtual space there are available numerous tools that facilitate creating educational materials, which may contain both text messages, spoken statements and static visual materials (photos, drawings, infographics, diagrams, charts, tables, maps) and dynamic (films, animations). The use of graphic materials in teaching makes sense only when it brings educational value, and not when it has a purely aesthetic function (Hyla, 2005). Digitizing various codes, i.e. linguistic, auditory and visual, can be helpful in introducing the topic, presenting instructions for completing a task, exposing various aspects of a specific topic, initiating a discussion, demonstrating research materials or case studies for analysis, and summarizing the content. Visual and auditory stimulation through multimedia tools can make the learning process more attractive, however, it should be used only as a supplement as "over-viewing" (Hopfinger, 2013) may favor the formation of a hedonistic attitude and mental laziness, which results in distracting attention from everything that is not a moving and voiced image (Filipiak, 2003). To prevent this, innovative teaching methods use interactivity, which means that the teaching process requires a specific action to be taken by the learner. This way of learning forces the student to be proactive and involved, forces them to react to the course of the lesson and allows for a change in its course (Warszewski, 2010). In e-learning, interactivity means that the program or application waits for the reaction of the user (pupil, student) (Jóźwik, 2017). The rest of the lesson plan depends on this reaction. Interactivity is therefore a teacher-designed dialogue between the program and the student. The student can react by clicking the mouse (choosing the right answer) or completing the answer. The program or application may respond with a text, audio, visual, or audiovisual signal. Innovative teaching methods, i.e. with the use of a video, in e-learning are based on combining text and spoken statements with visualization and interactivity. Popular free film editing programs that support most formats include: Avid Media Composer First, DaVinci Resolve, VSDC Free Video Editor, Kdenlive, Avidemux, HitFilm Express, Shotcut, OpenShot Video Editor, Lightworks.

Figure 1. The official logo of Avid Media Composer First
Source: https://my.avid.com/get/media-composer-first (retrieved September 10, 2022).

Figure 2. The official logo of DaVinci Resolve
Source: https://www.blackmagicdesign.com/products/davinciresolve (retrieved September 10, 2022).

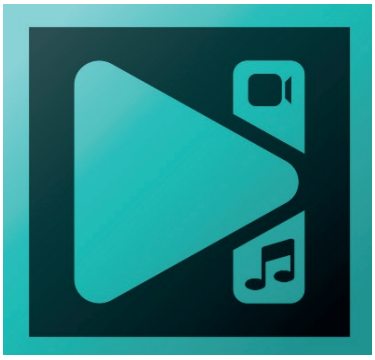

Figure 3. The official logo of VSDC Free Video Editor
Source: https://www.videosoftdev.com/ (retrieved September 11, 2022).

Figure 4. The official logo of Kdenlive
Source: https://kdenlive.org/en/ (retrieved September 11, 2022).

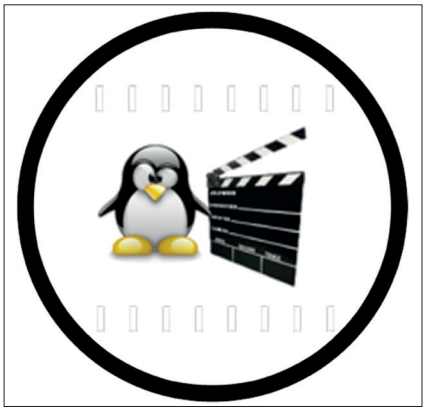

Figure 5. The official logo of Avidemux
Source: https://avidemux.sourceforge.net/ (retrieved September 12, 2022).

Figure 6. The official logo of HitFilm Express
Source: https://hitfilm-express.softonic.pl/ (retrieved September 10, 2022).

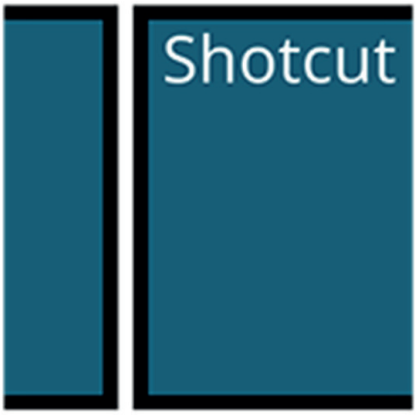

Figure 7. The official logo of Shotcut
Source: https://shotcut.org/ (retrieved September10, 2022).

Figure 8. The official logo of OpenShot Video Editor
Source: https://www.openshot.org/ (retrieved September 10, 2022).

Figure 9. The official logo of Lightworks
Source: https://lightworks.softonic.pl/ (retrieved September 10, 2022).

Programs and applications used to create multimedia presentations with video elements

For people who do not want to explore the secrets of film production, there exist a number of programs and tools for creating multimedia materials. Most of them offer a combination of text, sound, image (static and dynamic) and website links.

Canva (www.canva.com) is a digital tool for creating graphic materials, including multimedia presentations, using ready-made templates. The program was created in 2013 and is very popular, for example in marketing activities. This program allows effective creation of posters, graphics, invitations or graphic posts for social networks. The application does not require any graphic knowledge or artistic sense. All that is needed is to select an appropriate template and drag images (a rich library of free images).

Figure 10. The official logo of Canva
Source: https://www.canva.com/pl_pl/ (retrieved September 10, 2022).

In order to create a multimedia presentation in Canva one needs to register and then log in. The creator can add all types of multimedia (photos, sounds, videos, animations, maps, links) as well as use a free library of images, graphics and illustrations available in Canva (Stradomska, 2022). The program allows inserting an audio/a video into a presentation, thanks to which the educational material becomes interactive.

Emaze (www.emaze.com) is another digital art creation tool. One can work on the content individually or in collaboration with other users. The advantage of the program is the fact that it offers hundreds of templates, both 2D and 3D.

Emaze makes it possible to create various multimedia materials, including not only audiovisual presentations, but also quizzes, websites, blogs, e-cards, and photo albums.

Figure 11. The official logo of Emaze
Source: https://www.emaze.com/ (retrieved September 10, 2022).

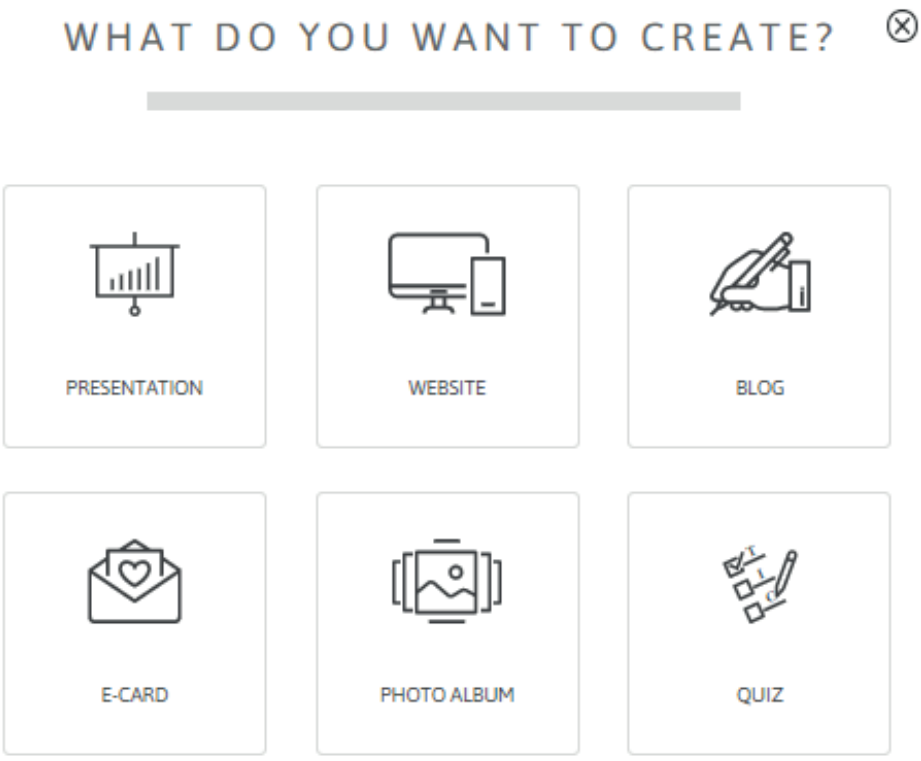

Figure 12. Types of interactive projects

Source: https://app.emaze.com/mypresentations#/home (retrieved September10, 2022).

Figure 13. The official logo of Sway

Source: https://sway.office.com (retrieved September 10, 2022).

Sway (www.sway.office.com) is a digital tool for creating multimedia presentations with the use of photos, videos or infographics, created in 2014 by Microsoft and made available to users as a part of the Microsoft Office suite. The program allows users to add various materials from sources such as social media, e.g. YouTube, Facebook, OneDrive or Twitter, and the project can be saved to the cloud. Sway can also be used to create reports, scripts, and multimedia stories.

Canva, Emaze and Sway do not require programming techniques skills. The mentioned programs make it possible to create a presentation consisting of slides to which one can add various multimedia materials. During the presentation, audio and audiovisual files can be played.

Among programs and applications for creating interactive whiteboards, one should mention Padlet (www.padlet.com) and ThingLink (www.thinglink.com). Padlet is an interactive online board created by Microsoft, while ThingLink is an interactive board created by a Finnish company. ThingLink and Padlet are used

Figure 14. The official logo of Padlet

Source: https://pl.padlet.com/ (retrieved September 13, 2022).

Figure 15. The official logo of ThingLink

Source: https://www.thinglink.com/ (retrieved September 10, 2022).

to create interactive visual messages using images: static photos, 360° photos, movies, 360° movies, sounds, virtual tours, 3D models, simulated reality and access in the form of digital photos to places in the real world (Bulisz, 2022). An interactive composition can be created from a photo taken with a phone camera or from ready-made graphics, such as posters, drawings, caricatures, multimedia presentations, typographies, graphs, infographics, maps, drawing scans, comic books, screenshots

Conclusion

The advantages of using multimedia materials include: attractiveness of their form (Hałas, 2022), access to the content with no space or time limit, possibility of using it as revision at any time, saving time (as the content of a video is absorbed faster than that of a book). "If we use videos as teaching material, the participant's task is not to merely watch it. It should be an engaging activity. It is therefore advisable to ask a question students should answer after watching the video material" (Marciniak, 2022, p. 230). Multimedia materials are an important element of innovative teaching.

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Netography

https://www.blackmagicdesign.com/products/davinciresolve
https://www.canva.com
https://www.emaze.com
https://www.kdenlive.org/en/
https://www.magisto.com
https://www.my.avid.com/get/media-composer-first
https://www.padlet.com
https://www.sway.office.com
https://www.thinglink.com
https://www.videosoftdev.com

MARLENA STRADOMSKA[1] III

Selected applications in Educational Issues – On the Basis of University (Erasmus+ Students)

ABSTRACT

Introduction: This article is a theoretical and research work on the evaluation of selected working and learning methods, including applications that can enable learning for students. Method and research group: The ongoing research has been conducted since 2019 with the use of an interactive Google survey among course participants at Maria Curie-Skłodowska University in Lublin. Additionally, qualitative research was carried out. In this article, two of them were selected, which were conducted with students, representatives of nations participating in the Erasmus+ program.
Summary: The article contains recommendations on the use of the application for people representing early and middle adulthood. This work describes in detail selected applications e.g. learning foreign languages – Quizlet, Reverso. The work is the next in a series of scientific articles on the above-mentioned topic and will be continued in the next academic year.

Keywords: application, education, modern learning, Quizlet, Reverso.

Introduction

At the beginning of 2020, no one expected any sudden changes that would have to be introduced in the education system in the world. COVID-19 brought the world to a standstill, and many educational institutions were not ready for such drastic changes. Nobody knew how long the pandemic would last, so action was not taken immediately. Both schools and workplaces had to

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decide to transfer from physical meetings to online platforms. For many years, there have been free applications such as Skype or Zoom that allowed many people to connect – on the same server and to make voice calls. An additional advantage of such applications is the ability to turn on the camera and share the screen with other users, e.g. to share your multimedia presentation or desktop. Applications can be relevant to many social groups. It is important that more and more people are aware of how much this market has developed and how applications can be used for their own development and education. It can be considered that this number of applications is almost unlimited, and every day new applications are designed. They can be useful in the changing reality (Badzińska, 2014).

Self-paced learning, saving time, and great access to knowledge are only a few of many advantages of e-learning. Year by year, expanding knowledge in such a modern way is becoming more and more popular. Expandable educational platforms equipped with many amenities allow flexibility in everyday life, including health, education and other aspects (Zadarko-Domaradzka & Zadarko, 2016; Łosiak-Pilch, 2017). What is more, e-learning is not limited to real-time meetings with other participants, it could also happen online without voice interaction, but it could also be used offline anytime when it is convenient for a user. Online learning can be used as a complementary method of studying, but also as a primary, which becomes convenient for full-time users. Electronic form and traditional education have many advantages, but also many disadvantages that may differ depending on the needs of users. In addition, the development as well as growing popularity of mobile applications creates an opportunity to introduce a new form of activities for personal development (Kuźmińska-Sołśnia, 2017).

The development of technology has led to an increase in students' interest in distance learning, which allows them to participate in classes anywhere in the world, where there is an internet connection. Regardless of whether a person is on vacation or planning to move to another city or even to another country, learning is possible. Actually, e-learning makes it all possible. Nowadays, practically everyone has access to a mobile phone, laptop, or tablet, so learning is available at one's fingertips. If it turns out that a person needs access to any publication, book or scientific article, online libraries offer a wide range of materials in the form of e-books. However, when it comes to teachers, for the proper conduct of classes it is necessary for them to have basic knowledge of how to use applications and other necessary tools. These applications should be tested in advance (Musiał, 2019). Many people appreciate the comfort of being

at home, and when you can combine pleasant with useful, learning becomes more effective. However, if someone does not have access to the internet at home, many public places, such as libraries, offer free Wi-Fi access.

Teaching should be adapted to the requirements of the digital environment and the world as well as the use of new and mobile tools for young people (Kuźmińska-Sołśnia, 2013). Researchers believe that modernity is an important goal for education nowadays, and modern facilities can help in developing competences important from the perspective of cultural education. They are understanding training needs and cultural development in the process of lifelong learning (Słaby, 2014).

Learning a new language is an activity that requires the involvement of the learner's intellectual resources, and memorizing is an indispensable element of it. Therefore, it is extremely important that memorizing new vocabulary takes place with the involvement of many senses. While learning, words in a foreign language are encoded in the form of interneurons. The length of the interneural path for memorizing a word depends on whether the word matches with the entities existing in the brain linguistics. The higher the match level, the shorter the interneural path and the easier it is to remember. Treatment of neurodegenerative diseases is difficult, and not always effective.

In addition to pharmacology, intellectual exercise is one of the most important elements of therapy. However, it helps not only to inhibit neurodegenerative processes, but also it is a great part of prevention, and one of the best exercises for the brain in learning foreign languages.

The essence of learning and memorizing is very important, so it was decided in this article to present two applications – Quizlet and Reverso – which prove that learning can be interesting, natural, and useful in the aspect of adult learning.

Quizlet

Quizlet is a free tool for students, and teachers. It currently includes over 150 million flashcard-based and user-created practice kits worldwide. Quizlet is a mobile application and website that allows you to learn vocabulary in an effective and fun way. Users can learn anywhere and at any time of the day. It is possible to use Quizlet from the website www.quizlet.com or by downloading the application to the mobile phone. After setting up an account, it is possible to use the same login details both on the website and in the application. The easiest way to sign up is to use a Facebook or Google account, but it is also

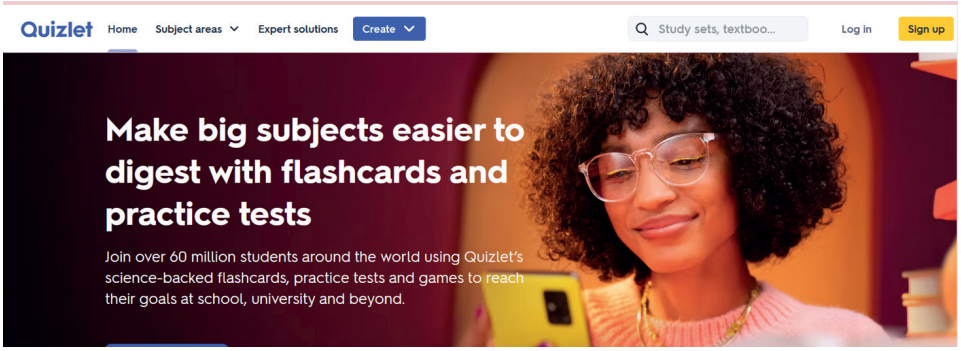

Figure 1. Quizlet

Source: https://quizlet.com/en-gb (retrieved: September 17, 2022).

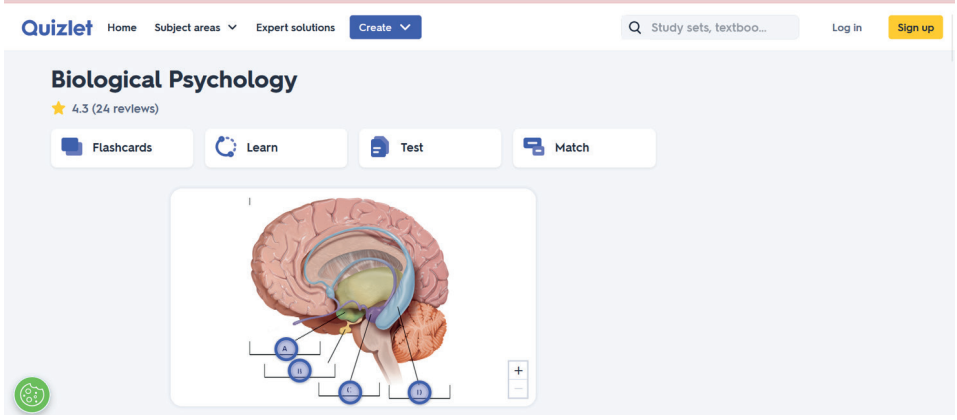

Figure 2. Quizlet – Biological Psychology example

Source: https://quizlet.com/240278214/biological-psychology-diagram/ (retrieved: September 17, 2022).

possible to create an account in a traditional way. Quizlet offers a paid version, but the free version is more than enough for effective studying.

Quizlet is used to learn not only languages, but also chemistry, history, and math. It can be used on a computer, tablet, and smartphone. The types of exercises vary greatly. The exercises are searched for using the search engine – just type an interesting topic or a phrase and press Enter. After a while, a list of flashcard sets will appear. The sets often contain pictures, which will make it easier to remember words and make learning more attractive.

The Quizlet app allows users to:

- learn from flashcards,
- obtain solutions to tasks from textbooks verified by experts,

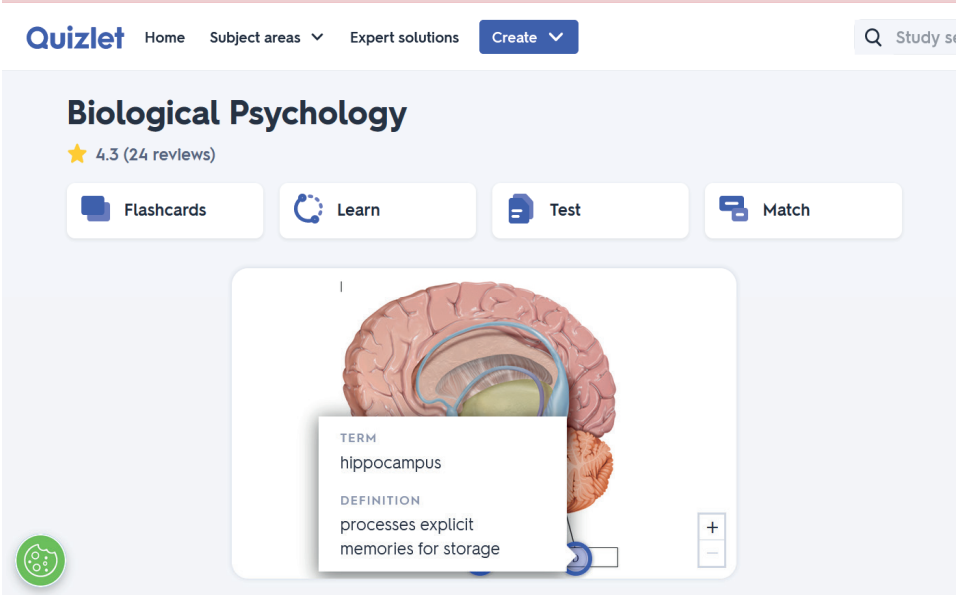

Figure 3. Quizlet – Biological Psychology example with a note
Source: https://quizlet.com/240278214/biological-psychology-diagram/ (retrieved: September 17, 2022).

- share flashcards with friends, classmates or students,
- prepare for your exam in the *Learning mode*,
- recall the test material in the *Writing mode*,
- race against time in the *Match game*,
- learn English and other foreign languages,
- listen to users' correct pronunciations in 18 languages,
- learn science, math, history, programming and more.

This section will provide tips on how to create study kits. First of all, make short sets of 20–30 words maximum. Extensive folders with a three-digit number of words only discourage you from opening the application. It is important to group the vocabulary thematically, or according to lessons or sections in the book. Double coding is also important, i.e. learning with words and pictures, which can make it easier to remember[2].

[2] See: https://mockingbird.pl/quizlet-w-nauczaniu-jezykow-obcych/

Reverso

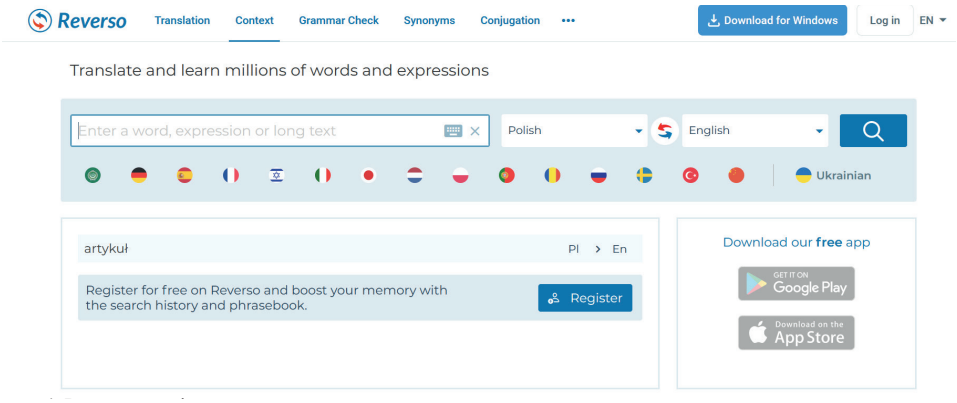

Figure 4. Reverso – main page

Source: https://context.reverso.net/translation/ (retrieved: September 17, 2022).

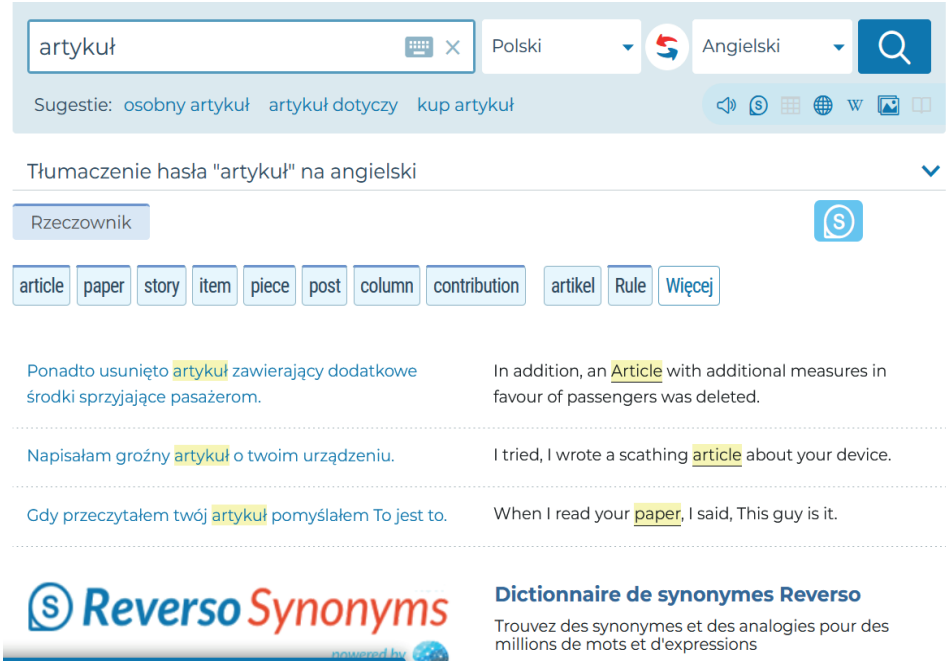

Figure 5. Reverso – translations in context

Source: https://context.reverso.net/ (retrieved: September 17, 2022).

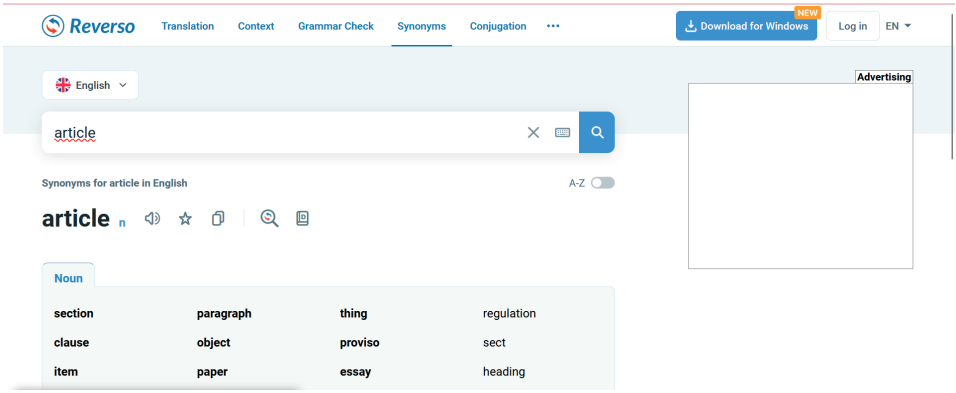

Figure 6. Reverso – synonyms

Source: https://synonyms.reverso.net/synonym/en/article (retrieved: September 17, 2022).

Reverso is an application primarily used for translations. Main feature of which is the context – by entering a phrase or word in the search engine, it shows examples of its use in various contexts. In addition to the translator function, the app also includes a learning mode and different verb variations in any tense. There are 14 languages to choose from the application: English, Arabic, French, Hebrew, Spanish, Dutch, Japanese, German, Polish, Portuguese, Russian, Romanian, Turkish and Italian. When it comes to translations, the application is designed for everyone – regardless of age, language proficiency or profession. It is different in the learning mode – users should definitely know at least the basics of the language, because the sentences are not translated into Polish language there.

In addition to the main functions of the application, Reverso also has the option to go to the next level as you learn, adding words to your own dictionary as well as translating text from a picture. An interesting addition is the word of the week – a new word in the language, which the user is learning (the notification pops up on the phone). There is also a possibility of buying a premium version, which includes access to unlimited examples of translations, offline learning or disabling ads.

The advantages of the application include:

- translations in context for better understanding the use of a word,
- possibility of choosing a learning strategy to suit one's own needs,
- notifications for the word of the week,
- option to add words to the users' dictionary.

The disadvantages of the application include the following aspects, although they will result from the differences between individual users:

- the learning mode is not suitable for beginners,
- translation of the application itself – the dictionary is signed as "glossary" and the learning mode as "teaches itself" – it is understandable, but not professional,
- it is not possible to select specific categories of words to learn.

Own research

Research Methodology

In order to obtain information about mobile applications used by students, a survey was carried out. The research is another in a series devoted to modern teaching techniques and tools. Its aim was to get to assess the level of knowledge of people in early adulthood on the subject of mobile applications and their use in educational practice. More information about the research procedure, hypotheses and the research group will be presented in the following sections. In addition to the questionnaires, structured interviews were conducted. Since 2019, 300 students at Maria Curie-Skłodowska University and 55 Erasmus+ representatives have been surveyed.

Research hypotheses

For the purposes of the study, the following hypotheses were formulated:

1. Respondents aged 19–26 have knowledge about the use of mobile applications for education.
2. Young people know mobile applications and they use them in everyday life, including education.
3. Young people perceive the possibility of using mobile applications as an innovative way of learning and building their own habits enabling educational success.

Additional objectives of the article are to present in a nutshell the topic related to mobile applications, to evaluate the reasons for using mobile applications and to indicate applications the most frequently used by the research group.

Research methods

The research is part of a larger project at Maria Curie-Skłodowska University in Lublin (UMCS). Only part of the research is described in this article. The research tool has been prepared in an interactive Google form. An original questionnaire was prepared for the purposes of the study. The study was conducted using an interactive Google survey covering the period from April 2019 to the present (September 2022). This period covers the distance learning period at Maria Curie-Skłodowska University in Lublin. Research continues to date. The survey consists of 5 open and 15 closed questions. In addition, the respondents were asked to provide contact details in order to conduct in-depth interviews carried out by educational platforms such as Microsoft Teams and the Virtual Campus of UMCS.

The research was divided into several topics: knowledge about mobile applications, the use of applications in educational activities, advantages and disadvantages of specific applications and modern teaching techniques. The survey was voluntary, and the anonymity of the respondents was also ensured. The form was sent to over 600 people. For the final analysis, 300 respondents – 180 women and 120 men – were chosen.

The respondents were students who study online. They were invited to the study and gave their voluntary consent to participate in the fields of psychology, pedagogy, cognitive science, philosophy and physical education. Some of them did not agree to use their answers in research work or had no experience with the use of mobile applications. Structured interviews were conducted with the respondents, which allowed for a qualitative analysis. In this work, the author will focus on the description of 2 randomly selected structured interviews (UMCS student and Erasmus+ attendee).

The author believes that this may become an interesting reflection on the evolution of this issue and multi-faceted changes in the perception of specific situations.

Case study I
Gender: male
Age: 25
From: Turkey

1. Do you have knowledge of mobile applications in education?
I admit that it has never been a priority for me. I started dealing with applications as I noticed that I was addicted to my computer and phone.

2. Do you use mobile applications for learning?
Since I am participating in Erasmus, I noticed that using various types of applications is important to me. Polish is quite a difficult language. Trying to learn from the application can be, and actually was, a helpful element for me. At first, I was not convinced of these applications because I really did not feel the need to learn. However, without it, it was hard for me. Now I think that I am more open to using different types of applications. On one hand, it is a free option, and on the other, there is a chance to just learn something and be better at what you do. In addition, I study psychology, so understanding others' needs and sometimes the need to look for options, for example prophylactic or therapy, is important and it is worth practicing it yourself.

3. Do you think that the use of mobile applications can be classified as an innovative teaching method?
As far as I am concerned, I think applications are the future. I do not have motivation and perseverance to remember various things. I do not remember many things and it is difficult for me to reconcile all my activities. First, I am a student, second, I work or implement a research grant. It is very important to me and sometimes there are too many things to do. Additionally, I notice that when I am not in contact with a foreign language or even my mother tongue, I sometimes forget various words, which is why I think that these cognitive processes need to be shaped all the time and it is important to look for opportunities that would help me in some way. I would like to try various applications for planning my time, but also to work effectively and to learn, for example, with the use of Pomodoro, which is good for time planning. I've noticed that I get distracted a lot and I don't know how to deal with it. Therefore, I think that modern learning, but also e-learning, are great opportunities especially for personalized experience. For example, I am much better at learning independently than learning during lectures, therefore I believe that for many people like me it is the future.

Case study II
Gender: female
Age: 22
From: France

1. Do you have knowledge of mobile applications in education?
I can say that I use a lot of applications for learning. I am familiar with applications for learning foreign languages and planning my free time. These applications also allow me to control my body condition such as activity (number of steps), blood pressure, weight and more.

2. Do you use mobile applications for learning?
I believe that these are also development applications and thanks to them I can control what is important to me. It is also important that I can use these applications at any time of the day, regardless of whether I am away, at school or at the beach or anywhere else. In fact, with apps I can do the essential tasks for example study. It is important for me to learn even one word a day. Therefore, I use applications very often.

3. Do you think that the use of mobile applications can be classified as an innovative teaching method?
I believe it is obvious that the use of applications is characteristic to modern learning techniques. With applications, you can do something important for yourself at any time, whatever it is, for example, sports, fun, self-control or any other activity. A person like me sometimes needs reminders of certain things. Stressless applications remind you of certain responsibilities, e.g. about meeting in an hour, or to drink more water. Now, while writing this, I can say that I have at least 25 applications on my phone. I use twenty of them very often. Most of all, I have downloaded applications that allow me to listen to music and podcasts. Which I also believe is learning (listening in a foreign language). I have also apps for example to control the number of steps. This is also my personal development. I can check the weather. Most of all, however, I mean learning new languages, because I am on student exchange in Poland, and I care about it. It is also important for me to remember, i.e. to train memory, create graphics, send emails and do other things. My understanding is that such kind of applications allow me to have a hobby and to do things that are useful for my work – scientific and professional. The basis of this is also the fact that I can do it immediately, which also favors my results on many levels.

Selected practical implications

1. Information about the advantages and disadvantages of e-learning should be explained in theoretical and practical terms.
2. It is important to implement modern teaching techniques at every educational stage, including addiction prevention.
3. Taking advantage of modern technical possibilities may be an inseparable aspect of functioning.
4. Informing about applications or e-learning should be free from stereotypes.
5. Having knowledge and inspiration on aspects related to mobile applications and modern teaching techniques may be associated with personal development.
6. Teachers, regardless of their views, should encourage students to use technical possibilities.
7. Applications or new methods of expanding knowledge should be used even during traditional classes at various educational stages.
8. Elements related to mobile applications should be introduced at every stage of education, including the academic level.
9. Attention should be paid to preventive aspects – addiction to mobile phones, games or to the internet.
10. Teachers should carefully select applications and learning opportunities for the target group.

Summary

Undoubtedly, e-learning is a helpful tool, but it has its drawbacks. In the event of a pandemic, there was no other solution than transitioning fully online or, at a later date, to hybrid studying. COVID-19 was a huge challenge for students, teachers, parents, but also FOR employees and employers. An important factor in improving the effectiveness of this form of learning is self-discipline and systematic learning. Difficulties in using computer programs, loss of internet connection or lack of it, become a great obstacle when it comes to using remote education. However, distance learning brings many benefits, especially for adults who have decided to take distance learning up and combine it with work, it allows an additional development with better prospects for the future. An important element is that the use of technology allows personal development, which would not be possible otherwise.

To sum up, respondents of age 19–26 have knowledge about the use of mobile educational applications. Although this knowledge, in most cases, is not systematized, education in this field is important.

Young people know mobile applications and they use them in everyday life, including education. However, from the available results, it can be concluded that this data is not satisfactory. Sometimes respondents only use a notebook or documents to write down aspects that are important to them, instead of using beneficial applications.

Most of the respondents (over 90%) perceive the possibility of using mobile applications as an innovative way of learning and building their own habits enabling educational success. At the same time, it is worth mentioning that this is declarative knowledge, as they do not always use these possibilities in practice. Despite the fact that they have technological or time capabilities, e.g. appropriate equipment.

Knowledge of the mobile application market in many cases becomes a priority. Lack of knowledge, skills or access to technology may result in some kind of exclusion or the necessity to use older, less profitable ways. Expanding knowledge about mobile applications, use of the internet, mobile phones, laptops and modern computer programs can contribute to the fact that children, adolescents and adults will not become so addicted. This task is very difficult and complicated, but preventive and educational activities can be a great resource. Educational activities, although not in every case, may contribute to the fact that more and more people will spend their time constructively, using modern technologies, and not only recreationally, e.g. playing computer games. It turns out that both students and parents express their views on the implementation of online education during the pandemic. Parents' opinions about this form of learning are not the best, however, you can find advantages such as developing computer skills, greater independence, saving time on transporting children to school, and quick and easy access to feedback on the child's progress in learning. The negative aspects are the length of time spent in front of the computer, inadequate preparation of teachers for online classes, not enough movement, and lack of physical education classes. There are many advantages and disadvantages, which will depend mainly on individual differences and needs. However, the perspective of changes and appropriate selection of methods to match one's preferences seem to be developmental and future oriented.

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Analysis of E-learning Trends on the Basis of Students' Opinions

ABSTRACT

The aim of the article is to learn about students' experiences in relation to current e-learning trends. In the context of a pandemic and post-pandemic situation, this topic is particularly important. The article examines the preferences regarding the selection of applications used for didactic purposes, methods of communication among students and also analyzes changes in the way of transferring knowledge by lecturers to students. In order to learn about the opinions of the academic youth, surveys were conducted among students from various universities.

Keywords: e-learning, trends in remote education, educational applications.

Introduction

Every year, a new year class of students enters universities, and they are different from their older colleagues in many respects. However, Łucja Kapralska (2020) notes that the current generation is quite unique. For the first time, these are young people who grew up in the world of the Internet, who skillfully use advanced technologies and who do not know what the world was like before the network became common. They are representatives of the Y and Z generations, digital natives who do not accept the division into online and offline reality, because they function in both at the same time. Technologies are their natural habitat. They exchange a notebook for a smartphone, Wikipedia replaces a multi-volume encyclopedia for them, they treat social media as a substitute for social life and they switch from taking meticulous notes to

taking photos of PowerPoint slides. Having in mind the above reflections, it seems obvious that traditional education must change.

The board, tables and narrative lectures may be perceived as obsolete or even tedious. Current students grow up with a constant presence of media that provide them with countless visual and auditory stimuli. This situation forces teachers to use a dynamic and interactive form of conducting classes. The lecturer should choose tools for transferring knowledge in accordance with the requirements, expectations and perceptual abilities of a contemporary student and resign from the role of a thinker, the only master and mentor in favor of a role of a guide and helper, who interacts with students and creates personalized learning paths with them. Nowadays, universities educate students born after 1995, who are the representatives of the Z generation and for whom the Internet and social networks constitute the natural living environment. However, unlike their older colleagues, they choose Snapchat, not Facebook, and give up a desktop computer for a smartphone. Currently, one can observe the phenomenon of young people's activity being transferred to the Internet, which gives them unprecedented freedom of action. The COVID-19 pandemic has intensified this situation even more and forced the need to receive education through e-learning. Permanent immersion into the digital world of the academic youth prompts reflections on changes in the way knowledge is transferred. The aim of the article is to present e-learning trends, describe preferences regarding the selection of applications used for didactic purposes, methods of communication among students, as well as analyze changes in the way of transferring knowledge on the lecturer-student line. The article presents the results of the research, which are based on the survey conducted online. The group of respondents consisted of students from various universities throughout Poland.

E-learning – theoretical assumptions

E-learning is used at various levels of education, from primary school to university. It is also successfully used in the business environment. This term can be defined as one of the forms of education, which uses all available electronic media, including computer networks, satellite, television and radio transmissions (Szabłowski, 2009). With the growing popularity of distance learning, in particular in the context of the pandemic situation, e-learning is more and more often the subject of interest of scientists studying the phenomenon from various research perspectives. Irena Pułak and Małgorzata Wieczorek-Tomasze-

wska (2016) write about e-learning in the context of key trends and challenges related to the implementation of new technologies in higher education. The considerations relate to the changes taking place in the didactic process under the influence of the use of new media and digital technologies. The article also discusses new perspectives of humanities-related research in the context of the development of digital education. "Special issue on the current trends in E-learning Assessment" (Lara, Aljawarneh, & Pamplona, 2020) is an interesting publication in the field of foreign language literature. The paper reviews and presents current trends related to e-learning, e.g. gamification. It also presents recommendations and suggestions for, among others, theoreticians exploring the field of e-learning in order to improve the quality of research in this field.

Every year, the EDUCASE Learning Initiative[1] (an association promoting academic teaching in new media) develops "The Horizon Report", which is considered one of the most important sources of current trends in higher e-education (Brown et al., 2020). The aim of the report is to describe and evaluate the technologies implemented, as well as predict scenarios and how they will affect the shape of education in the world over the next 5 years. The report is based on the knowledge and experience of a group of experts and practitioners from around the world (e.g. Asia, Africa, Europe, America, Australia), representing higher education, teaching and learning, as well as the technology industry. The authors first study literature extensively and then vote, giving each vote its proper weight. After having created an initial list of new technological solutions, trends and practices, the authors choose the most important problems in four categories: trends, new technologies and practices, directions of development, consequences. The last edition of the report was prepared in March 2020. In terms of trends, new technologies and practices in higher education, the authors emphasize the important role of artificial intelligence and machine learning. One of the applications that use such solutions is automated chatbot software, which supports students. For instance, it is able to search for scientific resources, verbally answer a question about the functioning of the library or be used to conduct the recruitment process of students. Some algorithms can also predict students' scientific results before the class begins, which allows cooperation, sharing of resources and knowledge.

[1] It is a global non-profit association, whose mission is to develop higher education through the implementation of new technologies. Its members are, among others, American and international higher education institutions and corporations, with more than 100,000 people associated in member organizations located around the world (source: https://er.educause.edu/about).

In the category of developmental directions, the authors predict four scenarios. The first is the growth trajectory of higher education, in which academic teaching is developed to the great extent, but some of its problems remain only partially solved. The second scenario predicts a decline in the role of higher education. Another scenario is the vision of higher education plagued by failures beyond its control. The last scenario, however, is a vision in which higher education gains a new quality and becomes transformed. When it comes to the consequences resulting from the implementation of new technologies, the authors used higher education in Australia, Canada, Egypt, France as a reference (Brown et al., 2020).

E-learning trends

The following scopes determining the shape of contemporary academic e-learning can be distinguished (Kurek, 2013):

- mobile applications: In 2021, according to data from the Office of Electronic Communications, 77.3% of Poles declared to have access to the Internet on their phones (UKE, 2021). In remote education, smartphones can be, therefore, allies in the implementation of an educational mission, more and more commonly accepted by teachers and lecturers. New mobile learning applications keep on appearing on the market;
- tablet and mobile revolution: tablets with large screens, equipped with the function of touch and movement, have become a perfect equivalent of a computer and at the same time: a tool for sharing teaching materials, films, photographs or presentations, via Internet links;
- analysis of the learning process: thanks to the tools for data interpretation, data are collected directly based on students' behavior during exams and classes, as well as on social interactions, extracurricular activities and activities on forums, which allows to evaluate progress in learning, forecast trends and expose potential problems. This allows academic teachers to adapt to the capabilities and predispositions of students;
- use of games in learning: it turns out that academic teachers and game producers cooperate in creating games that can be used in e-learning, from social games, focused on carrying out specific missions, to team and individual ones, which enrich skills in various disciplines.

Other trends in the field of modern remote education can include:

- continuous development of communication forms, including the improvement of omnipresent online platforms thanks to the modernization of information technologies;
- crowdsourcing, i.e. a tendency to joint creation and dissemination of knowledge;
- three-dimensional computer applications: the use of 3D platforms in communication and research activities;
- the creation of network communities, also of an educational nature, and transfer of the process of creating educational content to the recipient – increasing involvement of learners in the learning process, including them in the responsibility for the learning outcome (Kurek, 2013).

E-learning trends – own research

The survey was conducted in August 2022. The research group consisted of 32 students from various universities. The respondents were selected randomly from different parts of Poland. The invitation to the research was published on the Facebook social networking site. The research was conducted with the use of an electronic questionnaire in August 2021. The survey included eight closed-ended questions and one open-ended question. Respondents had a possibility to indicate more than one answer. The study was anonymous. The questionnaire was prepared in Polish, the respondents answered in Polish, then the content of the answers was translated by the author into English. The aim of the survey was to learn about the experiences of students with e-learning – trends in remote education, preferred applications used by students for educational purposes, as well as their preferred methods of communication.

In the first question, students chose the most commonly used digital tools for didactic purposes. It was possible to select only one answer from the ready-made list, but the respondents could indicate their tool in the "other" window. The answers are presented in Figure 1.

The vast majority (25 people) chose Microsoft Teams. Half of the respondents use mailboxes. Zoom also enjoyed high popularity – it was chosen by 11 respondents. Google Meet and Google Docs, on the other hand, is used by 8 students. Only 3 people use Discord and only 2 use Skype. Users also mention once ClickMeeting and Moodle. One of the students gave an answer by himself/herself and pointed to "MS Forms, Moodle, MS Office". No student has selected

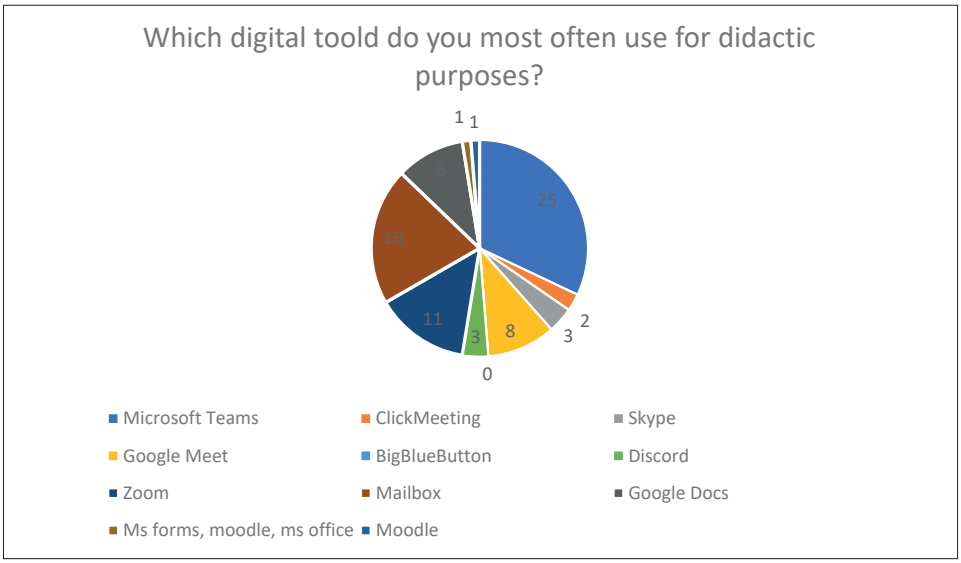

Figure 1. Answer to question no. 1
Source: Author's own elaboration.

"BigBlueButton"[2]. The popularity of Microsoft Teams may be due to the fact that it is a free program for students and the interface is pleasant to use. Teams seems to be a useful application for studying and business, but it will not work as an application for private use. The program is equipped with a number of functions: e.g. the ability to conduct voice and video calls, exchange private messages, place files, integrate with the calendar, manage groups of users and work within Word, Excel and PowerPoint files. The popularity of this tool might be due to the fact that it is integrated with Office and focuses work in one place, which is why it will work better for educational institutions than ZOOM or Skype. Students can use the application free of charge during their studies. Currently, all students have an email account (otherwise it would not be possible to register for a course). This is usually the first form of contact between student and lecturer. Students use private mailboxes or accounts created through university platforms. Some courses or year classes have a group mailbox to which the lecturers send materials. BigBlueButton is a tool that allows users to share images, sound, presentation, computer screen and have conversations in real time using chat. It does not function as a separate program but is launched as

[2] Based on questionnaires no. 1–32

a function of some university platforms, which may explain the low popularity of this solution among respondents.

The second question was similar to the previous one. The respondents pointed to Microsoft Office applications as the most commonly used for teaching purposes. The distribution of answers is illustrated in Figure 2.

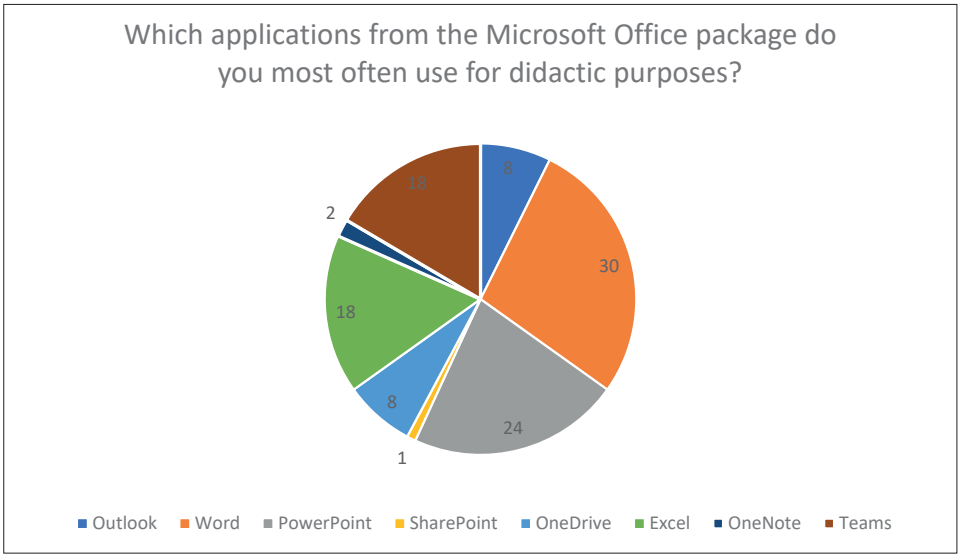

Figure 2. Answer to question no. 2

Source: Author's own elaboration.

Word definitely was the most popular among the answers (30 people), followed by PowerPoint (24). Excel and Teams were placed equal third, while Outlook and OneDrive were indicated by 8 people. Only two people pointed to OneNote and one to SharePoint[3]. The fact that students most often pointed to Word is not surprising. It is this program that students use to express their knowledge and thoughts while writing their theses. OneDrive and SharePoint are used to store files in the cloud. The first program is for private use – it saves files that are created independently. Files are private but can be shared with others. SharePoint, on the other hand, is a platform for cooperation within the team. The materials created there are made available to the whole team.

The preferences for using Microsoft Office applications set out in the second question were confirmed in the answer to the next, third question, which

[3] Based on questionnaires no. 1–32

concerns the choice of mobile applications used for teaching purposes. The results are presented in Figure 3.

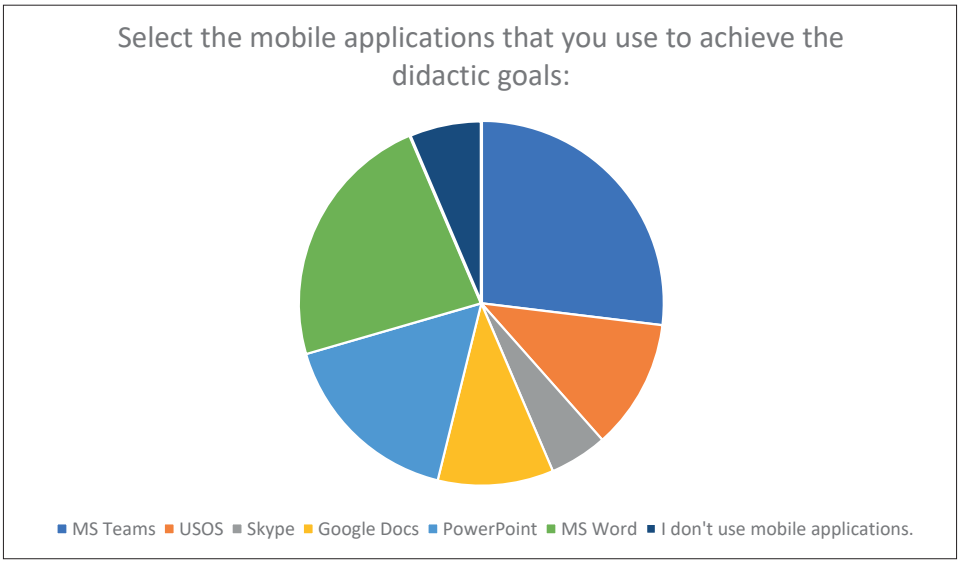

Figure 3. Answer to question no. 3

Source: Author's own elaboration.

Similarly to the first two questions, Microsoft Teams turned out to be the most frequently chosen application. Students also appreciated the mobile version of Word (18 people). A high response rate was noted by PowerPoint. 9 respondents chose USOS and 8 – Google Docs. 4 people marked Skype. The remaining respondents (5 people) declared that they do not use any mobile applications[4]. The answers show that mobile applications can also be an ally in education. Students, more and more often, are professionally active during their studies and frequently have problems with time management. A mobile app helps to eliminate the space and time barrier. In order to listen to a lecture, a student does not have to turn on a laptop anymore or spend time in front of a desktop computer – it facilitates the reconciliation of professional duties with those related to university and it saves time. Smartphones are the dominant form of interaction with the environment, and they can be an extension of students' activity. The potential of mobile device is evidenced by the fact that almost

[4] Based on questionnaires no. 1–32

80% of adult people from Poland use a smartphone. Therefore, a smartphone deserves to be a fully-fledged educational tool in e-learning.

Another point of research was learning about the preferences regarding digital tools used by students in group work. The distribution of answers is presented in Figure 4.

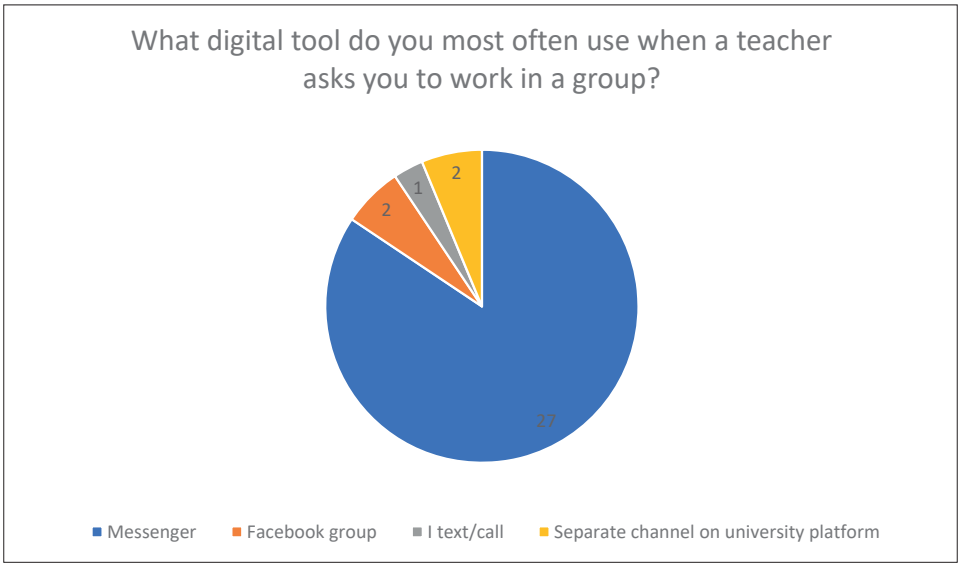

Figure 4. Answer to question no. 4

Source: Author's own elaboration.

The vast majority of students (27) communicate via Messenger, only 2 people indicated a Facebook group and a separate channel on the university platform. One of the respondents deals with group work by contacting others using text messages/phone calls[5]. The answers may be justified by statistical data on the popularity of instant messengers. According to a study conducted by Mediapanel (2022) in August 2022, Messenger ranked first in the category of popularity of Internet messengers. Nearly 22 million people declare using this communicator.

The fifth question examined which device is most often used by students. The results are presented in Figure 5.

[5] Based on questionnaires no. 1–32

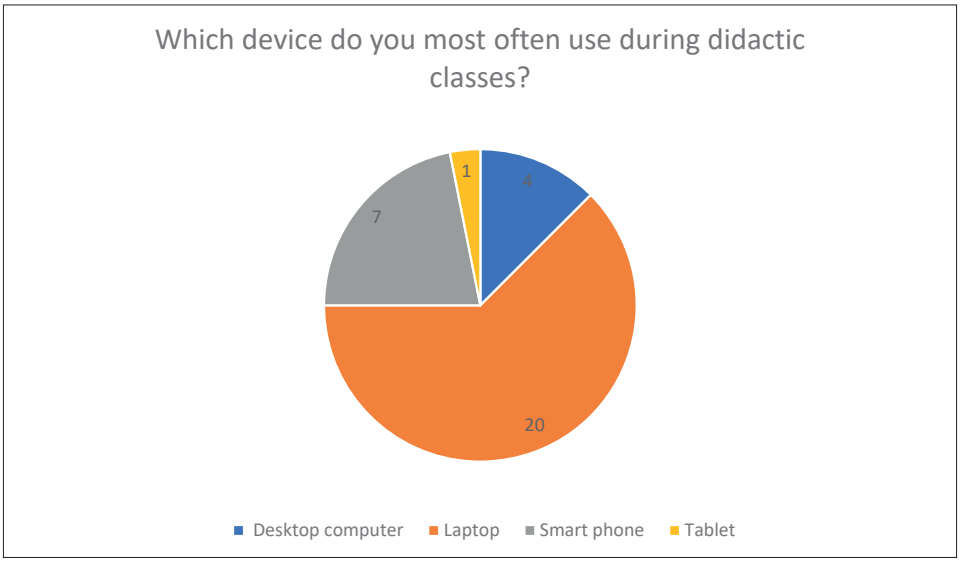

Figure 5. Answer to question no. 5
Source: Author's own elaboration.

The vast majority use a laptop – 20 people. Students also appreciate working on smartphones. It may seem somewhat surprising that only 4 people use a desktop computer[6]. Only one person uses a tablet. Mobility of this type of device is in favor of smartphones. The smartphone can be used freely outside the educational facility. Multifunctionality is also an advantage. The student can create voice notes, written notes, participate in videoconferences. From the student's perspective, the function of scanning texts also seems important – many smartphones are equipped with a function of scanning. On the other hand, it is difficult to imagine remote learning only via a smartphone. This is possible, but not very comfortable. A smartphone can only be an additional tool, but a computer still remains the most adequate. A tablet is a cheaper alternative, but its technical parameters can often be insufficient to participate in online classes.

In question 6, the respondents were asked to indicate the program, which, in their opinion, is the most useful in creating multimedia presentations. The answers are presented in Figure 6.

The vast majority prefer PowerPoint. Two respondents prepare presentations using Google Presentation. Few answers mention such programs as

[6] Based on questionnaires no. 1–32

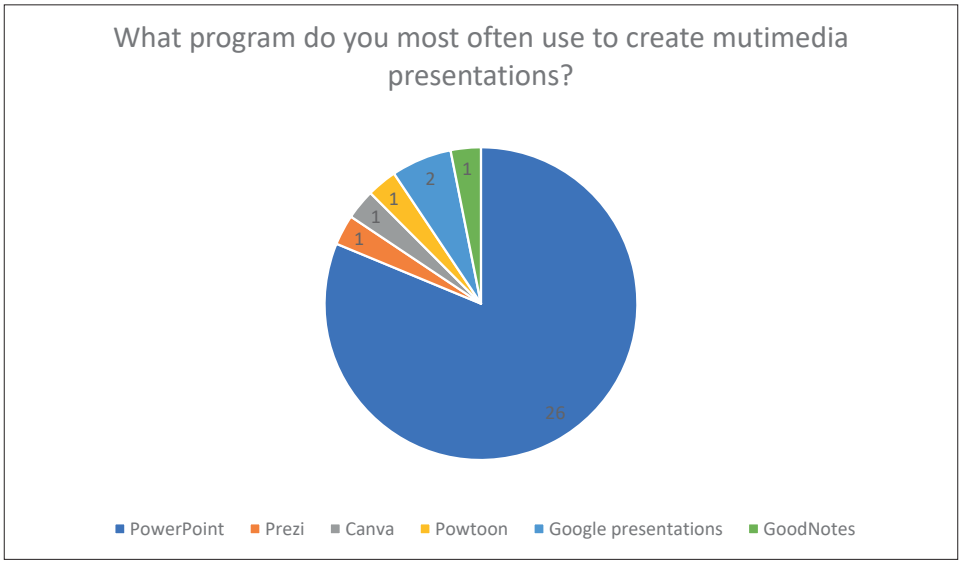

Figure 6. Answer to question no. 6

Source: Author's own elaboration.

Prezi, Canva, GoodNotes, Powtoon[7]. Today, it is hard to imagine a situation where a lecturer recites the content of a lecture solely on the basis of their notes and focused students meticulously note it down for 90 minutes. Such a form is outdated and ineffective. A student needs an interactive form and to experience while acquiring knowledge. Multimedia educational materials are the alternative which is used successfully in e-learning. The content of didactic classes presented in the form of slides, enriched with tables, video materials and graphics, engages the sense of sight, which has a positive impact on the effectiveness of teaching.

The last question was of a different nature than the previous ones. The respondents were asked to indicate the applications they use, but not listed in the previous answers. WhatsApp, Visual Studio, Statistica, Google Classroom, Mendeley, Mentimeter, Jamboard were among the applications that appeared[8].

The question: Do you use educational games during didactic classes, was answered negatively by 26 respondents[9].

[7] Based on questionnaires no. 1–32

[8] Based on questionnaires no. 1–32

[9] Based on questionnaires no. 1–32

Surveys – conclusions

The conducted research proves that students use Microsoft Teams most frequently. When it comes to Microsoft applications, also used in e-learning, students most often pointed to Word. E-learning is also eagerly used by academic youth in a mobile form. This new model of education, e-learning, is one of the key trends in distance learning. Another tendency is to move away from a linear lecture in favor of the transmission of interactive content, engaging students, e.g. in the form of multimedia presentations. The transfer of knowledge in this form creates a greater range of possibilities. Multimedia means stimulating different senses and communicating information in a multifaceted way. The didactic content is more attractive in terms of visual, sound and aesthetics. It turns out that most students do not use educational games during didactic classes.

Conclusion

Distance learning is the subject of scientific debate and numerous publications. E-learning seems to be an integral part of academic education. The shape of this education depends on the voices of students whose expectations change with the development of digital reality. The changes that take place along with the development of modern technologies always carry the risk of uncertainty. It does not seem reasonable to believe that future generations of students will respond positively to traditional methods of learning if they grow in the digital media environment. Effective education should coexist or at least be integrated with the media.

Tomasz Goban-Klas (2014, pp. 19–20) assumes that the new reality: with media being engaged in education, requires a reasonable reconstruction, "not subject to marketing of praises of the new technology as a panacea of the university's problems." The reconstruction is based on knowing the intellectual resources, social level, mental preparation of students and motivated by psychological, social and pedagogical research. This issue cannot be diminished and limited to the government's project of a free textbook or e-textbook, i.e. dealt with without reflection, without intellectual background, postponed until the next academic year... Furthermore, the media expert, referring to the words of the then editor-in-chief of the online magazine "eMentor", focused on issues related to e-education, knowledge management, e-business, points to the need for a professional debate and expert panels, during which it would be possible

to improve the teaching skills – they should be part of the so-called Personal Development Plan.

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JOLANTA DYNDUR[1], MARLENA STRADOMSKA[2]

E-learning Issues on the Example of Selected Applications – Evernote, Lumosity, Pomotodo

ABSTRACT

The article is a research report on the evaluation of e-learning by students from abroad.
Method and research group: Research has been conducted since 2018 using an interactive Google survey of Erasmus+ participants. In addition, qualitative studies were conducted on 5 students, representatives of the nation's participating in the Erasmus+ program.
Aim of the work: The important assumptions of the research carried out were how students who come from other countries perceive classes conducted in Poland with the use of modern teaching methods. Students stayed in Poland from one to two semesters.
Results: subjects that were well assessed by students during academic classes were analyzed. It turns out that it was rated the highest by the blended learning model, consisting in conducting classes in a mixed manner using traditional teaching methods and e-learning. Erasmus students claim that e-learning classes are important in their case due to the need to move to the family country or to organize leisure time in Poland.
Conclusion: The idea of corporate social responsibility is increasingly being considered as an essential element of the strategy management of the entity, regardless of the profile of its activities – whether university or company. The article contains recommendations for blended-learning and e-learning on international student mobility.

Keywords: e-learning, international exchange, education and development, Evernote, Lumosity, Pomotodo.

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Introduction

The first distance learning models were developed in broad areas of business, education and military. Globalization is of great importance in the field of education. At this point, people who wish to qualify can do so regardless of the restrictions (Dziuban et al., 2018).

It turns out that diplomas from various universities offering online education are recognized in the work environment. E-learning, in simple terms, is the transfer of knowledge and skills using computers, smartphones, tablets, networks, etc. (Clark & Mayer, 2011).

What is more, the decentralized specificity and universal availability of networks and electronic devices allow for conducting courses, training or even studies without the need to physically attend classes, generating costs, allows for flexible learning adapted to the needs and capabilities of students. On the other hand, the use of e-learning methods has a positive relationship with active learning, the development of practical skills and student involvement, and learning with student satisfaction is one of the most important factors in the effectiveness of online learning (Fernández, 2017).

What is important, the teachers' approach may differ depending on the needs of pupils or students. A significant obstacle is cooperation with people with a recognized level of intellectual disability. These people need appropriate teaching methods to enable them to educate effectively, which may not necessarily favor distance learning. A large number of educators have often encountered gaps in IT knowledge, which makes it difficult to conduct classes. Teachers at different stages of education have noticed fewer online learning problems during the pandemic. What was involved in controlling the allocation of voices to people who report, allows for easy control of distractions. However, there are things that the educator was not able to control, i.e. turning on other applications by students, or doing something else, not related to the classroom. An important aspect is also the ability to focus on a given task, which is not easy for many people. It turns out that the effective use of an application can be conducive to long-term educational and then professional success.

Therefore, in e-learning, Cope and Kalantzis (2017) distinguish several methods of online learning:

- science management systems
- e-textbooks
- flipped classroom
- intelligent tutors, games and simulations

- discussion pages
- web workspaces and e-portfolios
- adaptive, personalized and varied instruction
- machine assessments.

Disadvantages of e-learning

E-learning provides many opportunities and innovation in the learning process, which cannot always be provided by classroom teaching. Despite the enormity of facilitations provided by e-learning, this type of learning also has disadvantages. Some of them will be presented and discussed below.

The disadvantages of e-learning include (Cidral et al., 2018):

- high implementation costs related to the purchase of an appropriate platform, IT equipment, etc.,
- in most cases, there is no direct contact with the teacher,
- the need for the student to be highly motivated and self-disciplined due to the lack of top-down control and compulsion to complete the studies,
- lack of social contacts and integration between course participants,
- problematic effectiveness control,
- the credibility of examinations checking the knowledge acquired during the course,
- barriers in the form of a lack of IT competences or adequate infrastructure,
- more time-consuming and labor-intensive than in the case of traditional education, the development of materials adapted to education in the form of e-learning.

Further exemplary disadvantages pointed out the following weaknesses of distance learning:

- technical problems (bandwidth limitations, Internet problems, technological incompatibility),
- limitation of social relations due to the lack of interactivity and feedback,
- lack of computer and Internet skills, fear of technology,
- educational problems (academic quality, assessment, teaching methods),
- high costs of infrastructure maintenance and development,
- organizational problems (lack of support, lack of trained staff, cultural resistance).

Both the literature and the practice of using e-learning indicate the following weaknesses and barriers to the wider use of this form of teaching:

- online student feedback is limited,
- e-learning can cause social isolation,
- e-learning requires strong self-motivation and time management skills,
- online students' lack of communication skills development,
- preventing cheating in online assessment is complex,
- lecturers tend to focus on theory rather than practice,
- e-learning lacks face-to-face communication,
- e-learning is limited to some disciplines (more theoretical than practical),
- online learning is not available to computer illiterates,
- lack of accreditation and quality assurance in online education.

Evernote

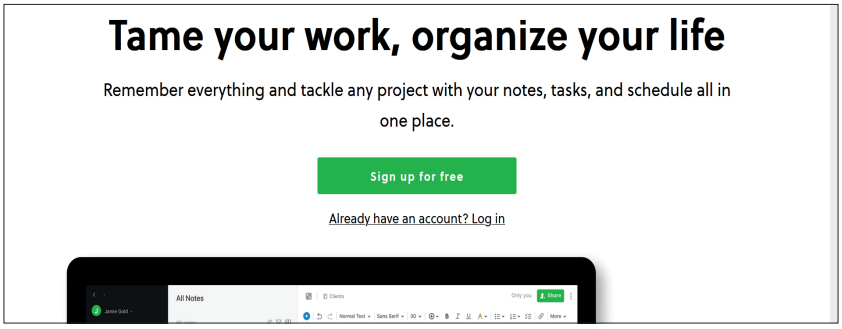

Figure 1. Evernote

Source: https://evernote.com/intl/en (retrieved September 17, 2022).

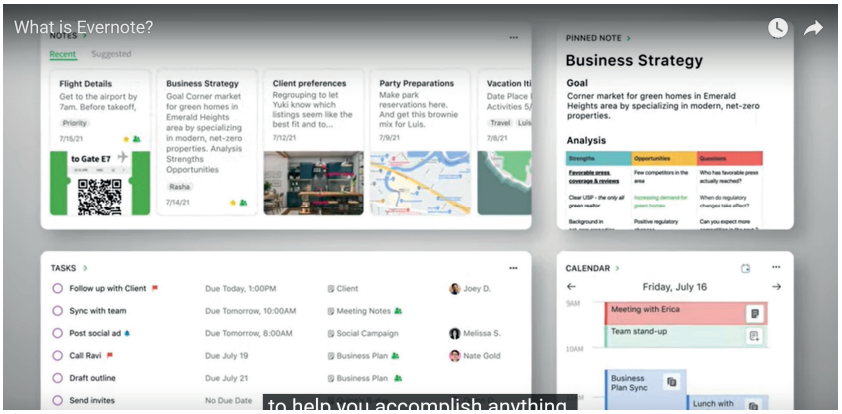

Figure 2. Evernote

Source: https://www.youtube.com/watch?v=NgkCgqIogcY (retrieved September 17, 2022).

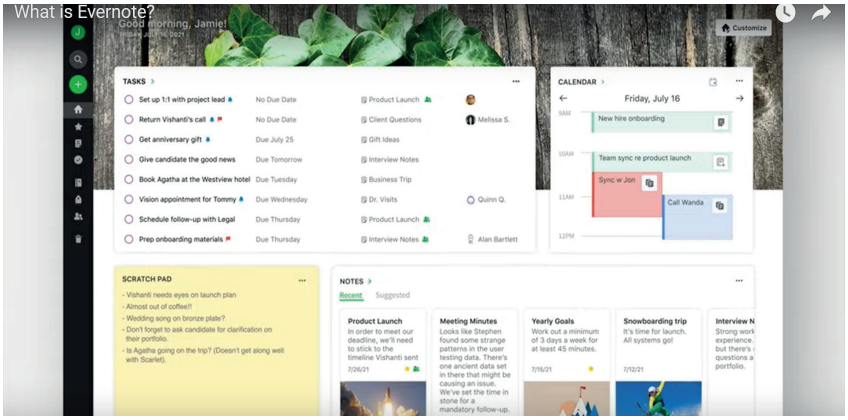

Figure 3. Evernote

Source: https://www.youtube.com/watch?v=NgkCgqIogcY (retrieved September 17, 2022).

The Evernote app allows you to save ideas and inspiration anytime, anywhere. In a virtual notebook information can be saved in the form of text, graphics and sound. All records are in the cloud, which allows you to use them from various devices.

Possibilities in the application:

- edit, track and manage tasks on one screen,
- adding appointments, reminders, and notifications to your tasks,
- connectivity of the notebook with the Google Calendar,
- receiving notifications when a task is performed as per calendar,
- adding photos, pdf files, spreadsheets to your notes,
- recording and playing back sound sheets,
- creating your own custom note templates.

Other features of the application include such elements as connectivity with Google Drive, so that you can add files to notes and have quick access and editing options, as well as the ability to access notes offline, both on portable and stationary devices. An important aspect is also sharing the note with other people, even if they don't use Evernote. Support and protection are available in the app. The data is strongly protected, the data included is subject to two-step verification ensuring additional protection. You can find help on the Evernote community forum and submit a support request to get answers to your questions.

Lumosity

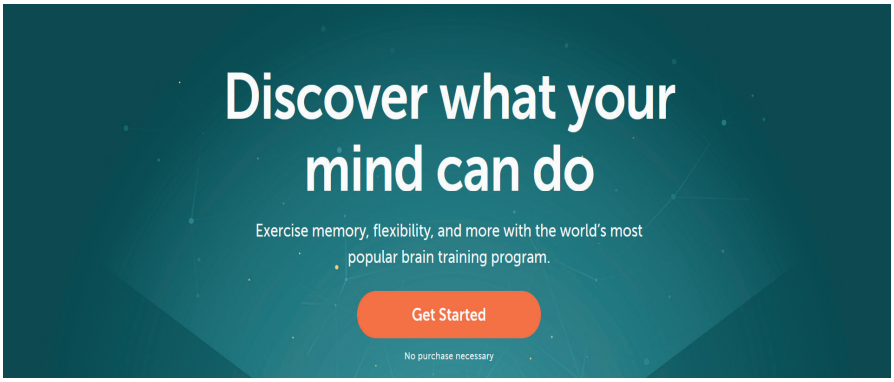

Figure 4. Lumosity

Source: https://www.lumosity.com/en/ (retrieved September 17, 2022).

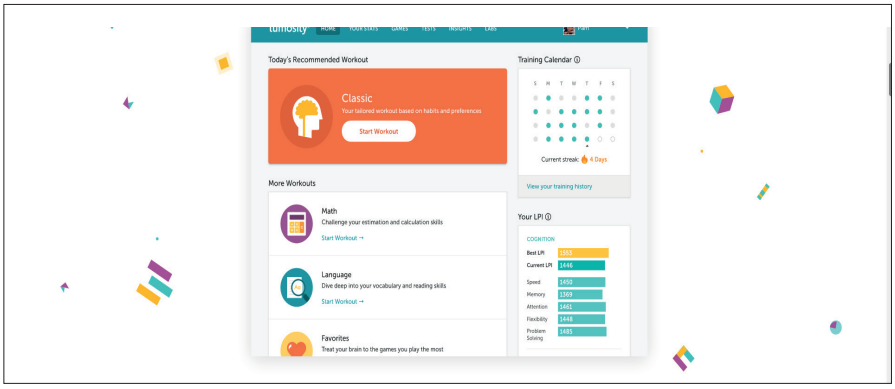

Figure 5. Lumosity

Source: https://www.lumosity.com/en/ (retrieved September 17, 2022).

The Lumosity app is used by over 70 million people worldwide. It is an application consisting of games, thanks to which the user can train attention, concentration, logical thinking, perceptiveness and memory. The application is intended for children, adults and seniors and has a great effect on the work of the brain. The application also allows you to choose user preferences, thanks to which you can train the most desired skills, and the program independently selects puzzles and determines an action plan. The app also selects tasks in terms of results, so games pose a constant challenge to the brain.

The application is created by a team of about 40 scientists from around the world and designers who discover new ways to exercise the brain and study its cognitive functions. Skilled researchers have unlimited access to Lumosity training and tools to explore new cognitive domains. They use popular cognitive and neuropsychological tasks or create completely new, experimental ones. Together with experienced designers, they transform them into games that practice basic cognitive skills.

When choosing preferences users can select – memory training, attention, brain flexibility, quick decision making and problem solving. After the game is over, the application shows the result that the user has achieved, as well as a percentage list comparing their result with the results of other users belonging to the same age group.

The advantages of the application include:

1. The level of difficulty is constantly increasing.
2. The games are fun and addictive.
3. Ability to compare your results with those of other users.
4. Possibility to check the obtained points.
5. Convenient access on a mobile device.

The disadvantages of the application include:

1. Most of the games are only available for premium accounts (USD 0.99–USD 59.99 per item – around USD 4–USD 254.92).
2. In the absence of a paid account, it is possible to play only 3 games a day.
3. Lack of Polish language in the settings (especially a great difficulty for children and seniors).

Pomotodo

The Pomodoro technique is a technique that helps in organizing work, or even organizing your own energy for work. The technique was developed by Francesco Cirillo. The name comes from Italian – tomato. The technique has nothing to do with healthy eating, but with the kitchen clock Cirillo used to keep time. In this process, concentration is important, and it is a thought process consisting in immediate focusing of consciousness on a specific task, stimulus, thought or object.

Nowadays, the main problem with focusing on work is the presence of constant distractions – you are constantly inundated with notifications from various social networks. A person is also constantly distracted from a task,

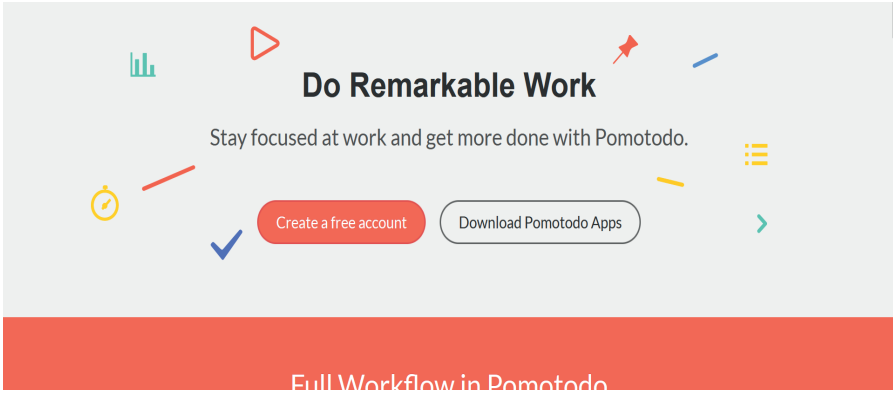

Figure 5. Pomotodo

Source: https://pomotodo.com/ (retrieved September 17, 2022).

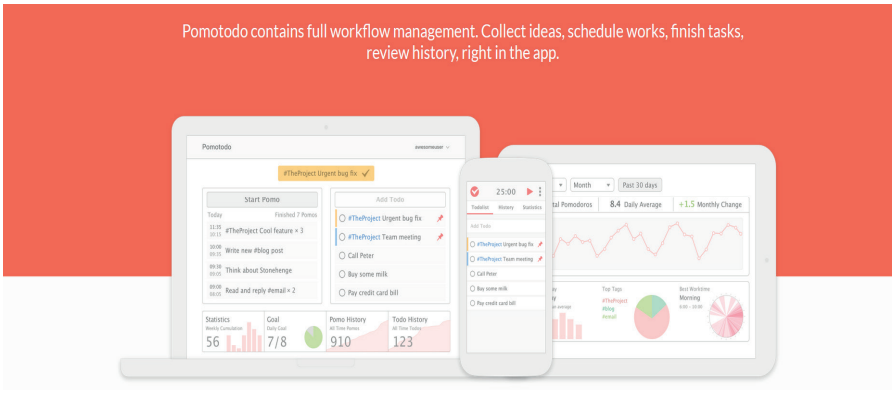

Figure 6. Pomotodo

Source: https://pomotodo.com/ (retrieved September 17, 2022).

and they then have to put more energy into completing this element. Another problem is working without a break, during which you can lose focus and in fact we only work seemingly. According to research, the technique is effective, because it forces us to focus for a short period of time, which makes it easier to avoid distractions than if we wanted to constantly work for a longer period of time. Short breaks promote concentration and make it easier to look at the problem with a fresh eye.

Pomotodo is designed for time management. It allows you to organize your study and work time and manage your duties. It is said that these 25 minutes is the time when you can work intellectually without getting tired. This method helps you make the most of your time.

Thanks to planned breaks, overwork can be avoided, which makes learning or work more productive. This method also increases motivation to study or work. It increases due to the fact that the working time is divided into sections. Thanks to this application, it is possible to better understand what and how distracts us and what to give up while working/learning. In addition, the application can teach you better time management, planning work or learning will come easily, because we will know how much time each activity takes. Thanks to it, we will be able to sort tasks from the most important to the less important ones. In addition, it facilitates the organization of time, starting work or teaching discipline, and improves the quality and speed of work.

This application may be intended for people who have difficulty concentrating. During classes, you can turn on the Pomotodo countdown, and tell your child to focus on the task until the clock shows 0:00. After this time, there will be a break that the child can use freely. This issue may also apply to adults. The application can also be intended for people who have communication problems. Users can set a short time, e.g. 5 minutes, for an attempt to communicate between the patient and the therapist. It can also be helpful for people who have trouble planning. The application is a way to solve difficulties among specific professional groups – programmers, designers and others who have to create projects on a regular basis. It is also useful for students who need to learn a lot of material from various fields in a short time during their exam assignments. The application can also be important for people who lack motivation to perform a specific task or for those who have learning difficulties.

Practical implications

1. Ensuring constant contact in the teaching process between the teacher and students.
2. Whenever possible, e-learning should be introduced at every stage of teaching, including academic one.
3. Students should be informed about the principles of conducting classes with the use of modern teaching methods, get to know the purpose of the classes and the practical application of selected methods.
4. Paying attention to training and workshops for teachers.
5. Paying attention to the appropriate knowledge transfer.

Practical recommendations for e-learning in student mobility and international exchanges:

1. It is important to adapt the methods to the individual skills and language abilities of students.
2. Foreign students should be able to combine traditional methods with e-learning.
3. Sharing materials on e-learning platforms will facilitate the exploration of knowledge.
4. Traditional education mobilizes contact with other students and development of integration.
5. It is important to pay attention to the development of technical competences of people cooperating with the academic staff.
6. It is important to promote the strengths of Polish education, which, in the eyes of students, also has significant advantages compared to the native education of individual students.

E-learning should be introduced at every stage of teaching, including academic one, especially in the form of blended-learning.

1. Students should be informed on what principles the classes will be conducted with the use of modern teaching methods, learn the purpose of the classes and practical application, the possibility of consulting the effects at every stage.
2. Ensuring constant contact in the teaching process between students and dormitories.
3. Developing academic discourse also on educational platforms, enabling synchronous contact with the lecturer.
4. Staff training, especially in the technical area, virtual contact with students, as well as the transfer of knowledge and maintaining the right proportions between the transfer of knowledge and homework.

Summary

E-learning aspects turn out to be very important for the civilization of the 21st century, which is mainly related to the fact that it can be used anywhere and anytime. An additional advantage is that it can also be used by representatives of various environments – from exact sciences to humanities. As has also been shown in recent pandemic and health situations around the world. There are important alternatives to what we can do with new technologies, and there are

more and more of them. Therefore, it becomes an increasingly important issue. This article presents only selected applications that allow you to learn, solve problems, but also exercise memory and other cognitive processes. Which also allows you to verify the knowledge and knowledge about your body and what can be achieved in the long term. These selected apps were most often chosen by respondents in the smaller study. They were indicated as the most useful for Erasmus+ students.

The important thing is that this article has theoretical rather than practical issues, hence these examples are mainly presented. It turns out that over 90% of respondents believe that they were unfamiliar with the applications used in the study (more than 25) and did not know that they could be so effective in achieving certain professional and academic successes. In this aspect, education, prevention and looking for new solutions are also important, because there are so many applications that it is difficult to choose the right one.

It is important to note that e-learning is a helpful tool, but it is not without its drawbacks. An important factor in improving the effectiveness of this form of learning is self-discipline and systematic learning. Hence the idea of studying the applications and their practical knowledge by students. Difficulties with the use of computer programs, loss of Internet connection or the lack of it, become a major obstacle when it comes to using e-learning. However, distance learning has many benefits, especially for adults who have chosen to take up distance learning and combine it with work, it allows for additional development with better prospects for the future. In the event of a pandemic, there was no solution other than switching to full online or later time – hybrid. COVID-19 was a huge challenge for students, teachers, parents, but also employees and employers.

It is worth mentioning that the variety of definitions of e-learning illustrates the ambiguous perception of this phenomenon and its multidimensionality. The common denominator is the use of new technologies and the Internet for learning, and the fact that it is a modern teaching method that improves the quality of learning.

E-learning, thanks to its modernity, can be a great alternative to traditional stationary learning. Thanks to the use of modern technologies and the Internet, it offers wide educational opportunities, regardless of location. It provides the possibility of learning in various conditions and circumstances, in which it was not possible before, which also gives wider and more common access to education. It is therefore a method of learning and teaching that significantly modernizes and expands the possibilities of the education system.

It is important to note that e-learning is a helpful tool, but it is not without its drawbacks. An important factor in improving the effectiveness of this form of learning is self-discipline and systematic learning. Hence the idea of studying the applications and their practical knowledge by students. Difficulties with the use of computer programs, loss of Internet connection or the lack of it, become a major obstacle when it comes to using e-learning. However, distance learning has many benefits, especially for adults who have chosen to take up distance learning and combine it with work, it allows for additional development with better prospects for the future. In the event of a pandemic, there was no solution other than switching to full online or later time – hybrid. COVID-19 was a huge challenge for students, teachers, parents, but also employees and employers.

It is worth mentioning that the variety of definitions of e-learning illustrates the ambiguous perception of this phenomenon and its multidimensionality. The common denominator is the use of new technologies and the Internet for learning, and the fact that it is a modern teaching method that improves the quality of learning.

E-learning can be used by people with a certificate of disability or in case of illness. People with disabilities should have easier access to a variety of resources that would allow them easier access to self-education. Considering the fact that in order to get a dream job, it requires appropriate knowledge and proper education. E-learning meets the expectations as, regardless of the degree of disability, direct participation in training becomes possible for everyone. Using the current technology, e-learning can be created either with audio description or with the use of visual materials and subtitles. For deaf people, this is ideal when lip reading becomes impossible. In the event of an unfortunate accident or an ordinary illness, the recipient does not have to leave the classes/training, as online or offline forms are possible.

E-learning, thanks to its modernity, can be a great alternative to traditional stationary learning. Thanks to the use of modern technologies and the Internet, it offers wide educational opportunities, regardless of location. It provides the possibility of learning in various conditions and circumstances, in which it was not possible before, which also gives wider and more common access to education. It is therefore a method of learning and teaching that significantly modernizes and expands the possibilities of the education system.

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Netography

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Evernote, https:// youtube.com/watch?v=NgkCgqIogcY

Lumosity, https:// lumosity.com/en/

Pomotodo, https://pomotodo.com/

In What Direction Is E-learning Going? – Research on the Discourse Around E-learning Trends for 2023

ABSTRACT

The article presents the results of a discourse survey, in which I checked which e-learning trends are most often reported and searched for. As part of the research, I searched for materials that present trends in e-learning, then I chose the trends that appear most often and described them. Then I verified with Google Trends whether the interest in these trends has increased recently. The three most frequent trends in e-learning in the articles are microlearning, the use of AI in education and immersive learning. Recently, "microlearning", "AI education", learning analytics, "mobile learning", and "gamification" are more frequently searched on Google, which may mean increased interest in these topics.

Keywords: trends, e-learning, Google Trends.

Introduction

The time of the pandemic forced a greater interest in e-learning, which made learning possible during social isolation. "It is estimated that the e-learning market will grow by approximately 8% in CAGR by 2026, from USD 200 million in 2020 to USD 370 million in 2036" (Kapuscinski, 2020). However, e-learning consists of many different methods, techniques and approaches. Which of them will develop further? In what direction will e-learning develop? This question can be answered from many different perspectives. We can take into account economic factors (e.g. which solutions have the greatest financial gain), public opinion, scientists' predictions, and much more. I decided to check what direction of e-learning development will be revealed to us if we enter keywords related

to this topic in Google. What materials will be shown in the search results and what trends will be mentioned there? Most of us start by checking the search results when we want to learn more about a topic. Therefore, I decided to check which trends are most often mentioned in the articles. Then I checked whether these trends are actually searched more often in google search using the Google Trends application.

Purpose of the study

The aim of the article is to present trends in e-learning, which are presented in generally available articles. The trend is "a general development or change in a situation or in the way that people are behaving" or also "the general direction of changes or developments" (Cambridge, n.d.-a). I searched through a search engine and analyzed articles published in the last two years on the Internet that related to the subject of the research. I considered articles on websites, most often written by companies, journalists and representatives of the business world, and not scientific articles, because I care about materials that are accessible to everyone. Google search is available to everyone – "the vast majority of users know how to use a web browser, and 92% declare the ability to use a search engine" (Jeran, 2012). The results for the trends most frequently and least discussed in the materials will provide educators and researchers with knowledge about the methods and techniques of e-learning courses that are of great interest and are judged to have a significant impact on the development of education in the near future, allowing us to prepare for emerging changes. The research questions raised in this study were: What topics, techniques and methods are mentioned in web articles as trends for 2023 in e-learning? How are these highlighted trends described? Which of these trends occur most often and which are the least frequent?

The second part of the study consisted in checking the frequency of searches for a given term (trend) by the Google search engine around the world over the last 5 years. If a given term or topic is more and more frequently searched by users, it is most likely associated with increased interest. The second part of the study will, therefore, indicate which of the trends and topics discussed in the articles are searched for and are of interest to a wider group.

Methodology

In order to search for articles about e-learning trends in the Internet search engine, on September 7, 2022, I entered the following entries: "trends e-learning 2023", "e-learning trends 2023", "digital learning trends 2023", "e-learning predictions 2023". When searching, I gave the year "2023" so that there would be articles that relate to the near future. The search results for the terms presented didn't differ significantly – similar articles appeared on the first two pages of the search.

Out of all the search results, I chose the materials that met the following requirements for analysis:

1. They are articles – I have rejected blog entries, invitations to webinars and conferences, etc.
2. They directly relate to e-learning, digital-learning or the future of education – I rejected articles on narrow topics, e.g. about cohort courses, deep learning or artificial intelligence.
3. They are available to any user – I rejected materials that required registration.
4. They are published in English in the years 2021–2022.
5. Appeared in the first two pages of Google searches with "trends e-learning 2023", "elearning trends 2023", "digital learning trends 2023" or "e-learning predictions 2023".

In total, I collected information from 12 articles. The list of articles on which I relied can be found in the bibliography. I wrote down which trends are mentioned in the articles, and then I analyzed the trends that appeared in at least three different articles. I have briefly characterized selected trends, using descriptions and quotations from articles.

Then, using Google Trends – an application that shows the number of searches – I verified whether Internet users were searching for a given keywords more often, and therefore whether the interest in a given trend was increasing. The charts from the Google Trends application show the frequency of search terms for the last 5 years around the world. Google Trends is one of the tools for analyzing user behavior on the Internet – "subject to careful selection of the searched-for terms, Google data can accurately measure the public's interest" (Mavragani, Ochoa, Tsagaraki, 2018). As we can read in article "Assessing the Methods, Tools, and Statistical Approaches in Google Trends Research: Systematic Review", "the monitoring of Web-based activity is a valid indicator of

public behavior, and it has been effectively used in predictions, nowcastings, and forecasting" (Mavragani et al., 2018).

4. Trends in e-learning

I checked what trends in e-learning are indicated by Internet articles that were on the first page of the search engine. Out of all the trends mentioned, I chose those that appeared in at least three articles.

Table 1. Article title, publication date and trends it relates to. There are no trends in the table for less than 3 articles

ID	title of the article	date of publication	Micro-learning	Immersive learning (extended reality)	AI	Learning analytics and big data	Personalization	Gamification	Mobile learning	Video-Assisted Learning	hybrid learning
1	The 5 biggest trends in learning going into 2023	08.07.2022	x	x		x					
2	eLearning Trends: Top 5 Trends to Watch For in 2023	23.02.2021	x	x	x	x	x		x		
3	Digital Business learning Trend in 2023	02.07.2022	x			x					
4	Top Trends in Education in 2022–2023	01.07.2022	x	x	x						
5	EdTech Trends to Look Out for in 2023	13.07.2022			x		x				
6	7 top e-learning trends for 2022 and 2023	07.07.2022					x				
7	Predictions For Learning & Development	07.02.2021	x	x				X	x	x	
8	Top Educational Technology Trends In 2022–2023	17.03.2022		x	x	x		X		x	

9	10 eLearning Software Trends for 2022/2023: Latest Forecasts You Should Know	05.01.2022	x	x	x						x
10	Predicting The Future Of E-learning	25.01.2021			x				x	x	x
11	Emerging Trends in Education to Keep In Mind for 2022–2023	04.08.2022	x					X			
12	Top 13 Education Trends in 2023	05.08.2022	x	x	x	x	x	X			x
RESULTS:			8	7	7	5	4	4	3	3	3

Source: Author's own elaboration.

Micro-learning

One of the most frequently mentioned trends is microlearning. Microlearning "has the potential to revolutionize e-learning in education; learners can get specific skill sets by consuming bite-sized content, which is highly time-effective and media-rich" (Anderson, 2022). Microlearning delivers learners "short, easily-digestible lesson content exactly when and where they want to" (OctopusBi, 2022).

Why microlearning is so popular? "This rising trend is often attributed to the shortening of peoples' attention spans and patience, and the many competing pressures and demands that people have on their time" (OctopusBi, 2022). Craig Weiss – CEO of E-learning 24/7 – "predicts that videos in the 90 to 120-second range will become the norm over the next year" (WorkingVoices, 2021) and Karl Kapp – an instructional technology professor at Bloomsburg University – agrees with that. Platforms like Coursera, or Udemy, or Duolingo are very popular because they provide knowledge i.e. their content in small portions. "Shorter learning sessions over a longer period of time helps encourage continuous engagement, learning and retention, while the flexibility and rich media materials enable learners to learn when and how is best for them" (OctopusBi, 2022). As we can read, "the focus is on performance" (Wade, 2022). On the microlearning platforms "you can leverage properly spaced replays, gamification, informative reports and analytics for instant feedback, corrective action, and more" (Wade, 2022). Also "microlearning is a powerful option for corporate training" (Sebatina, 2021), because allows organizations to tailor training to each employee's needs, for example for employees which have only

five minutes for a day to learn. Microlearning is often appreciated for supporting learners, but it is also beneficial for teachers – brief, focused lessons can "eliminating wandering attention, time wasting, and irrelevant material" (OctopusBi, 2022). As FinancesOnline.com reports "among L&D professionals, 94% prefer microlearning compared to other e-learning tools (eLearning Industry, 2021)" (FinancesOnline, 2022).

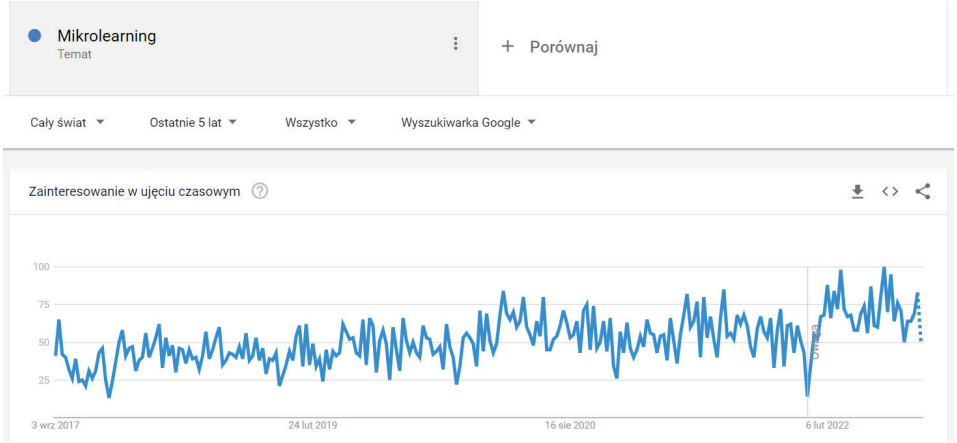

Figure 1. The graph shows the number of searches for the topic of microlearning over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=%2Fm%2F0d553s (retrieved: September 10, 2022).

In Google Trends, I entered "microlearning" as the subject of my searches. The chart shows that after a large drop at the end of 2021, the term became popular and is searched more often in 2022.

Immersive learning (extended reality)

Next frequently mentioned trends are immersive learning or "extended reality learning", which includes virtual reality (VR), augmented reality (AR) and mixed reality (MR). In articles authors focused on AR and VR, that is why I won't write about MR.

I found a definition in one article: "Augmented Reality (AR) is an emerging technology that combines real-life interactions with 360-degree photography to augment existing training materials. [...] Virtual Reality (VR) on the other hand, uses 360-degree photography and real interactions to simulate the environment

of the learner" (Anderson, 2022). In brief, "while VR provides a constructed reality, AR gives an enhanced view of a real image" (Educahk, 2022).

What are the advantages of immersive learning? It's "a great way to grab and hold learners' attention" (OctopusBi, 2022). Immersive technologies "allow employees to work through complex simulations and practice in real-life scenarios to bridge the gap between theory and real application" (Sebatina, 2021). We can transfer an employee to a selected situation, e.g. he can be in a virtual factory that looks like real, where he will learn to use machines in safe conditions, testing their capabilities in a virtual world. Augmented reality technology can "boosting learning ability and productivity" (Anderson, 2022). Also "VR has the unique capacity to bring together lots of the elements of elearning, microlearning, hands-on training, and personalization" (FinancesOnline, 2022). There are many elements that can be incorporated into VR and AR training; "organizations may use virtual classrooms, webcasts, video, and audio conferencing, virtual coworking, file sharing, and content co-creation". The forecasts of economic importance are also impressive – "the gross value of Augmented Reality (AR) in education could reach $5.3 billion by 2023 and it might touch $640 million for head-mounted Virtual Reality (VR) tools used in education" (Gupta, 2022).

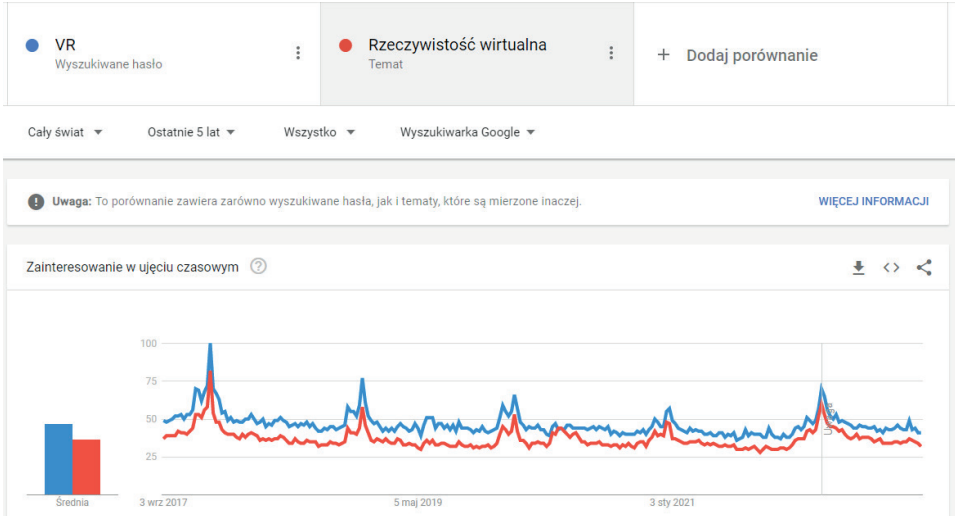

Figure 2. The graph shows the number of searches for the topic of virtual reality (red) and for the keyword "VR" over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=VR,%2Fm%2F07_ny (retrieved: September 10, 2022).

In Google Trends application, I gave two keywords – the abbreviation "VR" and the full name of the topic "virtual reality". Timeline searches for both terms are on a similar level. The graph shows that the interest in virtual reality has risen in several moments over the last 5 years, while apart from these spikes, the interest in virtual reality has not changed significantly.

AI (Artificial intelligence)

Artificial intelligence, which we can mean as "computer technology that allows something to be done in a way that is similar to the way a human would do it" (Cambridge, n.d.-d), is often mentioned in articles about the future of e-learning. "AI will change education" (Anderson, 2022). The development of artificial intelligence allows the development of other trends mentioned here, like personalization, learning analysis, immersive learning.

Firstly, "advancements in AI have led to more personalized learning experiences for employees, allowing organizations to create/modify their training modules as per the needs of the employee and the learners can attain relevant skills that are needed to upgrade his/her knowledge" (Sebatina, 2021). In brief, "While changes have already begun to take shape in many state curriculums for personalization, AI has the potential to enable hyper-personalized journeys" (Gupta, 2022). Artificial intelligence is driven by data – the more data it collects, the better it can adapt to the user. The articles mentioned that thanks to the collected data, AI can provide feedback to students and teachers.

AI is already being used, although its potential is certainly not yet fully realized – "in some schools, AI systems are already monitoring students' progress and alerting professors of potential problems" (Anderson, 2022), which means that AI is already being used, although its potential is certainly not yet fully realized. In fact, artificial intelligence can make a big difference to the work of educators – "teachers will no longer need to teach students in a conventional classroom setting" (Anderson, 2022). Artificial intelligence is able to replace many of the teacher's tasks in time – keeping documentation, transferring knowledge, verifying acquired information, etc. "This shift will make the role of the teacher into an educator of sorts; (…) AI-powered systems will allow teachers to focus more on engaging with students and developing instructional materials" (Anderson, 2022).

The development of artificial intelligence works well with the development of e-learning. Artificial intelligence is easily applied in e-learning and e-learning can develop thanks to this – "such emerging technologies have revolutionized

modern learning and over time have increased its demand to utilize the full potential of the eLearning realm" (Sebatina, 2021).

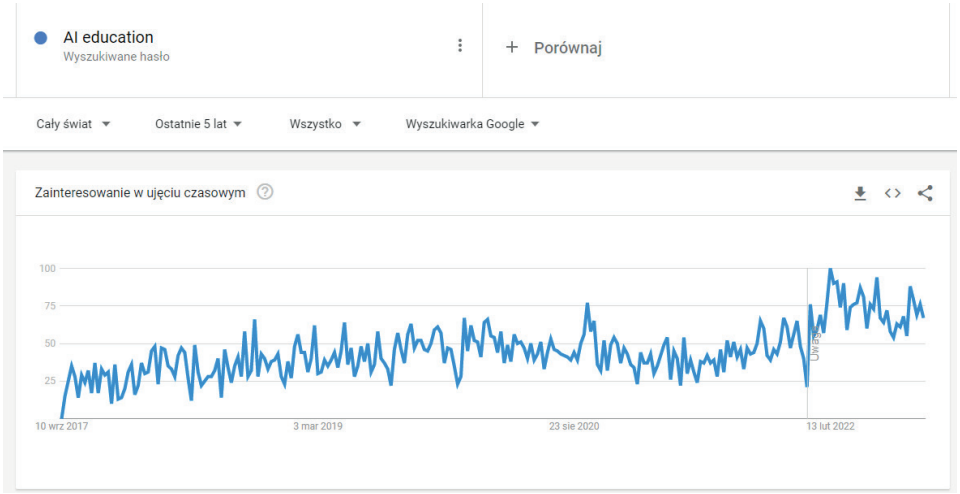

Figure 3. The graph shows the number of searches for the keyword "AI education" over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=AI%20education (retrieved: September 10, 2022).

Artificial intelligence is used in many areas, and we are mainly interested in the use of AI in education, that is why I check "AI education" in Google trends. The interest in the keyword is much higher in 2022 than in previous years.

Learning analytics

"We know that the future depends on the information that is available to us and the more information we have, the better the insights and therefore the decisions will be" (Wade, 2022). As I wrote in a chapter about AI: Artificial intelligence is driven by data – the more data it collects, the better it can adapt to the user. "AI-powered analytics coupled with learning platforms creates a whole new learning environment and ecosystem" (Wade, 2022).

Learning analytics "refers to the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs" (OctopusBi, 2022). As we can read in "The 5 biggest trends in learning going into 2023", "reliable data analysis tools can assist educators in identifying trends and pat-

terns among learners" (OctopusBi, 2022). Having data and drawing conclusions from it, we can strengthen the effectiveness of training, e.g. if we know which elements of the training have been poorly assessed, assimilated and understood by the participants, we can improve them.

Learning analytics enables personalization – "with learning analytics, education providers can tailor their strategies and plans for individual courses or students based on what they know works, personalizing learning and training both efficiently and effectively; this will, in turn, engender stronger engagement, better retention, and a rewarding learning experience" (OctopusBi, 2022). Data serves not only educators and students, but also companies that want to design well-tailored educational solutions – "the reporting functionality helps identify gaps in employees' knowledge and skills which can be used to determine the organization's business objectives and learners' performance" (Sebatina, 2021).

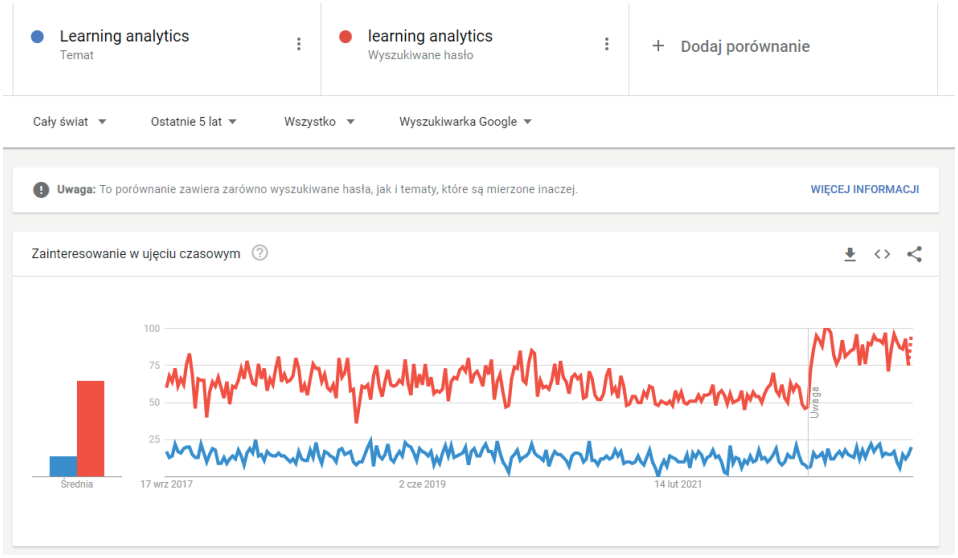

Figure 4. The graph shows the number of searches for the topic of learning analytics (blue) and keyword "learning analytics" over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=%2Fm%2F0crfzwn,learning%20analytics (retrieved: September 10, 2022).

I checked the keyword "learning analytics" as a keyword and as a topic in the Google Trends application. The results show that the interest in searching for the term "learning analytics" as a keyword increased significantly in 2022.

Mobile Learning

"More than four billion people around the world own smartphones (...); with the emergence of smartphones, users' data consumption habits have changed. This has made eLearning more widely accessible" (Anderson, 2022). Mobile learning is "a system of learning that uses mobile devices such as mobile phones, small computers that can be carried, etc. so that people can learn anywhere at any time" (Cambridge, n.d.-b). The advantages of mobile learning are "flexibility, anytime learning, seamless accessibility and just-in-time learning" (Sebatina, 2021), and also "faster access to key materials, and the ability to initiate learning sessions at will whenever learners are ready to study in a distraction-free environment" (WorkingVoices, 2021).

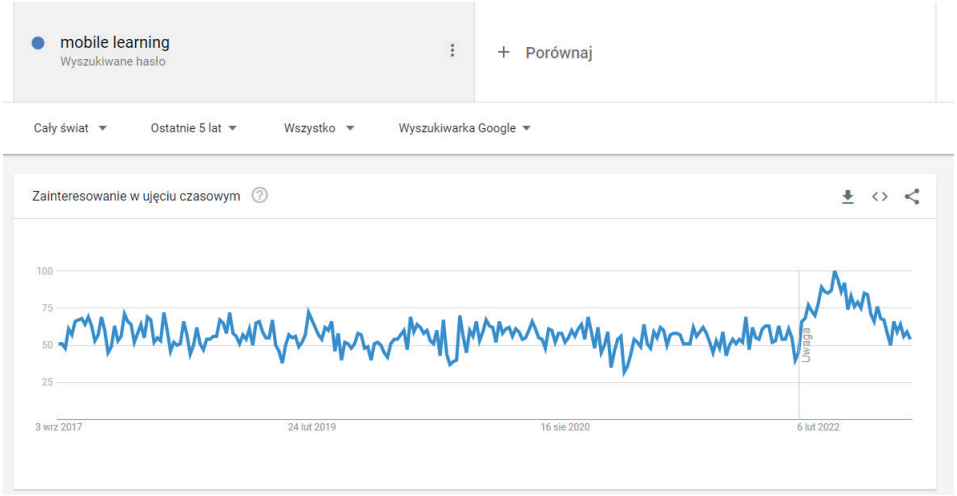

Figure 5. The graph shows the number of searches for the keyword "mobile learning" over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=mobile%20learning (retrieved: September 10, 2022).

I checked the keyword "mobile learning" in the Google Trends application. The results show that interest in searching for this term increased in the first half of 2022.

Personalized Learning Experience

"Ensuring that every individual has the opportunity to reach their potential, aided by great learning experiences that are tailored to their strengths and weaknesses, ambitions and their role within your wider organizational goals; personalized learning is one of the biggest e-learning trends at the moment" (McAlister, 2022). Several articles indicate personalization – "the process of making something suitable for the needs of a particular person" (Cambridge, n.d.-c). "The basic concept behind implementing personalized learning is the fact that each child has a different way and a different pace at which they learn" (Moonpreneur, 2022) and modern technologies allow us to effectively implement solutions supporting students. Personalization is combined with other trends, because different learning techniques, like adaptive learning, game-based learning, and immersive learning "can be combined with the modules to make every learning experience different and personalized" (Sebatina, 2021).

"Data-rich models can help students develop holistically" (Gupta, 2022), because the more data we have about a given person, the better we can adjust the product for them. Personalized Learning Experience is possible thanks to Artificial Intelligence (AI) – "AI can help teachers to craft customized educational courses for students; AI can help teachers analyze data about students and provide feedback on course success" (Sebatina, 2021).

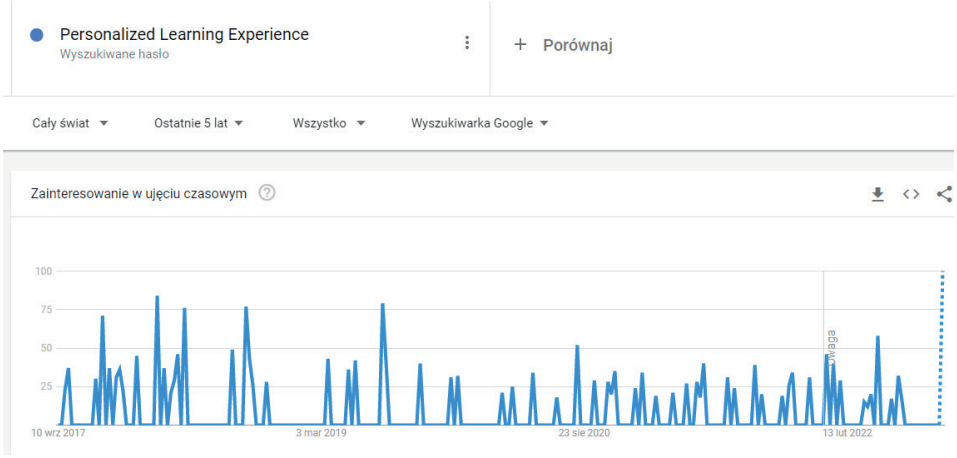

Figure 6. The graph shows the number of searches for the keyword "personalized learning experience" over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=personalized%20learning%20experience (retrieved: September 10, 2022).

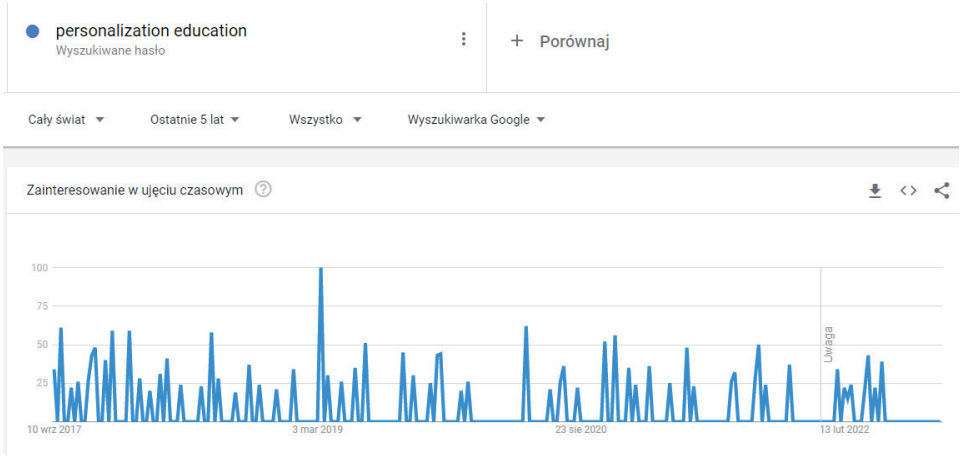

Figure 7. The graph shows the number of searches for the keyword "personalization education" over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=personalization%20education (retrieved: September 10, 2022).

According to the results from the Google Trends application, the slogan "personalized learning experience" may have seen a significant increase recently (dashed line), but we are not sure about it because there is no complete data. In turn, the term "personalization education" is not searched more often in 2022 than in previous years.

Video-Assisted or video-based learning

In the article "Predictions for Learning & Development", the author talks about microlearning in relation to videos, and indeed, the trend for educational movies fits well with microlearning. Videos can be a short knowledge pill that fits easily throughout the course. "Videos, especially animated videos, are extremely beneficial to enrich lessons and make content comprehensible. It improves students' outcomes and reduces teachers' workload" (Educahk, 2022). In another article noticed that "Video-based learning or live streaming not only increases retention, is immersive, and allows comprehension more easily, it also increases student engagement and motivates them towards further learning and research" (FinancesOnline, 2022).

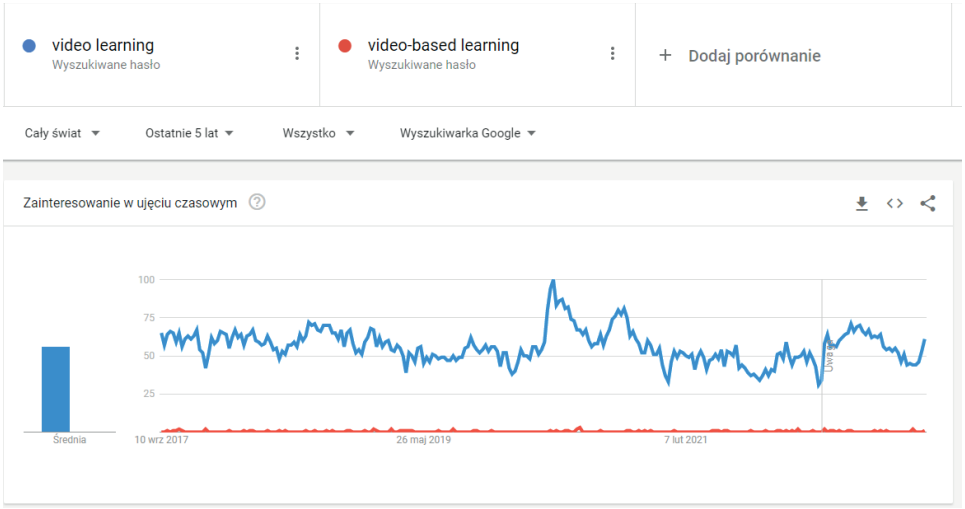

Figure 8. The graph shows the number of searches for the keywords "video learning" (blue) and "video-based learning" (red) over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=video%20learning,video-based%20learning (retrieved: September 10, 2022).

I checked the password "video learning" in the Google Trends application. The results show that the highest number of searches for "video learning" was in previous years (March 29–April 4, 2020 – 100 times). In 2022, the number of searches varied between 36 and 74.

Gamification

Another trend is gamification, which "is related to the game as it basically refers to the application of the mechanics and theory of games to non-game contexts" (VerIntent, 2022). Author of "Top Educational Technology Trends In 2022–2023" noticed that "the adoption of gamification is most popular in the K-12 education sector; it's because kids are quickly engaged in gaming videos or getting higher scores in a game" (Educahk, 2022). However, gamification is also very popular in the business world. Gaming elements – similar to VR and AR – "help create a funny and positive learning environment for learners" (Educahk, 2022). "According to Kapp, gamification has a number of benefits backed by neuroscience" (WorkingVoices, 2021) – gamification makes it easier for students to engage in the learning process.

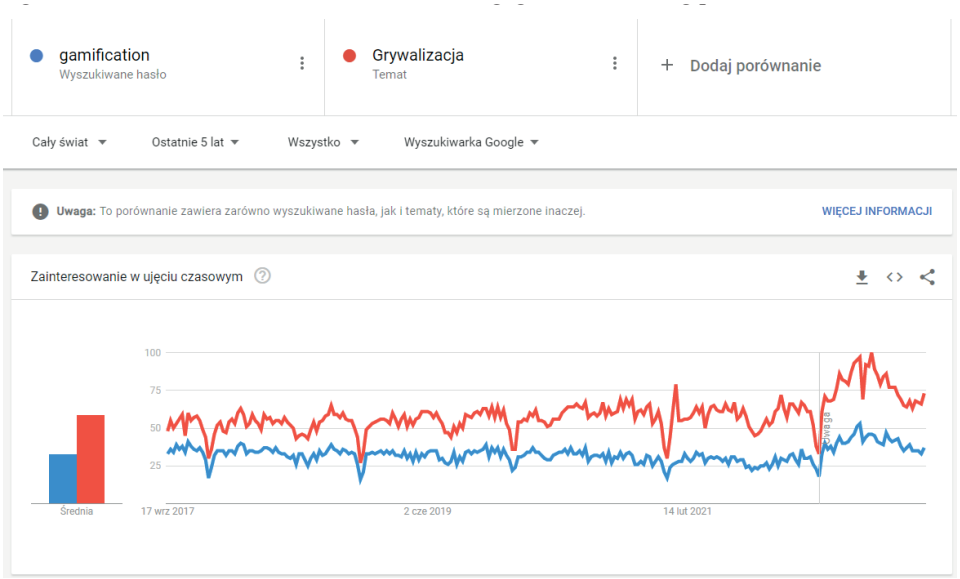

Figure 9. The graph shows the number of searches for the keyword "video learning" (blue) and for the topic of gamification (red) over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=gamification,%2Fm%2F0cm8xv9 (retrieved: September 10, 2022).

According to the results from the Google Trends application, the term "gamification" is searched more often in 2022 than in previous years, as shown in the chart.

Hybrid learning

"Hybrid learning blends in-person and online learning; it is a method in which some students attend class in person, while others join the class virtually from home" (Moonpreneur, 2022). Hybrid learning is a model that uses many different techniques – "with hybrid learning, e-learning tools are used, including micro-learning, smart content creation, video-based learning, game-based learning, interactive content, social learning, and adaptive learning" (FinancesOnline, 2022). What is important: "with technology supporting this model, hybrid learning can be combined in any proportion when it comes to grading and classroom participation where each student can find their own unique blend of learning that suits their personal style as well" (Bansal, 2021). In practice, companies or schools often define the framework of the hybrid model, e.g. they define how many and which classes can be attended online and how many in

the office. Nevertheless, the hybrid model is certainly a step forward. The time after the pandemic forced us to think about what we want to learn in stationary and what we participate in online – what serves us and what does not. As we can read on Boston.com – "over 80% of students choose a hybrid learning environment over the traditional one (Boston.com, 2020)" (FinancesOnline, 2022).

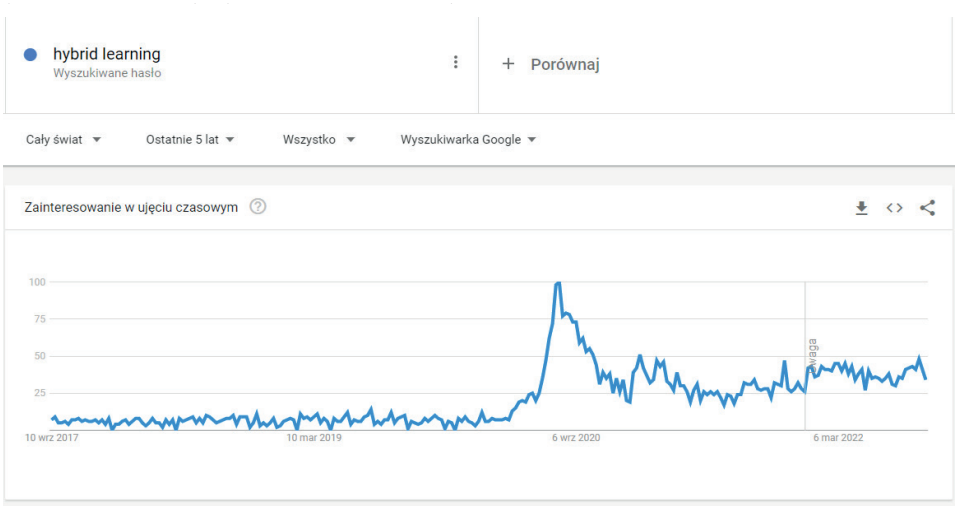

Figure 10. The graph shows the number of searches for the keyword "hybrid learning" over the last 5 years around the world

Source: https://trends.google.pl/trends/explore?date=today%205-y&q=hybrid%20learning (retrieved: September 10, 2022).

According to the results from the Google Trends application, the term "hybrid learning" experienced the greatest increase in interest in September 2020 (100 searches), and then decreased, and since then the interest in this term has remained at a similar level (26–47 searches).

Conclusion

After the research, I have a few conclusions:

- The three most frequent trends in e-learning in the articles are microlearning, the use of AI in education and immersive learning.
- Recently, "microlearning", "AI education", learning analytics, "mobile learning", and "gamification" are more frequently searched on Google, which may mean increased interest in these topics.

- When describing trends, the authors of articles often referred to the fact that the indicated techniques and methods enhance the effectiveness of learning. The articles very rarely pointed to the disadvantages of the above-mentioned trends.
- Trends are interrelated. First of all, the development of individual areas strengthens the development of others, e.g. the development of AI affects the development of learning analysts, and this in turn allows the development of personalization. Secondly, the trends mentioned in the article intertwine, e.g. the fashion for short educational films is part of microlearning.

I believe that the information presented here will be interesting for researchers, teachers, students, but also for people who are simply interested in the future of e-learning. Tracking trends, deepening your knowledge and being up to date is important as it allows us to prepare for ever-evolving changes. Initial search for information in the search engine allows us to do some preliminary research.

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Part II

BELGIUM

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GAËTAN TEMPERMAN, BRUNO DE LIÈVRE

Design and Applications of the Techno-Pedagogical Innovation Model (TPI)

ABSTRACT

This article reflects on the concept of techno-pedagogical innovation (TPI) and the development of a model to guide interventions whose ambition is to foster this innovation in a sustainable and lasting manner. The TPI model is intended for all actors of education: researchers, technopedagogues, trainers, educational advisors and teachers. It is intended to be versatile and transposable to multiple fields. To illustrate and guide its use, the TPI model is applied to three different contexts: in-service teacher training, an online community of practice and e-learning design.

Keywords: technopedagogical, innovation, in-service teacher, community of practice, e-learning

Context

For several years now, action plans have been implemented at national (Fédération Wallonie-Bruxelles, 2019) and international (European Commission, n.d.) level to encourage the implementation of new and innovative practices, particularly through the integration of digital tools. These plans aim to encourage and contribute to the digital transition of the education system. This increase in interest requires a certain level of digital competence on the part of teachers and pushes them, willingly or not, to move towards more ambitious uses of digital tools (Boéchat-Heer & Gonzalez-Martinez, 2021).

Pragmatically, innovations can result from the initiative of teachers (bottom-up) or decision-makers (top-down). Although, in the first case, teachers are in favour of renewing their teaching practices, in the second case, the literature highlights a particular point of attention: when the innovation is imposed by decision-makers, it may be "difficult for teachers, who do not always see the meaning of the innovation" (Boéchat-Heer & Gonzalez-Martinez, 2021, p. 3). Other authors also agree on the importance of the meaning given by practitioners to innovation for the implementation of truly innovative and sustainable pedagogical practices (Fullan, 1985; Gather Thurler, 2004; Lison et al., 2014; Lemaître, 2015). The driving force of innovation therefore lies not so much in the introduction of the technological artefact but in the action of the individual. In this sense, this article adopts a socio-centric view of innovation.

In order to accompany this innovation, the Pedagogical Engineering and Educational Digital Service of the Faculty of Psychological Sciences and Education of the University of Mons (Belgium) is carrying out various support and training actions, particularly in distance learning, for teachers and trainers. These actions concern in particular the integration of digital tools in educational practices, the development of digital skills and the renewal of pedagogical practices. Their aim is therefore to guide the digital transition and encourage techno-pedagogical innovation.

In order to guide the different interventions in these varied educational contexts, it seems appropriate to investigate the scientific literature on theoretical models that can support the articulation between the different phases that we propose during training, support and exchange actions with the aim of promoting techno-pedagogical innovation. This literature review highlights two shortcomings: the first is that there is no consensus on a definition of "techno-pedagogical innovation", and the second is that, to our knowledge, there is no standard model to guide interventions directly in the field. Based on these observations, the ambition of this article is to (1) define techno-pedagogical innovation from a socio-centric viewpoint; (2) propose a model to guide its intervention in an educational context in order to help all the different actors involved in the dynamics of change to make their techno-pedagogical innovation projects sustainable and durable; (3) apply this model to three case studies.

Towards a definition of techno-pedagogical innovation: a process based on the action of the individual

In 2005, Bérubé & Poellhuber (quoted by De Villers, 2016, p. 136), put in place for the first time, a reference framework mentioning "the technopedagogical competencies that teachers must acquire and demonstrate in the classroom". In 2012, the Centre d'étude et de développement pour l'innovation technopédagogique (Study and Development Centre for Technopedagogical Innovation) presents technopedagogy as the articulation between technology and pedagogy, it also induces a reflection on the articulation between these two aspects. Technology must, in this case, be placed at the service of learning (Bérubé & Poellhuber, 2005 quoted by De Villers, 2016). There are two aspects to this concept. The first concerns pedagogical aspects such as "teaching and learning methods, motivation, skills to be developed in students, etc.; the second develops technological aspects such as the use of computers, the web, interactive whiteboards, etc." (De Villers, 2016, p. 137). Furthermore, innovation is often associated with the desire of social actors to make a voluntary change (Cros, 1997) to improve a situation that is deemed important (Anderson, 2004). These definitions highlight the importance of the individual's action in the process of techno-pedagogical innovation. Indeed, according to Betton and Pondaven (2019), digital integration is not necessarily synonymous with innovation and some digital inclusions may even reinforce traditional teaching. This process of innovation is not only based on the use of technological tools to assist teaching and learning, but also on the individual's reflection aimed at reorganising his or her teaching practices. Tricot (2017) confirms this by considering that an innovation in a teaching/learning context must enable a change in practices so that they are effective and efficient.

This "socio-centric" vision of innovation thus leads to a primordial place for social actors in the innovation process (Depover et al., 2007). Moreover, the definition of the concept of individual-oriented social innovation (Cloutier, 2003) is very similar to the concept of techno-pedagogical innovation: individual-oriented social innovation refers to innovation as "a support system designed to bring about lasting changes in the individual, to develop him or her so that he or she can regain power over the course of his or her own life" (Cloutier, 2003, p.10). According to the steering committee of the Forum on Social Innovations[1], any

[1] The Social Innovation Forum is an initiative of the Association nationale des assistantes de service social (ANAS).

social innovation is conditioned by 5 criteria: (1) an innovative, experimental character in a given context; (2) a state of mind and risk-taking on the part of the project's actors; (3) an impact on social policies at national or local level; (4) the quality of the partnership between the usual actors and the new ones; and (5) the participation of beneficiaries, volunteers and inhabitants of the territory concerned in the project. This vision of social innovation is perceived as a new way of doing things with the ambition of meeting social needs (Taylor, 1970) or solving a problem (Fontan, 1998; Lallemand 2001). The presence of innovativeness is therefore a *sine qua non* for this innovation (Gray & Braddy, 1988; Fontan, 1998).

At this stage of the writing, our postulate could be the following: techno-pedagogical innovation is a social innovation oriented on the individual in a specific environment: it is carried out in an educational context and the technology allows to solve a problem or to bring an educational added value. Finally, the aim of this innovation is to modify and improve practices.

In other words, innovation is a complex, dynamic and long-term process characterised by its innovative nature and its positive social and pedagogical consequences (Lallemand, 2001; Parravano & Bretesche, 2001 cited by Cloutier, 2003). Thus, the process of techno-pedagogical innovation would be associated with a learning/teaching process during which the practitioner could update his or her teaching practices thanks to the added value provided by digital tools.

Towards a conception of the TechnoPedagogical Innovation model (TPI)

Definition of the research theme and eligibility criteria

In order to guide our literature search, we conducted a systematic review of the literature on our research topic: innovation models. To improve the completeness of the search, this search was conducted on the Google Scholar engine (Zaugg et al., 2014). The keywords used were "innovation", "model" or "evaluation". In order to refine our identification of a theoretical model on innovation, we coupled the following adjectives to these concepts: "pedagogical", "technological" or "social" (e.g. social innovation). Indeed, our objective was to modify the technocentric approach that is regularly associated with innovation (Poumay, 2014; Lemaître, 2018). Once the theme and keywords were defined, the eligibility criteria were specified in order to select the studies to be included in

our corpus. To this end, only models of innovation centred on the action of the individual were selected. After the analysis of this basic corpus, some additional models were retained by consulting the references cited in the basic corpus. The selection of models was carried out by three researchers independently, "with a conciliation mechanism for the resolution of disagreements" (Zaugg et al., 2014, pp. 658–659).

Evolution from a social innovation model to a techno-pedagogical innovation model

Based on our definition of techno-pedagogical innovation, this article draws on a concept of social innovation (Figure 1) proposed by Le Réseau Québécois en Innovation sociale defined as:

> a new idea, approach or intervention, a new service, a new product or a new law, a new type of organisation that responds more adequately and sustainably than existing solutions to a well-defined social need, a solution that has found a taker within an institution, an organisation or a community and that produces a measurable benefit for the community and not just for certain individuals. The scope of a social innovation is transformative and systemic. It constitutes, in its inherent creativity, a break with the existing. (Le Réseau Québécois en Innovation Sociale, 2011, p. 3)

This search for more appropriate solutions and needs is also felt in the specific context of teaching. Indeed, the majority of teachers feel that they have little knowledge of the pedagogical uses of digital technology and are in constant demand for training adapted to their needs, but also to the equipment available (Delacharlerie et al., 2018).

As a result, the elements constituting the definition as well as the model of social innovation are, at first sight, present in most innovation projects where the concepts of "inadequate solutions", "needs" or even "transformation" are present in the existing context. It is in their implementation that the specificities appear. Therefore, we propose to outline the different steps foreseen by the Quebec network and then to explain the four adaptive phases we have imagined in order to establish the TPI model.

The social innovation model (Le Réseau…, 2011) is divided into three main operational phases: (1) emergence (2) experimentation and (3) appropriation (Figure 1). The emergence of the project takes up the conditions for the emer-

gence of an innovation project. The identification of the problem (the lack, dissatisfaction or imbalance of existing solutions) is the first step in this process. This identification of the problem will enable the development of a project that responds more adequately to the issues raised. This project must have a transformative scope and take into account the issues of the various stakeholders. This idea of co-construction is transversal to the social innovation process. Indeed, it is not simply in the development of the project that it is implemented, but in all its components. It allows the collective development, in the light of the knowledge and know-how of all the actors involved, of innovative responses adopted and appropriate to the various elements making up the project (management methods, financing, etc.). Then, in the experimentation phase, the innovation mechanism is tested in a real context. Experimentation is part of a quality process. This means that this phase provides for an evaluation of the system with a view to adjusting it. The last step consists of two levels of appropriation: one is local and the other is widespread. The interest of this phase is to disseminate the innovative system and ensure its sustainability. The authors speak of the project's influence to evaluate the resulting spin-offs. The project is therefore recognised as innovative when it is adapted or used. This phase therefore defines whether the actors have appropriated the innovation or not.

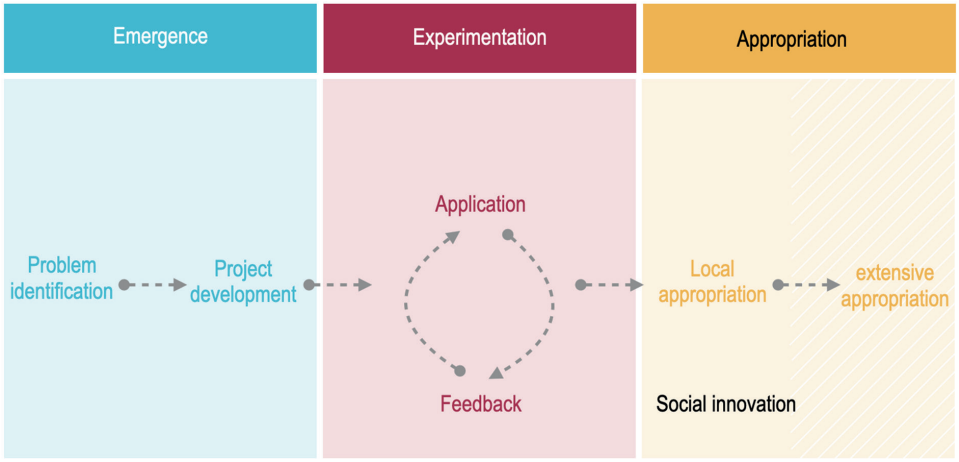

Figure 1. Social innovation model

Source: Le Réseau Québécois en Innovation Sociale, 2011.

The use of this model in an educational context seems relevant, but requires adaptation to take account of the implementation of technological supports.

The rest of this paper will lead to the adjustment of the model to include techno-pedagogical aspects, as well as aspects related to the training and support of teachers and, of course, trainers in a more general way.

Phase 1: a two-level model

The first phase of this modification gives rise to the identification of the actors in the model. Indeed, this model highlights two levels (Figure 2). The first level concerns the designer of the innovation. This designer can be a researcher, a teacher, a technopedagogue, a pedagogical advisor, etc. This is the investigator of the techno-pedagogical innovation. This level can involve several actors simultaneously if the innovation is the subject of a collaborative approach between researchers and practitioners in the world of education (Boilevin, 2013). This collaboration can be implemented between actors from the same sector of activity (intra-team collaboration) or from different sectors (inter-team collaboration). Taylor (1970) already emphasised in the 20th century the importance of multidisciplinary teams in the innovation process.

The second level concerns the beneficiaries of this innovation. Indeed, the ambition of an innovation concerns the change which, with the aim of improving a situation, may relate to a practice, a method, a way of teaching certain disciplinary contents, a procedure, etc. It may concern a product or a process. It may also allow new objectives to be achieved that could not have been addressed without a change in the situation (Peraya et al., 2004). The changes affect the beneficiaries of the innovation. Thus, in some cases, the

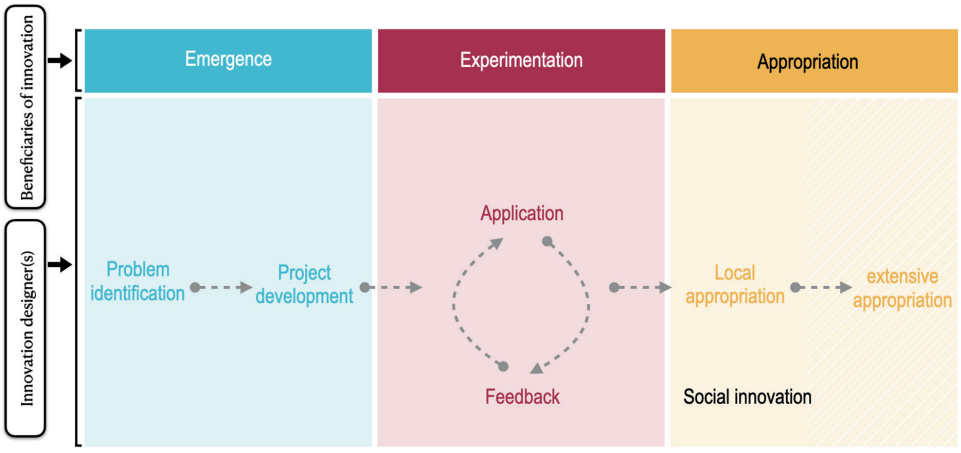

Figure 2. Phase 1 – a two-level model

Source: Authors' own elaboration.

designer(s) and the beneficiaries are different actors. This is notably the case in training courses that aim to renew teachers' practices (i.e. Delalande et al., 2019). In other research, the actors of the innovation and the target audience can be identical, which is the case of collaborative research (Boilevin, 2019). Indeed, the research by Kumps et al. (2019), shows that teachers are both the designers – they design the device in collaboration with the researcher – and the beneficiaries of the innovation – they reap the benefits of the innovation by modifying their teaching practices.

Phase 2: evolution of the behaviour of the beneficiaries of the innovation

The model of the Réseau Québécois en Innovation Sociale (2011), known as RQIS, proposes a 3-step model: emergence, experimentation, appropriation. As a reminder, these three steps refer to the evolution of social innovation. In the design of the model integrating digital technology, the ambition is to identify the 3 phases defining the development of the behaviour of the beneficiaries of techno-pedagogical innovation. Thus, with reference to Ameisen (2018), innovation is characterised in the behaviour of beneficiaries by:

1. Emergence: the behaviour appears in an individual;
2. Propagation: the behaviour spreads. It is adopted by more and more individuals.
3. Modification: the behaviour is accepted and reproduced by the majority of individuals.

With reference to our research area, although the term emergence seems appropriate, the other two can be discussed. For the second step, the term "diffusion" seems more appropriate (Rogers, 1995). Indeed, the sociologist Rogers uses the term diffusion of technologies to develop his theoretical model. Indeed, the author is interested in the way in which the individual will engage with and take ownership of the innovation. According to him, diffusion is "the process by which the innovation will be progressively communicated, through certain channels, over time, to the members of the social system" (Rogers, 1962 cited by Chapuis & Bovis-Vlahvic, 2016). Thus, the new practices spread gradually through the community of practitioners. Finally, the third step is manifested by the "adoption" of the innovation. The introduction of a new technology or new practices induces a process of change leading to a modification of organisational arrangements, skills, roles, etc. (Bobillier-Chaumon & Dubois, 2009). This adoption decision can be more or less forced, as is the case when the project's beneficiaries are enrolled at their own expense, or free, if they voluntarily join an innovation process (Baujard, 2004). This globalised adoption of behaviour

can be observed in education. Indeed, it is not uncommon for a teacher to rely on the expertise of a more experienced colleague to update his or her teaching practices (Delacharlerie et al., 2018). Therefore, it appears that the emergence and dissemination of new practices within a group leads to the adoption of practices beyond the group. These new practices can be instilled in colleagues who are not initially part of the group of beneficiaries of the innovation (Housni et al., 2020). The model we propose therefore consists of three steps: emergence, diffusion and adoption (Figure 3).

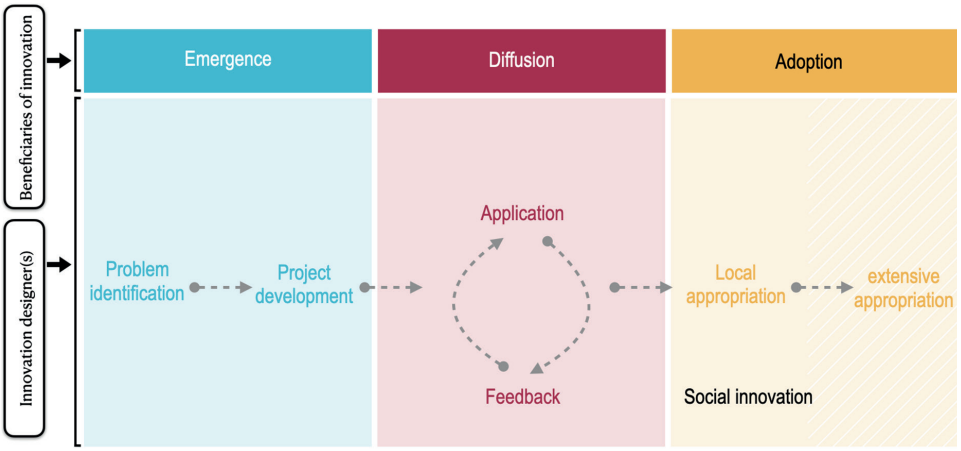

Figure 3. Phase 2 – evolution of the behaviour of the beneficiaries of the innovation
Source: Authors' own elaboration.

Phase 3: redefining the tasks of the innovation designer(s)

With reference to the modification proposed in phase 1, the second level refers to the tasks performed by the innovation designer(s). These steps are created on the basis of cross-referencing between several research approaches. According to Frechtling et al. (2002) cited by Randolph (2008), an evaluation method in research involves several steps: developing a conceptual model of the programme and identifying key evaluation issues; developing evaluation questions and defining measurable outcomes; developing an evaluation design; collecting data; analysing data; and sharing research results with interested audiences. For Vial (2015, p. 24), it is about "systematically producing, describing, evaluating and valuing the concepts, artefacts and experiences generated during a design and creation process". Within these steps, Temperman (2013) identifies regulation as an important step in order to adjust the learning environment based on the

analysed results. This addition corroborates with Deming's (1982) model according to which a quality process goes through 4 steps: "Plan", "Do", "Check" and "Act". In fact, the desire to be part of a fundamental approach, that of evaluation and regulation, which takes account of the results of the evaluation. We therefore propose a redefinition of the tasks in five steps (Figure 4): apprehend, design, implementation, evaluate and regulate.

Step 1: apprehend

Apprehension appears to be more "global" than the "problem identification" proposed in the social innovation model (Le Réseau…, 2011). This idea of "apprehending the problem" refers to a reflection or data collection with the beneficiaries beforehand in order to multiply the angles of view on the problem. This step may include understanding the inadequate situation, identifying needs, profiling beneficiaries or finding solutions. It is the anchor point of the process as it contributes to building new knowledge on which the designer relies to design the project.

Step 2: design

This step of the project gives rise to the design of a digital or physical environment. This design is conditioned on the one hand by the data collected during the apprehension step, and on the other hand, with reference to the TPACK model, by the judicious articulation between content, pedagogy and technology (Koehler et al., 2013). As mentioned before, the design of the device can be carried out by one or more designers. It can be foreseen in this second phase that the designed project will be subject to constant evaluation in order to respond as adequately as possible to the objectives to be achieved.

Step 3: implementation

Step 3 refers to the experimental treatment of the project, the intervention with the target audience in the context investigated. This may lead to a more formal treatment in the context of empirical research or to a more "informal" application in the context of an innovation implemented by a teacher. The principle of this step is to collect real data from observation, experimentation, interactions, etc. in a learning environment (Schneider & Class, 2020).

The last two phases of the model leave room for two relatively important steps in the continuous improvement of a teaching device: evaluation and regulation.

Step 4: evaluate

This step refers to the work of Temperman (2013). It gives rise to the evaluation of the environment a posteriori. Thus, according to the author, this evaluation can investigate perceptions, processes or performances. Perceptions are related to the learner's experience and can be of the order of motivation, usefulness, usability, etc.). Processes relate to how specific activities and events in the learning environment occur (usage, connection times, resource uses, etc.); and performance is determined by learning outcomes (level of mastery, progression, sustainability, transfer). Evaluation can be done through qualitative or quantitative analyses. It is also possible to carry out cross-analyses by combining this quantitative and qualitative information. "This questioning corresponds to a quality approach whose objective is the continuous improvement of the educational scenario (...). The answers obtained then provide the opportunity to regulate the environment developed, if necessary" (Temperman, 2013, p. 151).

Step 5: regulate

Following the evaluation of the system, it is possible to regulate the whole process if it does not achieve the objectives. This regulation consists of modifying the learning environment accordingly by making adjustments to the teaching scenario. "In reference to Van Der Maeren's typology (1997), our approach clearly has a pragmatic focus with the search for functional solutions for learning" (Temperman, 2013, p. 151).

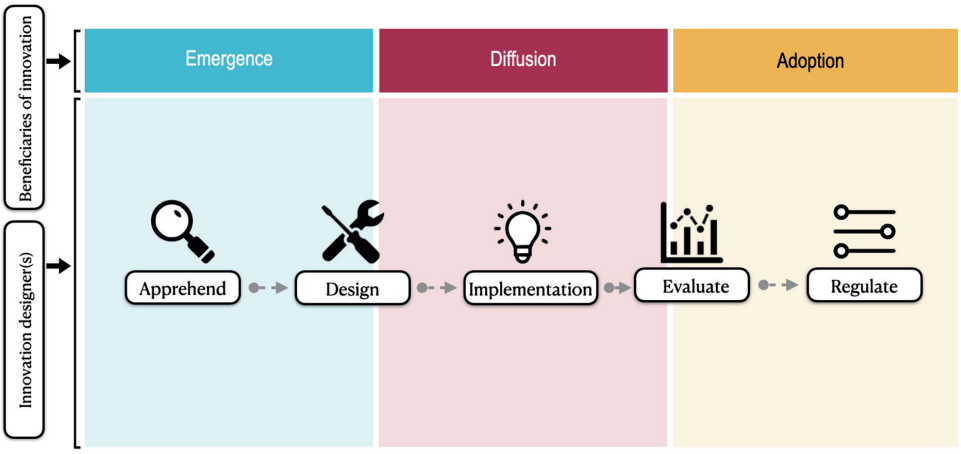

Figure 4. Phase 3 – redefining the tasks of the innovation actor(s)

Source: Authors' own elaboration.

Phase 4: the innovation process, an iterative approach with a view to quality

Finally, the last phase gives rise to the modification of the very structure of the model (Figure 5). Indeed, the research activity requires multiple loops in order to refine the system (Schneider & Class, 2020). This passage through multiple loops shows the importance of the iterative aspect of the model in a logic of continuous improvement of the learning environment (Deming, 1982; Amiel & Reeves, 2008). Such thinking is based on the principle that an innovation must continue to develop in order to survive. Therefore, once the last step is completed, the new state is considered standard, and the innovation continues from a new emergence.

With reference to Deming's model (1982), a multidisciplinary model of the quality approach, the *raison d'être* of the TPI model is therefore to be part of a continuous quality process. Indeed, "Plan" corresponds to our "Apprehend" step. "Do" is divided for the purpose of designing a techno-pedagogical model into two steps "Design" and "Implementation". "Check" is the equivalent of our

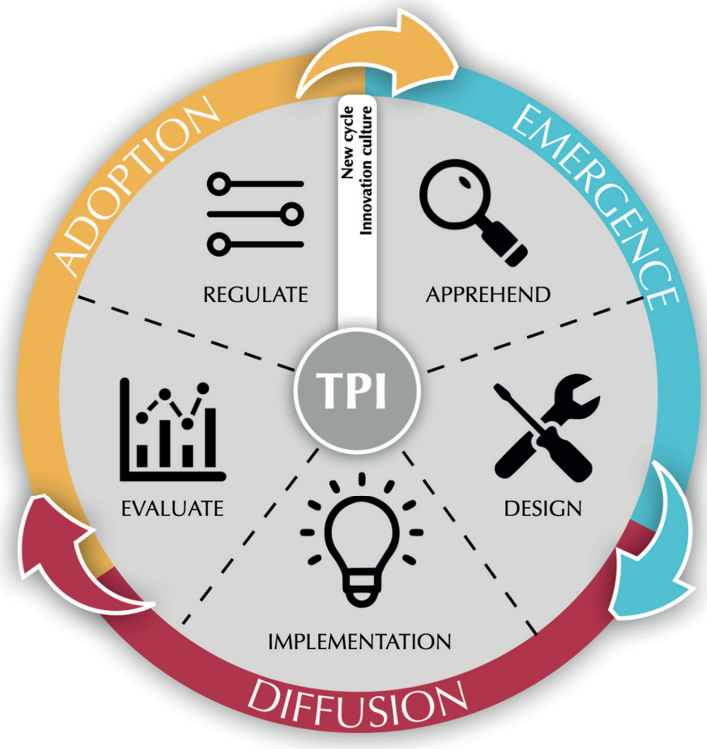

Figure 5. Techno-pedagogical Innovation model (TPI)

Source: Authors' own elaboration.

"Evaluate" phase, during which it is essential to identify the quality criteria to be favoured according to the context. In the context of a techno-pedagogical model, these will be criteria specific to technologies and those relevant to teaching and learning (Charnet, 2019). Finally, "Act" is similar to "Regulate". The interest of this last step is to chase away what proves to be of lower quality to improve the innovation process (El Gaied, 2019). According to Khelif and Chaoui (2009), the implementation of a quality process ensures reliability and validity. This system in a cyclical form gives the possibility to remedy any shortcomings found during the evaluate step. Finally, with reference to Gaudreault (2012), the implementation of a new cycle gives rise to a continuous search for innovation and, by extension, to a culture of innovation.

Applications of the model to 3 case studies in the context of training and coaching of trainers

In a deductive approach, this TPI model is applied in different contexts and adapted to the needs of various educational actors. To support the possibility of using this model in multiple contexts, we exemplify our approach in terms of three types of innovation designers: (1) a researcher, (2) a collaboration between practitioners and (3) a collaboration between researchers and higher education teachers.

Application by a researcher in a techno-pedagogical teacher training design context (Kumps, n.d.)

- Designer of the innovation: Researcher
- Beneficiaries: In-service teachers

Context of the techno-pedagogical engineering intervention:

With the Internet, information has become more accessible in a few clicks and seconds. Since 1995, the network has grown exponentially (Kemp, 2020). As a result, searching for information online is now part of the habits of the majority of the European population (European Commission, 2017). It is therefore not surprising that students choose this modality first and foremost to meet their academic and everyday information needs (Smahel et al., 2020). Educating them to be able to search and be critical on the web has therefore become one of the important goals of education (Hämäläinen et al., 2020) and this, from the early years of their schooling (Leu et al., 2015). However, this competence is not

much worked on for its own sake in school. The learning activities proposed by teachers remain very limited in this respect (Kumps et al., n.d.). Currently, the educational system of French-speaking Belgium, wanting to fill this gap, suggests in its new reference materials (Fédération Wallonie-Bruxelles, 2022) that pupils should be able to acquire transversal competences in this field. Thus, being able to search effectively for information on the Internet will be one of the skills that pupils will necessarily have to develop from the age of 8. However, teachers do not seem to be ready to provide this teaching (low sense of self-efficacy, lack of ideas for implementation activities, negative perception of usefulness and usability, etc.). This is why our intervention sets up an in-service training, totally at a distance, for a public of teachers.

To do this, we first (Apprehend Step) proposed a questionnaire adapted from the technology acceptance model in order to define the teacher-profiles regarding the acceptance of teaching online information retrieval. This first step highlights a major problem in the implementation of this teaching. The responses to our questionnaire show that teachers are facing difficulties in implementing online information retrieval teaching. The results show that there is a need for pedagogical and technical support.

To meet the needs identified by the teachers, we are designing a fully distance learning course. In order to build the content of the course (Design step), we opted for the analysis of the students' strategies and errors thanks to eye-tracking techniques. The actual practices of the pupils enabled us to formulate recommendations directly for the teachers in the field.

We then set up this training (Implementation step). It includes technical, techno-pedagogical and reflective aspects of the educational use of the Internet to search for information. The training is based on the connectivist pedagogical model and provides for the learner to be active and constructive throughout the training. It is through exchanges, consultation of resources, creation of links, etc. that the participant in the training will be able to find the answers to his or her own needs. This training course lasts ten weeks and ends with the collaborative design and implementation of a teaching sequence highlighting the search for information online.

In order to assess the training system put in place (Evaluate step), we analysed the evolution of teacher profiles before and after the training. Data was also collected one year after the training in order to measure the impact of our long-term training on teachers' acceptance of teaching online information retrieval. Teachers' perceptions of satisfaction, usefulness and usability of the training were also investigated.

These different steps and data collection finally allow us to make adjustments and recommendations (Regulate step) in order to train teachers to integrate a digital competence in the school context.

TPI model adjusted to the context:

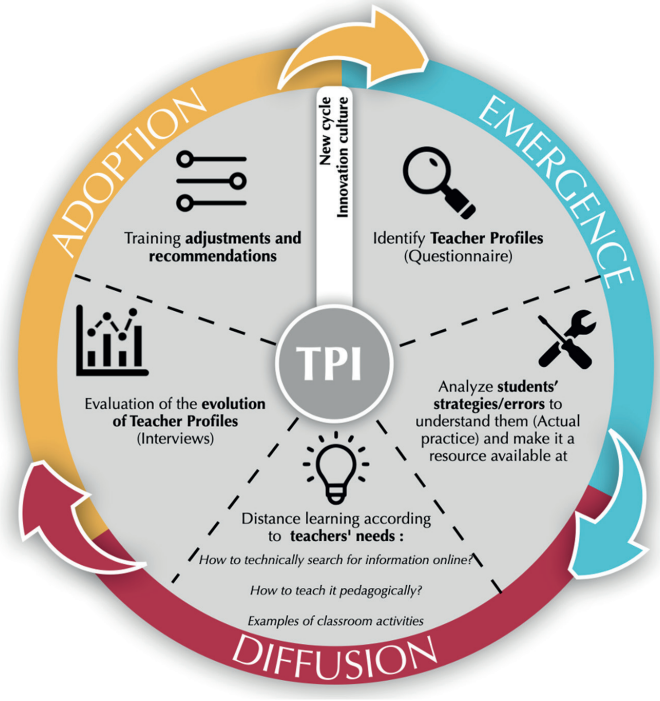

Figure 6. TPI model structuring teacher training

Source: Authors' own elaboration.

Application in a Community of Practice (CoP) context

- Innovation developer: CoP members – practitioner team[2]
- Beneficiaries: learners[3]
- Context of the Community of Practice

The project "Digital Transition for Teaching" (2019), known as Teach transition, is based on the following observations:

[2] Higher education teachers, secondary teachers, primary teachers, pre-school teachers, trainers, researchers, etc.

[3] Pupils, students or trainees depending on the learning context.

> The omnipresence of technology has profoundly changed all aspects of daily life, the way we think and act. It is important to train citizens, especially children and young adults, to use these digital technologies creatively, productively and critically (...) at the same time [there is] a strong interest in enabling teachers and trainers to exploit the potential of these new technologies efficiently. However, there is little structuring training for this public in relation to the demand from the field in the project's working area. Moreover, the training courses offered are not all valued and recognised on either side of the Franco-Belgian border. (Digital Transition..., 2019, p. 2)

The ambition of Teach Transition is therefore to create a framework and a continuous training course for teachers and trainers wishing to respond to the digital transition of their profession and to develop their skills in technopedagogy. Among the activities planned by the project, a community of practice (CoP) is to be set up around the project, led by the project's actors (technopedagogues) and whose members are represented by trainers and teachers at all levels (from pre-school to higher education). The ambition of this community is to identify and solve challenges around issues inherent to teaching practices.

For each CoP cycle, the members (Apprehend step) identify problematic situations for themselves or for their learners, i.e. situations that lead to difficulties either in the exercise of their profession or in the learning of their learners. To respond to these problematic situations, the members of the CoP invite experts to testify and discuss the issue. They can then create activities or suggest solutions in workshops (Design step). They can then apply these activities or solutions directly in their professional environment (Implementation Step). In order to assess the quality of the implemented ideas (Evaluate Step), the members evaluate them on the basis of previously identified criteria. They can discuss it together in an exchange workshop with the aim of making adjustments and improvements on an ongoing basis (Regulate Step). TPI model adjusted to the context is presented in Figure 7 (below).

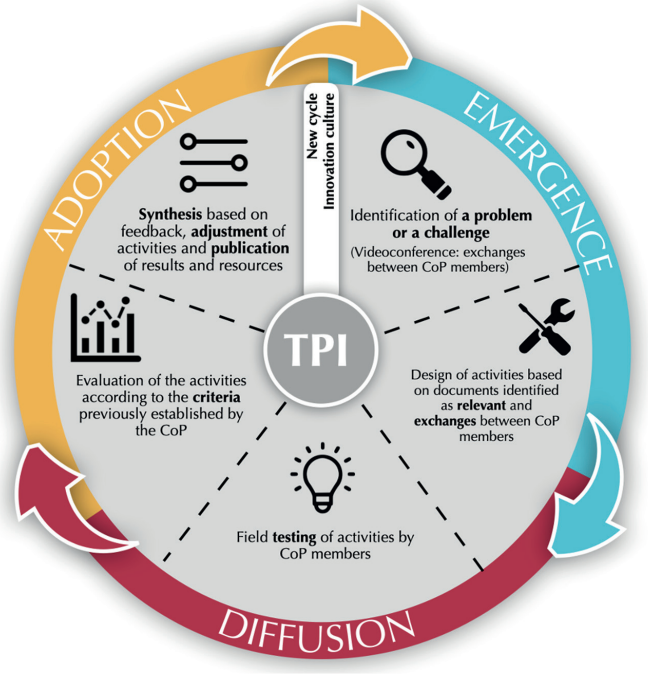

Figure 7. TPI model structuring a community of practice
Source: Authors' own elaboration.

Application by a researcher in an e-learning design context

- Designer of the innovation: Researcher and Higher Education Teachers
- Beneficiaries: Higher education teachers and their students

Context of the Community of Practice:

This third application of the TPI model is taking place within the framework of the Erasmus+ CoNeCTE project (Collaborative Network for Career-building, Training, and E-learning) in partnership with Lebanese higher education institutions. Among the objectives of this project, we find the support of teachers and students in their digital transition, particularly through distance learning. Indeed, the ambition is to set up a Virtual Learning Environment "which allows the production and sharing of digital educational content [...]. The virtual collaborative platform will contribute to an effective transition to graduate employment." (Chamber of Commerce, Industry and Agriculture of Beirut and Mount-Lebanon, 2021). Thus, to feed this virtual learning environment, four design teams have been set up to produce online training courses on various

topics such as economic and financial culture or bioinformatics. The development of these online courses constitutes a techno-pedagogical innovation in the sense that distance and hybrid courses are still difficult to recognise legally in Lebanon (Cressens, 2017).

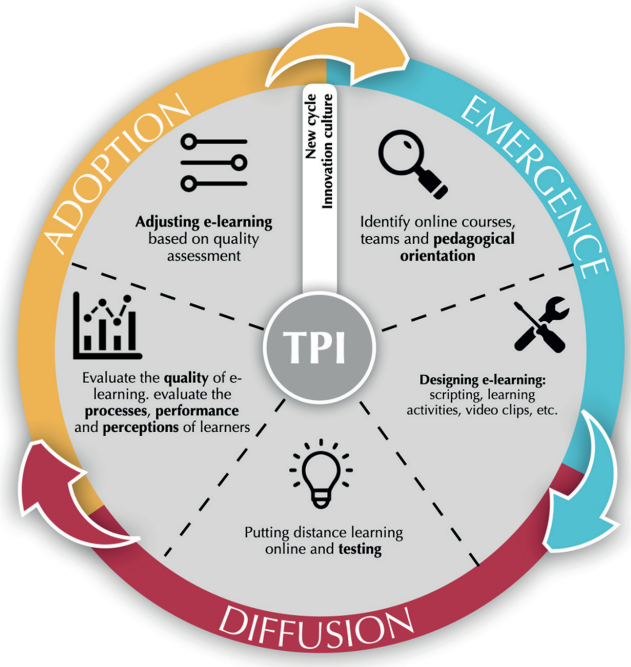

Figure 8. TPI model structuring the design of e-learning courses and the feeding of a virtual learning environment

Source: Authors' own elaboration.

Our role, as an institution belonging to the European Union, is to accompany and guide the teams to carry out this design work. Thus, we wished to apply this model of Techno-pedagogical Engineering to best accompany the Lebanese partners (Figure 8). The designers of this innovation are the researcher and the Lebanese higher education teachers participating in this Erasmus+ project. The beneficiaries are both the Lebanese teachers who can use the training modules and the students who can follow them. The project started with an analysis phase (Apprehend step). It was a question of identifying the online training courses to be carried out, of setting up the teams and of reflecting on the pedagogical orientation (Which target public? What prerequisites? What training objectives? What content? What learning strategies? etc.). Then, the design phase of the

distance learning courses consisted of scripting, designing and producing the activities, teaching aids and videos (Design step). This step was split into two: the design of the e-learning course (division into modules, scripting of activities, identification of pedagogical objectives for each activity, etc.) and development, i.e. the development of the e-learning tools. This choice was made because the Lebanese partners, the designers of the techno-pedagogical innovation, were used to working with the ADDIE model, which includes these two steps. At the time of writing, this step is still in progress. Next, the distance learning courses will be put online and tested with learners (Implementation step). Then the quality of the e-learning prototypes will be evaluated (Evaluate Step). This evaluation will be carried out according to the three dimensions put forward by Temperman (2013) to evaluate human learning environments: learners' perception, performance and products. Finally, the project will conclude by adjusting the e-learning courses according to this quality assessment (Regulate Step). TPI model adjusted to the context is presented in Figure 8 (above).

Conclusion

Based on our research activities in various fields, we have developed a model of techno-pedagogical innovation that can be applied in various contexts, such as training, coaching, collaborative research or the support of communities of practice. Our objective is to guide interventions related to the design of an innovative practice combining education and digital technology by adopting a sociocentric approach. Indeed, the literature has revealed that there is no clearly established definition of techno-pedagogical innovation nor a pragmatic model to which the designers of the innovation could refer.

According to our convictions, we want to put the beneficiary at the centre of techno-pedagogical innovation and thus propose a model that gives a sociocentric vision of innovation. In the literature review, the RQIS model (Le Réseau…, 2011) is identified as being applicable to any situation involving innovation. Therefore, we decided to adjust it so that it can be adapted to the educational environment. To achieve this, this model is fed by different theories relating to technopedagogy (Koehler et al., 2013), social innovation (Gaudreault, 2012) or the quality approach (Deming, 1982). It seemed essential to us to give a graphic form to this model. Indeed, a diagram makes it easier to visualise the relationships between the elements and the overall structure (Jamet, 2008) and therefore to go further than a linear text.

Once developed and in order to verify its transposition to various contexts, the TPI model is applied to three case studies: the design of a techno-pedagogical training course on online research for in-service teachers (Kumps et al., n.d.); the collaboration of practitioners through a community of practice; and an Erasmus+ CoNeCTE project that aims to develop e-learning in Lebanese institutions.

The TPI model considers that the guiding approach is an integral part of the innovation process and is the driving force behind it insofar as it makes possible the conditions for the emergence of this innovation. Indeed, by proposing moments of diagnosis, evaluation or regulation, the innovation makes sense for the educational actors. Our ambition is to develop a multi-purpose model that allows everyone to design an innovation and evaluate their practice in a continuous process. Moreover, we believe that this approach can also be implemented in multiple contexts, whether or not they include the use of digital tools. We therefore propose that practitioners, teachers, educational advisors and technopedagogues use this model to design technopedagogical innovation interventions in which the key factor is the action of the individual.

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A Model for the Integration of Podcasts (Audio or Video) in an E-learning System

ABSTRACT

Today, podcasting is an easy way to distribute content via the Internet to mobile devices (smartphone, laptop, tablet, etc.). Our problem concerns the analysis of the effect of integrating podcasting into a distance learning device. Numerous initiatives for the development of educational content are currently emerging in the context of university education (Dale et al., 2009). To guide their design and integration into a training perspective, however, pedagogical reflection is necessary. In our contribution, we would first like to describe how podcasts have been implemented in the Faculty of Psychology and Educational Sciences of the University of Mons. Based on an experimental design, our paper will also evaluate their effectiveness by analyzing the performance of learners who benefited from the device compared to learners who did not use the device, as well as the learners' opinion about their learning experience.

Keywords: Mobile learning, learning support, podcast, educational scenario.

Podcasting

Definition

The term podcasting is a neologism that comes from the contraction of the terms "iPod" and "Broadcasting". They have been combined to indicate that the content of the iPod (or any other mobile device supporting MP3 or MP4 formats) is fed on a regular basis via a feed aggregator (such as Apple Music,

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Spotify, etc.) which integrates and updates audio and/or visual information made available using RSS-type technologies (although this term is no longer as apparent as it was when podcasts first emerged). These allow for the selection and then automatic download of the news content that users want. Every new version, every new episode is offered to the user who has subscribed to a feed, to a channel. They do not have to search for the information, it comes to them because they have expressed an interest in it at a given time by subscribing to the feed. Today, practically all radio stations offer podcasts so that listeners can (re)listen to their programs at any time they wish, wherever they are.

Podcasts, which originally consisted mainly of audio files, can now include image files and video sequences. This technological evolution has allowed McCombs et al. (2007) to distinguish three podcast formats: audio podcasts, video podcasts which are short films compressed in digital format and mixed podcasts which combine the use of different media (audio source, image files, animations, and video sequences).

Podcasting in education

Podcasts have become a means of disseminating information that concerns all sectors of activity: radio stations as well as press organs have appropriated them. Higher education institutions, including universities, have not been left behind, as shown by the number of courses that were once available on iTunes U[3] (for University). English-speaking universities were very active from the outset, and today more and more French-speaking universities are also using it as a tool for disseminating knowledge and promoting their institutions. If the fashion effect has somewhat passed, it is nevertheless true that today many institutions continue, either systematically or on an ad hoc basis, to disseminate recorded content that is accessible internally, but also in a broad and open manner, as the initial philosophy of podcasts had envisaged. COVID-19 pandemic, which for two academic years disrupted the traditional course of face-to-face teaching to give a larger place to distance learning, has enabled many teachers to (re)discover the virtues of these recordings and their mode of dissemination, whether it be their own production or that of colleagues or other training professionals.

Many advantages are attributed to the use of podcasts in a pedagogical context: one of them, which is often mentioned, is that it allows the student to approach the content at his or her own pace and to return to it as often as nec-

[3] https://www.open.edu/itunes/ (as an example)

essary. Others see it as an opportunity to prepare the student before the lecture and thus increase the degree of face-to-face interactivity in the lecture session. For example, in medicine, podcasts can be used to present situations that are then discussed in class. The podcast can also allow the student to benefit from summaries or syntheses after the course (or instead of it), which do not require the student to view the whole course, but rather a structured summary of its important elements. According to Evans (2008), being able to study by replaying parts of a lecture can reduce students' anxiety during exam periods. Fernandez, Simo and Sallan (2009) point out that podcasts offer a better overview of the material to students. The podcast can also be used to make a process explicit or to facilitate the use of specialized tools. Before starting laboratory work, video commentaries can be made available to show learners how to use a particular piece of equipment or how to follow health and safety instructions.

Authors such as McCombs et al. (2007) or Maag (2006) see podcasting as a tool with great potential for learning. We consider that these possibilities are linked to the way the information is accessed, the way the information is structured and the purposes for which the mediated material is used.

As regards access to information, following the example of Ola and Niclas (2005), we believe that RSS technology greatly facilitates the learne's task. Indeed, the user is no longer obliged to go and look for information but can subscribe to an information feed which is automatically updated on his mobile device (computer, tablet, smartphone, etc.). Regarding this ease of dissemination, Lee, Miller & Newham (2009) highlight the fact that students are still not very well informed about the possibilities and facilities offered by this form of communication. It should be noted, however, that it is now much more transparent in its activation, whereas in the past it sometimes required several operations to implement it.

In terms of information structuring, podcasting offers multiple possibilities from text-only or audio information to information enriched with a combination of different communication languages. From the filmed teacher to a restructuring of information using different media (audio, images, animations and videos), the tool is extremely flexible to meet different needs or levels of training as well as to take into account the human and technical means available.

Regarding the purpose of the material, a distinction can be made between two types of possible use of the podcast: spontaneous use and integrated use. Spontaneous use is the most frequent. It corresponds to the situation where the podcast is made available in parallel with the classroom course. The learner is not given any specific instructions on how to use it. The learner can therefore

use it freely according to his needs. The first need considered may be absence from class. It should be noted that Deal (2007) and McKinney et al. (2009) have pointed out that attendance in class does not decrease if the podcasting provides different information from that given in the course. The need may be to revise aspects of the course that are less appropriate (Fernandez et al., 2009). Finally, the learner may personally pursue an area of study covered in the course. In this type of use, McKinney et al. (2009) also highlight the fact that the medium encourages students to check and structure their lecture notes.

In the context of an integrated use, the provision of the podcast is thought out by the teacher to serve his or her pedagogical objectives. A typology of the functions that the podcast can fulfill will be available shortly in a publication in progress (Decamps et al., n.d.). However, it is already possible to mention some of them. The podcast made available to learners can be considered as:

- a motivational trigger to make the learner want to go further;
- a set of organizational information to explain the course;
- the content to be understood to deal with it during the course, it is then the main object of the session;
- an illustration of a point of the course which will be described here, detailed to go further in an explanation;
- a different, complementary explanation by another teacher or a renowned expert in the field;
- etc.

Depending on whether it fulfills one of these (or other) functions, the podcast is offered either as an initial situation, as the "body" of the learning session, or as used at the end of the session. The material developed serves as a support for the teaching activity and thus constitutes a learning object. It enables a series of activities to be initiated with a view to reinvesting the content discovered in the podcast. This decontextualization approach is conducive to the transfer of knowledge. In the last case, that of using the podcast at the end of the sequence, several possibilities exist: a final podcast can be proposed, as an exercise or an evaluation, as an object of analysis (of the case study type) through which the students testify to their understanding of the course. It can also be a summary of the content by the teacher or an expert to close the sequence. And the student himself/herself can be the creator of a podcast which, at the end of a sequence, serves as a final product of synthesis, reflection, analysis, etc. In this case, the student develops creative skills in terms of digital production and finds himself in a position of actor rather than receiver. The podcast is, therefore, an opportunity to process and appropriate content while making it available to

other learners, which is undoubtedly to be encouraged from our point of view. The creation and publication of podcasts by students is also highlighted as an effective activity (Dale & Pymm, 2009; Lazzari, 2009).

Our typology of podcast use is illustrated in Figure 1 below and consists of two axes. The first, horizontal axis is the axis of the structuring of the medium which considers, at the extreme left, the situation where the structuring of the podcast is practically nil insofar as the entirety of the teacher's lecture is only filmed, whereas at the other end of the axis (right), we find a situation where the lecture has been structured in such a way that it highlights the essential points of a given lecture in forms that may be very different from those of the face-to-face lecture and very strongly illustrated by diagrams, tables, illustrations and video sequences. The vertical axis concerns the mode of use. It extends from spontaneous use (lower end) by the learner who listens to or views the podcast if and when he or she wishes without any particular instruction from the teacher. The upper end of the axis represents the integrated use of the podcast in an instructional sequence designed by the teacher in which the learner is expected to view the podcast at a certain time. In this way, the student processes the information contained in the podcast to invest it in an appropriation activity

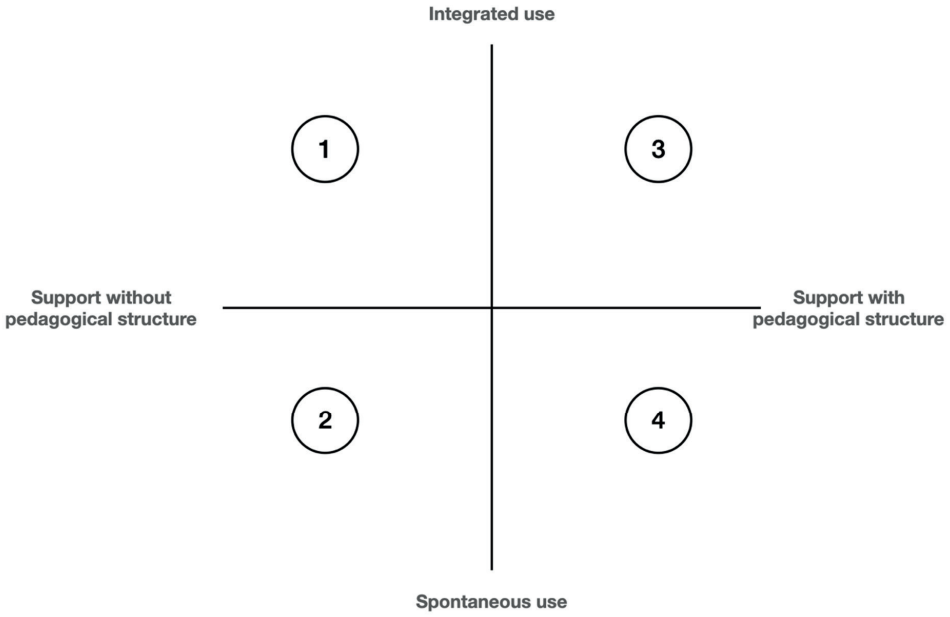

Figure 1. Digital media integration model
Source: Authors' own elaboration.

and reports on the degree of appropriation of the content. The intersection of these two axes makes it possible to visualize four pedagogical situations where podcasting is used.

The two situations that we will assess in the following are located in zones 3 and 4 of the figure 1 below. What they have in common is that they are podcasts structured to deal in a synthetic way with 6 themes of a general education course. The difference between these two zones will be linked to the vertical axis: some of the learners see the podcasts integrated into a pedagogical scenario (zone 3), while other subjects are simply offered to use the podcasts according to their inspiration, need, desire... in short, in a spontaneous manner without any particular instructions (zone 4).

Example of integrating podcasts into a teaching scenario

Integrated use

The pedagogical scenario of the project in which the podcasts are integrated is based on two phases of appropriation structured by several tasks envisaged to mobilize the learner cognitively (D'Hainaut, 1983). The table below details

Table 1. Learning scenario for the integrated podcast

	Nature of the task	**Modalities**	**Objectives**	**Additional tools**
Stage 1	Exploration	Individual	Identify the key concepts presented in each podcast Justify the choice of key concepts with a thorough argumentation	Groupware
	Conceptualization	Individual	Establish possible links between concepts discovered in different podcasts	Groupware
Step 2	Problem solving	Individual	Analyze different case studies using the concepts discovered in the podcasts	Groupware
		Collective	Write a joint analysis of these case studies	Groupware Cat Forum

Source: Authors' own elaboration.

these specific activities as well as the different work methods envisaged in them (individual vs. collective) and the tools favored in the learning environment.

The scenario described below (Table 1) highlights how the tools integrated into digital working environments can be made complementary: podcasts provide information in a dynamic way but have little interactive capacity. The communication tools (chat – forum) make interactions possible so that students exchange information about the content of the podcasts and the groupware allows users to upload documents in order to complete the task based on the podcasts.

Spontaneous use

Spontaneous use of podcasts is when learners are free to access the podcasts whenever and however often they wish. However, it should be noted that the students who benefited from the podcasts only had access to them at a certain point in their learning process. These students had a traditional lecture combined with collaborative practical work, the aim of which was to enable them to mobilize the concepts in different case studies. The podcasts were made available to them after the course in preparation for their exams.

Research questions

To evaluate the effect of podcasts on learners' performance, we analyze the results of a group with podcast resources integrated into a learning scenario and a group without podcast resources. The analyses carried out focus initially on what students retain when the learning object consists of podcasts integrated into a learning scenario. These results are put into perspective with those of learners whose learning scenario is not structured around podcasts, but rather around other concept integration activities. This analysis allows us to highlight what specific learning benefits podcasts can bring.

The first question we will try to answer will be: How do learners perform in a learning scenario with podcasts on the one hand and in a learning scenario with other learning resources than podcasts on the other hand (Question 1)?

To take into account learners' opinions on the use of podcasts, we offered them an online questionnaire to express their opinions on this subject. We therefore considered the opinions of learners who had used the podcasts as part

of the teaching scenario and those who had used them spontaneously outside the teaching scenario intended for them.

What are the perceptions of learners who benefit from podcasts used as part of an educational scenario on the one hand, and from podcasts used spontaneously on the other hand (Question 2).

Our sample consists of a total of 28 students: 14 who benefited from the integrated scenario (these are all the students who were integrated into the planned scenario) and 14 who made spontaneous use after having completed the assessment of their degree of mastery of the concepts (these are 14 students who have a similar learning style to those who used the podcast). These profiles were based on Kolb's (1984) style test.

Analysis device

The approach implemented is marked out in 5 phases as illustrated in Table 2 below.

Table 2. The 5 phases of the process

Phases Groups	**1. Pre-apprenticeship**	**2. Learning phase**	**3. Performance Analysis**	**4. Provision of resources**	**5. Analysis of students' perceptions**
Integrated podcast	Questionnaire on learning styles	Podcasts integrated into the script	Assessment of the degree of mastery of the concepts	Written course materials	Online opinion questionnaire
Spontaneous podcast		Face-to-face courses + Course materials	Assessment of the degree of mastery of the concepts + Learning styles questionnaire	Podcasts for spontaneous use	Online opinion questionnaire

Source: Authors' own elaboration.

In the first phase, we collected information on the individual characteristics of the learners in the integrated podcast group via two online questionnaires: one positioning them according to Kolb's learning styles and the other establishing their pedagogical profile according to De La Garanderie (1993). The

students in the "spontaneous podcast" group were not given a task to complete during this phase.

The second phase is where the learning itself takes place. The students in the "integrated podcast" group carried out the activities provided for in the learning scenario that incorporates the use of podcasts. No other course resources were provided at this stage. The students in the "spontaneous podcast" group carried out their learning (see the learning scenario described in Table 1) with all course resources (lectures, notes, etc.) except for the podcasts.

The third phase of the experimental approach consists of evaluating how the content of the podcasts was appropriated by the learners. An identical post-test was administered to both student groups. The items of the post-test are designed considering the taxonomic model of D'Hainaut (1983). Three levels were considered: reproduction (e.g., quoting facts and concepts explicitly present in the podcast), application (e.g. implementing principles and procedures mentioned in the podcast, but presented in a new situation) and mobilization (using a given pedagogical concept, proposing an example of implementation). Considering the taxonomic levels will enable us to refine our analysis of the learners' achievements. During this phase, questionnaires on learning styles were also administered to the students in the "spontaneous podcast" group.

The fourth phase is to provide students with learning materials that they had not previously had access to. For example, students who had access to the embedded podcasts were given access to the course notes (syllabus, slide shows, glossary) and students who had not previously had access to the podcasts were given the opportunity to view the podcasts.

Finally, the fifth and last phase looked at the students' perception of the podcast tool. We administered an online opinion questionnaire to students in both groups.

It is therefore important to remember that question 1 considers one group that has used podcasts and the other that has not, while question 2 looks at the perception of those who have used it in their learning scenario and those who have used it spontaneously because of learning activities.

Analysis of the results

Effects on performance (Question 1)

In terms of performance, we will highlight the results obtained as a whole, those distinguished according to the taxonomic levels (reproduction, application, and mobilization) and those distinguished according to the underlying pedagogical strategy implemented (deductive approach vs. inductive approach).

Overall results

In Table 3 below, we can see first that, when comparing the overall performance on the post-test, the score of the learners in both groups is relatively low (51.07% and 21.02%), but also that there are significant differences between these two groups.

Table 3. Overall results

Groups	N	Average (%)	Coefficient of variation (%)
Integrated podcast	14	51.07 %	32.76 %
Without podcast	14	21.02 %	44.84 %

Source: Authors' own elaboration.

If we apply a statistical test to assess the significance between the two averages, we observe that a significant difference can be highlighted ($t = 5.81$; $p = .000$). These differences can be explained by the training schemes implemented. The one that learners benefit from the most is the one for which the device was designed. The students who carried out activities other than those centered on podcasting did not go into the content covered in the same way. This is not surprising, especially since the questionnaire administered to assess the degree of mastery, which was identical for both groups, focused on the issues and specificities addressed in the podcast. This result is in line with the idea of Depover, Karsenti and Komis (2007) concerning the use of a tool with cognitive potential within a training course, i.e., that a digital tool can lead students to acquire high-level competences if it is correctly integrated into the pedagogical scenario, we can see here an effect of this kind.

However, while this effect is positive in the case of the scenario that integrates the podcast, we should not interpret the opposite for the scenario that does not integrate the podcast. Indeed, this scenario implements other skills through

other activities whose relevance in terms of performance should be evaluated. It should be borne in mind that the evaluation that was carried out focused on the potential added value of podcasts. And if these characteristics are clearly better understood in the case of the scenario that includes podcasts, and less so by those who have not benefited from them, we should not conclude that one scenario is superior to the other in terms of the pursuit of the course's objectives as such, since we have not specifically evaluated them in this context. This result is also consistent with Dale's (1969) theoretical model. The latter shows that recall of information increases as the learner's level of activity increases through a diversity of learning experiences. In our study, we can consider that the interaction between the task and the use of a mediated medium seems to be beneficial for learning. Another explanation for these differences in results can be attributed to the fact that for the students in the scenario with podcast, it is a question of immediate retention of information in contrast to the learners who benefited from the scenario without podcast for whom the information from the courses and the associated activities is more distant in time.

Results according to taxonomic levels

Regarding the results according to taxonomic levels, we can establish the same findings as for the overall results, namely a difference in favor of learners whose podcasts are integrated into the teaching scenario. The differences are significant between our two groups (t replication = 4.09; p = 0.001, t application = 4.75; p = 0.000 and t mobilization = 5.51; p = 0.000). The differences between the two groups can be explained by the fact that the students did not have to perform the same tasks in their respective scenarios. It should be noted that the overall success rate is still relatively low (barely 50%). We can consider that the podcasts are complementary course materials, but that they are certainly not sufficient to allow fully autonomous distance learning that could lead to a high degree of mastery of knowledge. It is also interesting to observe that the results of learners benefiting from podcasts are more homogeneous for the levels of application (coefficient of variation: 37.58%) and mobilization (coefficient of variation: 31.87%) than the results of learners who did not have access to podcasts (application: 71.42% and mobilization: 87.75%).

Table 4. Results by taxonomic level

Groups	N	Taxonomic levels	Average (%)	Coeff. of variation (%)
Integrated podcast	14	Reproduction	56.10 %	43.89 %
		Application	50.04 %	37.58 %
		Mobilization	51.90 %	31.87 %
Without podcast	14	Reproduction	28.00 %	25.54 %
		Application	20.79 %	71.42 %
		Mobilization	18.18 %	87.75 %

Source: Authors' own elaboration.

Results according to teaching strategies

Of the six podcasts offered to the students, four podcasts were built on a deductive reasoning mode while the other two were built on an inductive approach.

Table 5. Results by mode of reasoning

Mode of reasoning	Average (%)	Coefficient of variation (%)
Inductive podcasts	44.33 %	43.82 %
Deductive podcasts	33.33 %	34.17 %

Source: Authors' own elaboration.

Although we observe that providing learners with examples beforehand so that they construct the concept by gradually moving towards a more general level (inductive podcasts: 44.33%) seems to be more beneficial for learning than the opposite situation (deductive podcasts: 33.33%), we do not find any difference from a statistical point of view ($t = .726$; $p = .481$) between the two reasoning methods. This result is, however, in line with the work related to the transfer of learning, which stresses the importance of the process of decontextualization of knowledge likely to effectively guide its reuse in new situations where it must be mobilized (Tardif, 1997).

Effects on learners' perceptions

We collected learners' opinions about their learning experience by means of an online questionnaire administered on the one hand to learners who had made integrated use of the podcasts and on the other hand to students who after the

post-test used the podcasts spontaneously (phase 5). The questionnaire was composed of different items built on a Likert scale. It allows students to express their opinion about statements on a 4-level scale: 2 negative (Strongly Disagree and Disagree) and 2 positive (Agree and Strongly Agree) except for item 1.

Terms of use of the podcast

With the help of item 1, we were interested in how the students used the podcast.

Table 6. Modalities of use of the podcast

	Types of use	**Yes**	**No**
Item 1: I have watched one or more podcasts of the course on an iPod or portable media player.	Integrated	14.3 %	85.7 %
	Spontaneous	35.7 %	64.3 %

Source: Authors' own elaboration.

Table 6 shows that use of mobile media is relatively low. This observation is in line with those of Lee, Miller & Newham (2009) who point out that students are generally unaware of the different ways of using this type of media. Finally, we can see from the table that it is the students who have integrated use who use the computer exclusively (85.7%). In our context, this preferential reading on the computer for these students is quite logical given that the various tasks requested in the environment require parallel work using a word processor.

Relevance of podcasts

Table 7. Relevance of the podcast

Items	**Types of use**	**Strongly disagree**	**Disagree-ment**	**I agree**	**Totally agree**
Item 2: During the first viewing, I understood the whole theme developed.	Integrated	0.0 %	35.7 %	50.0 %	14.3 %
	Spontaneous	0.0 %	0.0 %	50.0 %	50.0 %
Item 3: I understand the concepts that have been developed in the podcasts better than the other concepts in the course.	Integrated	0.0 %	35.7 %	42.8 %	21.5 %
	Spontaneous	0.0 %	35.7 %	35.7 %	28.6 %

Items	Types of use	Strongly disagree	Disagree-ment	I agree	Totally agree
Item 4: Concepts are easier to understand in the podcasts rather than in the glossary.	Integrated	0.0 %	21.4 %	50 %	28.6 %
	Spontaneous	0.0 %	28.6%	35.7 %	35.7 %
Item 5: I found the information presented in the podcast to be well structured.	Integrated	0.0 %	7.1 %	78.6 %	14.3 %
	Spontaneous	0.0 %	0.0 %	50.0 %	50.0 %
Item 6: Podcasts are a useful support to the course.	Integrated	0.0 %	7.1 %	35.7 %	57.1 %
	Spontaneous	0.0 %	0.0 %	28.6 %	71.4 %
Item 7: Podcasts are a more motivating source than the traditional syllabus.	Integrated	0.0 %	35.7 %	50.0 %	14.3 %
	Spontaneous	0.0 %	28.6 %	21.4 %	50.0 %
Item 8: I like podcasts because they allow the presentation of information in different ways.	Integrated	0.0 %	7.1 %	64.3 %	28.6 %
	Spontaneous	0.0 %	7.1 %	57.1 %	35.7 %

Source: Authors' own elaboration.

Overall, we can see from table 7 that learners have a positive perception of the relevance of podcasts, regardless of the context in which the medium is used (spontaneous vs. integrated). We can consider that this positive opinion of the medium can potentially have a beneficial effect on their learning dynamics. Some nuances appear, however, if we compare the opinion of learners who have used the medium spontaneously with that of learners who have had an integrated use of the medium, which is also instructive, regarding item 2 (immediate comprehension) and item 5 (structuring of the podcast). Regarding item 2, spontaneous use following the course leads students to consider that understanding the podcast when first viewing it is easier than students who have not had the course beforehand ($p = .008$). A prior learning experience helps to explain these differences in access to information. This benefit linked to complementarity (face-to-face and podcast) is also highlighted in item 5, where learners with spontaneous use rate the structuring proposed in the podcast more positively than learners who did not have the face-to-face course ($p = .0038$). These differences in opinion lead us to believe that the discovery of the podcast offers learners a situation conducive to activating and reorganizing the knowledge covered in the face-to-face course. This hypothesis is consistent

with the actual use by learners of podcasts in spontaneous mode. As the exam approaches, we find that students make increasing use of the podcast resources made available to them (see Figure 2). This behavior is consistent with Evans (2008) who found a link between reduced anxiety and podcast use during exam periods and McKinney et al. (2009) who found that podcasts stimulated students to reorganize their lecture notes.

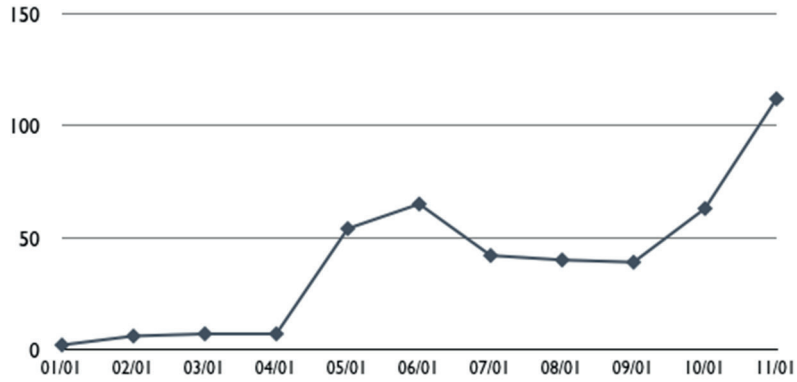

Figure 2. Evolution of connections to the podcast site during the exam preparation period
Source: Authors' own elaboration.

These results lead us to believe that the relevance of the podcast in an academic context probably lies more in the restructuring of information than in a course filmed and then put online in the form of a podcast. This course support, which is complementary to the lecture notes, thus gives the teacher the opportunity to differentiate the learning processes of his students (Perrenoud, 1995).

Conclusions

Our results show that the added value of the podcast lies in the pedagogical exploitation of the complementarity of the sources of information, but also in the necessary integration of the principle of activity dear to constructivists by appealing to the cognitive mobilization of the learner. If the mediatization of information using a podcast appears to be beneficial for learning, the question of mediation by supporting the discovery of the medium with a specific task is just as important. Our recommendations are therefore in the direction of a pedagogical reflection that must integrate technological means rather than giving

too much importance to technology at the expense of reflection on what really creates the quality of learning. In terms of perspective, it may be interesting to investigate further how learners appropriate the information provided in a podcast depending on the nature of the media used (multimedia vs. audio). To evaluate the combined effect of learner activity, we also believe that it would be useful in future studies to cross-reference this variable relating to mediatization with the mediation modalities relating to the presence or absence of activities for mobilizing the information contained in these podcasts.

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What Are the Individual Characteristics of the Learners Enrolled in the MOOC?

ABSTRACT

In this contribution, we investigate the personal and professional characteristics as well as the motives for entering training of learners enrolled in a MOOC. As discussed by Li et al. (2015), it is relevant to describe learners' individual characteristics as they may modulate their behavior. Therefore, we describe and compare the individual characteristics of these two types of learners and their similarities and differences. As a reminder, the term enrolled refers to students (N = 357) enrolled at the beginning of their studies at the Faculty of Psychology and Educational Sciences (FPSE) for whom participation in the MOOC is compulsory and part of their learning program, while spontaneous learners are learners who are free to enroll in the MOOC. The latter are the most numerous (N = 2,175) and therefore theoretically enroll in the MOOC by personal choice.

Keywords: MOOC, professional characteristics, personal characteristics, reasons for entering training.

Conceptual framework

Definition and characteristics of MOOCs

Cisel (2013a), Charlier (2014) and Kennedy (2014) consider MOOCs, or Massive Open Online Courses, to be online courses that are generally free to access and intended for large numbers of learners. According to Depover et al. (2017), the term "MOOC" is inspired by the acronym MMORPG (Massively Multiplayer Online Role-Playing Games), which refers to online role-playing games in which a multitude of players interact simultaneously in a virtual uni-

verse. However, the parallelism stops at the dimension of "massiveness" because MMORPGs, unlike MOOCs, are generally paid for and are products intended more for entertainment (video games) without any real learning ambition. MOOCs, however, aim precisely to encourage learning by as many people as possible. MOOCs are courses, often attached to a university, but not necessarily. They can take different formats – which we present below – and can be consulted entirely online in return for user registration. The notion of massiveness of MOOCs stems from the fact that these learning devices are intended for large numbers of participants. We agree with Cisel (2016b), who explains that "the term Massive, for Massive, has the defect of imposing an element of arbitrariness" (Cisel, 2016b, p. 49). Indeed, the analysis of the literature has shown us that the number of registrants differs from one MOOC to another. Some MOOCs bring together a few hundred learners, while others have several thousand registrants. The term "massive" can therefore be problematic, probably because of the lack of a standard characterizing the massiveness of MOOCs. Although somewhat arbitrary, such a standard would allow courses to be ranked against each other. Another problem concerning the characterization of massiveness concerns the moment of accounting of learners participating in the MOOC (entry vs. exit). Indeed, for Cisel (2016b), it is not possible to anticipate the number of learners who will enroll in a MOOC. In the interests of rigor, he advocates "talking about MOOCs only at the end of the course, when it has proven its ability to attract a large audience" (Cisel, 2016b, p. 49).

As Depover et al. (2017) explain, one of the characteristics of MOOCs is that they are scalable: pedagogically, they are designed to allow for gradual scaling. They point out that this scalability implies several constraints, in terms of organization, costs and pedagogical approaches. From an organizational point of view, it is necessary to use a hosting platform capable of accommodating many learners who can interact simultaneously. This type of platform generally has a high cost linked to the cost of hosting servers, maintenance, hiring qualified staff to provide technical support, etc. From a pedagogical point of view, designers must anticipate massification by proposing appropriate supervision, opting for tasks that can be carried out by large cohorts (self-correcting questionnaires, peer evaluation, etc.). The evolving character of the massification of MOOCs goes hand in hand with a principle of openness: "if we want to respect the principle of openness that characterizes MOOCs, we must be able to cope with an influx of candidates that was not necessarily anticipated" (Depover et al., 2017, p. 10). The notion of openness can have several meanings depending on the perspective adopted (Cisel, 2016b; Depover et al. 2017).

Openness refers first of all to the fact that MOOCs are generally free (to register). Cisel (2016b) explains that, in some cases, the notion of openness is not necessarily linked to that of Open Educational Resource "insofar as most of the content disseminated in MOOCs is under a proprietary license, with the exception of the MOOCs on the FUN platform" (p. 50). Indeed, as argued by Yeager et al. (2013 cited by Julien & Gosselin, 2016), some MOOCs ask their learners to sign a non-reuse, non-modification, or even non-redistribution agreement of the course content. The notion of free access is not universal and does not apply to all MOOCs. Some are accompanied by a range of paid services to which learners have to subscribe in order to benefit from (personalized) coaching, access to additional content or to be able to take an assessment allowing them to access a certification (Julien & Gosselin, 2016; Depover et al. 2017). The "open" character of MOOCs is also linked to the fact that they do not always require any prerequisites (diploma, experience, etc.) on the part of the learner who wishes to enroll, apart from mastery of the language – which is not systematically checked beforehand – in which the MOOC is designed (Roy et al., 2016; Depover et al., 201+7) and compliance with the timetable of the programmer's organization (Cisel, 2016b). Furthermore, within this "mass" of learners, Roy et al. (2015) point out that sometimes some registered users have no experience of distance learning.

The "online" nature of the MOOC refers to the fact that the course is hosted on an online platform although, as we have seen, some developers offer participants hybrid learning arrangements in which face-to-face learning can also have a place. Face-to-face learning can take different forms: teacher-developers traveling around the world to meet their learners, the setting up of coworking spaces (Cisel, 2013b), face-to-face coaching, or even the taking of certification tests (Depover et al., 2017).

Regarding the notion of "course", Depover et al. (2017) point out that the MOOC differs from "classic" online courses offered in a web-based distance learning context by its open and massive character. These authors, citing Depover and Orivel (2012), insist that MOOCs are not just a collection of online resources such as those offered by "French digital thematic universities whose ambition is limited to sharing course materials in digital format that can be made available to students" (Depover et al., 2017, p. 10). For Hennequin (2014), MOOCs are structured more like lecture theatre courses and involve several pedagogical actors (teachers, assistants, etc.) who evolve together and exchange with learners. The MOOC is an online course designed to enable the acquisition of knowledge and the development of skills. Following this logic, Cisel (2016a)

explains that a device (e.g. an online resource) offering only static resources cannot be called a MOOC. MOOCs are based on a pedagogical scenario designed by their creators. This scenario generally proposes learning activities in which a learner is "active" and has the possibility of interacting, on the one hand, with tools with cognitive potential, such as video-pedagogical capsules or exercises – generally self-correcting, given the possible "massive" number of learners – and, on the other hand, with other individuals by exchanging, for example, with tutors or peers. Furthermore, Cisel (2016b) states that it is the temporality that makes the difference between a space containing resources and a MOOC. Indeed, the latter offers learners activities (evaluated or not) delimited in time; it therefore has a beginning and an end. The beginning corresponds to the start of the learning activities and the end corresponds to the limit of their completion (when these activities are assessed). Now that the main characteristics of MOOCs have been established, it seems interesting to us to look at the audience that participates in these distance learning devices.

MOOC learners: what characteristics?

In this section, we will look at the individual and motivational characteristics of learners who enroll in MOOCs. We will try to identify the learners (geographical distribution, level of education, socio-professional sector, etc.) who enroll in MOOCs, and we will try to define the reasons why they enroll on the basis of empirical data from the techno-pedagogical literature.

Study by Breslow, Pritchard, DeBoer, Stump, Ho & Seaton (2013)

Breslow et al. (2013) analyzed the Circuits and Electronics MOOC offered on the edX platform by MIT and Harvard University in March 2012. This MOOC, the first to be conducted in a consortium between these two American universities, offered a variety of resources, including video lectures, interactive exercises, online labs and a discussion forum. The 155,000 students enrolled came from 194 countries around the world. The majority spoke English (67%) or Spanish (16%). At the end of the learning process, 7,161 students responded to the survey sent to them. Of the 1,100 students asked about their age, most said they were between 20 and 30 years old. Breslow et al (2013) estimate that 88% of the learners surveyed were male, 37% of the learners had an undergraduate degree compared to 28% with a master's or vocational degree and 27% with a secondary school diploma. Of the total number of registered learners, 7,100 (or 4.58%) obtained their certification.

Study by Christensen, Steinmetz, Alcorn, Bennett, Woods and Emanuel (2013)
Christensen et al. (2013) also looked at the profiles of learners enrolled in MOOCs. Their study of 32 MOOCs hosted on Coursera revealed several characteristics of the learners (N = 34,000). 83% of the enrollees had a higher education degree (bachelor or master). Of the learners, 40% were under 30 years old, 50% were between 30 and 60 years old and 10% were over 60 years old. The analysis indicates that 70% of the learners were professionally employed, 17% had student status, 7% were unemployed and 6% were retired.

MOOCs@Edinburgh group study (2013)
The MOOCs@Edinburgh group (2013) analyzed data collected from 6 MOOCs offered by the University of Edinburgh. Their research found that of all registered users (N = 309,628), approximately 39.9% logged on to the MOOCs in the first week, 53.3% completed the activities and 11.7% participated in the certificate assessment. Prior to the closure of registration, a survey was sent to 217,512 learners; 21% of registrants responded. Respondents came from 203 countries, the majority from the USA (28%) and the UK (11%). The survey shows that 33% of users were between 25 and 34 years old. The MOOCs@Edinburgh group (2013) found that 75% of registered users were having their first MOOC experience and 53% had only participated in one other MOOC. Over 70% of respondents claimed to have a university degree and 40% claimed to have a PhD. At the end of the MOOC, a second survey was launched; 4.96% of the registrants responded. The survey conducted shows that 98% of these respondents "felt they had got what they wanted from the course(s)" (MOOCs@Edinburgh, 2013, p. 2), stating that the duration, pace and level of the MOOC was relatively good and that they had spent an average of 2–4 hours per week on this distance learning facility.

Gillani & Eynon's study (2014)
Gellani and Eynon (2014) analyzed a MOOC developed by the University of Virginia and hosted on the US platform Coursera in 2013. This MOOC aimed to learn about business-related issues. The course, which attracted more than 87,000 registrants, was designed to be interactive with extensive use of forums and numerous videos illustrating case studies. Learners could complete a peer-reviewed project. They were asked to complete a survey at the beginning and end of the MOOC to gather information about their professional and educational background and motivations. Approximately 9% of registrants completed the first survey, compared to 1.15% for the second. The researchers refer to Arm-

strong and Overton (1977) and Couper (2000) to explain this low response rate and mention the possible existence of a response bias insofar as learners who have completed a course will not necessarily reconnect to the platform and, by extension, will not answer the questionnaire. This may seem paradoxical for a solution based on digital communication, but it should be noted that it is not always possible to contact learners directly by email, as MOOC managers often do not have access to contact details for reasons of user data protection. Communication between the two parties is sometimes exclusively via the platform hosting the MOOC. As regards the learners enrolled in the MOOC, the study showed that the majority were young adults aged 25 to 34 (39.9%), already holding a first (42.1%) or second cycle degree (36.3%), mostly professionally active and participating in the MOOC to refine their professional skills.

Study by Bar-Hen, Javaux & Villa-Vialaneix (2015)

Bar-Hen et al. (2015) focused on the MOOC Fundamentals in Statistics hosted on the French platform FUN. This online course, developed by the University of Paris Sorbonne in 2014, welcomed 7,997 learners, who benefited from different resources such as forums, videos or quizzes. A self-assessment questionnaire offered to registrants (N = 6,918 respondents) revealed that most learners were male (68%) and that about three quarters of participants who provided their location data lived in France. The remaining learners were mostly from Francophone Africa. The average age of the participants, close to 36 years, indicates a low level of interest on the part of students enrolled in initial training. On the other hand, the study reveals a massive presence of learners with a Master's degree (48.51%). The other participants have an undergraduate degree (14%), a doctorate (13.5%) or a bachelor's degree (7%). This indicates a desire on the part of learners to deepen or complete their knowledge in a philosophy of "enrichment" and continuing education, since the type of teaching provided in this online course (statistical databases) is generally provided in the first cycle of the university curriculum in France. Finally, out of all the registered learners, 251 (3.14%) have completed all the activities proposed in the MOOC.

Study by Mariais, Bayle, Comte, Hasenfratz & Rey (2017)

Mariais et al. (2017) analyzed six MOOCs offered by Inria. According to them, the success of a MOOC can be conditioned by the content it addresses. Regarding the target audience of these MOOCs, Mariais et al. (2017) found that more than 57% of the participants had a university degree (master, engineer, PhD). Research MOOCs, according to their typology, theoretically intended for

participants with a master's degree, have a significantly higher proportion of participants with a short higher education degree. Between 40 and 50% of participants are employed. For these authors, the content offered in a MOOC influences the type of participants. For example, the MOOC on algorithms attracted many teachers (15%), while the MOOC on advanced computer science attracted mainly engineers (41%).

Why enrol in a MOOC?

In this section, we describe different arguments that may lead learners to enroll in a MOOC. We highlight the desire to enroll in these online education and training systems for personal or professional development purposes, or because of their convenience and accessibility to all.

For personal and/or professional development

Several factors can motivate learners to enro.l in a MOOC: impulse, desire to show the community their commitment to a training process, prestige of the institution hosting the MOOC (Bruillard, 2014), acquisition of personal or professional skills, employment or advancement opportunities (Breslow et al., 2013), curiosity, enjoyment of learning, increase in the chances of succeeding in obtaining a degree (Mariais et al., 2017), etc. Engagement in a MOOC would come from motivation which is itself intrinsically linked to performance (Karsenti & Bugmann, 2016), even if the latter does not explain learners' participation. In other words, the success of the activities proposed in the MOOC would encourage learners to persevere.

A survey by Belanger and Thornton (2013) reveals several categories of learner motivation (N > 10,000) to enroll in a MOOC: geographical location resulting in distance from higher education institutions, inability to study, interest in the (online) teaching method, desire for professional development, desire to learn more, etc. These authors propose four main categories of motivation that can explain why learners enroll in this type of e-learning device: continuing education and learning new things, enjoyment of the learning experience, convenience of the learning experience and experimentation with this type of e-learning. Gillani and Eynon (2014) also asked learners (N = 1,964) about their motivations for enrolling in a MOOC. They report that the majority (93%) of learners enroll for professional development. The rest enroll for the pleasure of learning (6%), because the MOOC is a way for them to access knowledge (1%) or because the course is offered by a famous university (<1%).

Breslow et al (2013) also analyzed the motivation of learners (N = 1,173) to enroll in a MOOC-type distance learning process. For 55.4% of the learners surveyed, enrolment in the MOOC was linked to the desire to acquire new knowledge in the field concerned. Just over a quarter, 25.5% to be exact, took up the MOOC as a personal challenge and 8.8% said they enrolled in the course to benefit from possible job opportunities or advancement. It is worth noting that Breslow et al. (2013) found that there was no correlation between learners' motivation to enroll in a MOOC and course completion.

In their research, Mariais et al. (2017) suggested that the main form of motivation driving learners to enroll in MOOCs would be intrinsic in nature. Between 64% and 77% of registrants would claim to take the MOOC for the pleasure of learning or to satisfy personal needs. The second most important motivation for learners (between 36% and 51%) would be to increase their professional opportunities. Indeed, according to Cisel (2013b), the majority of learners enrolled in MOOCs are no longer students, but workers who, for organizational reasons, do not necessarily have the time to undertake traditional training. This learning craze could be very positive for participants as it reaches thousands of people from all over the world with different backgrounds and life experiences (personal and professional).

Reasons for entering a MOOC

Cisel (2016b) looked at the reasons for entering training, documented by Carré (2001), of learners (N = 6,222) registered in 11 MOOCs. It is important to distinguish between motivation and reasons for entering training. As Cisel (2016b) points out, unlike motivation, reasons for entering training are the only observable elements. They correspond to the explanation given directly by the respondents and collected through a survey to justify their enrolment in a training course. This author specifies that these reasons for entering training should not be confused with motivation in the strict sense of the term, as there may be a discrepancy between the reason given by the respondent and the actual motivation for enrolling in training. We will define motivation in accordance with Cisel (2016b), who cites Vallerand and Thill (1993), as a construct representing "the internal and/or external forces producing the initiation, direction, intensity and persistence of a behavior" (Cisel, 2016b, p. 35). Carré (2001) distinguishes ten motives for entering training which are organized along two dimensions. The first corresponds to a continuum of self-determination and distinguishes between extrinsic and intrinsic motivations that may underlie entry into training. The second contrasts learning with participation: [it] divides the motivations

for engaging in training between those that aim at acquiring training content (knowledge, skills, attitudes), thus focusing on learning knowledge, and those that aim at participation, i.e. enrollment and/or attendance in training. (Carré, 2001). Vertongen et al. (2012, p. 4) add that this dimension "indicates whether the objective of the training is aimed at the acquisition of knowledge (learning) or rather at mere enrolment and/or attendance within a group (participation)".

Motives from intrinsic motivation

According to Deci and Ryan's (2000) theory of self-determination, intrinsic motivation motives correspond to the highest level of self-determination. Adam and Louche (2009) translate Deci and Ryan's (2000) idea that intrinsic motivation is based on the needs for competence and self-determination and that all factors related to these needs are relevant for the development of intrinsic motivation. In this sense, and more specifically in computer-supported collaborative learning environments, Temperman (2013) cites Rienties et al. (2009) to emphasize that learners motivated by mastery goals engage more in activity-focused exchanges. He also refers to De Lièvre et al. (2009), who found that a higher degree of intrinsic motivation leads learners to critically evaluate what their peers do or say in discussion forums. Table 1 shows the intrinsic motivations for engagement in training according to Carré (2001).

Table 1. Reasons for involvement in training of an intrinsic nature according to Carré (2001)

Epistemic motive	"Learning, acquiring knowledge, cultivating oneself, etc. are processes that find their justification (their "reinforcements") in themselves. Motivation here is linked to the content itself. We speak here of "personal taste" (...), curiosity, even passion for learning or knowledge" (Carré, 2001, p. 47).
Socio-affective motive	"It is about participating in training to benefit from social contacts. It is the social conditions in which the training takes place that count. (The training should offer opportunities for exchange with others)" (Carré, 2001, p. 47).
Hedonic motive	"It is about participating in training to benefit from social contacts. It is the social conditions in which the training takes place that count. (The training should offer opportunities for exchange with others)" (Carré, 2001, p. 47).

Source: Authors' own elaboration on the basis of Carré (2001).

The first of these three motives is more likely to concern learning-oriented individuals, while the other two are more likely to concern participation-oriented individuals.

Extrinsic motivation motives

So-called extrinsic motivations refer to goals outside the training. Deci and Ryan (1985) define extrinsic motivation as a phenomenon in which the learner engages in a behavior in order to generate a consequence external to the activity he/she is carrying out (reward, good result, congratulations, etc.) or to avoid negative consequences (feeling guilty, bad results, etc.). Table 2 presents the intrinsic motives for commitment to training according to Carré (2001).

Table 2. Intrinsic motives for commitment to training according to Carré (2001)

Professional reason for the operation	"It is a question here of acquiring competences (knowledge, aptitudes, attitudes), perceived as necessary to carry out specific activities in the field of work, in order to anticipate or adapt to technical changes, to discover or perfect practices, always with a precise performance objective" (Carré, 2001, p. 50).
Personal operational motive	"The personal operational motive is now about acquiring skills perceived as necessary for carrying out specific activities outside the field of work (leisure, family life, associative responsibilities, etc.), once again with a concrete and clearly identified goal of action" (Carré, 2001, p. 51).
The professional reason	"In this case, it is a question of acquiring the skills and/or symbolic recognition necessary to obtain a job, to keep it, to develop it or to transform it. The reason for engaging in training is here centred on a logic of professional orientation, career management or job search (before or alongside its economic, operational or identity-related characterisation)" (Carré, 2001, p. 52).
The economic reason	"The reasons for participation are here explicitly material: participation in a training action will bring economic benefits. These may be direct or indirect" (Carré, 2001, p. 48).
Prescribed reason	"In discrete forms (the pressure of social conformity, the 'advice' of a superior, the intervention of an influential person, etc.) or explicit forms (the constraint of enrolment, provided for by law), commitment to training results from the injunction of others, evoking the most extrinsic dimensions of motivation" (Carré, 2001, p. 49).
Derivative motive	"To acquire the competences (knowledge, skills, attitudes) and/or symbolic recognition necessary for a transformation (or preservation) of one's identity characteristics as such, from the point of view of professional, cultural, social or family identification, by maintaining or transforming one's social or family status, function, level of qualification, title, etc. This motive is therefore centered on the recognition of the environment and social image, apart from any economic motive. This motive is therefore centered on the recognition of the environment and the social image of the self, apart from any economic motive" (Carré, 2001, p. 51).

Identity motive	"To acquire the skills (knowledge, aptitudes, attitudes) and/or symbolic recognition necessary for a transformation (or preservation) of one's identity characteristics as such, from the point of view of professional, cultural, social or family identification, by maintaining or transforming one's social or family status, function, level of qualification, title, etc. This motive is therefore centered on the recognition of the environment and social image, apart from any economic motive. This motive is therefore centered on the recognition of the environment and the social image of the self, apart from any economic motive" (Carré, 2001, p. 51).

Source: Authors' own elaboration on the basis of Carré (2001).

Methodology

Context

The context of this study focuses on the study of the MOOC Educational innovation of which you are the hero... developed by UMONS. This MOOC was hosted on the FUN platform during the first quadrennium of the 2016–2017 academic year. It welcomed more than 8,265 learners. It can be described as a distance learning and teaching device, welcoming a heterogeneous public composed of learners that we describe as spontaneous or enrolled. The former were learners who were probably enrolled in the training scheme to acquire knowledge that could be reinvested in their professional lives. The latter were students enrolled in the beginning of the bachelor's degree in Psychological and Educational Sciences at the University of Mons (Faculty of Psychology and Educational Sciences), for whom participation in this device was credited in their university course.

The MOOC was conceived on the initiative of the General Pedagogy and Educational Media Department, under the academic responsibility of Professor Bruno De Lièvre – thesis director – and Associate Professor, Gaëtan Temperman, in association with the Cellule facultaire de pédagogie facultaire (CFPU), through the involvement of an assistant (Karim Boumazguida) – also a doctoral student. Our position is therefore that of a researcher-designer evaluating the educational system in the scripting and management of which he has participated.

Pedagogical scenario of the MOOC

In this sub-point, we present the way in which the MOOC was structured by describing the modules and the learning activities (lives, MCQs, capsules, etc.) relating to them. We explain the contents and objectives of the device and focus on each of its components (informative, formative and interactive) relating to the different research variables. It should be noted that for the reader's convenience, and in order not to be redundant, we do not develop the "technical" elements (educational capsules produced on Office Mix, in particular) similar to those presented in the pre-experimentation.

Hosting of the MOOC

The MOOC studied was launched on the France Université Numérique (FUN) hosting platform. Each chapter of the online course corresponds to a training module. To facilitate navigation, each chapter was structured in the same way: general information on the modules, instructions on the specific tasks to be performed and, finally, a link to the video clips hosted on the Office Mix platform. Several additional resources were also made available to learners (tutorials, syllabus, etc.). The platform includes a discussion forum allowing learners to exchange information asynchronously.

The teaching team had also set up a public Facebook group for learners, the "UMOOC" group. Each learner could post and exchange asynchronously with other registered users. Aware that some learners prefer to opt for forums because they appreciate the fact of being able to access information from the MOOC centrally (Alario-Hoyos et al., 2013) while others prefer social networks (Cisel, 2017) with which they are more familiar (Guillemet, 2014), we voluntarily opted for these two types of communication tools.

Description of the learning modules

The MOOC is subdivided into six thematic modules that allow learners to discover theoretical content through videos and then to assess their understanding through formative self-correction questionnaires. It had a double objective: to get learners to identify pedagogical principles (in the videos) and to articulate these principles to design a collaborative or individual synthesis illustrating their links and application. The objectives of the MOOC were communicated explicitly and transparently to the learners. Their transmission was also the result of a request from the FUN platform managers. Overall, the learning modules constituting the MOOC addressed 78 key concepts enabling students to acquire knowledge

in educational sciences. These concepts are mainly related to central themes considered by Hattie (2009) as making a difference in terms of learning (feedback, collaborative learning, didactic design of course materials, etc.). They were selected by the educational team because they were illustrative of the themes addressed in the different modules. The designers opted for these themes in order to offer active professionals and future practitioners pedagogical tools and principles whose effectiveness is proven in and validated by research. They have also taken care to propose, for each theme, concrete examples to enable learners to visualize the application of these principles in the field. It should be noted that the learners registered for the MOOC were able to benefit from the content for a period of two years. Pedagogical support was offered to learners for eight weeks. They were able to consult the different contents related to the different modules from week 1 (the first week or "week 0" being intended for contact) without following a logical order. Nevertheless, we provided learners with a schedule that allowed them to follow the modules in a chronological order. As in the pre-experimentation, each module was divided into an informative part (consultation of the capsules), a formative part (completion of the quizzes) and finally an interactive part (completion of an infographic and a conceptual map in group and with all the peers).

Research questions and variables

As part of this exploratory research, and in an attempt to understand who the learners are within the MOOC, we asked ourselves two research questions based on the three variables we have just described.

The first question is descriptive and relates to the characteristics of spontaneous and enrolled learners in the MOOC.

§ Question 1: What are the individual characteristics of learners enrolled in the distance learning MOOC?

This research question is subdivided into five sub-questions concerning the geographical origin, gender, age groups, level of education and finally the socio-professional sector of the learners. Then, we asked ourselves about the motives for entering the training course that led spontaneous and enrolled learners to register in the MOOC.

§ Question 2: What do learners say about their reasons for joining the MOOC?

On the basis of the questionnaire developed by Carré (2001), we looked at the intrinsic and extrinsic motivations driving spontaneous and enrolled learners to enroll in the MOOC. We analyzed the motives for entering the course in

relation to these dimensions on the one hand, and to participation and learning on the other.

We also asked learners about their previous experience with other MOOCs and how they had found out about the MOOC. This type of question may be useful for the sustainability of the system and the selection of communication channels for future sessions.

Analysis of the results of the first study

In this section, we present the different analyses carried out to answer our research questions.

In order to answer the questions, the sub-sample for our analyses consisted of subjects who met the following criteria:

- having completed the questionnaire on individual characteristics.

Question 1: What are the individual characteristics of the learners enrolled in the hybrid distance learning MOOC?

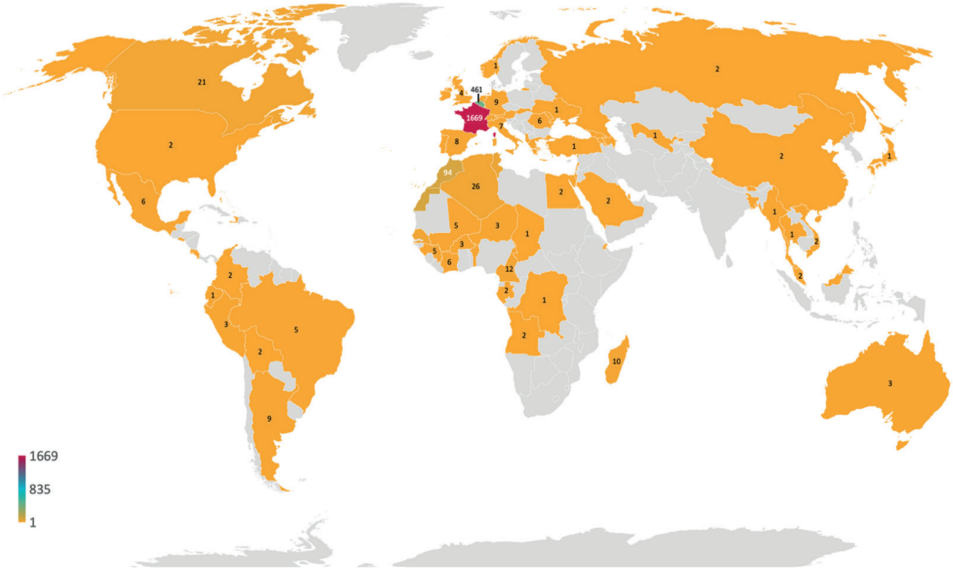

Figure 1. Geographical location of the learners registered in the MOOC

Source: Authors' own elaboration.

The sample considered consisted of 2,532 learners from 76 states around the world. The majority of learners registered for the MOOC (N = 1,669 or 65.92%) indicated that their geographical area is France. The second most represented location is Belgium (N = 461, or 18.21%). We note that the set of learners from neither France nor Belgium represents approximately 15.88% of our sample (N = 404).

Figure 1 also allows us to appreciate that learners came from all over the world. In addition to Western Europe, many other countries are represented. We note that the remaining learners are mostly from North Africa, mainly Morocco (N = 94 or 3.71%) or other French-speaking countries (Canada, Senegal, etc.).

We can see in Table 3 that the questionnaire was completed by 68.6% of women (N = 1736) and 31.4% of men (N = 796).

Table 3. Distribution of learners by gender

	Number	Proportion (%)
Men	796	31.44 %
Women	1,736	68.56 %
Total	**2,532**	**100.00 %**

Source: Authors' own elaboration.

Table 4 shows that, whatever the enrolment method, the majority of learners are women.

Table 4. Comparison of distributions of enrolled and spontaneous learners by gender

	Workforce	Men	Women	Totals
Enrolled	observed	**84** (23.53 %)	**273** (76.47 %)	**357**
	expected	112.23	244.77	
Spontaneous	observed	**712** (32.73 %)	**1,463** (67.26 %)	**2,175**
	expected	683.77	1491.23	
Totals		**796** (31.44 %)	**1,736** (68.56 %)	**2,532**
		$X^2 = 11.63$; $p < 0.001$		

Source: Authors' own elaboration.

Thus, among the enrolled participants we count 273 women (76.47%) and 84 men (23.53%), whereas the group of spontaneous participants is composed of 1,463 women (67.26%) and 712 men (31.44%).

Comparing these gender distributions of the two groups ($x2 = 11.63$; $p < 0.001$), however, we can conclude that they are significantly different and that the female representation in the enrolled group is statistically higher than in the spontaneous group (in which we observe slightly more male subjects than expected, unlike the enrolled group). We can perhaps see this as an effect of the very female composition of the FPSE student population that constitutes this first group.

From a descriptive point of view, Table 5 allows us to observe that the average age of all learners combined (N = 2,526) is 39.68 years. Enrolled subjects had an average age of 22.94 years, while spontaneous subjects had an average age of 42.44 years.

Table 5. Descriptive statistics on the age of learners (in years)

	M	SD	**Min.**	**Max.**
Enrolled **(N = 357)**	22.94	7.72	18	61
Spontaneous **(N = 2,169)**	42.44	9.91	19	78
Learners **(N = 2,526)**	**39.68**	**11.79**	**18**	**78**

Source: Authors' own elaboration.

In order to assess whether the subjects in our groups have significantly different mean ages, we applied the Mann-Whitney U test to compare our distributions. Indeed, the normality tests (Kolmogorov-Smirnov procedures, see Table 6) showed that neither of them followed a normal distribution (with $p = 0.000$ in both cases), ruling out the use of a parametric procedure.

Table 6. Normality tests of the age distributions of enrolled and spontaneous learners

	Statistics Kolmogorov-Smirnov	**P-value**
Enrolled **(N = 357)**	0.338	0.000
Spontaneous **(N = 2,169)**	0.041	0.000

Source: Authors' own elaboration.

The result of the Mann-Whitney test is detailed in the following table. It shows that the two groups of learners do have significantly different average ages (p = 0.000).

Table 7. Comparison of ages of enrolled and spontaneous learners

Workforce	Statistics Mann-Whitney U	Statistic of the standardized test	P-value
2,526	72,724.500	26.643	0.000

Source: Authors' own elaboration.

More specifically, we can therefore confirm that enrolled learners are statistically younger (22.94 years) than spontaneous enrollees (42.44 years). As shown in Figure 2, the MOOC is mostly attended by subjects between 35 and 44 years of age, for both sexes. Figure 3 shows that this trend is also true for spontaneous learners (N = 2,169).

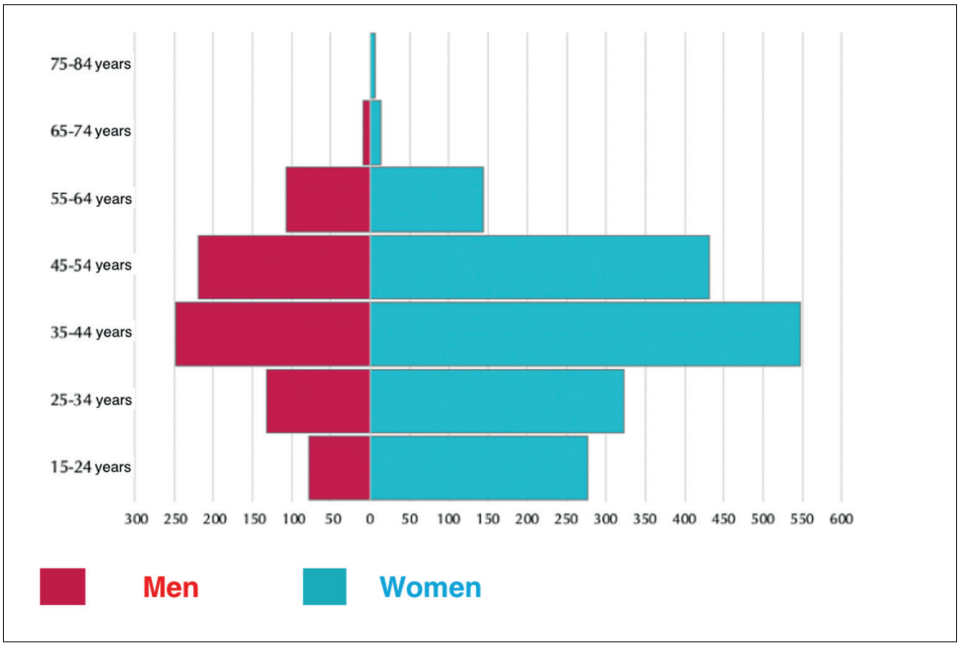

Figure 2. Age pyramid of registered MOOC learners (N = 2,526)

Source: Authors' own elaboration.

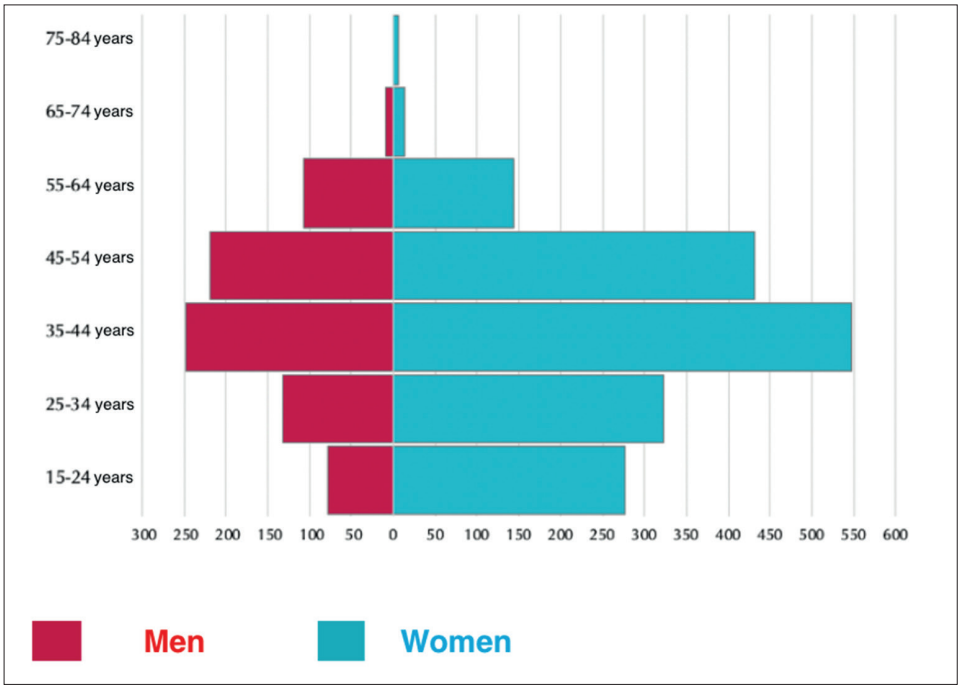

Figure 3. Age pyramid of spontaneous subjects enrolled in the MOOC (N = 2,169)
Source: Authors' own elaboration.

In contrast, we observe a rather different distribution among enrolled learners (see Figure 4). The majority of these learners are between 15 and 24 years old, again for both sexes.

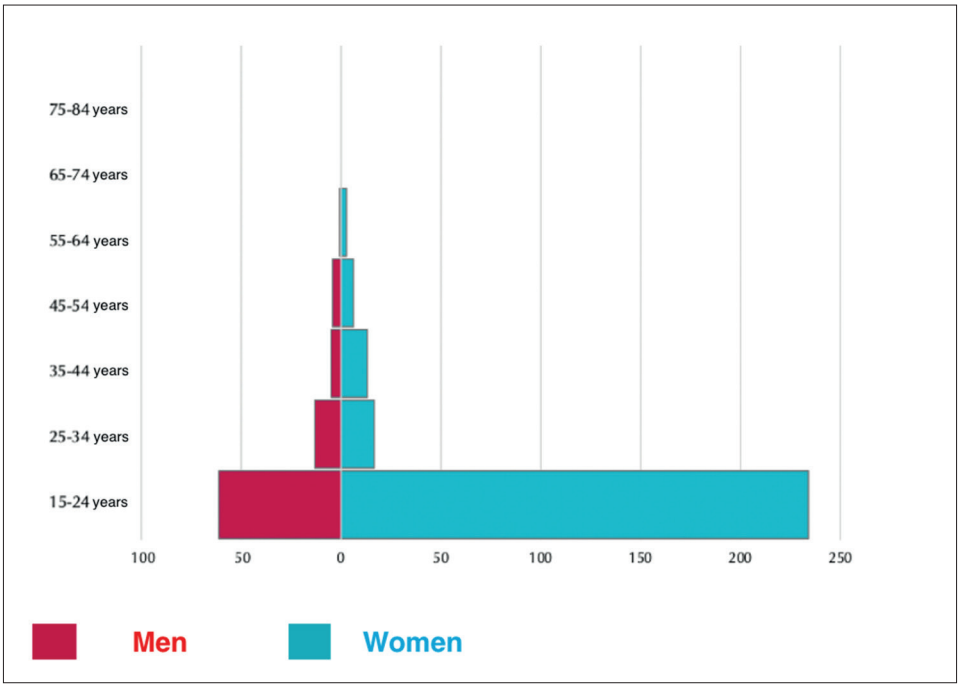

Figure 4. Age pyramid of enrolled subjects in the MOOC (N = 357)
Source: Authors' own elaboration.

What is the level of education of the learners enrolled in the MOOC?
We were also interested in the educational background of the learners enrolled in the MOOC.

From a descriptive point of view, it appears that the majority of respondents declared themselves to have a post-secondary degree (see Figure 5). We also observe that spontaneous learners are the most highly educated (see Figure 6).

The majority of these learners have a university degree of the long type (N = 1,267, i.e. 99.76% observed for 85.9% expected). In contrast, the enrollees generally had a secondary school diploma (N = 311, or 87.11%).

The secondary school diploma is the highest level of education attained by this type of learner (N = 312, or 73.07% observed for 15.44% expected) compared to spontaneous learners (N = 115, or 26.93% observed for 84.56% expected). It should be noted that enrolled learners had to have at least an upper secondary school diploma to access higher education. Given the characteristics of our sample, we have deliberately excluded outliers that could bias our statistical treatment. Therefore, we do not consider the categories "no diploma", "primary school diploma" and "doctorate" as they do not relate to enrolled learners.

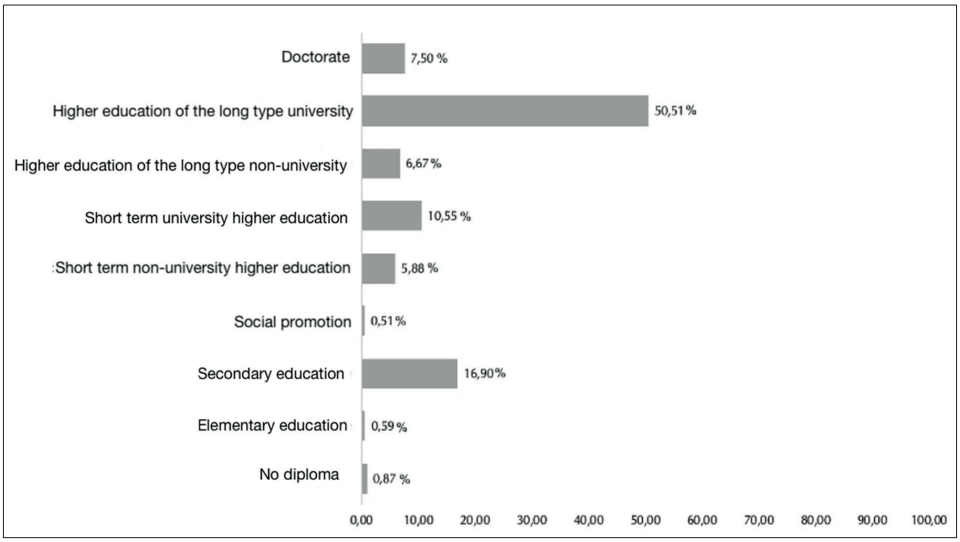

Figure 5. Educational background of MOOC registrants (N = 2,532)
Source: Authors' own elaboration.

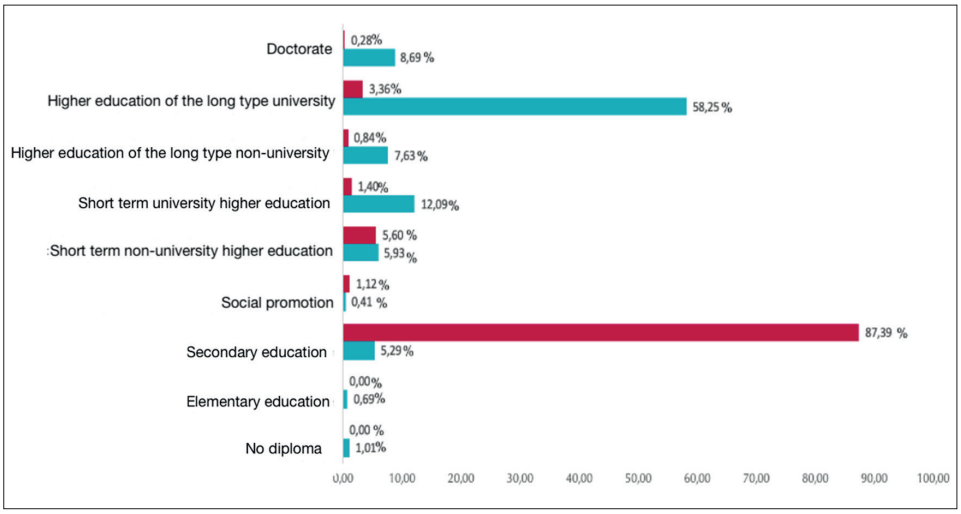

Figure 6. Educational level of spontaneous and enrolled learners
Source: Authors' own elaboration.

Using the x2 statistical test, we assessed whether the observed numbers were close to the expected theoretical numbers. The comparison of the distributions allows us to conclude that there is a significant difference between the two groups of participants in terms of educational level (Table 8: x2 = 1355.51; ddl = 1; p < 0.001).

Table 8. Comparison of educational levels of enrolled and spontaneous learners

	Workforce	Enrolled	Spontaneous	Totals
Secondary education	observed	**312** (73.07 %)	**115** (26.93 %)	**427**
	expected	65.79	360.20	
Social promotion	observed	**4** (30.77 %)	**9** (69.23 %)	**13**
	expected	2.00	10.99	
Short term non-university higher education	observed	**20** (13.42 %)	**129** (86.58 %)	**149**
	expected	23.01	125.99	
Long non-university higher education	observed	**5** (1.87 %)	**263** (98.13 %)	**268**
	expected	41.39	226.60	
Higher education of the long type non-university	observed	**13** (7.26 %)	**166** (92.74 %)	**179**
	expected	27.64	151.35	
Higher education of the long type university	observed	**3** (0.24 %)	**1,267** (99.76 %)	**1,270**
	expected	196.14	1,073.85	
	Totals	**357** (15.44 %)	**1,949** (84.56 %)	**2,306**
		χ2 = 1,355.51; p < 0.001		

Source: Authors' own elaboration.

In fact, it appears that "enrolled subjects" are significantly more likely than expected to have secondary education and social promotion diplomas (312 vs. 65.79 and 4 vs. 2.00 respectively). Conversely, spontaneous subjects are the most likely to have diplomas in the four categories of higher education (129 vs. 125.99; 263 vs. 226.60; 166 vs. 151.35 and 1,067 vs. 1,073.85 respectively).

Table 9 shows the distribution of learners in 18 different socio-professional sectors. These socio-economic sectors were modelled on the International Standard Industrial Classification of all economic activities proposed by the Organisation internationale du Travail – International Labor Organization (2005).

Table 9. Distribution of learners by socio-professional sector

Sectors	Descriptions	Sample size	%
1	Manufacturing activities	**31**	1.20
2	Mining and quarrying	**1**	0.00
3	Public administration	**100**	3.90
4	Agriculture, hunting and forestry	**13**	0,50
5	Other community, social and personal service activities	**159**	6.30
6	Wholesale and retail trade, repair	**22**	0.90
7	Construction	**11**	0.40
8	Education	**1,415**	55.90
9	Students	**402**	15.90
10	Hotels and restaurants	**13**	0.50
11	Real estate, business services	**45**	1.80
12	Financial intermediation	**13**	0.50
13	Private household employing domestic staff	**1**	0.00
14	Extra-territorial organizations and agencies	**6**	0.20
15	Production and distribution of electricity, gas and water	**13**	0.50
16	Retired	**13**	0.50
17	Unemployed	**103**	4.10
18	Health and social work	**171**	6.80

Source: Authors' own elaboration.

We asked learners the following question: "How long have you been employed?". On average, the participants who answered this question (N = 1998) had been professionally employed for 17.06 years (see Table 10).

Table 10. Descriptive statistics on the duration of employment of learners (in years)

	M	SD	Min.	Max.
Enrolled	1.61	5.23	0	34
Spontaneous	17.21	9.49	0	48
Learners	17.06	9.53	0	48

Source: Authors' own elaboration.

Descriptively, we observe that spontaneous learners had been professionally employed for a longer period of time than enrollees.

This observation stems from the fact that, as explained earlier, although some enrolled learners were already professionally inserted, the majority of subjects were just starting their life as students.

Undoubtedly, the socio-professional sector of education is the most represented, accounting for the majority of enrollees (55.90%). In view of the large number of learners belonging to this sector, we examined the category in more detail (see Figure 7).

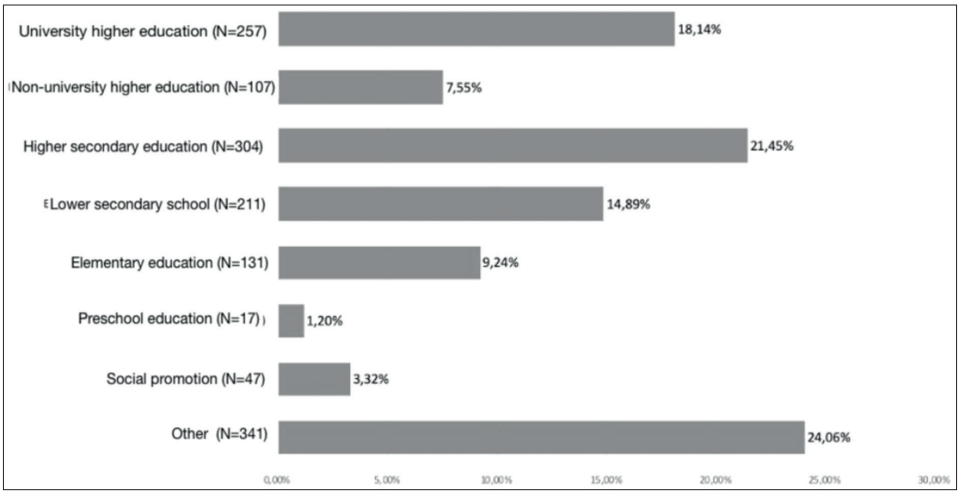

Figure 7. Registered MOOC learners in education occupations
Source: Authors' own elaboration.

In connection with the above-mentioned gender characteristic, we were interested in the numbers of registrants belonging to the socio-professional sector of education. Of the 1,415 listed under this label, 66.64% are female. Our analysis shows that the majority of learners (40.07%) have been professionally employed teachers for between 11 and 20 years (N = 567).

Question 2: What do learners say about their reasons for engaging in the hybrid MOOC?

As a reminder, we have adapted Carré's (2001) questionnaire on the reasons for entering (classical) education in such a way that it can be used in the context of a MOOC (see Table 11). To help the reader distinguish the reasons for engagement that encouraged participants to enrol in the MOOC, we offer different graphical representations.

Table 11. Motives for entering training according to Carré (2001)

# 1	Hedonic motive
# 2	Identity motive
# 3	Epistemic motive
# 4	Economic motive
# 5	Prescribed motive
# 6	Vocational reason
# 7	Personal Operating Ground
# 8	Social-emotional motive
# 9	Professional operating motive
# 10	Derivative motive

Source: Authors' own elaboration on the basis of Carré (2001).

First, we propose a representation highlighting the motives that drove our overall population (N = 2,532) to enroll in our MOOC (Figure 8).

Learners engaged in the MOOC are generally driven by epistemic (92.01%), professional operational (81.34%), hedonic (73.88%) and personal (66.57%) motives.

	Learners (N = 2,532)	
# 4	Epistemic motive	92.01 %
# 9	Professional operating motive	81.34 %
# 1	Hedonic reason	73.88 %
# 7	Personal motive	66.57 %

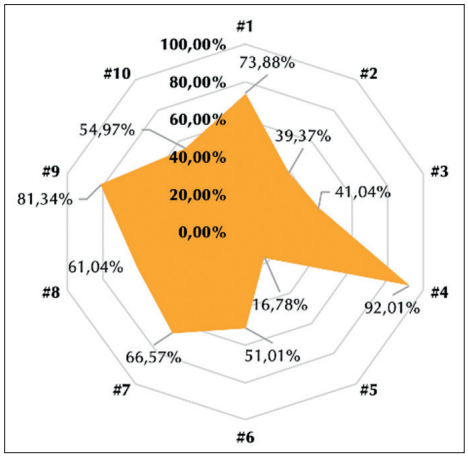

Figure 8. Motives for entering training for learners registered in the MOOC

Source: Authors' own elaboration.

Like the learners as a whole, the "spontaneous" are mainly driven by epistemic (94.59%), professional (85.80%), hedonic (75.33%) and personal (66.22%) motives (compare Figure 9).

	Spontaneous (N = 2,175)	
# 4	Epistemic reason	94.59 %
# 9	Professional operating reason	85.80 %
# 1	Hedonic motive	75.33 %
# 7	Personal operating motive	66.22 %

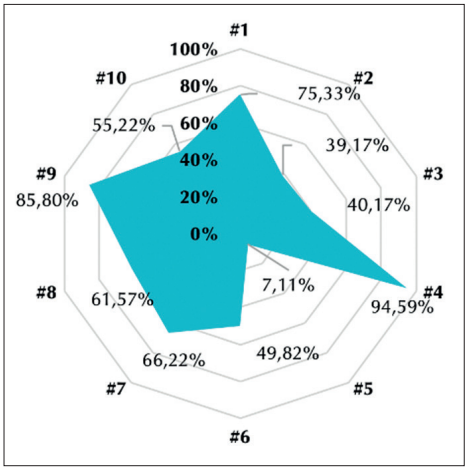

Figure 9. Reasons for entering training for spontaneous MOOC learners
Source: Authors' own elaboration.

We also find a strong presence of epistemic (76.30%), personal operational (68.73%) and hedonic (65.04%) motives among enrolled learners (see Figure 10). Nevertheless, we note a major difference between spontaneous and enrolled learners with regard to the prescribed motive: 75.68% of enrolled learners are driven by this motive as opposed to 7.11% of spontaneous learners.

	Enrolled (N = 357)	
# 4	Epistemic reason	76.30 %
# 5	Prescribed reason	75.68 %
# 7	Personal operative reason	68.73 %
# 1	Hedonic reason	65.04 %

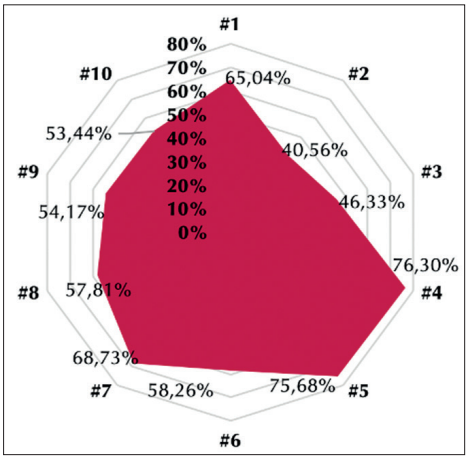

Figure 10. Reasons for entering training for enrolled learners
Source: Authors' own elaboration.

The conditions for applying a parametric test were checked using the Kolmogorov-Smirnov test. The significance of the normality test implies the use of a non-parametric test. As we can see in Table 12, the application of the Mann-Whitney U test reveals a significant difference between the subjects of the two groups in the importance they gave to the hedonic (p = 0.000), epistemic

(p = 0.000), economic (p = 0.000), prescribed (p = 0.000), vocational (p = 0.000), socio-emotional (p = 0.013) and professional operative motives (p = 0.000).

Table 12. Comparison of enrolled and spontaneous learners' scores on entry motives

Motifs		Enrolled	Spontaneous	U Mann-Whitney	P-value
# 1	Hedonic	65.04 %	75.33 %	501 286.000	0.000
# 2	Identity	40.56 %	39.17 %	371 418.000	0.181
# 3	Economic	46.33 %	40.17 %	340 839.000	0.000
# 4	Epistemic	76.30 %	94.59 %	599 102.000	0.000
# 5	Prescribed	75.68 %	7.11 %	58 303.500	0.000
# 6	Vocational	58.26 %	49.82 %	340 533.500	0.000
# 7	Personal operational	68.73 %	66.22 %	385 916.500	0.853
# 8	Socio-affective	57.81 %	61.57 %	419 153.500	0.013
# 9	Professional operative	54.17 %	85.80 %	623 467.500	0.000
# 10	Derivative	53.44 %	55.22 %	407 787.000	0.120

Source: Authors' own elaboration.

Enrolled learners appear to have been significantly more motivated by economic (46.33%), prescribed (75.68%) and vocational (58.26%) motives than spontaneous learners (40.17%; 7.11% and 49.82% respectively). Conversely, spontaneous learners were clearly more motivated by hedonic (75.33%), epistemic (94.59%), social-emotional (61.57%) and vocational (85.80%) motives than enrolled learners (65.04%; 76.30%; 57.81% and 54.17% respectively). On the other hand, there were no significant differences in the identity (40.56% vs. 39.17%), personal operational (68.73% vs. 66.22%) and derivational (53.44% vs. 55.22%) motives.

Discussion

In this research we asked ourselves two research questions:

- Question 1: What are the individual characteristics of learners enrolled in the distance learning MOOC?
- Question 2: What do learners report about their motives for engaging in the MOOC?

To answer this first question, we describe the enrolled and spontaneous learners who connected to the MOOC Educational innovation of which you are the hero... with regard to variables relating to their personal characteristics (geographical origin, gender, age, level of education, socio-professional sector).

The subjects of our first research presented a less variable profile insofar as these learners were students enrolled at the beginning of the bachelor's cycle at the FPSE of the UMONS, for the most part recently graduated from secondary education and generally living in Belgium. It is therefore on the subjects of our second research, presenting a much wider diversity, that these analyses were focused. Indeed, our online teaching and training system brings together enrolled participants, who have registered for the MOOC as part of their "classic" university curriculum, and spontaneous participants who have registered for their own reasons.

These learners come from 76 countries, mostly developed, mainly from France (N = 1,669) and Belgium (N = 461). The large number of Belgian participants can be attributed to the presence of enrolled learners (N = 357) registered at UMONS. As for the French presence, it is probably related to the platform chosen for the dissemination of the MOOC, namely France université Numérique (FUN). Indeed, Cisel (2016b) notes that 65.92% of the users of the FUN platform in 2015, i.e. one year before the launch of our MOOC, connected from France. He also finds that the proportion of registrants on the FUN platform from states with a high level of development is higher (approximately 78.00% for about 11.00% of registrants from countries with a low level of development). Another possible explanation for the large majority of learners from French-speaking countries is the predominance of learners who are fluent in the language of instruction used in a MOOC: this is documented by Breslow et al. (2013) who indeed point out that this is generally a characteristic of MOOC registrants. The average age of all learners is 39.68 years, which is in line with the trends we found in the studies by Christensen et al. (2013), Gillani and Eynon (2014) and MOOCs@Edinburgh (2013). Most learners (68.56%) are female. This finding contrasts this time with those posited in the literature, where it is generally indicated that it is male individuals who enroll in MOOCs (Breslow et al., 2013; Li et al., 2014; Bar-Hen et al., 2015). Also, for Cisel (2016b, p. 120), "the FUN audience is predominantly male, with 60% male; the sex ratio varies significantly across disciplines". The MOOCs@Edinburgh (2013) researchers also state that the gender of MOOC participants differs according to the content of the courses. The subject matter of our MOOC is education, a discipline which, according to the OECD (2017), is more popular with women, and this could

explain the over-representation we are concerned with. It should be noted that there are significantly more women in the group of enrolled participants than in the other, slightly more male, group. This is not surprising, since the majority of the participants enrolled are intended to be psychologists. And according to the labor force survey conducted by the Directorate General Statistics of the Belgian Federal Public Service Economy, SMEs, Self-employed and Energy (2019) on approximately 21,000 psychologists, 83.10% are female and only 16.90% are male.

The majority of spontaneous learners have a long university degree (58.25%). We observe that their level of education does not differ from that generally observed in the literature. Indeed, MOOC "consumers" have often already obtained a degree from a higher education institution (Breslow et al., 2013; Christensen et al., 2013; MOOCs@Edinburgh, 2013; Cisel, 2016; Mariais et al., 2017). These already graduated learners would enroll in MOOCs to deepen or complement their knowledge related to the subject matter covered in this type of learning device (Gillani & Eynon, 2014; Bar-Hen et al., 2015). We observe only a very small minority of mainstream learners with less than post-secondary education (6.99%). MOOCs, as they stand, may not be adequate for sharing knowledge and developing skills with the learners who would need them most (Depover et al., 2017). Logically, all enrolled subjects have at least a secondary school diploma. This is indeed a requirement for access to higher education. Spontaneous learners are generally professionally employed, and many are from the education sector (55.90%). The high presence of teachers in a MOOC related to education is not surprising. Referring to the study by Gillani and Eynon (2014), we hypothesize that these are professionals who enroll in a MOOC to deepen their knowledge and improve their skills so that they can apply them in their original professional environment.

We also analyzed the motives for engagement (second research question), as defined by Carré (2001), claimed by MOOC registrants. As Ho et al. (2014) explain, given the wide diversity of people enrolling in MOOCs, it seems legitimate that motives differ according to learners' perspectives. We found that the subjects in our studies were generally driven by epistemic (92.01%), professional operative (81.34%), hedonic (73.88%) and personal operative (66.57%) motives. Our results corroborate those of Cisel's research (2016b), which argues that the most dominant motives for engagement among learners enrolled in a MOOC are mainly the two operative motives followed closely by the epistemic motive. According to him, the latter is manifested in learners who enroll in MOOCs for the pleasure of learning rather than to complete exercises

and thus obtain a certification. The importance of the professional and personal operative motives for our subjects could stem from their desire to engage in the MOOC for practical reasons and be related to the fact that participants would engage in MOOCs to deal with concrete problems likely to be encountered in everyday life (Cisel, 2016b), to reinvest the newly acquired knowledge in a future project, and to learn from the MOOCs. knowledge in a future project and to be able to complete a parallel project (Cisel, 2017).

The high position of the hedonic motive in the ranking we were able to establish could be explained by the fact that subjects wish to learn in a device for the practical conditions it offers: they appreciate the freedom of learning that is left to them to progress at their own pace by immersing themselves in the contents proposed in the MOOC (Hao, 2014) and are particularly fond of useful or easy-to-use devices (Aharony & Bar-Ilan, 2016).

Finally, a comparison of spontaneous and enrolled learners shows us that the latter seem to be significantly more driven by the economic, prescribed, and vocational motives than the former. The prescribed motive is logically among the most claimed by the enrolled learners who participate in the MOOC as part of a compulsory training linked to their academic course. As for the importance of the vocational motive, we assume that it stems from a desire on the part of learners enrolled in a university course to acquire skills that may be necessary to obtain a future job.

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Supporting E-learning Design with Trello

ABSTRACT

This contribution aims to give feedback on the use of Trello, a task management tool, in a context of team coaching in e-learning design. The handling of this digital tool was carried out in the framework of the Erasmus+ CoNeCTE project in partnership with Lebanese higher education institutions. In the framework of this research, the Pedagogical Engineering and Digital Education Service (UMONS) accompanies teacher-researchers in the design of virtual learning environments. In order to monitor them, we created dashboards combining the Kanban method and the ADDIE model. Focus groups were conducted with the design teams to analyse the usability and usefulness of the Trello tool in this context. Our results show that Trello is a fast, efficient and easy-to-use tool for managing a project remotely, visualising progress, encouraging collaboration and supporting design teams. This contribution is also an opportunity to write some recommendations about the integration of the Trello tool in a team support context.

Keywords: Trello; Coaching; Instructional design; Distance learning, Kanban method.

Introduction

Within the framework of the CoNeCTE project (Collaborative Network for Career-building, Training, and E-learning), an Erasmus+ Capacity Building in Higher Education programme with European funding in partnership with Lebanon, the Pedagogical Engineering and Digital Education Department of the University of Mons trains, accompanies and advises teacher-researchers in the design of virtual learning environments.

The intention of the CoNeCTE project, launched in January 2020, is to improve the employability of students in the digital market by identifying their

future digital skills, as well as the needs of this future employment sector in order to propose innovative training (CCIB, 2021). It has four objectives:

1. To help universities adapt their programmes to meet the skills demanded by companies. To this end, a macroeconomic study has predicted future trends in the digital market (Noun, 2021).
2. Supporting teachers and students in their digital transition, particularly through distance and online training. The aim of the project is to create a virtual and collaborative learning environment offering students or young graduates innovative training related to the digital transition (CCIB, 2021).
3. To couple work-based learning with the online and distance academic pathway in order to acquire the required skills in a work context. The ambition is to develop work-study training in a Lebanese context where this type of education does not exist.
4. To bring companies and universities together to facilitate the integration of future graduates through a connected project. Indeed, CoNeCTE is the result of the collaboration of 11 Lebanese[1], European[2] and international[3] public and private, academic and non-academic partners (Noun, 2021).

The CoNeCTE project emerged with the aim of promoting the evolution of technologies in Lebanon, where students must acquire numerous skills throughout their academic career, in order to face the various challenges of the job market marked by the digital transition of professions. This programme takes place in a context of deep economic and social crisis (Hariri, 2021 cited by Noun, 2021), as well as in a context of health crisis. Indeed, it began at the dawn of the COVID-19 pandemic in January 2020. Prior to this crisis, the design of distance learning by higher education teachers was only at an embryonic stage in Lebanon (Azzi, 2021) and knowledge of e-learning varied from one institution to another. Indeed, some higher education institutions had participated in the Erasmus ADIP project aimed at deploying distance learning and pedagogical innovation.

The context of the CoNeCTE project gave rise to two distances: a spatial distance (Jacquinot, 1993) between the European mentor and the various Leb-

[1] Chamber of Commerce, Industry and Agriculture of Beirut and Mount Lebanon, Basil Fuleihan Institute of Finance, Higher Institute of Applied Sciences and Economics – Cnam Lebanon, Islamic University of Lebanon, Jinan University, Ministry of Education and Higher Education, University of Balamand.

[2] Conservatoire National des Arts et des Métiers in France for the alternating education, Institute for advanced studies in Austria for the macroeconomic study and the University of Mons in Belgium for the virtual learning environment.

[3] Agence universitaire de la francophonie.

anese teams and a socio-cultural distance caused by the health crisis between the members of the design teams. It is in these circumstances that we asked ourselves the question: how can we support the teams in the design of distance training? To achieve this, we turned to the Trello tool, which enabled us to set up dashboards and monitor each team. In this contribution, we present this tool and give you feedback on its integration.

Theoretical framework

Before presenting this feedback, we feel it is essential to go back over a few key concepts that will enable the reader to better understand the support provided in the design of distance learning with the Trello tool.

Teacher coaching

According to Paul (2009; 2012), coaching is defined as the action of joining with someone to go where they are going or where they want to go. This definition hides a real relational dimension where presence and availability are essential. Accompaniment is also a way of supporting a peer so that he or she can achieve objectives by giving the best of themselves (Boutinet, 2007).

Paul (2009) emphasises that it is a cooperative relationship where attention is focused on a task, a common objective. In her article, she also mentions two types of coaching.

> On the one hand, there is what is known as "accompaniment/maintenance", which is predominantly social and relational, and involves being present with a person in an existential situation, and on the other hand, "accompaniment/visioning", which consists of energising this person in the realisation of a project. (Paul, 2009, p. 15)

Accompaniment can also be characterised by 5 postures (Paul, 2012):

1. An ethical posture that is reflected in a reflective and critical spirit. It is a non-violent relationship where there is no power or domination.
2. A non-knowledgeable posture where intelligence is born from exchanges where we support questioning rather than assertion and where we encourage a search for meaning.
3. A posture of dialogue where exchanges are established from person to person and not from professional to user or from teacher to learner.

4. A listening posture where the coach is attentive and responds to requests, as well as to questioning.
5. An emancipatory posture, it is a question of seeing the accompaniment as an opportunity for both individuals.

There are many forms of accompaniment (Paul, 2019): counselling, coaching, sponsoring, mentoring, tutoring or consulting. Counselling is a form of support that consists of helping someone to overcome personal difficulties by giving advice and guidance. The term coaching is associated with effectiveness. It is a form of coaching where action is emphasised. According to Tiffert (2021), today we can also talk about "virtual coaching", i.e. coaching at a distance that can be set up using digital communication and/or task management tools such as Trello.

Coaching will differ according to the context, expectations, or the audience. In the CoNeCTE research programme, higher education teachers are being supported. The specific literature on support for this group highlights various points of attention. According to Chênerie (2011), the tutor must offer varied and personalised proposals. They must provide the pedagogical conceptual framework and the design methodology. They must adapt to different needs and inform the teachers' choices in order to achieve the objectives they have set themselves. He or she is "a facilitator, a go-between, a watchdog, an emancipator" (Lhotellier, 2001, p. 87 quoted by Cros, 2009).

Chênerie (2011) also highlights the importance of close monitoring, suggesting that remote support is impossible. However, as Audran (2007, p.15) points out "distance is not the enemy of support insofar as each of the partners is able to use the existing means offered by a system". The author also points out that, at a distance, the person being supported has a share of responsibility, as his or her action is ultimately quite decisive in the functioning of the system.

Design of distance learning

The CoNeCTE research programme aims to develop different e-learning courses to meet the needs of the Lebanese labour market and the digital transition of professions. Distance learning is characterised by a physical distance between the learner and the trainer during the learning process (Depover et al., 2007; Jacquinot-Delaunay, 2010). Indeed, this type of teaching device does not require the presence of students and teachers in the auditorium or in the classroom. There are different forms of distance learning depending on their format, their audience or their participation modalities: SPOC (Small Private Online Course),

MOOC (Massive Open Online Course), COOC (Corporate Online Open Course), SOOC (Small Online Open Courses), etc.

Instructional design requires a particular methodology. Throughout the literature on instructional design (Branch, 2009; Basque, 2017; Tricot & Musial, 2020), one model systematically comes up – the ADDIE model. Whether it is for face-to-face, distance or hybrid training, this model includes the essential stages of instructional design. As the ADDIE model is known to the Lebanese partners and was used by some of the institutions during the ADIP project (Azzi, 2021), we therefore used this model to support teachers in designing online training.

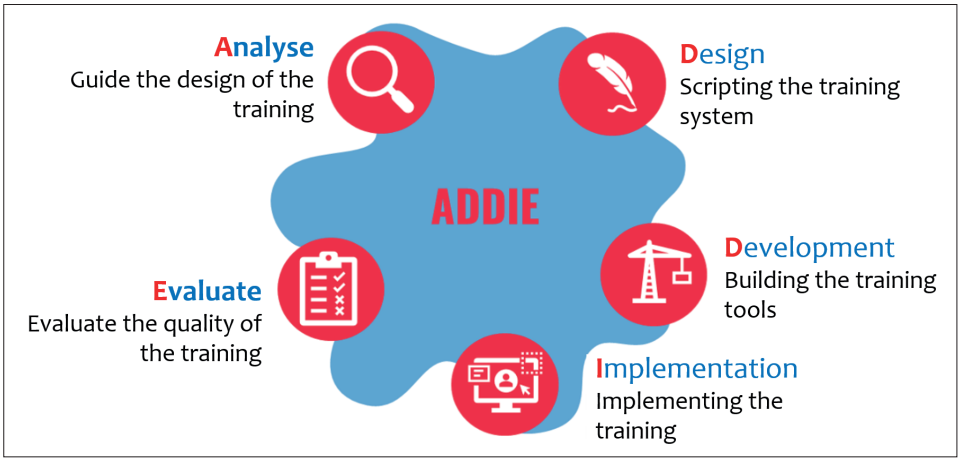

Figure 1. The ADDIE Model
Source: Branson et al., 1975.

Created in 1975 by the University of Florida, the ADDIE model has five phases (Figure 1) (Branson et al., 1975):

- The Analysis phase consists of taking into account all the parameters to guide the instructional design. This involves carrying out a needs analysis and identifying the context of the training, such as the target audience, the general objective, the human resources and the economic and material constraints (Branch, 2009).
- During the Design phase, the educational engineer writes the training plan. He or she defines the modular structure and, for each module, specifies the pedagogical objectives, the notional content and the learning activity.
- Then there is the Development phase, i.e. the construction of all the multimedia tools and resources for the training, such as the teaching aids or the video capsules.

- The fourth phase is Implementation, which consists of the implementation of the teaching device. This involves ensuring the facilitation, communication and logistical aspects.
- Finally, the Evaluation phase involves evaluating the quality of the training in order to adjust it.

To design e-learning courses, the Lebanese teams use the ADDIE model and also put into practice various e-learning design principles. Indeed, various authors (Horton, 2011; Basque & Baillargeon, 2013; Clark & Mayer, 2016) highlight various tips and recommendations. For example, the active engagement of the learner should be encouraged by proposing varied, engaging learning activities that are close to authentic situations and that encourage interaction and collaborative work (Basque & Baillargeon, 2013). The learner must be accompanied synchronously and/or asynchronously. To do this, the coach must be available, provide feedback, resources and discussion spaces. It is also advisable that distance learning designers favour the media format consistently. To do this, it is advisable that the instructional designer avoids redundancy between audio and text and uses visual cues, and varied representations (Clark & Mayer, 2016).

Digital tools for managing tasks and interactions at distance

The health crisis of 2020 required all sectors of activity to rethink their mode of remote management and allowed its development (Léon, 2020). Furthermore, the digital transition has offered a real change in the management of remote teams. According to Duport (2016), these are collaborative structures made up of sub-teams geographically dispersed over the same or several countries. In the framework of the Erasmus+ CoNeCTE project, bringing together European and Lebanese partners, we are truly involved in this case of remote work management.

Today, information and communication technologies facilitate distance management (Duport, 2016). Indeed, Depover et al. (2007) cite the different functions that digital tools can have: presenting content, communicating information to an individual or a group, structuring tasks, monitoring the team, motivating or even encouraging collaboration. In their book, the same authors characterise the tools for communication and management of remote interaction. First of all, they differentiate three modes of communication:

- Asynchronous mode, i.e. communication that takes place off-line where spatial and/or temporal constraints are non-existent (e.g. forum, e-mail, etc.);

- Synchronous mode, i.e. communication in real time where exchanges are direct and instantaneous (e.g. video conference, call or instant messaging);
- Predefined mode where interactions are defined or programmed during the design phase (e.g. an interactive website).

Trello tool

Trello and its functionalities

Trello is a team management tool, which helps to track the progress of a project and manage the workflow (Johnson, 2017). It is also a free, online tool that can be connected to a Drive system. The use of Trello is a suitable tool for virtual coaching and mentoring because the digital tool helps to accomplish goals (Boutinet, 2007). This tool is based on the Kanban method. This method, born in Japan and applied by Toyota in the 1950s, allows tasks to be visualised by placing labels on a notice board (Leopold, 2017). It aims to optimise production, efficiency and collaboration (Ahmed Mohamed, 2021). Initially adopted by the industrial sector, it has since spread to all sectors requiring task management.

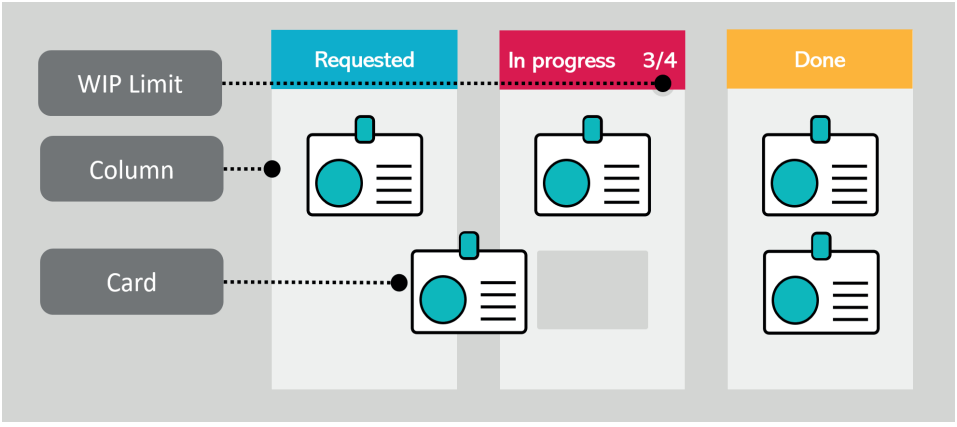

Figure 2. Diagram of the Kanban method
Source: Authors' own elaboration.

The task management board used in the Kanban method has three columns: "Requested", "In progress" and "Done" (Figure 2). Depending on their progress status, team members move the labels to the corresponding column (Leopold, 2017; Ahmed Mohamed, 2021). In Trello, the tags are called "capsules" and each

"capsule" includes a task. Once registered, users can create an unlimited number of boards for each of their projects. On the board, users have the possibility to assign tasks in the different columns.

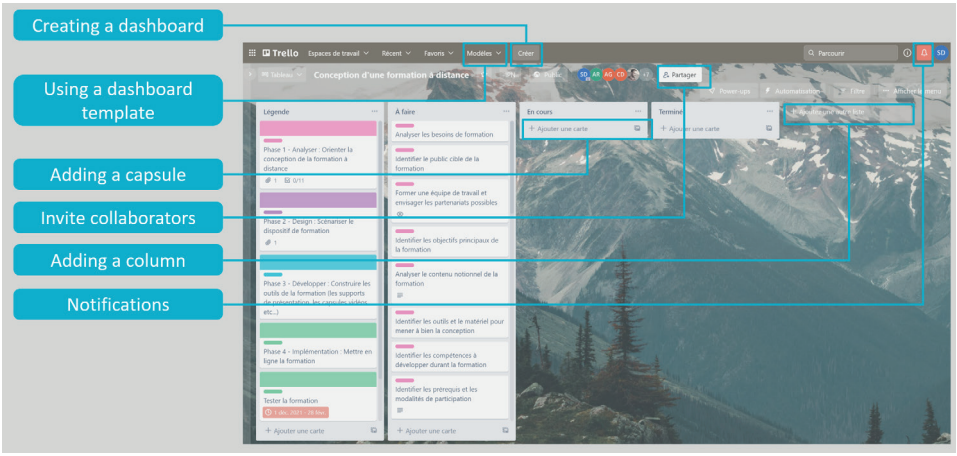

Figure 3. Illustration of the features on the Trello dashboard
Source: Authors' own elaboration.

Trello has various features. The user has the possibility:

- to create a new dashboard;
- to use a dashboard template. Trello offers a series of established dashboard templates for designing or managing projects in a variety of sectors: for example, designing a video game, monitoring recruitment or planning a training course. The user then has the possibility to adapt this model to his professional needs;
- to add a new "capsule", i.e. a new task;
- to invite members of the design team by entering email addresses or creating a shareable hyperlink;
- to add a new column to include new "capsules" and therefore a new series of tasks;
- to view notifications. Here the user can access notifications about deadlines or task assignments.

In addition to the functionality of the table, each "capsule" has its own options that can be programmed. The left-hand side of the "capsule" consists of three parts:

1. In "Description", the user can write a description of the task to be performed.
2. In "Attachments", it is possible to consult the various attachments associated with this "capsule".

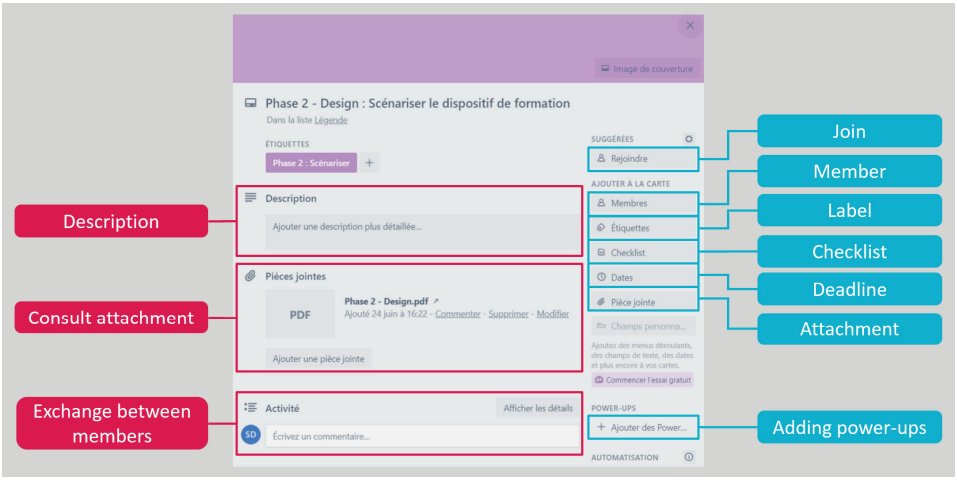

Figure 4. Illustration of the features on Trello "capsules"
Source: Authors' own elaboration.

3. In "Activity", the different team members have the possibility to communicate with each other synchronously about the task.
   The right-hand column also contains a number of other functions:

- "Join" offers the user to assign a task to himself.
- "Member" allows the task to be assigned to a team member by sending invitation emails directly from the project dashboard. Thus, contributors can easily coordinate the team by assigning tasks.
- "Label" option allows you to assign a label, name and colour code to this "capsule". This option makes Trello a visual tool. Note that Johnson (2017, p. 210) points out that for "colour-blind users, Trello offers patterned rather than solid-coloured labels, which can also be personalised with status words. These colour-coded labels offer the most efficient way to mark tasks as completed. Thus, this feature makes Trello an inclusive tool".
- "Checklist" offers the possibility to create a checklist of tasks. Once this option is activated, the team can track its progress with a progress bar that increases when an activity on the to-do list is completed.
- "Deadline" allows you to set a deadline for the task. Team members will then receive notifications when the deadline arrives.
- "Attachment" allows you to attach a document on a Drive to the "capsule".
- "Power-ups" section allows the integration of improvements such as a voting system.

The integration of Trello in the context of the Erasmus+ CoNeCTE project

In the context of the Erasmus+ CoNeCTE project, the Trello tool was used to create dashboards and monitor the progress of each of the e-learning design teams remotely. To design their virtual learning environment, the Lebanese teacher-researchers use the ADDIE model methodology. The dashboards were therefore constructed according to the stages of this model: Analysis, Design, Development, Implementation and Evaluation. Each phase comprises a series of subtasks and is highlighted by a colour code. Each design team has its own table. There are a total of four boards on Trello and the coach has access to these four boards to monitor the progress of each team in a personalised way.

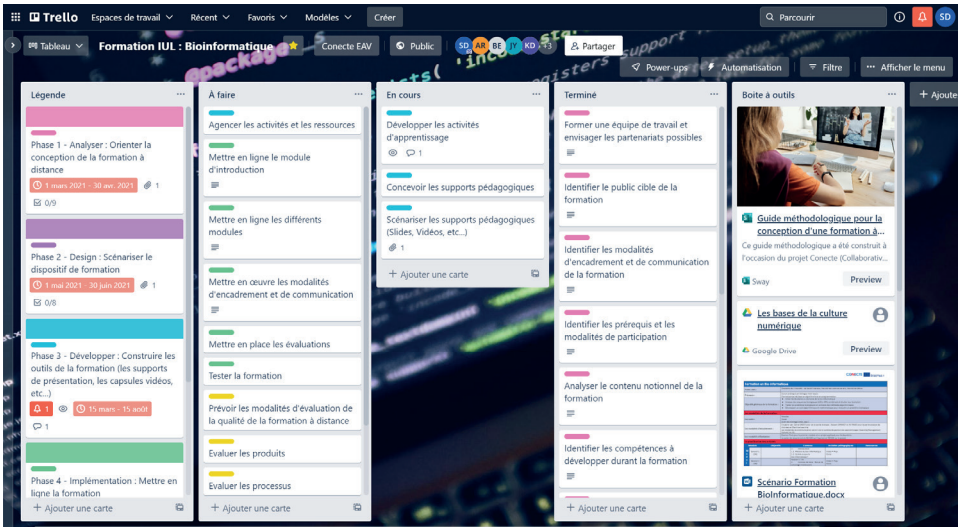

Figure 5. Example of a dashboard on Trello from one of the CoNeCTE project teams
Source: Authors' own elaboration.

The dashboard consists of 5 columns (Figure 5). The first column, "Legend", uses the colour code and the different phases of the ADDIE model. We have also added a red colour code to highlight the urgent tasks to be carried out. Then, the dashboard is composed of the three columns used in my Kanban method: "To do", "In progress" and "Finished". The Lebanese teams move the "capsules" to the column corresponding to their progress, depending on their status. Finally, the last column is a space for gathering resources such as the methodological guide used by the teams to design their training, the link to the Drive space,

multimedia links to feed the work of the teams or a videoconference space so that the participants can communicate synchronously.

The teachers' point of view

In order to monitor the progress of the design teams and to validate the integration of Trello in the management of work tasks, meetings were held with each of the Lebanese teams. During these meetings, focus groups were held. In addition, the users were also asked to rate the usefulness and usability of Trello on Likert scales ranging from 0 (strongly disagree) to 5 (strongly agree). Wooclap, an interactive survey tool, was used during the focus groups. In total, 16 Lebanese teacher-researchers from the Erasmus+ CoNeCTE project were surveyed.

In order to validate this tool, the Technology Acceptance Model (TAM) items (Davis et al., 1989) were adapted to Trello. Our questionnaire consists of 9 items divided into 2 dimensions and each associated with a category:

- Usability[4]: ease, clarity, controllability and flexibility;
- Usefulness: speed, performance, productivity, efficiency, transfer;

Table 1. Presentation of items according to the categories of the Technology Acceptance Model

	Categories	Items
Usability	Facility	Trello is a tool that I found easy to use
	Clarity and Understanding	Trello is a tool with which the interaction is clear and understandable
	Controllability	Trello is a tool that is easy to use for managing teamwork
	Flexibility	Trello is a tool that I can interact with flexibly
Usefulness	Rapidity	Trello is a tool that allows me to complete my tasks more quickly
	Performance	Trello is a tool that improves the quality of my work.
	Productivity	Trello is a tool that increases my productivity.
	Efficacity	Trello is a tool that is easy to use for task completion.
	Transfer	Trello is a tool that will be useful in my professional context.

Source: Authors' own elaboration.

[4] Usability is the ability of a tool or service to be used easily according to its design purpose.

Table 1 shows the different results. On the subject of usability, the analysis of Likert scales reveals that, according to the respondents, the interactions on Trello are very clear and understandable (mean score: 4.6). In addition, Trello is a very easy tool to use for managing teamwork (mean score: 4.6) and in general it is very easy to use (mean score: 4.4) by e-learning design teams. Finally, users were also able to interact flexibly with the tool (mean score: 3.8).

The perceived usefulness of Trello users was as positive as usability. Indeed, according to the subjects, Trello is a very easy tool to accomplish the task (mean score: 4.4). Users feel that the tool will be very useful in their professional context (mean score: 4.2). Moreover, several Lebanese partners (31.25%; 5/16) verbally state that they have started to use Trello in managing other projects and even with students. Moreover, according to the subjects, Trello improves productivity (average score: 4). Finally, it is also a tool that improves the quality of their work (average score: 3.8) and allows them to complete tasks more quickly (average score: 3.8).

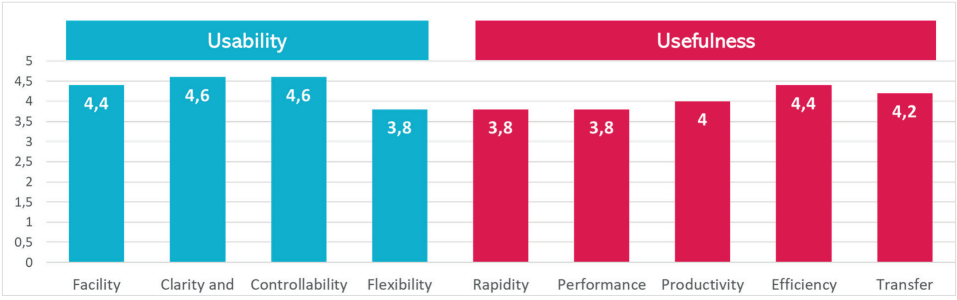

Figure 6. Perceptions of Trello users in the Erasmus+ CoNeCTE project

Source: Authors' own elaboration.

Conclusion and recommendations

In conclusion, Trello appears to be an effective tool for managing projects with remote teams and it fits perfectly into our context of e-learning design support. Indeed, the analysis of the usability and usefulness of Trello obtained very good results and shows that its integration in the Erasmus+ CoNeCTE project is relevant. Trello is perceived as easy, clear, controllable, flexible, fast, efficient, productive, effective and transferable to other contexts.

Our dashboards use the proven Kanban method (Leopold, 2017) to effectively manage the progress of Lebanese teams in their project design.

In addition, Trello offers a series of features that enhance the visualisation of the development process such as colour coding, checklist system and progress bar. Trello's features also give the possibility to improve the collaboration within the team as options such as synchronous communication tools or the notification system are directly integrated.

Using Trello to support the design of distance learning courses also gives the opportunity to exercise various digital skills of the 21st century teacher. The DigCompEdu (Redecker & Punie, 2017) sets out the different digital competences of teachers and the use of Trello in this context offers the opportunity to work on several of them:

- For the "professional engagement" axis, these are the skills related to organisational communication and professional collaboration.
- For the "digital resources" axis, it is about creating and modifying digital resources, as well as the competence related to the management and sharing of digital resources.

The analysis of the integration of Trello in a context of e-learning design support has enabled us to draw up a number of recommendations both on team management and on the tool itself:

- Recommendation 1: even if Trello is an efficient synchronous activity management tool, for optimal coaching, it is essential to set a time for regular meetings between the team members and the coach. These meetings, even at a distance, are an opportunity to gather the designers' feelings about their progress, to collect support needs and to identify difficulties in handling the digital tool. These moments also help to strengthen motivation and social relations between the participants.
- Recommendation 2: Although Trello includes a synchronous communication system in the form of a chat for each "capsule", we recommend inserting a videoconferencing space directly on the dashboard, for example by adding a hyperlink to a Google Meet. This functionality is not initially present on Trello. For this project, we added it to meet the needs of the teams. One of the strengths of Trello is its customisability. Indeed, it is possible to add extensions to meet the needs of the teams or the coach. For example, adding a voting power-up, a feature enhancement, will facilitate decision-making and cooperation.
- Recommendation 3: in the context of managing activities with Trello, we used the Kanban method. Thus, the dashboard was composed of three columns ("To do", "In progress" and "Done") where users have to move the "capsules" according to their progress. To these three columns, we have

added two more, including a place to store multimedia resources. We recommend not to limit ourselves to the predefined task lists of the Kanban method and to add more according to the needs of the teams. In the near future, we plan to add a "block" column where users can move tasks that are causing problems.

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XI

Practical Distance Work and Higher Education: Analysis of the Effects of Formative Assessment on Performance in Certificate Assessment

ABSTRACT

The quality of training systems in higher education, and more specifically the types of assessment offered, have often been the subject of analysis and/or revision with a view to making learning more qualitative. In fact, the present article aims at analysing the effects of formative assessment on the performance of students in the 3rd year of university education. For this purpose, an experimental group is formed and subjected to formative assessment. A control group, exempt from the latter, is formed in order to control the effect of our device. The analysis of our results indicates that the formative test has a real regulatory function.

Keywords: formative assessment, certificate assessment, higher education, performance.

Introduction

Currently, the university is concerned with evaluation in all its multiplicity (Allal, 2015). Indeed, the question of the effectiveness of the evaluation systems proposed there, on numerous occasions, has been the subject of questioning and discussion (Lebrun et al., 2011). This practice, considered as a complex pedagogical act (Gérard, 2013), occupies an important place within the teaching-learning process (Gérard & Roegiers, 2011). In fact, any training process, if it is to be qualitative in nature, must include this pedagogical practice. From then on, academics are no longer exempt from evaluation, and it is up to the professors in charge of administering their courses to propose one

or another form of evaluation within their teaching units in order to respect a pedagogical alignment (Biggs, 2003).

Among these assessments, teachers have a duty to design formative and certificative assessments (Romainville et al., 2015). With over thirty years of documentation, the literature on the potential of formative assessments continues to attribute virtues to it, presenting it as a highly effective instrument for improving learning in all disciplines (Perrenoud, 2001a; CERI, 2008). Indeed, numerous studies confirm the positive effects of this practice in various fields such as French or mathematics, as well as at different levels of education: primary, secondary, and higher education (CERI, 2008; MacMilan et al., 2013; Hanover Research, 2014; Klute et al., 2017). The second modality, by virtue of its status, naturally does not enjoy the same qualifiers (De Ketele, 2010).

However, despite its proven effectiveness, formative assessment is optional from the point of view of success insofar as it does not oblige students to show the required level of mastery in order to benefit from certification. On the other hand, the certifying evaluation does not induce such a potential, but forces a certain mastery of contents in order to open the way to certification (Perrenoud, 2001b; De Ketele, 2010).

In view of this paradoxical situation, the present study investigates the implementation of these two types of evaluation in higher education with a view to analysing the effects of formative evaluation on certificative evaluation with third-year university students. Our feedback and the analysis of the results will shed some light on the effects of formative assessment and more specifically contribute to the epistemological field related to assessment practice in higher education.

Theoretical framework

Review of the literature

The following review of the literature is divided into two parts, which aim to capture the notion of evaluation as we approach it here. The first part of the review discusses the importance of evaluation and the role it plays. In the second part, it questions the notions of formative and certificative evaluation with a view to identifying their different characteristics and subtleties.

Epistemological perspective

Assessment is an integral part of our educational system. Closely linked to the curriculum, it is a fundamental element of the learning process and has become an integral part of educational institutions at all levels. Indeed, the autonomous character of a school can only be conceived on the condition that this autonomy is framed and accompanied by an effective evaluation system (Yebbou, 2015). Indeed, characterised by a growing presence in our education systems, evaluation has renovated the teaching-learning process by transforming it into "a teaching-learning-evaluation process" (Gerard & Roegiers, 2011, p.76).

In terms of definition, consultation of empirical research reveals models specific to each author, but all converge in the same direction (Figari, Remaud & Tourmen, 2014). De Ketele (2010) details the stages of this process. According to him, this process aims to (1) gather a set of information, (2) confront this set of information with a set of criteria by means of an appropriate approach, (3) to attribute meaning to the results of this confrontation, and (4) to be able to base a decision consistent with the function targeted by the evaluation. For Gerard (2013), the act of assessment is a complex operation, insofar as it leads to important decisions for learning and for the future of learners. These acts and postures refer not only to didactic competences for teachers, but also to know-how and *savoir-être* at the level of social interactions inside and outside the classroom.

Evaluation takes three forms, each with its own function: formative evaluation, certificative evaluation and orientation or prognostic evaluation (Perrenoud, 2001b; De Ketele, 2010). Given the purpose of this research, the following section looks at the articulation between the first two modalities: formative and certificative.

Formative evaluation

It is a process that must allow decisions to be made with a view to improving ongoing learning (De Ketele, 2010). The identification of errors, the emission of explanatory hypotheses on their sources or the anticipation of actions to remedy them are at the heart of the process. Whereas in certification assessment, errors are sanctioned because learning is considered to have come to an end, in regulation assessment, the status of errors changes since identifying them and working on them is the driving force behind learning (Mottier-Lopez, 2015). Therefore, formative assessment is characterised by a process of collecting-interpreting-using clues related to students' learning and the way they learn, with a view to supporting ongoing learning and improving their future performance

(CTREQ, 2022). In this context, it can neither lead to a certificate-type mark nor contribute to the ranking of students (Mougenot, 2015). As such, various types of formative assessments exist. The following section looks at this subject.

Types of formative evaluations

Formative assessment can take different forms and offer several strengths (Mougenot, 2015). Therefore, Kluthe et al. (2017) distinguish between (1) peer-led assessment and (2) self-led assessment. The first modality offers students the opportunity to evaluate or to monitor their own or their peers' work, performance, strategies, and progress. For example, self- or peer-assessment is a form of student-led formative assessment. The second modality allows educators or computer systems to assess or monitor students' performance, strategies or progress. An assessment that is automatically corrected by a computer programme is a form of self-directed assessment. In relation to this test effect, Thomas et al. (2016) show that it is not the score on self-assessment tests that has a significant impact on the quality of learning, but the number of attempts that proves to be a positive predictor. Boumazguida et al. (2018) show the same result by exploiting students' learning traces in a distance environment.

Forms of regulation of formative evaluations

For Allal (1991), the regulation resulting from formative evaluation can take several forms. We have classified three of them in the Table 1.

Table 1. Forms of regulation from formative evaluation according

Interactive regulation	Is integrated into the situation and allows for an immediate change in the student's activity. This regulation is most often informal.
Retroactive regulation	It follows an assessment and aims at the implementation of remedial activities. It therefore implies a return to objectives that have not been mastered. It is therefore said to be "deferred".
Proactive regulation	The latter is also deferred and leads to learning consolidation perspectives.

Source: Allal, 1991.

This regulation cannot be separated from feedback (Clark, 2012), as this feedback to the learner allows him/her to correct his/her learning accordingly (Endrizzi & Rey, 2008).

Certificate evaluation

Certifying assessment, unlike its formative counterpart, therefore comes into play when it is necessary to attest to a learner's mastery of the objectives of a training course at the end of it (Gérard, 2013). In addition, it makes it possible to prove that individuals have mastered a certain amount of knowledge (Gérard, 2013). In fact, where error was tolerated with formative assessment, it is no longer tolerated here given its certifying nature: its mission is to inform society that individuals who have come out of an education system have the expected skills. In this case, the certificate-based assessment has an administrative rather than a regulatory function (De Ketele, 2010). It should be noted, however, that there can also be certification during the course of learning whenever a set of objectives has been worked on (Perrenoud, 2001a). The following section will describe and detail the different variants related to this evaluation.

Types of certificate evaluation

For Bonami (2005), certificate evaluation can be divided into two forms: internal and external tests. Both correspond to evaluation approaches designed and implemented by persons external or internal to educational institutions. Like formative evaluation, they guarantee several functions that are organised as follows: (1) diagnostic for decision-making; (2) certifying the achievement of objectives; (3) mobilisation on objectives; (4) accountability.

Working Methodology

Background

The present research took place during the academic year 2021–2022, at the University of Mons located in the province of Hainaut, Belgium. It was conducted with a group of 434 third-year university students. We investigate the effect of administering a formative assessment on performance in the certificate assessment. For the design of the experiment, the students were divided into two distinct groups: one group that completed at least one item of the formative assessment and the other group that did not complete the test. Thus, a first group of 347 students was subjected to both a formative and a certificative assessment. The second group, consisting of 87 students, was exempted from the formative evaluation and was therefore subjected only to the certificative evaluation. Insofar as the objective of formative assessment is to assess the

learners' mastery of a content and to guide their progress towards the targeted competences (Wiliam, 2010), we question the effectiveness of our assessment device (Lebrun et al., 2011). We hypothesise that subjects who take the formative test will perform better on the certificate test than those who do not take the formative test.

Course of action

This scientific investigation was carried out in four stages: (1) the development of the tests; (2) the administration of the formative questionnaires for one group; (3) the administration of the feedback for the same group; (4) the administration of the certification tests for both groups.

In accordance with what was said during our literary review, our formative assessment has been designed so that it can "support the regulation of teaching and learning in progress" (Mottier-Lopez, 2015, p. 2). It is therefore administered to students in the middle of their academic career. It is directed by others (Klute et al., 2017), if necessary, by a computer system offering retroactive regulation to students (Allal, 1991).

Our certificate evaluation is an internal type of certificate evaluation (Bonami, 2005). Consequently, it was designed by the teachers and assistants of the University of Mons who are responsible for this course. It was therefore administered at the end of all the courses related to this teaching unit (Gérard, 2013).

The formative and certificate tests are similar in every respect and consist of ten questions. The first three questions are "drop-down" questions, the next four questions are short answers, and the last three questions are "numerical" questions. These two tasks allow students to apply what they already know from a theoretical point of view to concrete cases. They develop the competence to analyse a training situation. This individual activity takes place exclusively on Moodle and is divided into two phases:

1. analysis of an initial teaching sequence with a formative test, available for one week, for which the students receive feedback the following week.
2. analysis of a second teaching sequence, this time a test that counts towards the evaluation, available for one month.

   The feedback is specific to each evaluation question and is automated.

Results

Research Question 1: Do students who are given a formative assessment increase their score in a certificate assessment on the same topic?

Table 2. Descriptive statistics: means and relative gain of scores on the formative and certificate tests of the experimental group

	Formative test scores			Certificate test scores			Average relative gain
	m(/20)	CV	N	m(/20)	CV	N	GR (%)
Total	9.98	4.57	346	13.88	3.38	346	38.91

Source: Authors' own elaboration.

Descriptively, we note that the students who were subjected to the formative test evolve positively on their total score on the certificate test. They obtained an average relative gain[1] of 38.91%, exceeding the 30% threshold attesting to real learning (D'Hainaut, 1975). Moreover, the decrease in the coefficient of variation (CV) attests to the fact that the initial gaps between students tend to decrease. Given that the data are not normally distributed, we use a parametric procedure for inferential analysis. The Wilcoxon test indicates that students who completed the formative test improved significantly on the certification test ($W = 4927$, $p<.001$).

Research Question 2: Do students who have been subjected to formative assessment perform better on the certificate assessment than a group of students who have not been subjected to formative assessment?

In the following, we consider a group that received the formative test and a group of students who did not take the proposed formative test. We compare the scores on the certificate test of each of these two groups.

[1] "The relative gain is calculated by the following formula (post-test score - pre-test score) / (maximum score - pre-test score) × 100. It is the ratio of what the student has gained to what he or she could have gained at maximum. It is independent of the starting level and, since the starting level is equal, it is proportional to the performance. One can consider that the relative gain is proportional to what he wants to measure. (D'Hainaut, 1975, pp. 158–159).

Table 3. Descriptive statistics: means and relative gain in certification test scores for the two groups

	Group that benefited from the formative test			Group that did not open the formative test		
	m(/20)	CV	N	m(/20)	CV	N
Total	13.84	3.38	346	11.15	3.88	87

Source: Authors' own elaboration.

The students who took the formative test had a higher mean score on the certificate test (m = 13.84) than the group that did not take the formative test (m = 11.15). The data from the two groups are not normally distributed. Therefore, we perform a Mann-Whitney test, a non-parametric procedure corresponding to the Student's t-test for independent samples. We find that the scores on the certification test differ significantly between the two groups (U = 90047.5, p<.001). It would seem, therefore, that the It would seem that the formative test allows learners who have taken the formative test to obtain better results on the certification test than students who have not taken the formative test.

Discussion and perspectives

Assessment is an essential part of the "teaching-learning" process (Gérard & Roegiers, 2011). This complex pedagogical act (Gérard, 2013) is part of the tasks that a teacher must carry out (Romainville et al., 2015) as it allows to ensure that the students have understood correctly and that the objectives defined have been achieved (Wiliam, 2014). Although many virtues are attributed to formative assessment (MacMilan et al., 2013; Klute et al., 2017), the same cannot be said for certificate assessment (De Ketele, 2010).

In this context, our research investigates the effect of an externally directed formative assessment (Klute et al., 2017) on performance in a certificate assessment.

The results outlined above indicate significant effects of formative assessment in terms of learning and are consistent with the literature (CERI, 2008; Hanover Research, 2014). We believe that this difference in performance can be attributed to the potential of formative assessment as a regulatory agent (De Ketele, 2010). Indeed, the feedback given to learners who have completed the formative test (Clark, 2012) informs them of the errors they have made and their degree of mastery, allowing them to correct their learning if necessary

(Endrizzi & Rey, 2008). Our system, which consists of the joint use of a formative assessment followed by a certificate assessment, allows us to reduce the gap between the level of performance achieved by the learner and the target level of performance (Wiliam, 2010).

To conclude, the results of the group that did not receive the formative test confirm our introductory remarks according to which the certificate evaluation forces a certain mastery of the contents (Perrenoud, 2001b; De Ketele, 2010), but weaker in comparison to the group that was subjected to the formative test.

It would be relevant to submit an opinion questionnaire to students who did not take the formative test in order to understand the reasons for not taking the test. Furthermore, it would have been useful to collect students' perceptions of the usefulness of the formative assessment on their performance.

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Analysis of the Real and Perceived Effects of the Integration of Open-Badges on Engagement in a MOOC

ABSTRACT

This article focuses on the integration of digital badges in a distance learning environment such as a MOOC. By comparing two sessions of the same course (without badges vs. with badges), we observe that participants in the session with badges have a higher level of engagement than participants in the session without badges. Based on a questionnaire provided at the end of the course, the positive opinion of the students about the badges shows that badges can influence the motivation and the implementation of self-regulation strategies during their learning process.

Keywords: MOOC, Badges, Engagement.

Introduction

Within distance learning environments, digital badges are increasingly used to boost online learning from a gamification perspective (Fajiculay et al., 2017; Imran, 2019). For learners, they are proof of achievement, of reaching a goal. Informatively, they usually include metadata such as the issuer of the badge and the criteria for assessment or achievement. Socially, the ability to share the badge on networks allows new evidence of this mastery to be disseminated among one's contacts (Stefaniak & Carey, 2019). In this study, we focus on the effects of these badges on learner engagement and the links between this engagement and learning quality. In addition, we analyse students' views on the perceived experience of these badges.

Open-badges

Open Badges are a digital badge system developed by the Mozilla Foundation[1]. It is a form of certification of mastery of skills and participation in various training systems. They are inspired by video games and are part of a movement that promotes gamification as a modality of interactivity in learning devices (De Lièvre et al., 2017). In an educational context, the aim of badges is to enhance learners' motivation and engagement with the activities offered (Reid et al., 2015). Research often indicates a positive effect on motivation (Reid et al., 2015; Fajiculay et al., 2017). However, this effect is relative due to a novelty effect often reported by learners (De Lièvre et al., 2017).

In terms of process, Uanhoro and Shwu-Ching Young (2022) examined the effect of awarding badges following quizzes. Their analyses show that learners complete their activities in a more regular and distributed manner. The learners' perceived experience shows an increase in the level of motivation for the course with the addition of digital badges. This result corroborates Rollin's (2021) data which shows that students' level of self-determination, academic performance or level of digital skills influence their engagement with an open-badge device and the number of digital badges acquired. Davis and Singh (2015) report evidence of the positive impact of badges on student engagement levels. Badges increase the quantity of student contributions and the length of engagement without decreasing the quality of their contributions. De Lièvre et al. (2017) show that this engagement with badges can be enhanced by proactive tutoring that regularly reminds them of their interest in the learning process.

A real difficulty with the use of digital badges is that they could undermine the intrinsic motivation of goal-oriented learners. According to Alt's research (2021), however, this risk can be limited at the design stage so that learners see them as tools for systematically working towards goals and developing the targeted competences. When instructions make the badge approach explicit (De Lièvre et al., 2017), these can thus be used to visualise the learning path of content and activities. In this perspective, the use of badges can be compared to a roadmap in scouting or a dashboard in the time management of a project.

From a pedagogical point of view, however, it is important to understand how digital badges impact on learning by questioning both engagement in

[1] A non-profit organisation established in July 2003. It manages the Mozilla community, which develops and publishes Mozilla products, all of which are freely available – https://en.wikipedia.org/wiki/Mozilla_Open_Badges.

learning and students' perceptions of that engagement in relation to badges. The study that we report in the following text, carried out in the context of a MOOC, questions these two dimensions in a complementary way in order to put into perspective what students actually do and what they want to tell us about their learning experience with badges. We plan to collect this perception of the learning experience by looking at self-regulation strategies, motivational dynamics and emotional management.

Self-regulation, motivation and emotions

In a learning process, engagement is partly linked to the learners' ability to implement self-regulatory and motivational strategies. From a conceptual point of view, regulation can be defined as the process that allows a system to maintain itself in a state of equilibrium (Raynal & Rieunier, 2009). Self-regulation applies to a system when regulation is taken over by the system itself. Informed by their results, these systems modify their behaviour if necessary. It therefore corresponds to the capacity of people to adapt to changes that involve continuous movements between desired and actual states (Viau, 2009). It is a form of regulation whose regulator is simply the learner himself.

According to Cosnefroy (2010), self-regulation requires a subtle balance between autonomy and effort. The ability to learn independently of the teacher requires significant effort. The idea of effort is also taken up by Vohs and Baumeister (2004) cited by Cosnefroy (2012) who defines the concept as the personal effort made to modify one's internal states and behaviour. This link between effort and autonomy can be explained by the fact that engaging in a learning activity represents a significant cost that requires giving up other, perhaps more attractive, activities in one's immediate environment. An individual's different goals are thus in constant competition. While learner autonomy is a desirable skill, it should not be a prerequisite. It should be seen as an objective to be achieved, in the sense that a learner is not autonomous in the absolute, but rather in relation to a task to be performed. Maintaining priority in the activity therefore always requires a relatively large effort. This situation of arbitration can be reinforced by the confrontation with the difficulty of the task. An autonomous individual is an individual who defines his own objectives, his criteria for success, and who is then able to implement the strategies he has devised to achieve his objectives (Cosnefroy, 2012). A learner is self-regulating

during the course of an activity when he/she becomes aware of his/her abilities and then adjusts his/her behaviour, according to them.

To achieve this, he must implement three successive processes which are based on a cycle logic: a process of anticipation, a process of control during the task and a process of self-reflection. The anticipation and planning process concerns the prior analysis of the task. It leads the learner to analyse the different constraints of the learning situation, to evaluate his/her resources and to elaborate his/her work plan. It involves highlighting the steps to be followed and the effective strategies for carrying it out. This orientation stage amounts to the learner asking the question: "Where am I going?". Control is more about overseeing the plan to complete the task. It allows the learner to collect data that will enable him/her to objectify the situation. It consists in coming back, by comparison, to the objectives set and the strategies implemented in order to evaluate their progress. This second stage plays a sort of feedback role by providing answers to the question: "What is my progress?". The third process, in which the learner takes a step back, is initiated. It is based on the data from the monitoring. This self-reflection leads the learner to make the necessary decisions to modify, if necessary, ineffective or inadequate strategies in the process. The question that then arises is: "What work do I do next" (Feed Forward). When the learner goes through these three stages, his or her learning can be described as self-regulated.

In parallel with the implementation of self-regulation strategies, we can also question the determinants of motivation insofar as they directly impact on the actual commitment to learning (Viau, 2009). A distinction can be made between the perception of the value of the activity, which relates to perceived usefulness, and the perception of one's competence (of oneself). The perception of one's competence can be associated with the concept of a feeling of self-efficacy (Bandura, 2019), which he defines as the knowledge that an individual has about himself and that he uses and modifies during events. It is constructed by the individual. It is subjective and does not correspond to the reality of the facts. This perception arises from past activities and is modified according to new experiences and the person's failures or successes.

Finally, a relative consensus exists in the literature around the idea that emotions play a central role in learning and influence our cognition (Tyng et al., 2017). The management of emotions in relation to badges therefore seems to us also relevant to question, in particular at the level of the pleasure and stress dimension of obtaining them.

Context and learning environment

The context of our experimentation concerns the MOOC: Evaluation of digital environments for human learning (Season #02), organised by the University of Mons (UMons) and the UMP of Oujda in Morocco. It is freely accessible from the portal: https://umooc.umons.ac.be.

This MOOC is structured around seven modules. Each module deals with a specific topic and is divided into three complementary phases: an informative phase with video clips accompanied by various resources (infographics, commentaries and bibliographies), a formative phase with a self-correcting quiz and an applicative phase, with learning tasks enabling the transfer of the content discovered. The last module deals with the review and certification of knowledge.

The training is spread over a period of 7 weeks. Throughout the course, participants can return to the learning and manage it as they wish, both in terms of discovering the video clips and carrying out the proposed activities. For each self-correcting quiz, learners can obtain a mastery badge (see Figure 1). This badge is obtained when the learners have achieved a level of success of at least 80%.

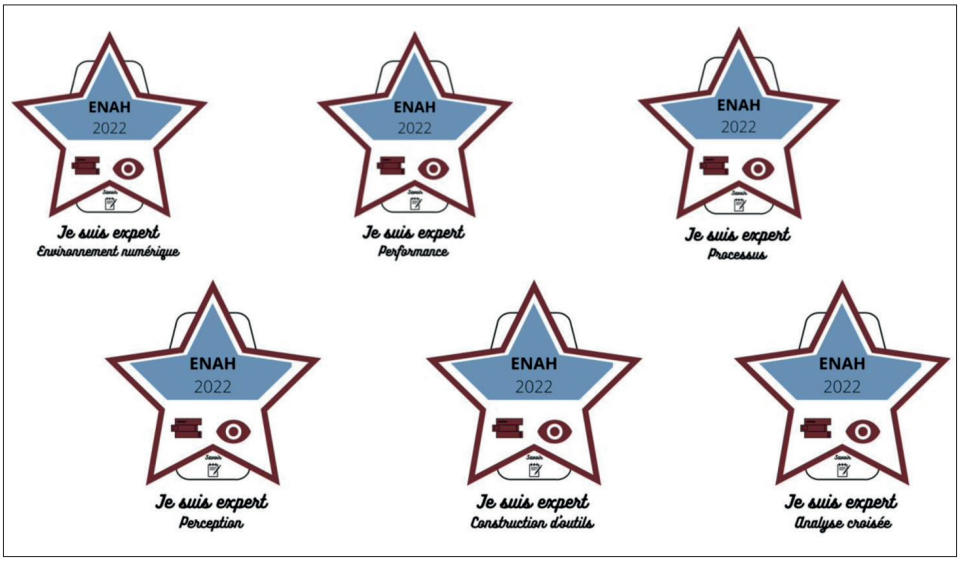

Figure 1. Examples of badges awarded in the MOOC

Source: Authors' own elaboration.

Methodology

Our sample consists of 281 participants, registered for the MOOC (Season #02). Of the 281 participants, 90 completed the final test to validate the training. In our study, we will also rely on the data from the previous year's MOOC (Season #01) where the participants (N = 1,468) benefited from the same scenario except for the integration of digital badges associated with the formative quizzes.

Based on our theoretical review of the literature, this study will try to provide some answers to the following two research questions:

- Q1: Do badges impact on effective engagement in learning?
- Q2: How do learners perceive their engagement with badges?

To answer the first question, we exploit the learning traces which concern the number of attempts at the quizzes associated with the badges as well as the number of badges obtained.

To answer the second question, which concerns the participants' perception, we asked them at the end of the training (week 7) to complete a questionnaire based on different complementary indicators that can explain the effective engagement in learning (see Table 1), namely self-regulation strategies, dynamics in terms of motivation and management of emotions. We have a total of 79 respondents to this perception questionnaire. In the online questionnaire, respondents expressed their level of agreement with different statements on a 4-level scale that includes two negative and two positive poles (strongly disagree - -, disagree -, agree +, strongly agree + +).

Table 1. Dimensions of the perception questionnaire

Perceptions of the...	Actions	Description
...to self-regulation	Planning	Estimating the time needed, managing time effectively, choosing appropriate strategies
	Anticipation	Forecast of expected results, identification of steps, clarification of implementation procedures
	Control	Justification of choices made, verification of understanding and goals, self-assessment, comparison of results obtained with the objectives set.
	Adjustment/adaptation/ self-reflection	Adapting planned procedures, making decisions on resource allocation (human and material), correcting errors.

... to motivation	Commitment	Entry into action and investment
	Perception of competence	Self-image (sense of efficacy, competence, values, etc.) and description of how one acts
	Goal setting	Formulation of objectives to be achieved
	Assessment of the activity	Perception of the value of the activity
...to emotions	Expression of emotions	Stress, pleasure, competition

Source: Authors' own elaboration.

Analysis of the results

Our analysis of the results is structured around the two research questions (actual engagement and perceived engagement).

Q1: Do badges impact on participants' engagement with the MOOC?

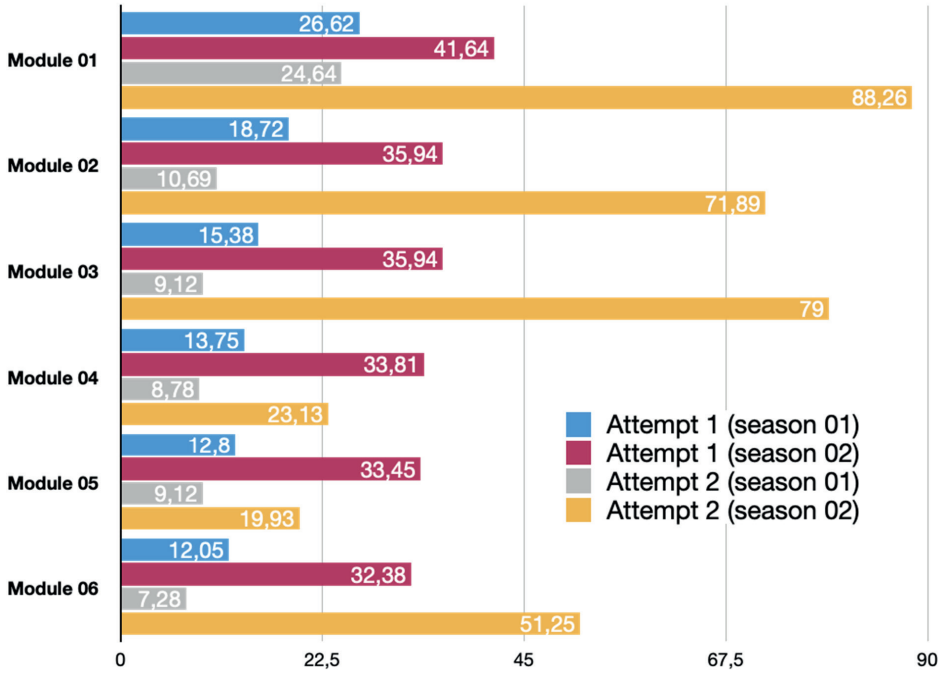

Figure 2. Relationship between number of attempts at quizzes and number of participants (MOOC #01 vs MOOC #02)

Source: Authors' own elaboration.

To answer this question, we compared the number of first and second attempts at the quizzes taken during each module (N = 6) between the two MOOCs (Season #01 vs. Season #02) weighted by the number of participants (see Figure 2). This ratio allows us to express the results in % and to compare the real engagement of the students between the two sessions of the MOOC (season #01 = no badge vs season #02 = with badges).

While there was a gradual decline in engagement over the course of the course (between Module 01 and Module 06), examination of Figure 1 shows that participants in Season 02 (with badges) were more active than those in Season 01 (without badges) in using the quizzes. This trend is observed on the one hand at the first attempt and on the other hand at the second attempt. This finding suggests that badges have a positive influence on learners' engagement with the device.

Table 2 shows the number of badges and the number of attempts per module. Although the number of badges is gradually decreasing, it can be observed that the number of badges given is still significant in relation to the total number of participants (N = 281) and corresponds to more or less 1/3 of the registered participants. These results correspond to a rather high level of commitment in a MOOC-type device (Boumazguida, 2020).

Table 2. Number of badges issued per module

Module	Number of badges issued	Ratio number of badges / number of participants
01	104	37.01
02	97	34.51
03	94	33.45
04	93	33.09
05	92	32.74
06	90	32.02

Source: Authors' own elaboration.

Q2: How do learners perceive their engagement with the MOOC in relation to badges?

Let's now look at what participants want to tell us about their learning experience with the badges. Table 3 shows the participants' views on the regulation of their learning. It shows that students were able to adapt their learning

strategies (57.50% positive) to take ownership of the content as they have the opportunity to check their level of mastery (67.50% positive). However, they were more sceptical about the ability of the badges to help them with time management (37.50% positive).

Table 3. Links between badge use and self-regulation (%)

	- -	-	+	++
I adjusted my learning strategies as a result of getting or not getting badges in each module.	15.38	25.64	38.46	20.51
The badge awarded in each module is a good check on my understanding of the subject.	10.25	20.51	53.84	15.38
The allocation of badges by module helped me in my time management in the course.	21.79	39.74	28.20	10.26

Source: Authors' own elaboration.

Regarding the motivational dimension, Table 4 summarises the students' opinions on four complementary items. It can be seen that the badges contribute to the achievement of the learning objectives (57.68% of positive opinions) and at the same time stimulate the value of the task. They support their commitment to the MOOC (62.83% positive opinions) and motivate them to complete the MOOC (55.12% positive opinions). However, they are more reserved about their commitment at the beginning of the MOOC (34.61% positive opinions). It is therefore more during the process that participants discover the value of Open badges for learning, probably reinforcing their sense of control over the task on this occasion.

Table 4. Links between badge use and motivation (%)

	- -	-	+	++
Obtaining the badges helped me to achieve my learning objectives.	17.95	24.36	47.43	10.25
The badges motivated me to engage in the MOOC.	15.38	21.80	29.50	33.33
The badges motivated me to start this MOOC.	26.92	38.46	21.79	12.82
The badges motivated me to complete this MOOC.	15.38	29.49	34.61	20.51
The badges awarded represent my work.	10.25	20.51	57.69	11.53
I expect to earn more badges in the future.	11.53	30.769	46.15	11.54

Source: Authors' own elaboration.

Regarding the link between the work invested and the achievement of the badge, the students expressed a rather positive opinion (69.22%). This result suggests that the integration of badges can enhance the participants' sense of controllability in a learning process (Bandura, 2019). In terms of prospects, however, opinions are more divided about earning more badges in the future (57.69% positive). This result is quite logical as motivation is linked to the learning context in which learners operate.

Table 5 examines the relationship between badges and emotions. It can be seen that students feel pleasure (79.48% positive). Few students felt stress about getting the badge (27.27% positive) or competition for the badge (12.89% positive). This result is quite logical as the environment does not offer a dashboard allowing students to observe the activity of other learners in terms of badges. They can only do so by consulting the learners' profiles to see whether or not they have acquired the badges in question. This navigational constraint probably tends to limit the mechanisms of social comparison within the community of learners in this way (Temperman, 2013). The low level of stress can also be explained by the formative nature of the test associated with each badge. From a correlational point of view, however, we observe that perceived stress in relation to badges is positively related to being in a competitive dynamic (Rho = 0.254; p = 0.026). This suggests that competition in relation to the principle of social comparison could perhaps induce stress in participants.

Table 5. Links between badge use and emotions (%)

	- -	-	+	++
I felt pleasure when I got a badge.	6.41	14.10	51.28	28.20
I felt stressed about acquiring badges	36.36	36.36	20.78	6.49
I felt that I was in competition with others as a result of acquiring the badges.	47.43	39.74	7.69	5.12

Source: Authors' own elaboration.

Discussion of the results and perspectives

Our results show that digital badges can have a positive effect on motivation and limit learners' procrastination. In a MOOC context, the integration of badges stimulates learners to engage in learning by acquainting themselves with the content and testing their mastery of it repeatedly via the available formative

tests. These results are in line with Uanhoro and Shwu-Ching Young's (2022) observations on effort distribution and Rollin's (2021) observations on engagement with the learning device. In terms of instructional design, this result is interesting in that the effect of the formative test positively impacts learning. Thomas et al (2016) show that it is not the score on the self-assessment tests that has a significant impact on the quality of learning, but rather the number of attempts that proves to be a positive predictor of learning quality. In a previous study, we were able to corroborate this result of the link between the use of online tests and the level of mastery at the end of learning (Boumazguida et al., 2018).

The analysis of perception proved to be interesting, as it allows us to highlight explanatory leads to the actual engagement of MOOC participants with the badges. Their actual use can be linked to certain self-regulatory strategies such as a means of checking the level of mastery of the content discovered and, to a lesser extent, of adjusting their learning strategies. At the motivational level, obtaining badges seems to have a positive influence on the determinants of motivation such as the learners' feeling of competence during the learning process, the value placed on the task and the feeling of controllability (Viau, 2009). Finally, it can be highlighted that the emotions linked to the acquisition of badges seem to reflect a positive learning experience (high sense of pleasure and low perceived stress).

All of our observations indicate that the integration of Open Badges is an interesting lever for boosting the learning experience of participants in a MOOC. This approach proves to be relatively efficient for managing large groups of participants, as it is based on automatic badge allocation according to the results of formative tests. It seems to us to be particularly well suited to learning environments such as MOOCs.

In terms of research perspectives, the effects of the use of badges on learners' performance in the short term and in the longer term in terms of transfer probably remain to be questioned. This is a complex issue from a methodological point of view, and one that is still poorly documented in the educational literature.

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The monograph is the result of research on the use of didactic innovations in teaching in higher education and other levels of education undertaken by a team of researchers from Poland and Belgium. The most important research problem is e-learning in the context of the pandemic situation, which forced rapid changes in teaching methods. The authors of individual chapters discuss the results of research on the use of digital tools, but they also do not avoid considering the psychosocial condition of students who had to adapt to the new system of learning.

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