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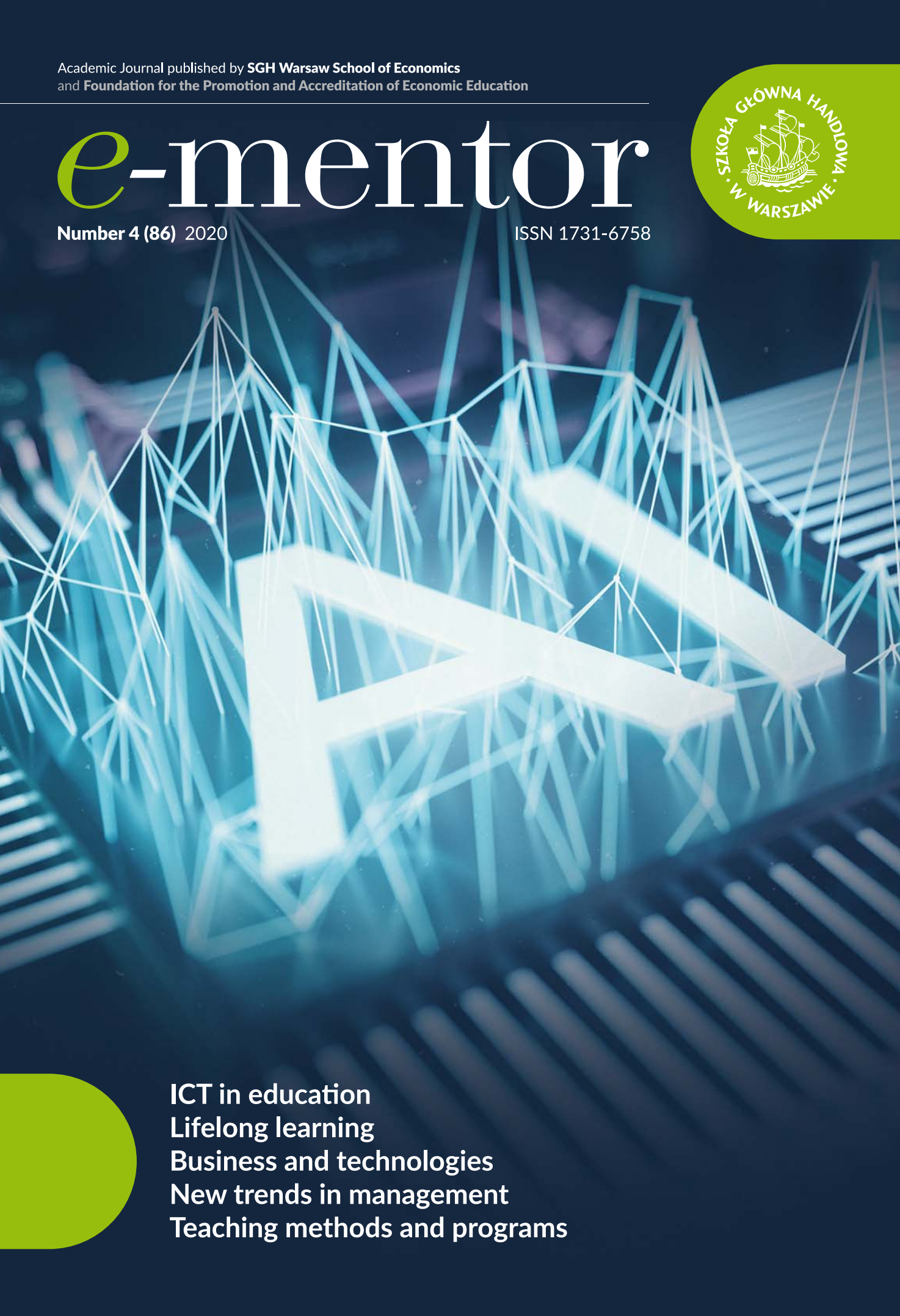

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Dear E-mentor readers,

The current volume of the *E-mentor* comes out at the end of a very unusual and tough year, disrupted by the unexpected surge of COVID-19 pandemic which affected every aspect of our lives. Among these disruptions was education, which in the early months of 2020 had to be moved in a rush online. And despite the hope that in the fall semester it would be possible to return to schools and universities, the vast majority of classes all over the world remain in the internet space. Although some people tend to call it online education, those who are involved in e-learning from decades warn that such a name could be misleading and propose to call it emergency remote learning.

No wonder then that the content of the current volume also reflects the situation, and the vast majority of the articles tackle the educational issues. We can read about how students appraised blended learning classes before the COVID-19 pandemic, and also how they reacted to the rapid change of the learning mode in spring 2020. It is worth pointing out that in the latter article, the research was carried out by students themselves among their peers and those students are also co-authors of the paper. Some other papers present the concepts and even practical guidance on how to design and conduct effective online courses. An interesting supplement to those hints may be the presentation of the *Acadly app*, which may help engage students before, during and after their classes (both online and on-campus when they return).

There is a commonly held belief that despite all its drawbacks, the pandemic might, in some sense have a positive impact, such as stimulating a rethinking about the way people earn their university degrees and get certified. One of the responses to such need may be the concept of open badges, or the use of an AI-based coach assistant when it comes to work-based learning. That, in turn, corresponds with the necessity to reflect on how the employers should get prepared for the new generation (called Generation Z) just entering the labor market.

I do hope this collection of papers creates a valuable reading for everyone interested in education all over the world.

E-mentor is an open-access journal available for free both online and in printed form. It continuously increases its international outreach, which is confirmed by the submissions from a growing number of countries such as Spain, Germany, Russia, Japan, India and Ghana. In the current issue, we also publish the contributions from the US and Ukraine, the countries from which the authors already collaborate with our journal.

All of the scientific papers are peer-reviewed (we apply a double-blind procedure). Every article gets its individual DOI registered in *Crossref*, and the journal is indexed in several global databases, including Web of Science ESCI and EBSCO. There is no publishing fee for the authors. A brief guide for authors can be found on the penultimate page of the journal. More detailed instructions (including the submission form) are available online at http://www.e-mentor.edu.pl/eng/page/8/Info_for_Authors. If you have any questions concerning the publications in *E-mentor*, please contact the editorial team at redakcja@e-mentor.edu.pl.

Maria Zając
Editor

Ministerstwo Nauki i Szkolnictwa Wyższego

„Kontynuacja działań na rzecz zwiększenia międzynarodowego zasięgu czasopisma E-mentor w wersji drukowanej i online (o otwartym dostępie)" – zadanie finansowane w ramach umowy nr 693/P-DUN/2019 ze środków Ministra Nauki i Szkolnictwa Wyższego przeznaczonych na działalność upowszechniającą naukę.

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Anna Pieczka

Polish-Italian virtual exchange. Learners as teachers of their native languages

Abstract

This article presents the position of virtual exchanges and telecollaboration in higher education, as well as the advantages of their implementation. They are a part of virtual mobility and can supplement or replace physical mobility. Advantages that follow from virtual exchanges correspond to the latest guidelines on education provided by the European Union. Moreover, telecollaboration requires less time and money than participation in physical exchanges. Therefore, its implementation makes it possible to develop varied skills (e.g. language, digital and intercultural competence), regardless of the financial and personal situation of students.

The second part of this study presents the course and structure of the Polish-Italian virtual exchange that took place in the academic year 2018/2019 between Maria Curie-Skłodowska University in Lublin and the University of Turin. As part of it, learners of Italian and learners of Polish acted as teachers of their native languages. The purpose of research was to determine whether this form of virtual exchange can be successfully implemented among students of first-cycle degree studies. What was analyzed were online tools chosen by students to complete their tasks, the form in which language issues were presented to partners and code-switching during the exchange. The research material consisted of the students' written assignments and the forms of presenting knowledge used to complete tasks in the virtual exchange. On the basis of this material, it was concluded that giving the participants freedom to switch between codes did not have a negative impact on the project. However, it was also noted that students were not adequately prepared to assume the role of teachers. Despite their knowledge of various online tools, they tended to select those that were not suited to the digital environment, whereas the presented language issues turned out to be too complex for people with no teacher training to successfully explain them to their exchange partners.

Keywords: virtual exchange, telecollaboration, virtual mobility, Polish as a foreign language, Italian as a foreign language, online tools, code-switching, student as a teacher

Introduction

This article presents the course of the Polish-Italian virtual exchange between Maria Curie-Skłodowska University in Lublin and the University of Turin, as well as the results of research based on this exchange. The purpose of the first part of the article is to show both the position of virtual exchanges in higher education as an alternative to physical mobility and the advantages of their implementation. The next part of the study shows the structure of the Polish-Italian virtual exchange at the university level. In this exchange, learners acted as teachers of their native languages. What was examined were three specific issues of significance to the course of the project: linguistic problems regarded as the most difficult by the participants, their choice of online tools and the moments when they switched codes in communication with their partners.

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Virtual mobility as an alternative to physical mobility

In foreign language teaching, effective verbal communication remains the overriding objective of teaching activities undertaken by teachers. Verbal communication as such is a complex process. It requires learners to use various strategies, understand the texts they read or hear and adequately react to them in speech or in writing, which means that it involves all language skills (Council of Europe, 2001, chapter 4.4). For learners, one of the best tests of communicative effectiveness is meeting native speakers of the target language. Some students have this possibility thanks to Erasmus+, a program which promotes physical mobility. It enables trips abroad, which often lead to an improvement in competences useful in an international setting, contribute to the development of language skills and intercultural knowledge, and support personal and academic development (European Commission, 2018a, p. 10). Participation in the program gives learners an opportunity not only to gain experience, but also to achieve their communication goals in a foreign language. However, not everyone can benefit from Erasmus+: its reach is limited and even though many students go abroad thanks to this initiative, they are still the minority. On the one hand, the cause of this situation is financial: even though the budget of the program is regularly increased, it currently makes it possible for about 4% of young people to participate in the program (European Commission, 2019, p. 9). On the other hand, many students do not apply to the project due to their personal or economic situation. According to the latest report of the European Commission for the academic year 2017/2018, 15,266 people in Poland took the opportunity to study or do an internship abroad under the Erasmus+ program (European Commission, 2020, p. 2). According to data published by Statistics Poland (GUS) on the total number of students that year (Główny Urząd Statystyczny, 2018, p. 1), it can be concluded that little more than 1% of all Polish students participated in the project.

Without a doubt, physical mobility has a prominent place in European education. In 2009, the communiqué published after the conference of European ministers responsible for higher education in countries with the Bologna system emphasized the benefits of physical mobility and called on Member States to invest in physical mobility programs, so that at least 20% of students take the opportunity to study or do an internship abroad by 2020 (European Commission, 2009, p. 4). As shown by the above data, the actual figures differ significantly from those projected a decade earlier. Therefore, it can be concluded, also due to the fact that Erasmus+ is the biggest driver of mobility within the academic community, that only a small percentage of young people have an opportunity to develop their communication skills in target languages through contact with native speakers as part of formal higher education.

In light of the quoted information, it seems necessary to find an alternative that would give a bigger group of recipients access to benefits similar to those offered by the Erasmus+ program in the course of higher education. The answer to this need may be virtual mobility, treated as an addition to physical mobility or as a separate activity when it is impossible to travel abroad (Commission of the European Communities, 2009, p. 18). This type of activity is gaining popularity in the academic community and gives learners an opportunity for multi-dimensional development as part of language classes, but most importantly, it enables authentic communication with native speakers. One of the ways of implementing this type of mobility are virtual exchanges.

Virtual exchanges: definitions and benefits

Virtual exchanges appeared in higher education for the first time in the 1990s (O'Dowd, 2007, p. 4). They have been gaining popularity ever since. There is also an increasing volume of research on different aspects of virtual exchanges (Lewis & O'Dowd, 2016b, p. 25) and in 2018 they became the axis of a flagship European project, Erasmus+ Virtual Exchange (European Youth Portal, n.d.). Robert O'Dowd, one of the promoters of virtual exchanges[1], and Tim Lewis define them as follows: "[it is] the engagement of groups of learners in extended periods of online intercultural interaction and collaboration with partners from other cultural contexts or geographical locations as an integrated part of their educational programmes and under the guidance of educators and/or expert facilitators" (Lewis & O'Dowd, 2016a, p. 3). Steven Thorne, another scholar who deals with different forms of telecollaboration projects, adds that it is also "a form of language-mediated social action that brings the complex reality of communicating across cultural and linguistic (as well as social class, gender and religious or spiritual) borders into direct experience" (Thorne, 2016, p. IX). In another article, O'Dowd emphasizes that those who participate in an exchange are at the center of the learning process because the responsibility for a successful interaction lies mostly with themselves, whereas the elements required to succeed are autonomy and reciprocity (O'Dowd, 2016, p. 293). Attention was drawn to similar issues also by Breffni O'Rourke back in 2007, when he wrote about different models of telecollaboration (cf. O'Rourke, 2007).

Researchers emphasize certain aspects of virtual exchanges, such as learning through social interactions, the learners' responsibility for the teaching

[1] Other terms used in similar contexts include: virtual exchange, online intercultural exchange, telecollaboration, e-tandem and collaborative online intercultural learning. They are often treated as synonyms to simplify terminology. Robert O'Dowd (2018) writes about subtle differences in their meanings.

process, communication based on reciprocity, autonomy, the use of technology in teaching and the direct experience of communicating across divides, which correspond to the latest educational objectives set by the European Union.

In the Common European Framework of Reference for Languages (hereinafter referred to as CEFR), the ability to learn includes the ability to use new technologies (Council of Europe, 2001, p. 108). However, the topic of communicating via these technologies was not discussed in detail. The changing role of new technologies in language teaching is evidenced by the fact that one of the most important changes in the previous system, introduced in CEFR Companion Volume (Council of Europe, 2018), which is an addition to CEFR, concerns the addition of the third category, i.e. online interaction, to previous interactive activities and strategies (or rather extracting this new category from the existing ones). In the past, they included only spoken and written interaction (Council of Europe, 2001, ch. 4.4.3). Online interaction consists of two elements: online conversation and discussion and goal-oriented online transaction and collaboration (Council of Europe, 2018, p. 82).

It needs to be emphasized that the objectives of participation in virtual exchanges overlap with many of the eight key competences. They were determined for the first time in 2006 and have been updated every year since then. Currently, they include the following skills (European Commission, 2018b, p. 2):

- literacy;
- multilingualism;
- numerical, scientific and engineering skills;
- digital and technology-based competences;
- interpersonal skills, and the ability to adopt new competences;
- active citizenship;
- entrepreneurship;
- cultural awareness and expression.

Activities involved in virtual exchanges contribute to the development of IT skills because they take place in the digital environment. Their tools are foreign languages used to communicate with partners. Contacts with groups of students from different backgrounds increase the participants' awareness of and sensitivity to cultural differences. Finally, online collaboration leads to the development of social skills, whereas a high degree of autonomy in this process and placing the learner at its center has a positive impact on the ability to learn.

The document describing key competences emphasizes that each of them makes use of such transversal skills as critical thinking, problem solving, teamwork, communication and negotiation skills, analytical thinking, creativity and intercultural skills (European Commission, 2018b, p. 2). The above mentioned elements overlap with the positive effects of virtual exchanges: the report from 2018 on their impact on students who participated in the European Erasmus+ Virtual Exchange program, states that there was an increase in digital skills, language skills, openness and cultural sensitivity, teamwork skills, collaborative problem solving and critical thinking skills (Helm & van der Velden, 2019, p. 7).

As shown by the above-mentioned documents, virtual exchanges give their participants an opportunity for multidimensional development as part of language classes. Thanks to them, learners can acquire both hard and soft skills. They develop not only their language and intercultural skills, but also digital literacy. The multidimensional nature of the discussed projects makes it possible to place students at the center of the learning and teaching process, so it also enables teachers to set teaching objectives befitting the 21st century for themselves and their students.

The last decade has definitely witnessed the greatest popularity of virtual exchanges. At that time, scholars published many studies on different aspects of virtual exchanges in higher education, for example their impact on learner autonomy (see e.g. Fuchs et al., 2012; Nogueira de Moraes Garcia et al., 2017) and the development of language and intercultural skills (see e.g. O'Dowd, 2011; Schenker, 2012) or digital skills (see e.g. Hauck, 2019; Helm, 2014).

In their works, researchers often addressed the topic of tools used in virtual exchanges. What is also popular are the criteria behind their selection. Robert O'Dowd (2007) draws attention to the complexity of this seemingly simple task, whereas Melinda Dooly (2007) describes factors that influence an adequate selection of tools in telecollaboration. The same author analyzes the capabilities and limitations of selected solutions, such as emails, websites, blogs, Internet forums, chats and video conference software. The positive and negative aspects of using specific applications are addressed by many authors: Sarah Guth and Michael Thomas (2010) look into tools that appeared with the emergence of Web 2.0, Francesca Helm (2015) presents the most popular programs and applications used by teachers in virtual exchanges, Ana Sevilla-Pavón (2016) analyses selected Google products from the perspective of students and Theresa Schenker and Fiona Poorman (2017) analyze the learners' opinions on emails, text and voice chats, forums and video conference software. The above examples show the popularity of research focusing on the perception of online tools that were previously chosen by teachers. In this article, one of the aspects which was analyzed concerns tools chosen by the students themselves. What is the closest to this perspective are studies on virtual exchanges in the context of educating teachers of the future. In such projects, learners come up with tasks as part of telecollaboration and select appropriate tools themselves (see e.g. Grau & Turula, 2019; Kurek & Müller-Hartmann, 2017). In this case, contrary to what is presented in this study, the target group does not consist of exchange partners, but hypothetical future students.

Another aspect discussed in this article is code-switching in virtual exchanges. There are many publications on this phenomenon in direct interactions in language classes, but works on code-switching in the online space are rather scarce. Researchers tend to

focus on the most important function of code-switching, i.e. the negotiation of meaning (see e.g. Bower & Kawaguchi, 2011; O'Rourke, 2005) and often disregard other aspects of this phenomenon. Jane Hughes (2010) writes more broadly about the possible reasons for code-switching in online interactions. Two reasons overlap with those identified in this work: switching to the native language to accelerate communication and due to insufficient language competence in the target language. This study presents an asynchronous virtual exchange, whereas publications on code-switching during telecollaboration focus mostly on exchanges based on synchronous tasks. One of these works presents a project in which learners have in advance determined the language they were supposed to use in online tasks (Kötter, 2003). This type of a virtual exchange was proposed by the author, who relied on the assumption that freedom to choose the language may lead to the insufficient use of one of them, but research results presented here do not confirm this correlation.

Virtual exchanges in the context of teaching Polish as a foreign language at the University of Turin

The virtual exchange described here became a part of classes in Polish as a foreign language at the University of Turin, due to organizational reasons and the specific nature of the language in question. The learners of Polish at the University of Turin are mostly first-cycle degree program students majoring in linguistic mediation. The curriculum of this major involves choosing three languages, referred to as A, B and C, the first two of which (A and B) are the leading languages taught for three years, whereas language C is taught for only two semesters. Students tend to choose languages such as English, Spanish or German as their leading languages and if they decide to learn Polish, they usually choose it as their language C. Therefore, Polish teachers have to face quite a challenge: how does one schedule the teaching process in this short period (limited to less than five months of classes) in such a way as to give learners a sense of success and the ability to effectively communicate at a basic linguistic level?

Yet another problem is the specific nature of the Polish language. In the case of Romance or Germanic languages, students relatively quickly acquire skills needed to freely communicate at a basic level. In Polish, it takes much more time to achieve this level of competence, mainly due to the inflectional complexity of this language, which requires learners to master a range of different grammatical structures to participate in basic interactions.

Due to a limited time to learn Polish and its high level of difficulty at A1, it was decided to include a virtual exchange in the beginner course. An additional motivation was knowing that in everyday life, most students do not have direct contact with Poles, which means that university classes are often their only opportunity to communicate in the target language.

Polish-Italian virtual exchange: description of the project

In the academic year 2018/2019, the project involving a bilingual Polish-Italian virtual exchange was completed. Its participants were first-year students of linguistic mediation attending Polish language classes at the University of Turin and first-year students of Romance studies learning Italian at Maria Curie-Skłodowska University in Lublin. When the virtual exchange started, both student groups were attending A1 language classes. The exchange consisted of two stages, one per semester. Each of them took from four to five weeks. The first stage involved thirty students in total (eleven Italians and nineteen Poles), who worked in three-person groups (there were ten groups in total). Due to the fact that some students decided not to continue their studies and because participation in the exchange was voluntary for Polish students, the second stage involved sixteen students (eight from each university), which made it possible to work in pairs. There were seven groups in total, whereby one group resigned during the course of the project. The exchange was scheduled outside university classes, so for students it was an extracurricular and yet mandatory activity, whereas tasks planned to be completed as part of it were asynchronous, so it was not necessary for partners to be online simultaneously. The main channel of communication with students were private groups on Facebook. General information on both stages is presented in Table 1.

This article concerns the second stage of the project[2], completed in April 2019. It consisted of three larger tasks, divided into constituent tasks:

TASK 1.
1. Introducing yourself to your partner.
2. Informing the partner about the biggest difficulties in learning the target language so far.
3. Informing the partner about the preferred forms and strategies of learning.

TASK 2.
1. Presenting knowledge about the problematic linguistic issue identified by the partner.
2. Preparing an exercise to consolidate knowledge.
3. Preparing a communication exercise.

TASK 3.
1. Checking exercises done by partners.
2. Doing a communication exercise prepared by the partner.

[2] Results of research conducted in the first stage of the project were presented at the PL-CALL conference in Kraków in 2019.

Table 1

Summary of general information on both stages of the exchange in the academic year 2018/2019

	1st semester 2018/2019	2nd semester 2018/2019
Participants	11 students from Italy 19 students from Poland	8 students from Italy 8 students from Poland
Division into groups	3-person groups (10 groups)	2-person groups (8 – 1 = 7 groups)
Online tools	Chosen by teachers: Padlet, Google Docs, FB groups for posting photos, videos and comments	Every student could freely choose tools
Task deadlines	Precise deadlines for individual tasks	General deadlines for sets of tasks
Role of the teacher (project coordinator)	Regular contacts with the project coordinator, close monitoring of task progress	Occasional interventions of the project coordinator, task progress assessment after the completion of the whole project
Research interests	Task design, tools (adequacy, difficulty of use), resulting problems	Learner autonomy, forms of transferring knowledge, resulting problems

Source: author's own work.

Research questions and an analysis of materials

Both stages of the virtual exchange completed in the academic year 2018/2019 were pilot schemes. Due to the complexity of such teaching activities, as well as their complicated organization and dependence on multiple external factors, the research interests of the project coordinator in the first stage of the project focused on identifying problems that could make it impossible or more difficult for the coordinator to guide students through both stages of the exchange. In the second stage, completed in the summer semester, the overriding research question was whether it was justified for students to act as teachers. It was assumed that such an exchange can be deemed successful if students are capable of presenting the teaching material in an attractive form (understood as innovative, interactive and clear), and if linguistic issues identified by the partners as difficult do not turn out to be too complicated to be analyzed by students without teaching training. At the same time, the participants were free to choose the language of communication, which supported their independent decisions in the learning process. There were only general deadlines for the completion of tasks, so that every student could manage their time individually.

In order to find an answer to the question of whether the presented structure of the second stage of the virtual exchange was justified, the author has identified three research problems related to the linguistic issues identified by students and activities taken by them while learning the target language and teaching the native language:

1. What basic linguistic problems in learning the target language will be identified by the learners? Will these problems be predominantly grammatical or lexical? → How will it influence their role as teachers?
2. Which languages will the students use to communicate during the exchange? When will the students switch codes in online interactions? → Will their autonomy to choose the language of communication negatively affect the exchange?
3. Will the learners use tools from the first stage of the virtual exchange to complete their tasks? → Will the presented teaching material be attractive and suitable for online teaching?

To answer these questions, the author has gathered research material that included the students' statements from posts and comments published on Facebook and written interactions on Messenger, as well as files or other forms of presenting knowledge chosen by students. The gathered material was coded by marking categories such as the author (Turin group/Lublin group), the language (Polish/Italian), the number of the task and the tool used. Where in-depth data was required, the quality of selected statements was analyzed in reference to the context of their creation.

Linguistic difficulties in learning the target language

The first research question is directly related to the initial task in the second stage of the virtual exchange. After a short introduction to the partner, the learners were supposed to inform the partner about the most difficult element of the target language that they have encountered so far and would like to repeat, understand better or practice again. To do that, all students chose the easiest and quickest form of communication, i.e. providing written information via Messenger in a private group on Facebook.

On the basis of the author's own experience, both as a student and a teacher, she assumed that the problem identified most often by the learners of Italian would be the use of prepositions, whereas for the learners of Polish it would be the use of the imperfec-

tive and perfective aspect of verbs. This hypothesis was only partially confirmed. Five out of seven Polish students identified prepositions as the most difficult linguistic issue they have encountered so far. It is not surprising because this issue is problematic even to advanced learners. It happens due to the irregularity of this linguistic phenomenon, the difficulty of coming up with rules that could help students master it and the necessity to memorize multiple examples of use for individual prepositions. When it comes to the remaining two students, one of them pointed to problems with choosing between the auxiliary verbs *avere* and *essere* in the compound past tense (*passato prossimo* in Italian), whereas the last student focused on problems with using pronouns, but did not specify whether it referred to direct pronouns (*pronomi diretti* in Italian) or combined pronouns (*pronomi combinati* in Italian) and whether the problems occurred with their use in the present or past tense.

The author's hypotheses as to the linguistic problems encountered by the learners of Polish were less accurate. The aspect of verbs was mentioned by only two out of seven students. Their responses did not point to any leading problem and varied significantly: for two people, the biggest problem were the forms of the genitive case, for one it was the locative case and for another one it was the combination of these two cases used to express dates. The last student was the only person whose response concerned a lexical rather than a grammatical issue: the names of the months.

The responses of the learners of Polish may be varied for two reasons: the students' absence in class when the issues they identified as problematic were discussed and an insufficient interiorization of a given structure. But to confirm these assumptions, it would be necessary to conduct in-depth interviews with the students.

The language of communication: native or target language?

In the first stage of the exchange (in the winter semester of the academic year 2018/2019), every task had an instruction specifying the language in which it was supposed to be done. In most cases, it was the target language. At the same time, the students were informed that they can use their native language if they want to express a given concept and feel that their current competence in the target language makes it impossible. They were always encouraged by the coordinator, however, to make attempts to use the foreign language.

In the second stage of the exchange, the instructions for specific tasks never specified the language that should be used. A general description of the project stated that students can freely choose the language they want to use to complete the tasks. However, the suggested language was always the target language.

The aim of the posed research question was to check whether students with full autonomy with regard to the choice of language will do what was customary in the first stage of the exchange and use the target language, also due to the desire to practice it, or whether they will opt for the speed and easiness of communication associated with the use of their native language. An additional objective set by the author was to determine when learners decide to switch the code.

An analysis of the use of language in each task showed that five out of seven groups used the target language in all situations. In the two remaining groups, the Poles always used Italian, whereas the Italians used both Polish and Italian. In group five, this ratio was 50:50 and in group seven 75:25 for the target language. Code-switching from Polish into Italian occurred in two cases. Firstly, when the speaker wanted to construct a compound sentence, which exceeded their language skills. An example which illustrates this situation can be this post from 23 April 2019, written by one of the Italian students[3]: "Cześć, Martyna! Mam nadzieję, że spodoba ci się ten wideo :) Wykonałem również krótkie ćwiczenie. Per il compito creativo potresti scrivere un breve testo dove mi racconti qualcosa in più su di te utilizzando le preposizioni :)"[4]. As can be deducted from the above post, the learner had no problems with the construction of correct simple sentences or sentences with two clauses, but when she wanted to use two subordinate clauses, one of which was additionally introduced by a participle (*utilizzando* in Italian), she switched to her native language. This choice is not surprising, because at this stage of learning, learners have limited contact with sentences that include subordinate clauses. Those that appear in classes are treated functionally, whereas active participles are not introduced at the A1 level.

The second instance in which the code is switched occurs when the speaker wants to react to a given situation as soon as possible and, in their opinion, using the target language would cause an unnecessary delay. The following situation can be used to illustrate this tendency: on Tuesday, 16 April at 6:00 p.m., an Italian student posted an exercise and at 7:03 p.m., her Polish partner commented on the new post. A few minutes later, at 7:08 p.m., the Italian student wrote in her native language: "Oh no! Ho visto ora che ho invertito soluzione/esercizio. Provo a correggere!"[5]. At 7:20 p.m., she added another comment: "Ok, ora è corretto :)"[6]. In the above example, the Italian stu-

[3] The original spelling and punctuation was preserved in the quoted example.
[4] Translation: Hi Martyna! I hope you will like this video :) I also prepared a short exercise. For the creative task, you could write a short text in which you will tell me a little bit more about yourself, using prepositions.
[5] Translation: Oh no! I've just noticed that I mixed up the solution and the exercise. I'll try to fix it!
[6] Translation: Ok, it's correct now :)

dent reacted immediately after realizing that she made a mistake. The use of exclamation marks and emoji emphasizes her emotional involvement. Therefore, it seems natural that she wanted to correct her error before her partner discovered it herself. A faster and more effective tool to do it was her native language.

To sum up the above solutions, it needs to be noted that throughout the virtual exchange, all students were trying to use the target language, which may result from the continuation of the pattern used in the first stage of the exchange and the sense that in this way, they are pursuing one of the objectives of online collaboration (and language classes), i.e. the development of language skills. Rare instances of using the native language occurred when the situation demanded such use and communication skills in the target language were insufficient to achieve specific objectives set by the learners. The fact that only the Italians used their native language and there were no such situations involving the use of Polish confirms that the latter is more difficult to learn and that the language skills of the two groups differed at the same point of the academic year (which is also affected by the fact that the schedule of the academic year is different in Lublin and in Turin).

Online tools used in the exchange

In the first stage of the virtual exchange, the students used various tools available online, which were ascribed to specific tasks: Padlet to post short descriptions with photos, Google Docs to enter longer written assignments, comment on them and correct them together, and private Facebook groups to post photos and videos with descriptions and comments. A survey conducted after the first semester of the exchange showed that students had no problems with using the proposed tools, whereas using the same technology again to complete two different tasks contributed to its evaluation as easy to use by the students.

In the second stage of the exchange, students were free to choose the tools they wanted to use to complete specific tasks. The purpose of the last research question was to check whether the learners would use varied and attractive tools they got to know in the first stage of the exchange. Their choice was analyzed in two tasks, i.e. when they presented knowledge to their partners (task 2.1) and when they prepared exercises to consolidate knowledge (task 2.2).

In the first constituent task (task 2.1), nine out of fourteen students presented a given issue in a PDF file attached to a post on Facebook or described the issue in a post with links to online materials. One person prepared a PowerPoint presentation. Two students did not complete this task and only two people used tools from the first stage of the exchange: one of them used Google Docs and the second one recorded a video with a chosen issue presented as an animation.

In the second constituent task (task 2.2), which consisted of preparing exercises for the partner to enable them to consolidate their knowledge of a chosen grammatical or lexical task, seven learners prepared PDF files with gap filling, two people sent links to similar exercises found online (and one person published a set of varied materials on Google Drive to share with the partner), three students did not complete this task and two participants created interactive exercises on their own: one person used Quizlet (flashcards, gap filling, matching, games, etc.) and the other used Riddle (interactive gap filling).

The above data shows that the majority of students used text documents, usually PDFs, even though this form was not used in the first stage of the virtual exchange. Most of the exercises prepared by them were not interactive, even though this was a feature of all activities proposed by the teacher in the first semester of the project. Therefore, it can be concluded that students most probably used the forms they came across the most often in their university education, which are not very engaging or interesting for learners. Despite having contact with varied online tools and the ability to use them, confirmed in the first stage of the exchange, only two students decided to use these tools. Moreover, these two students created their own language materials, whereas the others used online resources (mostly copied without acknowledging the source). Therefore, it can be concluded that students looked for the best-known, the easiest and the quickest solutions. It seems that in order to encourage learners to use varied tools to prepare language materials, it is not enough for them to get to know such tools, try them out themselves and know how to use them. It is also necessary to directly instruct learners and ensure that they have repeated contact with such tools.

Conclusion

Having analyzed the material gathered in the second stage of the virtual exchange, which took place in the summer semester of the academic year 2018/2019, it can be concluded that the exchange fulfilled its overriding objective with regard to teaching Polish at the University of Turin: it gave students an opportunity for increased production in the target language through interactions with its native speakers. The fact that the exchange partners mostly used the target language to communicate may show that students were consciously trying to use this opportunity to improve their communication skills. Their autonomy to choose the language of interaction did not have any visible negative impact on the language production of students: they switched the code very rarely.

In the first stage of the virtual exchange, the students were prepared to use varied multimedia applications, but in most cases, it had no impact on the tools they used to complete tasks in the second stage of the project. To present knowledge, the learners used tools that were not interactive and were hardly diversified. A solution that could change this situation and encourage students to opt for more attractive online tools is a precise definition of this objective, which should be explained to learners before the

beginning of collaboration. The exchange could also be constructed in such a way as to ensure that efforts in this direction are well-structured.

When the project was completed, feedback from students showed one more important fact: all of the Italian students were dissatisfied with the time when the second stage of the virtual exchange took place (the summer semester). It was the last month of the academic year in Italy, so they were stressed out about exams and had less time because they had to study for exams. As a result, they focused on the completion of tasks rather than the quality of their work. Therefore, it is possible that the time factor had a major impact on the choice of tools.

It also needs to be noted that the issues indicated by project participants as the most difficult elements of the language code (mostly grammatical issues) turned out to be too complex for students without adequate knowledge and skills to successfully act as teachers of their native language. Their intuitive actions were insufficient to explain the selected linguistic issues to their partners in an organized and attractive way. An additional obstacle was a lot of freedom, which gave them the possibility to decide about too many elements. Even though the idea to switch the roles surely has didactic potential, it should be adequately prepared and structured. Students must have the knowledge required to carry it out, because what they lack is familiarity with the methodology used in foreign language teaching. In the author's opinion, this process would be too time-consuming and complicated to be carried out in the first year of language studies, but it is worth organizing such an exchange for students with teaching specialization in later years of study. In the beginning of first-cycle degree studies, the educational value of the virtual exchange would be higher if its program and objectives were adjusted to the level of the learners' language and intercultural competence.

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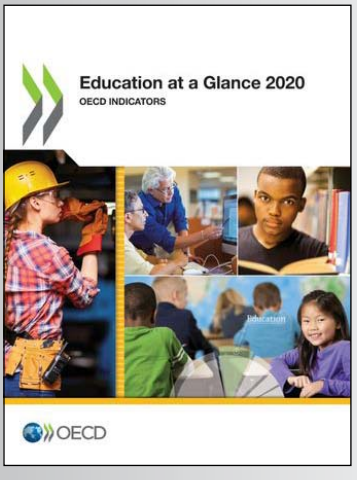
We recommend



The Impact of COVID-19 on Education – Insights from OECD's Education at a Glance 2020 report

The Covid-19 pandemic has thrown the world into an unprecedented crisis. It has affected people regardless of nationality, level of education, income or gender.

However, the same has not been true for its consequences, which have hit the most vulnerable hardest. Education is no exception. This pandemic has exposed the many inadequacies and inequities in the education systems – from access to devices or technologies needed for online education, and the supportive environments needed to focus on learning, up to the misalignment between resources and needs. While students from privileged backgrounds and in cities could find their way past closed school doors to alternative learning opportunities, those from disadvantaged backgrounds and in remote areas have remained shut out when their schools shut down. This has created a huge learning gap among students across the world.

An excerpt from the overview of the report, which can be read on the EdTechRieview website at https://bit.ly/3owoArT. The online and pdf versions of the report are available for free at **https://www.oecd.org/education/education-at-a-glance-19991487.htm/?refcode=20190209ig**.

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Fostering critical thinking skills among future teachers

Abstract

Today, a person who thinks critically is able to conduct a dialogue, determine the nature of any problem and find alternative solutions, and distinguish fact from assumption. This person is not afraid to question established opinions and judgments. That is why such kind of people are considered to be competitive and in demand on the labor market. The article, based on modern scientific positions, reveals the meaning of "critical thinking". The development of critical thinking is based on observation skills; on the ability to ask questions and find the necessary resources; on the ability to check beliefs, assumptions and opinions, contrary to the evidence; on the ability to distinguish and identify a problem; on the ability to assess the validity of statements and arguments; and on the ability to find and make smart decisions, and understand logic and logical arguments.

The authors of the article found that the process of solving pedagogical problems was the basic unit of critical thinking skills among future teachers. The availability of critical thinking skills among future teachers is determined by using a critical thinking test, developed by Lauren Starkey, an American author (Starkey, 2004). The analysis of the survey results shows that the majority of respondents have an average level of critical thinking skills. The average level of critical thinking skills indicates that an average future teacher's forms of thinking are unevenly developed. That is why it is difficult for a future teacher to make important decisions. We propose to foster critical thinking skills by solving pedagogical problems, which involves the use of modern interactive forms, methods and techniques of teaching.

Keywords: critical thinking, future teacher of higher education institutions, solving pedagogical problems, interactive forms, methods and techniques of teaching

Introduction

The aim of the article is to present results of the research aimed at establishing the level of development of critical thinking skills among future teachers in the course of pedagogical training in higher educational institutions, as a crucial requirement needed for solving pedagogical problems effectively.

The article is structured in the following sections: introduction; research aim, tasks and methods; theoretical basis; determination of the levels of critical thinking of future teachers; the process of pedagogical problem solving; pedagogical problem concept; teachers' activity; decision algorithm; methods of critical thinking development; determination of levels; summary and suggestions for further research.

The formation of a free society is aligned towards creative and constructive human activity. The ability to think critically has been important since ancient times. At the present stage of social development, critical thinking is a necessary professional quality of the individual, and vital for working with information flow. A person who thinks critically can solve complex, multidimensional problems not only in the sphere of life, but also in scientific, pedagogical and economic professional activities. The absence of a stereotype, the ability to find the truth and prove their judgments or reject them, activates a person's innate potential.

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The critical thinking ability helps to identify the problem in an ambiguous situation and effectively solve the pedagogical problem. The selection of the necessary information, its critical analysis, and comparison contribute to the formation of new educational ideas.

The main task of modern higher education is to develop the critical thinking of future teachers and their adaptation to life in a high-tech, competitive world. Modern society needs a specialist who can conduct a dialogue, determine the essence of the problem, find alternative ways to solve it, distinguish fact from assumptions, and critically evaluate opinions and judgments. The priority is to expand human capabilities and the fundamental qualities of the individual (Gąsiorowska & Gąsiorowski, 2019, p. 54). The development of critical thinking of future teachers is an integral part of shaping their professional competence. The modern professional must continuously improve critical thinking and acquire the skills to think flexibly, analytically and globally. It requires development of a conceptual methodology for forming critical thinking while working with future teachers. Therefore, during the future teachers' training in higher education institutions, the importance of using innovative methods to develop critical thinking increases.

Research aim, tasks and methods

The aim of the research is to reveal the theoretical and methodological basics of the development of critical thinking among future teachers in the course of pedagogical training in higher educational institutions, in order to solve pedagogical problems effectively.

The research aim defined the following tasks: to determine the essence of critical thinking based on the analysis of domestic and foreign psychological and pedagogical research; to reveal the meaning of the concepts "future teacher of higher educational institution", and "pedagogical problem"; to determine the levels of critical thinking of students; to characterize the process of critical thinking development by solving pedagogical problems; and to offer creative methods for the development of future teachers' critical thinking.

A set of research methods was used to resolve the defined tasks:

- general – analysis, synthesis, comparison, systematization and generalization to study the research studies of foreign and domestic scientists, legislative support, etc.;
- specific – interpretation method to determine the basic concepts of the research, prognostic analysis to determine the prospects for further research as to the development of critical thinking;
- empirical – observations to study the state of critical thinking of future teachers; testing to identify levels of critical thinking.

Theoretical basis

In Ukraine, the problem of developing critical thinking is covered in theses in the following areas: the formation of critical thinking in future economists (Kolesova, 2010); the formation of critical thinking in cadets and officers of military institutions (Konarzhevska, 2009; Marchenko, 2007); the formation of critical thinking in students (Khachumjan, 2005; Kyjenko-Romanjuk, 2007); and the formation of critical thinking in primary school pupils (Bielkina-Kovalchuk, 2006). The analysis of the presented directions showed the lack of research on the development of critical thinking in future teachers.

In psychological and pedagogical studies, researchers characterize critical thinking as a property of personality, their skills and abilities of mental activity, as well as a personal and socially relevant phenomenon that is a priority in the field of education (Dewey, 1999; Halpern, 2000; Kluster, 2005; Paul & Binker, 1990).

From a philosophical point of view, critical thinking is considered as dialectical, reflexive, creative, communicative, and constructive thinking aimed at the creation of new knowledge. The subject of the educational process is an active, critically thinking, creative and free-spirited person (Brożek & Jadacki, 2013; Hessen, 1973).

The issues of the development of critical thinking in future teachers are logically connected with the problems of the development of their creativity, self-actualization, and independence of thinking (Brushlinskij & Tikhomirov, 2013; Rubinshtein, 2015). The mentioned authors also considered critical thinking to be one of the most relevant educational problems.

The British researcher Kottrell characterizes the formation of critical thinking skills as a supra-situational type of thinking, which is reflected in the breadth of views, and a global approach to the problem (Kottrell, 2016, p. 17). The scientist Popkov pays considerable attention to the development of critical thinking in the future teacher (Popkov et al., 2001). The author balances critical thinking with reflective and evaluative activities and defines the concept of "evaluative activity" as the active interaction of a person with the surrounding world, which consists in the ability to determine its heterogeneity. Critical thinking includes the following components: a critical analysis of external information; identification of facts and ideas in the information; identification of various logical inconsistencies; and identification of arguments.

Therefore, critical thinking is considered in the ability to analyze information from the perspective of logic and a personal approach to solve problems. Critical thinking cannot be compensated for by other personality traits. In this regard, there is a need to develop the critical thinking of future teachers in higher education institutions.

The development of critical thinking is based on the ability to analyze, synthesize, compare, raise questions, and make reasonable generalizations and conclusions. As Pometun and others noted, critical

thinking can be developed using unique teaching methods that are also used in the process of self-education (Pometun et al., 2012, p. 5).

In psychology, thinking is considered as a process of solving problems. Rubinshtein, describing thinking as analysis and synthesis, stressed the problem situation and tasks. The scientist believed that the thinking process begins with the analysis of a problem situation, which often requires intricate mental work: the problem's setting, finding a method to solve it, fixing the achieved result, solving the problem, and implementing the result of this mental work in practice (Rubinshtein, 2015).

The researcher Brushlinskij focuses on the fact that problem-solving is a creative process. The solution of any creative problem that does not have an algorithmic method to solve it is always associated with going beyond the set limits. Therefore, thinking is a continuous mental process of analysis, synthesis and generalization of the life circumstances of a constantly changing subject (Brushlinskij, 1996).

The educator Kuzmina continues to develop ideas about thinking as a process of solving various problems. In practice, problem situations generate a variety of tasks, the solutions of which are based on new heuristic processes. The scientist focuses on the fact that the pedagogical thinking of a future teacher is characterized by the ability to analyze pedagogical situations, formulate pedagogical tasks, make appropriate decisions and anticipate the consequences of their pedagogical activity. All of these skills characterize a high level of creative development of the future teacher's personality (Kuzmina, 2005).

A researcher of critical thinking, philosopher and educator Dewey, believed that critical thinking occurs only in the process of solving a specific problem. The task stimulates a person's natural curiosity and encourages them to think critically. Only in the process of finding their way out of a problematic situation, a person begins to reflect. Therefore, critical thinking is a system of judgments that are used to analyze events, formulate reasonable conclusions, make an objective assessment, perform interpretation, and correctly apply the obtained results (Dewey, 1999).

According to the American scientist Kluster, critical thinking begins with asking questions and finding out the problems that need to be solved. The scientist states the fact that thinking can be critical only when it has an individual character, that is, critical thinking is independent thinking. Therefore, students should have enough freedom to think independently and solve even the most difficult tasks on their own. The scientist emphasizes that the process of critical thinking occurs when new, already right ideas are tested, evaluated, developed and applied (Kluster, 2005, pp. 5–13).

A leading specialist in the development of critical thinking is the American psychologist Halpern. He notes that the following qualities characterize a person who has good critical thinking skills: readiness for planning (the first important step to critical thinking); flexibility (the ability to perceive the ideas of others, think in a new way, and to not give up on the task until it is solved); perseverance of the mind, patience; the ability to recognize and correct their mistakes; observation of their actions, awareness of their thinking process; search for compromise solutions, and the ability to find solutions that could satisfy the majority (Halpern, 2000).

American researchers also pay great attention to the development of the critical thinking of future teachers. In 1983, in the United States, the Council of colleges (a non-governmental organization that provides testing and other types of educational services for students, schools and colleges in the United States) published a document that sets out the main criteria that an applicant must meet (Academic preparation forcollege. What students need to know and be able to do, 1983). The document focuses on critical thinking skills. Thus, the necessary competencies required for an applicant are the following: reading, writing, speaking and listening, mathematics, reasoning, and learning. Requirements for the ability to reason are formulated as the ability to identify, formulate problems and offer solutions to them; recognize inductive and deductive conclusions, identify errors in reasoning; draw conclusions on information taken from various sources; understand, develop and use concepts and generalizations; and distinguish fact from opinion. Regarding the ability to speak and listen, to perceive what is said, the published document emphasizes the ability of students to engage in the exchange of ideas, ask questions, and give answers.

Therefore, critical thinking involves the development of specific skills that allow the person to overcome stereotypes and find the right solutions. The ability to think critically is the search for ideas, and means of transforming reality, so critical thinking is always included in educational activities and exists as a process of solving pedagogical problems.

Determining the levels of critical thinking of future teachers

We applied Starkey's test of determining the level of critical thinking in the adaptation of Lutsenko (Lutsenko, 2014) to define the level of critical thinking of future teachers. This test is an objective assessment of abilities. It consists of questions and answers and is designed for the adult age group (16 years and older). The author of the test is an American scientist, Starkey (Starkey, 2004). As a result of psychometric procedures performed in 2013, Starkey's original critical thinking test was adapted by Lutsenko (Lutsenko, 2014) for use in Ukrainian society. All tasks and the author's language were preserved as much as possible in the test, except for three tasks that showed unsatisfactory reliability coefficients. The test meets the psychometric requirements of reliability, discriminability, and validity. It is also equipped with standards for the student and adult age groups of both sexes. The test results can be interpreted based on these standards, as well as analyzed qualitatively (Lutsenko, 2014, p. 69).

In the research described in this paper, subjects were asked to choose one of the suggested answers. Results were calculated according to the key and can have a value from 0 to 27 points. The resulting indicator is distributed according to the levels of critical thinking. A low level of critical thinking (0–7 points) means insufficient development of induction, deduction and logic. The medium level of critical thinking (8–20 points) indicates the need to develop one or more forms of thinking, such as logic, deduction or reflection. A high level of critical thinking (21–27 points) shows sufficiently developed logic, reflection, and control over emotions, which allows you to analyze and evaluate information for reliability.

Students of Kyiv National Economic University named after Vadym Hetman (Faculty of International Economics and Management; Faculty of Finance; Faculty of Economics and Management) and National Pedagogical Drahomanov University took part in the empirical study.

The research was aimed at the professional development of future teachers as teachers of high schools in Ukraine. According to the Law of Ukraine "On Higher Education" paragraph 1, Article 52, Section X, students of master's degree programs are potential future teachers because successful implementation of the relevant educational problem confers the right to be employed in the position of teacher or lecturer at a higher educational institution.

In total, the sample of respondents involved in the empirical study was 276 people. The authors performed a qualitative and quantitative analysis of the diagnostic results and determined the levels of critical thinking. Table 1 correlates the result with the corresponding level of critical thinking (high, medium, or low).

Analysis of the survey results showed that the majority of respondents – 173 (62.7%) – had a medium level of critical thinking skills. In these respondents, the forms of thinking were unevenly developed because it is difficult for them to make important decisions. The respondents with a medium level of critical thinking showed a predominance of deduction, while the ability to think rationally was absent. Such a future teacher cannot assess risks and determine the consequences. The ability to make balanced decisions is poorly developed.

Only 71 respondents (25.7%) had a high level of critical thinking. The high level of critical thinking skills of future teachers indicates sufficient development of thinking operations related to logic, deduction, induction and reflection. Respondents tended to be able to control their emotions. These characteristics allow them to make the right decisions, analyze information for accuracy, recognize manipulations, and trace cause-and-effect relationships or their absence. Developed reflection helps future teachers recognize the limitations of their thinking processes, and to find the best solutions in terms of uncertainty and risk. A high level of critical thinking also allows them to adapt to the different conditions of the educational environment.

And finally, 32 respondents (11.6%) demonstrated a low level of critical thinking skills. Future teachers with a low level of critical thinking have developed logic, as well as such forms of thinking as induction and deduction. It is difficult for them to determine the accuracy of information and to detect manipulation. According to Lutsenko, respondents with a low level of critical thinking cannot make balanced decisions, argumentatively discuss, and do not practically realize their bias and the bias of others (Lutsenko, 2014, pp. 65–70). In the educational process, reduced critical thinking is associated with a sense of insufficient competence in intellectual disputes; hence the conversation partner can be incommunicative, difficult to comprehend, may become aggressive, or even leave the conversation.

The authors of the article suggest that the reasons for the low level of critical thinking development of future teachers may be different. One of them is the lack of skills to clearly and logically carry out the argument of the judgment. The other is conservatism (inability to perceive information that contradicts dogmas). Another reason may be to replace critical thinking with beliefs. Such people often do not realize their mistakes and trust unreliable information. Sometimes a low level of critical thinking depends on the level of intelligence. However, a person can have a low level of critical thinking and at the same time be able to analyze information and distinguish fact from fiction. Therefore, critical thinking does not necessarily imply the ability to perform complex mental operations.

Table 1

Results of determining the level of critical thinking skills

No	Levels of critical thinking skills	*a* = 276 students (sample of respondents)	
		b **(the number of respondents who answered correctly)**	***p*** **(percentage of respondents who answered correctly)**
1.	High (21–27 correct answers)	71	25.7
2.	Medium (8–20 correct answers)	173	62.7
3.	Low (0–7 correct answers)	32	11.6
Total:		276	100

Source: authors' own work.

Analysis of the test results allows us to conclude that the problem of the development of critical thinking is relevant for most future teachers.

Process of pedagogical problem solving

Polish philosopher, logician, psychologist and educator Twardowski believed that knowledge is based on the theory of cognition and the theory of judgment. That is why it is necessary to develop the logic and critical thinking of students, which testifies to the independence of human thought. The main thing in the independence of thought is whether the thought is pure and logically justified (Brożek & Jadacki, 2013). Ukrainian scientist, psychologist, and academician Kostiuk (Kostiuk, 1988) emphasized that thinking is a process of cognition and appears during the interaction of a person with the outside world. It is generated by the need to understand some new situation for a person, a new object, and occurs in a problematic situation. If the problem situation is realized, it immediately becomes a task for the person.

The problem-solving process is a continuous interaction between subject and object, in which the subject, through analysis and synthesis, reveals the real relationship between what is and what is sought. The scientist concluded that the solution of a problem always includes emotional components that are present at all stages of this process, starting with the awareness of the problem, the search for a means to solve it, and ending with obtaining the necessary result (Kostiuk, 1988).

According to the Ukrainian psychologist and academician Moliako (2000), the structure of the problem-solving process includes such strategic actions as preparation (understanding the conditions), planning (forming the idea), and implementation (checking the idea, experiment).

Therefore, the critical mind is necessary for all parts of the process of problem learning, because it needs analysis, comparison, generalization and negation. Without a critical assessment of pedagogical tasks, it is impossible to put forward an assumption or hypothesis.

Pedagogical problem concept

Under the pedagogical task, the authors understand a system that is the primary unit of the educational process and has the same components as the educational process itself: the goal, content and means, the activity of the teacher, the activity of the student, the result of joint activities.

According to the authors, to solve a pedagogical problem means to assess a particular fact, reveal the motives of behavior, and find the best way out of a particular situation, and a practical approach to solving the problem. A task is a goal set in specific circumstances that requires an effective way of achieving it. The authors recognize the pedagogical task as a problem that arose in a specific situation, which can be solved in several ways to find the best option. Students often do not know how to allocate the primary and secondary information, systematize and generalize the material, and logically build it. Future teachers do not have a developed ability to analyze and synthesize, which is why training sessions should be based on the principles of critical thinking so that each student has the opportunity to formulate their ideas, assessments and beliefs independently.

Since future teachers who possess critical thinking skills find their solution to the problem and support their decision with reasonable justifications. The inclusion of students in activities to solve pedagogical problems allows them to develop practical competencies, professional skills, and readiness to solve complex professional problems. Realizing the existence of other solutions to the same problem, future teachers try to prove that their chosen solution is more logical and rational.

Teachers' activity

To organize an educational process that contributes to the development of critical thinking, the authors used educational and creative tasks as a specific form of forming the content of educational material. This form of work allows us to develop critical thinking and is a method of its development. Under these conditions, future teachers can independently study and analyze pedagogical processes, understand the logic and sequence of pedagogical actions, and use new knowledge to understand and solve problematic pedagogical situations.

The authors identified a system of pedagogical tasks that ensures the development of the critical thinking and productive activity of future teachers in the classroom. The following types of tasks are used in the classes:

1) information and analytical tasks to identify contradictions and problems (designing problem situations, highlighting imaginary contradictions, problem formulation);
2) tasks with incomplete information (problematic tasks);
3) optimization tasks (choosing the optimal solution, optimizing the process of functioning of the object, optimizing the means of activity);
4) operational and practical tasks aimed at forming value judgments (reviewing, critical analysis of reading, identifying errors, checking the result, evaluating and correcting the process and result of pedagogical activity);
5) logical tasks (description of phenomena, processes, the definition of concepts, establishment of cause-and-effect relationships);
6) tasks for composing opposite problems (independent search for a solution method that is the opposite of the most obvious one, tasks that require a solution method from the end to the beginning);

7) inventive tasks (search for new means of activity);
8) operational and practical tasks aimed at forming value judgments, correcting the process and result of pedagogical activity;
9) analytical and synthetic tasks (tasks related to the formation of knowledge and skills of future teachers to identify, analyze and research the components of the pedagogical system);
10) planning and design tasks (tasks related to the formation of skills to develop an individual project of activity).

Decision algorithm

Describing the critical thinking of the future teacher as a process of solving pedagogical problems, the authors identified the main stages of their solution: analytical, projective, executive and final.

At the analytical stage, the task is set or "formulated from the situation" (analysis of contradictions, reasons that caused the problem of the situation, its assessment, formulation of the pedagogical task). The process of solving the problem at this stage may have separate tasks: pedagogical diagnostics; awareness of a specific pedagogical goal; formulation of problems (questions). Thus, the very formulation of the problem is a product of the future teacher's critical thinking.

The projective stage of solving a pedagogical problem includes the development of a project of a pedagogical solution, designing ways to achieve the goal, and reflecting on the content and form of the teacher's activity.

At the executive stage, pedagogical decisions are made, and the practical implementation of the developed project is carried out, as well as implementation of the planned pedagogical actions in the process of interaction between lecturer and student. The executive stage consists of several independent tasks: determining the specific content of training, and choosing the types, methods and forms of organizing activities. The practical work of the teacher at this stage also includes the typical duties of a teacher: giving educational information to students, explaining tasks, distributing assignments, simplifying or complicating tasks, implementing external coordination of the team, monitoring the progress of work, and providing students with appropriate assistance in implementing the action plan.

In the last stage of "conclusions and evaluation of the results obtained", and "defining of new educational goals", the teacher analyses the results of the pedagogical activity of the students, takes into account any methodological shortcomings, draws attention to the contradictions and difficulties encountered in the solution of the problem, and summarizes the experience. New tasks for self-education and self-development are set, and the pedagogical goal is defined.

The development of critical thinking of future teachers by solving pedagogical problems was based on the following algorithm:

1. Presentation of new knowledge.
2. Formation of pedagogical skills at the reproductive level:
   a) demonstration of pedagogical actions in general and by elements, presentation of knowledge by the principle of "demonstration + explanation",
   b) organization of working-out of pedagogical skills and pedagogical actions in simplified conditions (by operations),
   c) organization of independent work of students with constant feedback and positive emotional support of the teacher.
3. Transition to search and creative pedagogical activity:
   a) creating problematic pedagogical situations, solving non-standard pedagogical problems, simulation modeling together with the teacher and a group of pedagogical actions of students to solve pedagogical problems,
   b) mandatory analysis of students' activities with the teacher and group, and discussion of activities.

The algorithm proposed by the authors has a creative orientation. It takes into account the creative processes manifested in the ability of the students to identify the problem in the proposed problem situation and to model pedagogical situations.

Methods of critical thinking development

One of the most effective methods of developing critical thinking is "Brainstorming", which is understood as group problem-solving. The goal of brainstorming is to produce ideas on a problem that is being considered for a limited time. During the training sessions, the authors conducted a "Brainstorming" in the form of a team game that helps solve problematic pedagogical tasks. Our research has found that brainstorming produces the most effective results if the teams include no more than 4–6 participants. As the number of team members increases, the effectiveness of the brainstorming decreases. The teacher introduces the game participants to the problem pedagogical situation. The situation defines the tasks that need to be solved. The teacher formulates the conditions of the pedagogical task, and the rules of the game are fixed.

The brainstorming team game consists of two stages. In the first stage, the teams discuss the problem and offer ideas for its solution. Each team should offer as many original pedagogical ideas as possible. All pedagogical ideas put forward by players are recorded. In the second stage of the game, the ideas proposed by the participants are discussed, analyzed and evaluated. This stage involves a critical attitude to the proposed ideas, selection of ideas, rejection of the utterly banal, ineffective, disconnected from pedagogical reality, or not aimed at solving the problem. Participants choose the most exciting pedagogical proposals. The ideas that are worthy of

further consideration or use in the practical activities of the teacher are chosen.

An essential member of the team is a "resonator", that is, a person who can reformulate a new idea, reveal its essence, and give it adequate expression (verbal, graphic, symbolic). The need to include a resonator in the game arises since not all players can clearly express their ideas.

In order to accustom future teachers to not be afraid to express their ideas and thoughts, and to have the right to make mistakes, special psychological and pedagogical conditions are created in the training session. Each participant's opinion is considered valuable, and other team members positively perceive their ideas. Insight, imagination, and fantasy are approved.

There are no censorship restrictions in the class. Any proposed idea, even a paradoxical one, should be carefully considered by the team because this idea can give rise to a new, original idea. Thus, ideas are produced continuously, and can be supplemented and developed.

The brainstorming process can be activated using techniques such as inversion (do the opposite), analogy (do as you did in the previous solution), empathy (consider yourself as part of the task, find out how you feel), fantasy (do something fantastic). The effectiveness of each team is evaluated according to specific criteria: moral orientation; scientific validity; originality of methods for solving pedagogical problems; the expediency of implemented methods.

One of the most effective methods of solving pedagogical problems is "Pedagogical debates". The purpose of pedagogical debates is to develop students' critical thinking skills, gain experience of communication and tolerant behavior, and activate their cognitive activity. The main skill in pedagogical debates is the art of persuasion, which requires a logical sequence of reasoning, the ability to formulate questions, and give convincing examples and their explanations.

During the debate, future teachers study a specific pedagogical problem, analyze specific pedagogical situations, and independently find solutions to them. Students express their thoughts, formulate their arguments, lead a discussion, and make a decision.

Debates are held according to the following principles: a friendly, creative atmosphere that promotes the implementation of new, original ideas; correct questions from debaters and correct answers; the ability to listen and understand opponents; the right of participants to put questions to their opponents to find out or explain difficult questions. Furthermore, the requirements for conducting a debate are as follows: definition of the subject of the debate; precise wording of definitions; compliance with logical consistency; reasoning over each logical course of the opponents' opinions and their own opinions; and exchange of views (arguments, facts, and speeches of each participant are discussed).

Two teams participate in the debate. The team that speaks first interprets the specified topic and formulates its reasoned position, which is confirmed by the facts and explained by specific pedagogical situations. The second team that objects, refutes the position of the first team and provides counterarguments, and formulates its position.

In debates, each player performs certain functions: represents the team; provides arguments with the necessary explanations; asks a question; draws conclusions based on the formulated position; analyses the positions of the opposing team; identifies the main points of contention; gives a consistent analysis and criticism of the position of the opposing team; and declares its independent position.

Conducting pedagogical debates consists of four stages: stage 1 (approaching the topic); stage 2 (research topics); stage 3 (preparing for the debate and the debate itself); stage 4 (feedback and evaluation).

In the first stage of pedagogical debates, there are usually three groups: two groups consider different aspects of a single pedagogical problem or complex pedagogical situations, and the third one looks for commonalities between them. Then the groups switch places, adding their ideas to the previous proposals. In the end, the players in a large group discuss the issues that have arisen.

The second stage of pedagogical debates involves future teachers' training to detect and systematize the necessary material. The third stage involves testing the constructed line of argument in practice and supporting it with facts. In the fourth stage, the analysis and evaluation of the conducted pedagogical debates are carried out.

The teacher evaluates the teams according to the following criteria: coverage of the main ideas of the author's information (the central thesis of the argument); the definition of arguments, explanation of the essence of the argument, disclosure of its relevance and connection with the subject of the debate; the definition of the arguments and explanations made by the author in support of one's own ideas; the credibility of facts, thoughts, examples, arguments, supported by an explanation and given by the author of the information; the objectivity of the author's information; and the manner of information presentation.

The teacher can assign personal points to individual players and determine their rating. Therefore, the team's success depends on the contribution of each team member, as well as on the joint solution of the set task.

An effective form of development of critical thinking is the role-playing game "Pedagogical situation". The goal of the game is to develop students' critical thinking, improve students' communication skills and identify the effectiveness of their professional behavior. The structural elements of the game are the pedagogical situation and task, the distribution of roles, and the stages and rules of the game. Realism is one of the requirements for the pedagogical situation.

Determination of levels

Based on these criteria, the authors determined levels of quality to solve pedagogical tasks:

1. High level – a brightly expressed creative orientation of the student's personality. Creative nonstandard approach to the analysis of pedagogical situations, the choice of optimal solutions to problems based on the diagnosis of specific conditions. Ability to theoretically analyze pedagogical situations and apply theoretical knowledge in new situations. Analyze and design the methods of their teaching activities, based on the categories, principles, methods, and criteria mastered in the study of psychological and pedagogical subjects. In specific pedagogical situations, students rely not only on theoretical knowledge and best practices, but also on pedagogical intuition, their emotional perception and personal experience. A variable solution of pedagogical tasks is often original. Students search for new, creative ways to work, and they have well-developed professional, analytical, and predictive skills. The process of solving creative tasks is characterized by a clear and evidence-based choice of actions in a specific pedagogical situation.
2. Medium level – students have the fundamental skills to synthesize theoretical knowledge and use them in practice. When solving educational tasks, students rely to a certain extent on the knowledge they have acquired in the course of theoretical and practical training. They have a well-established personal pedagogical position, which is based on modern educational concepts. It should be noted that the pedagogical position is not stable enough and can be deformed under the negative influence of real pedagogical practice. Individual creative elements are characteristic of pedagogical thinking.
3. Low level – students do not know how to apply theoretical knowledge to solve pedagogical problems and reveal the causes of certain problematic situations. As a rule, it is difficult for them to independently detect and formulate the pedagogical tasks of an educational nature. The proposed pedagogical situations are solved using a template, mainly focusing on external circumstances, on the fact itself, without linking the process of solving the problem with the diagnosis of the state and identifying the features of the object and subject of pedagogical activity. The variability of decisions made by students is limited. Students do not know how to defend their ideas and argue them.

Summary

The literature review allowed the authors to clarify the essence of such a scientific category as the "critical thinking" of the future teacher. It is defined as a set of essential personality characteristics, namely: dialectics, grounded on positive doubt and dialogue; constructiveness, heuristics and freedom; rationality, logic; and communication, combining social conditionality and personal freedom.

Testing of future teachers for critical thinking skills using Starkey's critical thinking test allowed us to conclude that the problem of developing critical thinking is relevant for most future teachers. The mentioned test was adapted by Lutsenko.

According to the authors, critical thinking is a conscious and purposeful interaction between the teacher and students. During this interaction, the following abilities are formed: to analyze information from the perspective of logic, to propose new questions, to make independent decisions, to reasonably defend their position with areas of difficulty, to listen to the partner in conversation. A practical method of developing the critical thinking of future teachers is the method of solving pedagogical problems, which involves the use of modern interactive forms, methods and techniques of teaching.

Suggestions for further research

The conducted research does not cover all aspects of the issue. Topical and controversial themes that await further study include the following: the use of information and communication technologies for the development of critical thinking; the development of critical thinking throughout life; peculiarities of the development of critical thinking in different age periods of personality development; the strategy for the development of critical thinking to self-efficacy and success throughout life; modeling of critical thinking.

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Motivational effects of open badges in MOOCs. A learner perception study in OpenVM Learning Hub and MiriadaX

Abstract

Open Badges have become a metadata standard that has been used to transform digital credentialing practices in learning contexts including Massive Open Online Courses (MOOCs). Badges may be designed and used in diverse ways to enhance learner motivation in MOOCs. However, empirical research about the motivational effects of the badging process has been limited to anecdotal evidence. *Objective*: The goal of this study was to explore the motivational effects of open badges in MOOCs. The primary research question was whether and how open badges motivate participants to: a) learn in MOOCs, b) to complete MOOCs, and c) to use Open Badges outside of the MOOC environment. *Method*: An exploratory learner perception study was conducted in two platforms: OpenVM and MiriadaX. Both platforms issue Open Badges to recognize learning outcomes in MOOCs. The research sample included 1788 participants with diverse backgrounds, who participated in OpenVM ($n = 1412$) and in MiriadaX ($n = 376$) courses. Learner perceptions were self-reported via two online surveys, which included an aligned set of items in English (OpenVM) and Spanish (MiriadaX). *Results*: The findings show that regardless of the MOOC platform, the topic of the course and the language of instruction, MOOC participants were motivated by open badges, especially by an adequate description of the skills developed in the MOOCs. A regression analysis indicated that an adequate skill description in the open badges had the greatest predictive value for motivation to learn in MOOCs and to complete the course ($r^2 = 56.3\%$). The instrument with five items showed high internal consistency ($\alpha = 0.92$).

Keywords: MOOC, Open Badges, micro-credentials, motivation, competencies, skills

Introduction

The concept of the Massive Open Online Course (MOOC) is based on an instructional model that allows access to a large number of participants (McAuley et al., 2010). Since its inceptions around 2008, the MOOC format has been established as a means of open and global education (Ortega-Arranz et al., 2019). This movement has been seen as the evolution of the OpenCourseWare (OCW) initiative from MIT OCW (Ma, 2015), which revolutionized higher education with Open Educational Resources (OER) embedded into course structures (Tovar et al., 2013). MOOCs resemble online courses in their structure and elements (Peco & Lujan-Mora, 2013), because they have a beginning and an end, a syllabus, and a set of resources, assessments and communication tools (Dillenbourg et al, 2014; Martin, 2012). MOOCs differ from more traditional online courses through open access for learners from any background, design tailored for a large number of participants, voluntary and self-paced participation, and mechanisms which allow learners to decide and navigate freely through the learning activities and content (Haug et al., 2014).

Despite recent developments and innovations in the field of MOOCs, including the use of learning analytics and performance prediction (Duru et al., 2016), as well as the use of reward-based gamification strategies (Ortega-Arranz et al., 2019), motivation to learn and complete the MOOCs remains the key challenge; low completion rates still remain an issue (Reich & Ruipérez-Valiente, 2019). The factors influencing the successful completion of MOOCs have been categorized and mapped into various dimensions, such

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as learners' characteristics, pedagogical approaches and instructional design, and MOOC quality (Albelbisi et al., 2018). Critical MOOC characteristics include free and flexible modes of participation that allow learners to enroll and leave the course at any time. Students declare a lack of intention to complete the course, lack of time, lack of digital skills, and lack of self-regulated learning strategies (Reparaz et al., 2020; Shukor & Abdullah, 2019) among others as difficulties in this context.

Recent studies have also considered (open) badges as possible factors enhancing motivation for learning. This article builds on the research on open badges in MOOCs and explores learners' perspectives on the role of open badges for motivation to learn in and to complete a MOOC. The article is based on the results of an empirical study with approx. 1,800 MOOC participants from diverse backgrounds, who participated in MOOCs on two different platforms: OpenVM and MiriadaX. The OpenVM Learning Hub[1], founded under the Erasmus+ program, is an online learning environment for the achievement and recognition of virtual mobility skills in higher education. OpenVM hosts eight MOOCs which were developed in the project by nine partner organizations. The MiriadaX[2] platform, driven by Telefónica Digital Education, is the first Ibero-American MOOC platform with over 6 million users in over 100 institutions, primarily universities, that publish open courses on a wide range of topics (MiriadaX, n.d.).

This article is structured as follows. The following section outlines past research on motivation in MOOCs including studies focusing on (open) badges. The subsequent section describes the design of the MOOCs and Open Badges in both MOOC platforms: OpenVM and MiriadaX. The fourth section describes the methodology applied to explore learners' perceptions about the role of Open Badges for motivation in MOOCs. This section is followed by the analysis of data and presentation of results from the online survey. The paper ends with conclusions and recommendations for future research.

Learner motivation in MOOCs

Research on learner motivation in MOOCs

Motivation plays a vital role in successful participation in MOOCs (Albelbisi et al., 2018). In the sections below, we outline some relevant research results related to learner motivation in MOOCs in general and to the use of (open) badges to enhance learner motivation in MOOCs in particular. Motivation in MOOCs has been studied using a range of methods, such as surveys, interviews and learning analytics. Past studies investigated a number of factors related to learner motivation, including content-specific interaction with the instructor (Hone & El Said, 2016), the use of video lectures and assessments (Kizilcec et al., 2013), course forums (Balakrishnan & Coetzee, 2013), videos and assignments (Coffrin et al., 2014), course materials, and monitoring participant progress (Hew, 2015), innovative pedagogic strategies and personalization (Bakki et al., 2015), instructor accessibility and peer interaction (Hew, 2016), content, accessibility and interactivity (Deshpande & Chukhlomin, 2017), and interaction and socio-demographic characteristics (Reparaz et al., 2020).

Researchers have explored the role of self-regulated MOOC learning strategies for retention and found that the major difference between course-completers and non-completers were differences in self-regulating learning (Reparaz et al., 2020). Studies have also investigated the role of instruction language and social engagement on motivation to learn. The findings from a study by Miri Barak et al. (2016) indicated that regardless of the instruction, learning in MOOCs was predominately related to intrinsic motivation and self-determination, while there was a positive relationship between social engagement (e.g. number of messages posted in online forums and number of members in online study groups) and motivation to learn.

Learning and retention in MOOCs has been explored in the context of reward-based gamification strategies, as an approach to promote engagement and prevent dropout. Research in this area demonstrated the effects of badges as a type of gamified reward on retention and engagement. The results showed that reward strategies failed to have a significant effect on retention and engagement, but learners who were able to earn badges participated more in tasks than learners in the control group (Ortega-Arranz et al., 2019). In the section below, we outline research results on (open) badges in MOOCs, taking a different perspective: instead of considering badges as gamification elements, we consider them as digital micro-credentials which recognize learning outcomes in MOOCs.

Research on motivation effects of credentials and badges in MOOCs

Open Badges are web-enabled digital tokens of accomplishment (Grant, 2014). Typically, these credentials in MOOCs have been used to recognize accomplishments such as participation, completion of activities and the entire course, as well as learning outcomes such as competencies or skills developed. Open badges differ from conventional credentials because they can contain verifiable metadata about the issuer, the earner, the accomplishment recognized by the badge, the criteria used to award the badge, date of issue, links to the evidence of learning, and verification of the endorser. Furthermore, open badges can be shared easily on the web including social net-

[1] https://hub.openvirtualmobility.eu/my/
[2] https://miriadax.net/

works where they can gain additional meaning and add value, especially through social validation of the evidence displayed in the open badges. In this way, they facilitate a broader shift in credentialing towards capturing, validating, and recognizing learning, away from measuring and accrediting achievements (Hickey & Chartrand, 2019).

In past years, certificates and credentials such as those enabled by open badges have been studied as possible factors for motivation in MOOCs (Buchem, Carlino et al., 2020; Cross et al., 2014; Jovanovic & Devedzic, 2015; Ortega-Arranz et al., 2019). Research has shown that most platforms use some form of an accreditation system, usually issuing statements or certificates of accomplishment and/or participation. While some MOOCs offer credits toward professional development and verified certificates for a fee, others offer a free statement of participation (Liyanagunawardena & Williams, 2014; Witthaus et al., 2016). Usually the final recognition is obtained after passing some kind of assessment or evaluation. Customarily this recognition has the form of digital certifications, in the form of open badges and/or blockchain-based certificates (Downes, 2019; Ma, 2015; Tovar et al., 2013). Beyond recognition practices related to certification of participation and/or completion of a MOOC, open badges have been used to recognize specific learning outcomes, in the form of micro-credentials, that offer an opportunity to make learning in MOOCs more visible (Lemoine & Richardson, 2015; Pickard et al., 2018; Witthaus et al., 2016). Some MOOCs use third-party badging platforms to increase the flexibility and versatility of their digital recognition, allowing for managing and issuing a greater number of badges, e.g. for specific skills, and for the creation of a badge ecosystems and/or badge pathways (Buchem & Carlino, 2018; Higashi et al., 2012).

Motivation to participate has been attributed to the possibility of obtaining certification, especially that which can be authenticated by the link provided in the certificate, eliminating the possibility of faking the certificate (Rai & Chunrao, 2016). There is also evidence showing that learners who attempt to earn credentials for career advancement or personal interest find MOOCs attractive not only due to the flexibility of learning at their own pace, time and place, but also because of the digital certificate/credential issued upon successful completion of the course (Chaw & Tang, 2019). In the context of a study of 30 new open badge systems, Hickey and Schenke (2019), indicated that open badges may be more meaningful than other forms of credentials especially due to the possibility of sharing and circulation on web-based networks.

Nevertheless, concerns about corrupting motivation due to the use of badges as extrinsic incentives for learning have been raised in the past (Hickey & Schenke, 2019). Research has shown however, that learners see badges less as extrinsic motivators and more as enjoyable and meaningful relevant learning targets that help visualize achievements (Rughiniş & Matei, 2013). Badges can be used to highlight desirable performance in a visual modality and in this way help learners focus their attention, map the curriculum and stimulate the exploration of the learning environment (Rughiniş & Matei, 2013). Furthermore, it has been argued that potentially corrosive effects of badges on motivation, such as undermining intrinsically motivated learning and free-choice engagement, may be avoided if badges are not used as evidence-free incentives, but as tokens of accomplishment with detailed evidence supporting those claims and documentation about how the evidence was gathered (Hickey & Schenke, 2019). A study by Abramovich et al. (2013) concluded that badges may have both positive and negative effects on motivation depending on the design of the badge system and the learner characteristics.

Context and participants

To explore the motivational effects of open badges on learner motivation in MOOCs, we conducted a learners' perception study using an online survey as a tool. The study took place on two different MOOC platforms and with two different groups of participants in 2019 and 2020. The sections below give an overview of the context of the two case studies, including the characteristics of the MOOC participants.

OpenVM Learning Hub

The first study took place in the context of the MOOCs developed in the Open Virtual Mobility project (abbreviated: OpenVM), a three year (2017–2020) strategic partnership for innovation and the exchange of good practices founded under the Erasmus+ program of the European Commission. The initiative's purpose is to enhance the uptake of virtual mobility in higher education by enabling virtual mobility and supporting teachers and students in higher education in developing the skills required for successful participation in and/or preparation of virtual mobility.

One of the key outcomes of the OpenVM project is the Learning Hub[3], an online learning environment for the development, assessment and recognition of virtual mobility skills in higher education. The Hub is a multilingual online learning environment that promotes collaborative learning as an instructional method and provides digital credentials based on the Open Badge 2.0 standard for recognition and validation of competencies. The application hosts a set of eight mini-MOOCs, in eight competency areas. Each one is dedicated to a specific competency cluster needed for successful engagement in virtual mobility. Learners can study at one of three levels: Foundations, Intermediate and Advanced. All modules are offered in English and available under Creative Commons Licences.

[3] https://hub.openvirtualmobility.eu/my/

The target groups of the OpenVM project include educators and students in higher education. During this phase of the study, most participants in the OpenVM MOOCs were university students from different countries in Europe and other locations. In some cases, participation was part of university curricula, as described by Buchem, Amenduni et al. (2020). At the beginning of 2020, there were 7,300 visitors and 1,500 MOOC participants.

MiriadaX

The second study took place in the third edition of the MOOC "Empower yourself with social networks" (Borrás-Gené et al., 2019) from Universidad Rey Juan Carlos (Spain), within the MiriadaX MOOC platform. The target groups are Spanish and Portuguese speakers, exhibiting a wide range of interests, ages and educational levels. In general, there is a predominance of users with some affiliation with higher education, including educators, staff, graduates and students. Within the course catalogue, there is a wide variety of options from very specific competencies including skills such as personal and professional development. There are two types of completion certificates: a free certificate of participation in the form of an open badge that is obtained automatically when 75% of the course is completed, and a digital certificate of completion, in PDF format, that is obtained upon successful completion of 100% of the course. The second certificate has a fee.

The MOOC was offered in 2019 for five weeks (October 29th to 4th December) and was organized in one module as a learning guide, and four modules in which participants were offered video formats, content to work on personal branding and diffusion through the use of social networks and web 2.0 tools such as blogs and video production. The course helps participants to analyze their digital identity and to be reflective about their digital footprint.

Design of MOOCs and Open Badges

Design of MOOCs and Open Badges in OpenVM

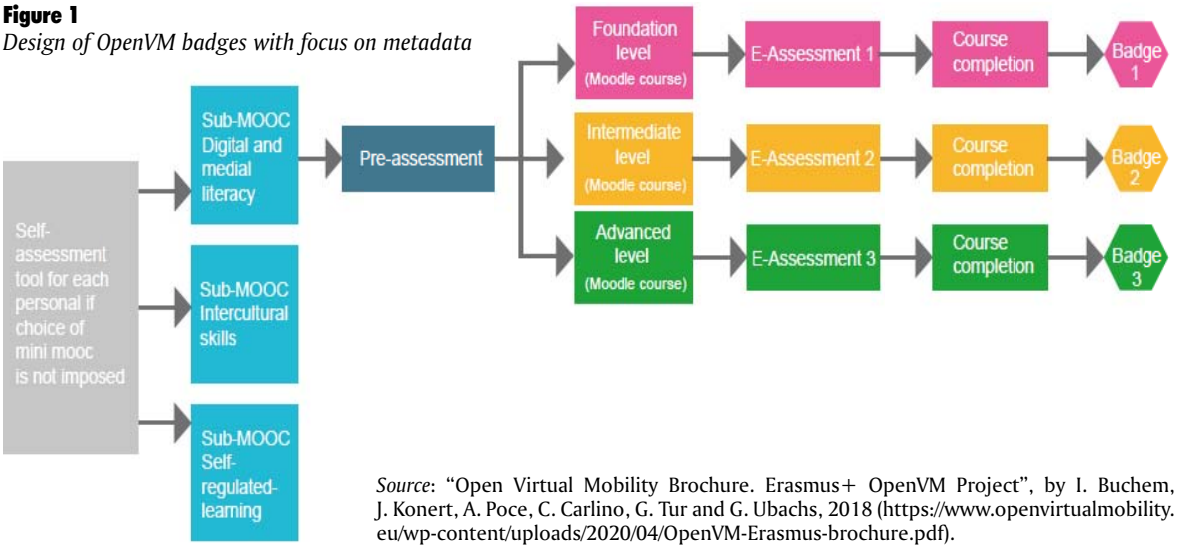
The MOOCs and Open Badges in both studies were designed in different ways. The sections below outline some of the key design features, which are discussed in relation to research results in further part of this paper. OpenVM MOOCs available in the Learning Hub were designed to support learners (both students and educators) in developing the competencies required for successful engagement in virtual mobility. Each MOOC is dedicated to one of the eight virtual mobility competency areas identified in the project: (1) Media and digital literacy, (2) Active self-regulated learning skills, (3) Autonomy-driven learning, (4) Networked learning, (5) Intercultural skills and attitude, (6) Interactive and collaborative learning in an authentic international environment, (7) Open-mindedness, and (8) Open virtual mobility knowledge. OpenVM MOOCs were designed as mini-MOOCs following micro-learning principles related to new forms of acquiring, producing and distributing knowledge in networks (Buchem & Hamelmann, 2010). The design of mini-MOOCs focusses on providing a shorter learning experience and covering less content and fewer skills than traditional MOOCs (Pilli & Admiraal, 2016). OpenVM MOOCs have a modularized structure, loosely coupled short learning activities with integrated granular pieces of content and different forms of e-assessments (such as automated self-assessments and e-portfolios with peer-reviews), as well as a total of 24 digital micro-credentials (Open Badges) which recognize the specific competencies that the learners developed in each MOOC level (Buchem et al., 2019). The design of mini-MOOCs allows learners to accomplish learning in a shorter time, which has been considered as a promising approach for increased engagement, higher completion rates and better learning results (Challen & Seltzer, 2014). The design of the OpenVM mini-MOOCs follows the principles of Constructive Alignment as the learning objectives, e-assessments and digital micro-credentials are aligned with each other through specific sets of skills (Buchem et al., 2019). Upon successful completion of each course level, the learner can claim a micro-credential for the given competency area and level. Figure 1 shows the structure of the OpenVM MOOCs with three levels as self-contained courses.

OpenVM badges are conceptually designed as micro-credentials recognizing the specific sub-set of skills in a given competency area. Technically, OpenVM badges are based on the Open Badges 2.0 standard. As shown in Figure 2, the use of the Open Badges 2.0 standard allows for an embedded metadata field, in which the sub-set of skills in a given competency area is listed. Additionally, OpenVM badges link to the semantic Competency Directory (CD), in which all OpenVM competency descriptions are available in human- and machine-readable format (Konert et al., 2019). OpenVM badges are issued via the Bestr platform leveraging the Badgr infrastructure. The Bestr issuing platform is integrated in the OpenVM Learning Hub via xAPI. All OpenVM badges are listed and displayed on the dedicated Bestr OpenVM project website[4].

The granular form of OpenVM badges, each recognizing a particular skill at a particular level, creates a unique system of micro-credentials. The design of the badges corresponds to the competency framework for open virtual mobility with the main eight competency areas, each characterized and operationalized by a specific skill set (Buchem, 2018). In order to obtain a badge, the learner must complete all of the required activities and pass all of the e-assessments. For automated e-assessments, a minimum of 50% must be achieved in order to pass. Advanced Level mini-MOOC credentials are issued not only as Open Badges, but also as Blockcerts[5], as a way of differentiating the more

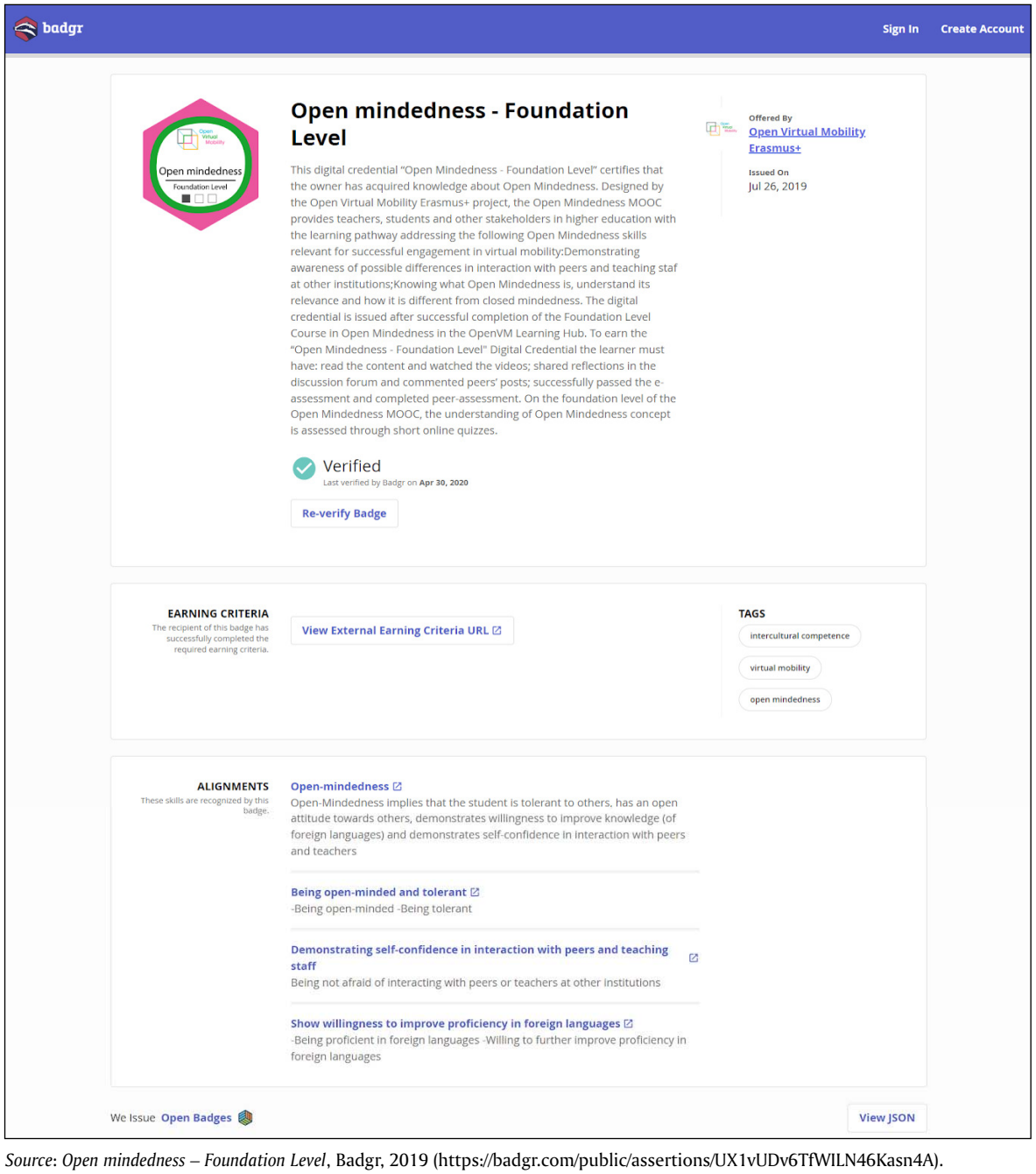
[4] https://bestr.it/organization/show/99

Figure 1
Design of OpenVM badges with focus on metadata



Source: "Open Virtual Mobility Brochure. Erasmus+ OpenVM Project", by I. Buchem, J. Konert, A. Poce, C. Carlino, G. Tur and G. Ubachs, 2018 (https://www.openvirtualmobility.eu/wp-content/uploads/2020/04/OpenVM-Erasmus-brochure.pdf).

Figure 2
Design of OpenVM badges with focus on metadata



Source: *Open mindedness – Foundation Level*, Badgr, 2019 (https://badgr.com/public/assertions/UX1vUDv6TfWILN46Kasn4A).

advanced achievement. Figure 3 shows two examples OpenVM badge-types (three levels per type).

Design of MOOCs and Open Badges in MiriadaX

MiriadaX offers the traditional tools for a MOOC, however with limitations for adding new elements and adaptations, such as collaboration and motivation requiring third party platforms. The design of the "Empower yourself with social networks" course is based on a hybrid MOOC approach with a high collaborative component requiring the participants to generate conversations and new content (García-Peñalvo et al., 2015; Fidalgo-Blanco et al., 2016). In order to enable this feature, it was necessary to create a virtual learning community, using an open group within the social network Facebook. This design stimulates participation, e.g. through volunteering activities in each module, and engagement in the community by sharing learning results.

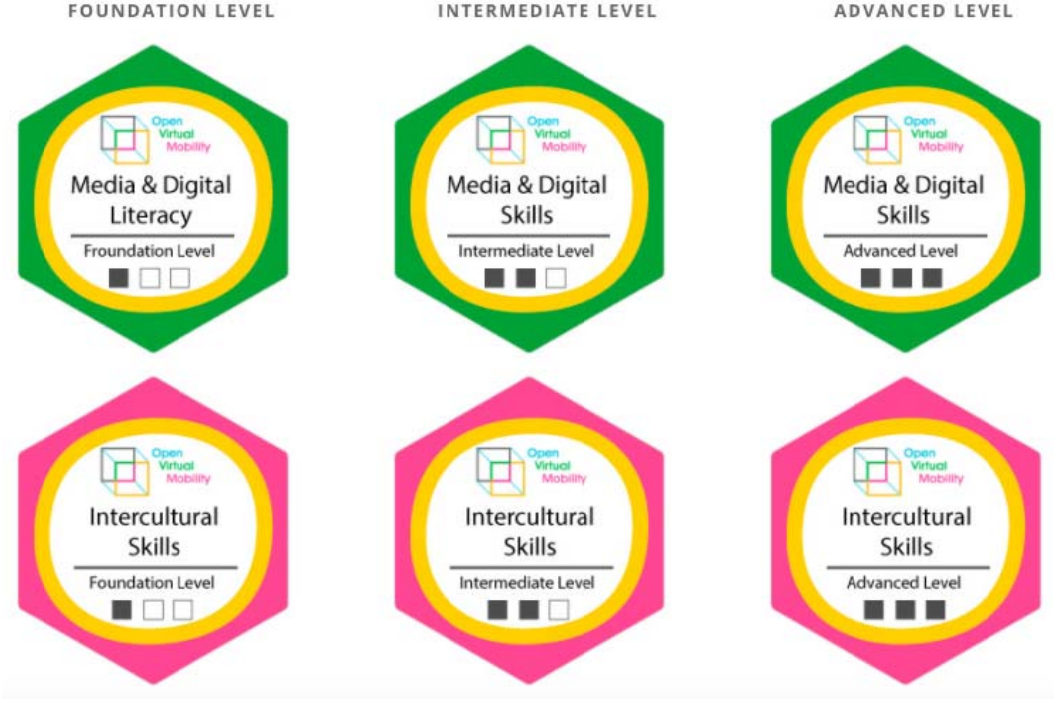
An open badges model was proposed to reward participants' work for doing additional MOOC activities and sharing them through the learning community. The result was the design of a badge pathway, displayed in Figure 4, consisting of a set of badges that recognize the different activities performed by the participants and could be obtained during the MOOC. This complemented the completion badge and certificate offered as standard by MiriadaX.

The MiriadaX platform automatically issues an open badge to participants who interact with all elements of the MOOC and properly complete the proposed tests. However, this badge does not reflect the effort of those participants who completed some or all of the voluntary activities. To recognize this work, an additional system of 8 open badges was designed and implemented through the Badgr platform, because of the inability of MiriadaX to configure additional badges in their MOOC. Figure 5 summarizes the designed badge system.

This badge system was designed using the Badgr[6] platform, which enables the creation of pathways composed of different badges. This platform also allows the addition of milestone badges that are automatically generated each time a user earns a predefined required badge and allows the creation of a comprehensive pathway with badges added to others. The design of MiriadaX badges combines milestone and single badges to obtain a final badge.

On the Badgr platform, badges can only be issued by the university staff. In order to facilitate participants claiming badges, one Google Form per badge was created. For each activity associated with a badge,

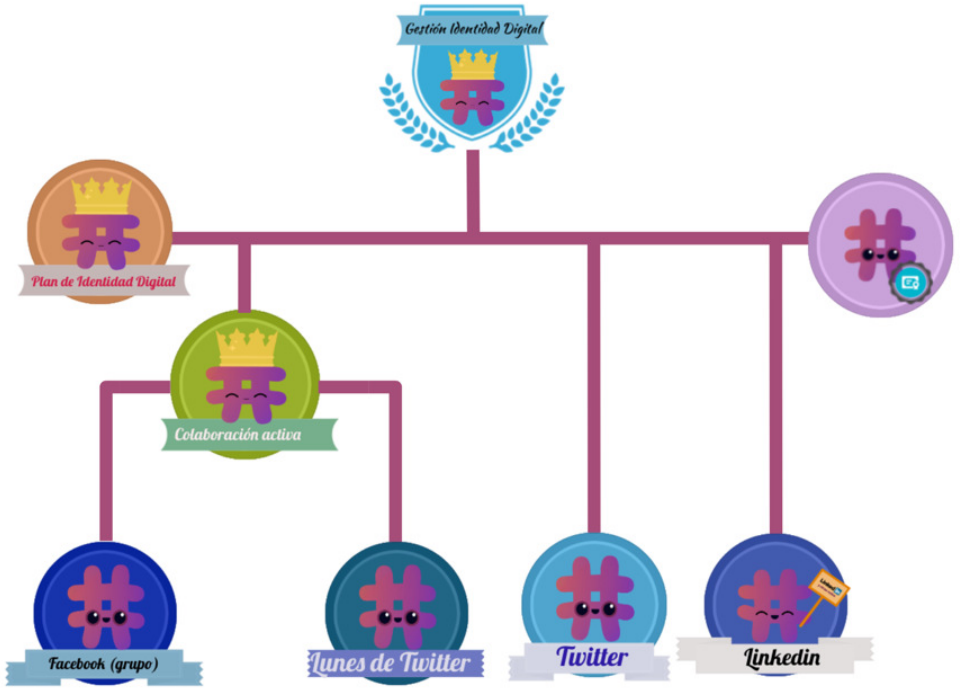
Figure 3
Example of OpenVM badges in three MOOC levels



Source: "Update of milestone 4: Implementation and user-testing of open credentials to recognise virtual mobility skills in the *OpenVM Learning Hub*. Open Virtual Mobility Erasmus+ (2017-2020)", by I. Buchem and C. Carlino, 2018, p. 8 (https://www.openvirtualmobility.eu/wp-content/uploads/2019/11/openVM_O5-A1-QG3_2019_CURRENT.docx.pdf).

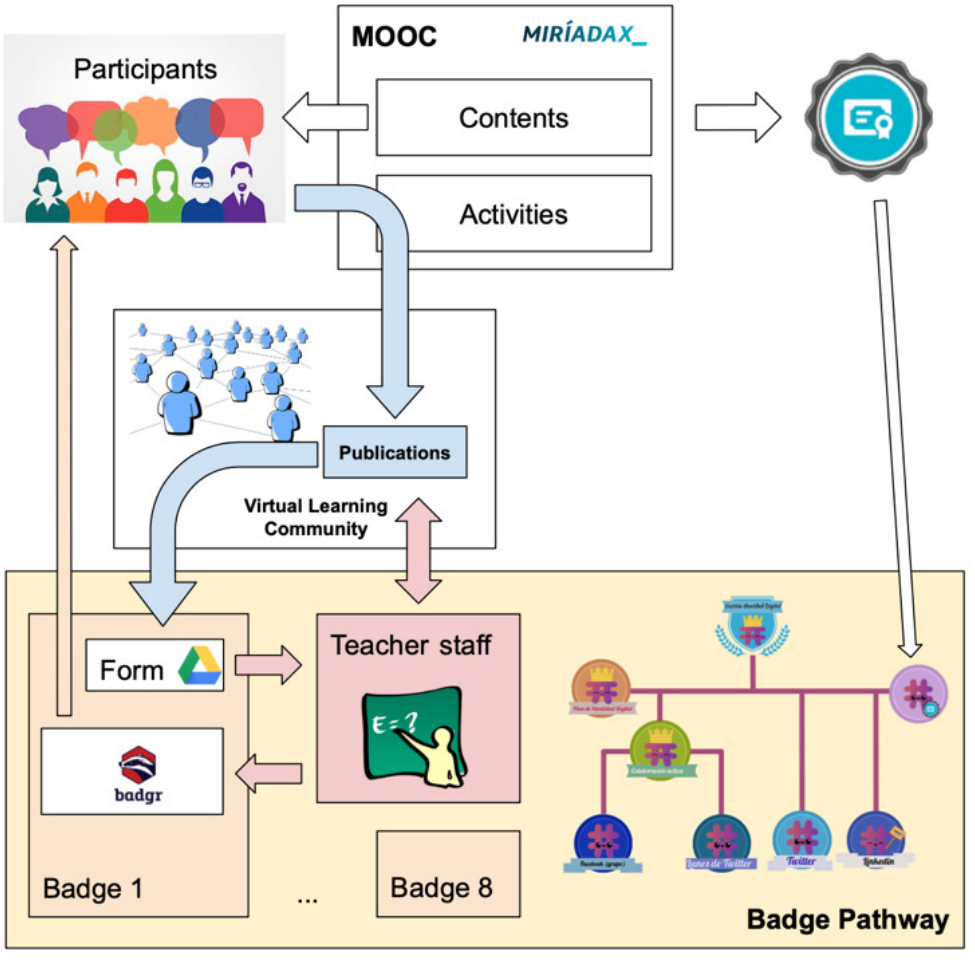
[5] https://blog.bestr.it/en/2019/06/13/blockcerts-bestr-faq
[6] https://badgr.com/

Figure 4
MiriadaX badge pathways



Source: authors' own work.

Figure 5
MiriadaX badges



Source: authors' own work.

the participants had to complete the form with personal information and add the evidence required to obtain the badge. Most of the evidence comprized screenshots of the publication in the virtual learning community performed as an activity. In order to integrate this design into the MOOC at MiriadaX, all of the information was included. Within the MOOC, each volunteer activity rewarded with a badge included a link to its Google Form with instructions on how to obtain it. The participant could accumulate a total of eight badges, five of which were related to volunteer activities in the MiriadaX MOOC, i.e. Twitter badge, LinkedIn badge, Twitter event badge, Facebook Group badge and Digital Identity Plan badge, and one that included the final MiriadaX badge. The earners of the final MiriadaX badge had to upload it to Badgr in order to validate it (MiriadaX validation badge). The MOOC team reviewed each application and, if it satisfied the criteria, the badge was awarded via Badgr. This platform automatically notified the participant that they were awarded the badge and sent it to them by mail. Two additional milestone badges were obtained automatically when earning the previous ones. The two milestone badges that Badgr generated automatically were the Communication Badge, which was issued as a result of participating in live events during the MOOC edition, and the Professional Digital Identity Management Badge, which was issued as a result of obtaining all of the previous badges. This badge includes the final MiriadaX badge, which must be uploaded to Badgr. Figure 6 shows an example of a volunteer activity which was rewarded with a badge in a MiriadaX MOOC.

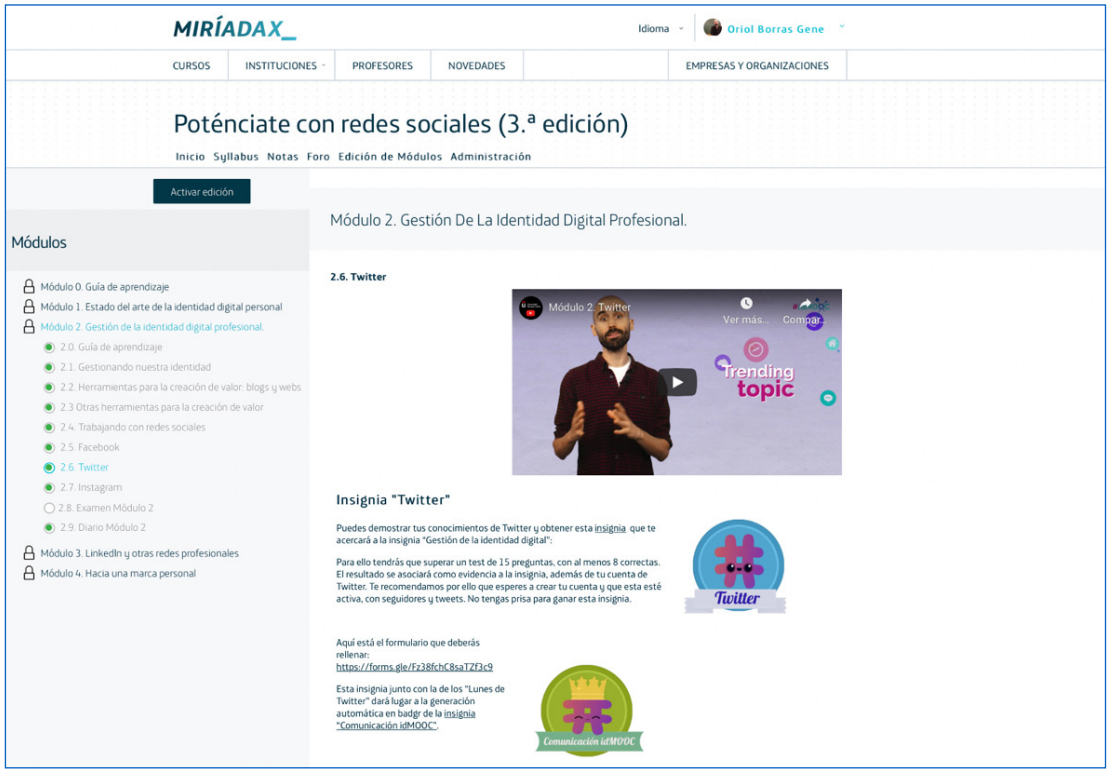
Research methods

The research was conducted in a total of nine MOOCs, i.e. eight MOOCs offered in the OpenVM Learning Hub and one MOOC offered in MiriadaX, using two online surveys with an aligned set of items. The sections below give an overview of the procedure, the sample and the survey items applied in the study.

Procedure

Participants in all MOOCs were invited to participate in the online survey designed for the specific audience in each of the two MOOC platforms. Participants in mini-MOOCs offered by the OpenVM Learning Hub were invited to participate in an aggregated online evaluation survey in English, which was used to evaluate various aspects of OpenVM MOOCs including Open Badges. The OpenVM survey was organized in eight sections and the participants were required to express their level of agreement with a set of statements related to OpenVM badges including the five survey items used for the joint study presented in this paper. Out of the 1,412 OpenVM MOOC participants who completed the survey, approx. 20% participated in the Active Self-Regulated Learning, 17% in Media and Digital Literacy, 15% in Collaborative Learning, 14% in Open-mindedness, and 12% in Intercultural

Figure 6
MiriadaX: A volunteer activity rewarded with a badge



Source: MiriadaX.

Skills MOOCs. Participants in the MOOC offered by MiriadaX used the OpenVM project online survey translated into Spanish. The survey was sent to all MiriadaX MOOC participants once the edition of the MOOC was over.

Study sample

The study sample consisted of a total of 1,788 participants, i.e. 1,412 from OpenVM Learning Hub, and 376 from MiriadaX. The participant profile both in the OpenVM Learning Hub and in MiriadaX was diverse. Table 1 below gives an overview of the distribution of the demographics in both groups.

The OpenVM participants were mostly students from 88 different universities in Europe, predominantly from the countries represented by the project partners (Romania, Italy, Germany, Spain, the Netherlands) and other European countries (UK, Lithuania, Sweden, Norway, Slovakia, Bulgaria, France, Switzerland). Participants also included students and teachers from outside of Europe, including the USA, Colombia, Ecuador, Chile, Mexico, Argentina, Turkey, Burkina Faso and New Zealand. Approximately 1,500 participants were enrolled in all eight OpenVM MOOCs at the beginning of 2020. 1,967 badges in total were issued upon completion of the MOOC courses at three levels (altogether 24: 8 MOOCs x 3 levels).

MiriadaX participants included both students and teachers, mostly from Latin America with 54.7% (Peru, Mexico, Argentina, Colombia and Ecuador) and Spain with 37.5%. A total of 2,815 participants were enrolled in MiriadaX, of which 1,547 started (54.8%) and 503 finished the MOOC (32.5% of students who finished the MOOC and 17.8% of enrolled students). In total, 711 badges were issued, 503 from MiriadaX and 208 from the Badge Pathway in Badgr (65 Twitter badges, 45 LinkedIn badges, 24 MiriadaX validation badges, 23 twitter event badges, 22 Facebook Group badges, 14 Communication badges, 9 Digital Identity Plan badges, and 6 Professional Digital Identity Management badges.

Survey items

The online survey was designed with the objective of attracting a large number of respondents through its compact format. The survey participants in OpenVM and MiriadaX evaluated the five statements on a scale from 1 (totally disagree) to 5 (totally agree). The statements were related to learner perception (2 statements), learner motivation (2 statements) and further use of the Open Badges (1 statement). The statements used in the online surveys on both platforms were aligned with each other but semantically adjusted to the given context. The internal consistency of the

Table 1
Study sample

Characteristics	OpenVM sample	MiriadaX sample
Gender	69% female 30% male	51% female 49% male
Age	61% 19–24 years old	39% 25–34 years old
Role	96% university students 3% teachers/educators	26% university students 16% teachers/educators
Country	44% Romania 20% Italy 20% Germany 7% Spain	37% Spain 11% Peru 8% Mexico 8% Argentina

Source: data from OpenVM and MiriadaX (2020).

Table 2
Survey items

Focus	OpenVM Items (EN)	MiriadaX Items (ES)
Perception	I like the design of OpenVM Badges.	I like the design of the Badgr Pathway.
	OpenVM Badges describe the skills I developed in an adequate way.	Badgr Pathway describes the skills I have developed in a suitable way.
Motivation	OpenVM Badges motivated me to learn in the MOOC.	Badgr Pathway motivated me to learn in the MOOC.
	OpenVM Badges motivated me to complete a MOOC level.	Badgr Pathway motivated me to complete the MOOC.
Further use	I will use OpenVM Badges outside of the OpenVM Learning Hub.	I will use the Badgr Pathway badges outside of the MiriadaX environment (social networks, Curriculum, e-mailing).

Source: OpenVM and MiriadaX.

scale with five items was measured with Cronbach's alpha. The results showed high internal consistency ($\alpha = 0.92$). The survey items are listed in Table 2.

Research questions

The two research questions guiding the study were: (1) *Q1: How did the participants perceive the open badges in terms of their design and conveying the skills developed in the MOOCs?*; (2) *Q2: How did the participants perceive the motivational effects of the open badges: Did the badges motivate the MOOC participants to a) learn in MOOCs, b) complete the MOOCs, and c) use of open badges outside of the MOOC platforms?*

The hypothesis behind the research study was that learners who liked the design of the open badges and thought that the open badges described the skills they developed in an adequate way would be both more motivated to learn and to complete the MOOCs. They would also be more inclined to use the badges outside of the MOOC platforms in which they were earned, e.g. websites, social media. Table 3 depicts the tentative research model used for statistical analysis.

Research results

The sections below outline research results in relation to the two research questions.

Q1: How did the participants perceive the open badges in the MOOCs?

The first research question was concerned with the perception of the open badges by the MOOC participants. Descriptive statistics summarized in Table 4 show high average values, gravitating towards "strongly agree" (value 4 on the scale), for all five survey items, including the first two related to participants' perceptions of the open badges: a) Badge design, and b) Skill description. The results indicate that the MOOC participants in both OpenVM and MiriadaX liked the design of the badges (badge design) and found that they accurately described the skills they developed in the MOOCs in an adequate way (skill description).

To compare the cumulative distributions of the two data sets from OpenVM and MiriadaX, the two-sample Kolmogorov-Smirnov test was conducted. Since $p < 0.05$ values were achieved for all five variables, it can be concluded that the two groups in OpenVM and MiriadaX were sampled from populations with different distributions. To analyze the mean differences between the samples from OpenVM and MiriadaX, an independent sample t-test was conducted. Levene's test for equality of variances reached $p < 0.05$ for all variables except for "badge design" and so equal variances could be assumed only for "badge design". Additionally, effect size was calculated using Cohen's *d* for the comparison between the means of the two groups. The results show that p-values less than 0.05 were reached for "badge design" $t(1786) = 2.68, d = 0.12$, $p < 0.05$, and for "further use" $t(542.83) = 3.94$ $p < 0.05, d = 0.33$, which means that the means for these variables are statistically different (cf. Table 5).

The results of the t-test are noteworthy because they show that the MOOC participants in OpenVM and MiradaX, regardless of their different perceptions of badge design and further use, did not statistically differ in their perception of how open badges influenced

Table 3
Research model applied in the study

Independent variables (predictors)	Dependent variables (outcomes)
Perception of design:	**Motivation:**
I like the design of badges. Badges describe skills in an adequate way.	Badges motivated me to learn in the MOOC.
	Badges motivated me to complete the MOOC.
	Further use:
	I will use badges outside of the platform.

Source: authors' own work.

Table 4
Descriptive statistics. Scale 1 (totally disagree) to 5 (totally agree)

Survey item	OpenVM M (*SD*)	Miriada X M (*SD*)	Total M (*SD*)
Badge design	3.73 (0.99)	3.89 (1.13)	3.76 (1.03)
Skill description	3.67 (0.95)	3.77 (1.16)	3.69 (1.00)
Motivation to learn	3.61 (1.01)	3.72 (1.25)	3.63 (1.07)
Motivation to complete	3.68 (1.03)	3.65 (1.26)	3.68 (1.08)
Further use	3.50 (1.07)	3.77 (1.20)	3.56 (1.11)

Source: authors' own work.

Table 5
*Independent sample t-tests (2-tailed)**

Item	*t*	*df*	*Sig.* (2-tailed)	*d*	*Mean Diff.*
Badge design*	2.68	1786	0.01	0.12	0.16
Skill description	1.62	515.35	0.10	0.14	0.10
Motivation to learn	1.60	513.50	0.11	0.14	0.11
Motivation to complete	0.47	517.02	0.64	0.04	0.03
Further use	3.94	542.83	0.00	0.33	0.27

*Equal variances could be assumed only for "badge design".
Source: authors' own work.

their motivation to learn, $t(513.50) = 1.60, p = 0.11$, $d = 0.14$, and motivation to complete the MOOCs, $t(517.02) = 0.47, p = 0.64, d = 0.04$, which indicates that in both cases, open badges were perceived by learners as motivating factors. The OpenVM and MiriadaX participants also did not statistically differ in their perception of how well the badges described the skills they developed in the MOOCs $t(515.35) = 1.62$, $p = 0.10, d = 0.14$, which indicates that in both cases, the badges properly described the learning outcomes. The values of $d < 0.5$ in all five variables indicate that the effect size is low. This means that the two groups of learners – OpenVM and MiriadaX – did not substantially differ in their perception of the open badges.

Q2: How did the MOOC participants perceive the motivational effects of the open badges?

To test the hypothesis that learners who responded in a positive way to the design of open badges and thought that they accurately described the skills they developed in an adequate way would be both more motivated to learn and to complete the MOOCs, and would be more inclined to use the badges in further platforms, correlation and regression analyses were conducted using the survey data.

The results of the correlation analysis, summarized in Table 6, show that all of the relationships assumed by the research model are significant at the level of $p < 0.01$ (2-tailed).

As Table 6 shows, higher Spearman's rho values were found for the variable "skill description". This result of the correlation analysis is very interesting as it shows that what motivated the MOOC participants in both OpenVM and MiradaX were adequate skill descriptions in the open badges. Furthermore, the correlation tests show that positive and significant correlations exist between both the badge design and skill description scores and the motivation for further use of the badges in other environments/contexts. Again here, higher Spearman's rho values were found for the variable "skill description", which means that the badge earners are more inclined to use open badges in other environments if the skills in the open badges are described in an adequate way.

Conclusions and further work

The results of the joint research study presented in this paper show that open badges motivated MOOC participants on both OpenVM and MiriadaX platforms to learn in MOOCs and to complete the MOOCs. Given a large sample of almost 1800 participants, the results presented in this paper are an important contribution to the field of study, indicating that adequate recognition of skills with digital credentials, such as micro-credentials based on Open Badges, may be an important contributor to motivation to learn in MOOCs and for motivation to complete MOOCs. These findings cor-

Table 6
Correlation analysis

All	**Motivation to learn**	**Motivation to complete**	**Further use**
Badge design	0.65**	0.66**	0.58**
Skill description	0.74**	0.73**	0.68**
OpenVM	**Motivation to learn**	**Motivation to complete**	**Further use**
Badge design	0.66**	0.68**	0.55**
Skill description	0.72**	0.72**	0.63**
MiriadaX	**Motivation to learn**	**Motivation to complete**	**Further use**
Badge design	0.52**	0.57**	0.61**
Skill description	0.71**	0.74**	0.77**

Note: ** $p < 0.01$
Source: OpenVM and MiriadaX.

respond with research showing that low completion rates and losing interest in MOOCs may be a result of certification and accreditation practices which allow students to earn a certificate without any proper engagement in the MOOC (Rai & Chunrao, 2016) and include digital badges or certificates that offer little value to MOOC participants (Jiang et al., 2014).

The results of the study presented in this paper should be interpreted in context of the self-reported perspectives of learners via an online survey. Further studies might combine survey-based methodology with learning analytics. The analysis of data in MOOC platforms could be used to validate the perceptions of learners, especially by focusing on the learning patterns and completion rates. Further studies could also use mixed-method approaches to explore the relationships between open badges, different types of learners' motivations and diverse modes of participants' engagement in MOOCs.

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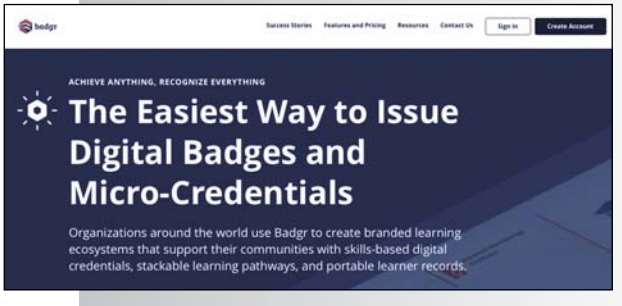

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Social aspects of introducing online learning – the students' perspective

Abstract

The article presents the introduction of online learning at universities in Poland, which was a solution aimed at preventing, countering and combating COVID-19. Attention was drawn to the perception of this change by the stakeholders, i.e. students. The analysis examines students' concerns regarding the implementation of this form of learning in selected areas related to access to technology, the organization of classes, and the participation in them, social interactions and administrative activities. The aim of the research was also to ascertain students' opinions on the consequences of the implemented change and on the actions aimed at facilitating the transition to online learning undertaken by the authorities and university employees.

The research was conducted with the use of an electronic survey questionnaire. The responses of 189 full-time university students were analyzed. Based on the results of the research, communication between students and university authorities, as well as the involvement of participants in the process of change were considered as key elements in the implementation of online learning.

Among the important activities there were those that enable participation in online learning (provision of equipment, programs, licenses) and those that support learning (access to library resources). As regards the latter, conclusions were formulated concerning the planning of teaching, i.e. the content and the way of transferring knowledge.

Keywords: online learning, change process, resistance, stakeholders, universities

Introduction

Changes are part of human life and organization. Some authors (Griffin, 2007; Skalik, 1996) associate them with new solutions, understood as a state that differs from the current one. Others (Armstrong, 1998; Czerska, 1996) see change in terms of the process (introduction of new solutions). Regardless of the approach, it is noted that the success of a change largely – according to Collin A. Carnall, 40% of the time (Jasińska, 2015, p. 61) and in technological changes, 57% – depends on the human factor (Legris & Collerette, 2006, p. 65). For this reason, stakeholders' responses to the change are underlined. Stakeholders are individuals and/or groups of people who are interested in and influence the functioning of an organization (Seres et al., 2019) and those without whom the organization cannot exist (Delgado-Zapero & Strojny, 2020). They can speed up, modify, slow down, or even stop the implementation of the change (Grundy, 1997). In order to prevent actions inhibiting the implementation of change, it is proposed to involve stakeholders in this process. This means identifying the stakeholders, analyzing their needs, as well as communicating with them and involving them in the decision-making.

Stakeholder management is the hallmark of effective change implementation at universities (Grigorescu & Olteanu, 2014). The study results show that it is the students who are the most important stakeholders of the university (Delgado-Zapero & Strojny, 2020). Therefore, it seems crucial to involve them in the process of educational changes. The introduction of online learning may be considered as one of them.

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An analysis of the literature on the subject indicates that universities are mainly considering the use of different forms of e-learning (*blended learning*) and the use of electronic tools in the learning process (*WBT*). No publication describing teaching conducted exclusively online has been identified. There are also few articles that address the process of change and take into account its perception by students (Falqueto et al., 2020).

Online learning was introduced by the Minister of Science and Higher Education in Poland on March 11, 2020 (Regulation, 2020) to prevent, counter and combat COVID-19. It should be noted that the change was not planned (it was adopted urgently) but imposed and treated as a temporary solution. Edicts can be indicated as the applied tactic of implementing changes (see Czapla, 1988). At the same time, it should be stated that the way in which online learning was adopted is inconsistent with the guidelines for effective implementations (see Centkowska, 2015; Wasiluk, 2004).

Considering the above, as well as the fact that the everyday functioning of contemporary students is based on the use of technology, their perception of the introduced change was found to be cognitively interesting. The following questions were asked: what were students' concerns about the transition to online learning? Have the concerns decreased over time? How do students evaluate their participation in the introduced change? Which form of learning do they prefer?

Change management at universities – review of the literature on the subject

Taking into account the subject of the article and the issues discussed, two main reviews of the literature on the subject were conducted. The first one concerned change management in relation to universities and online learning. The second one referred to university stakeholders in the context of changes, including online learning. The EBSCO multi-search engine was used in the review.

Each of the reviews started with a search for publications containing selected phrases in the title (i.e. change management, online learning, stakeholders, universities). Then the search results (and thus the list of publications) were limited to articles that: (1) were published in scientific journals, (2) were peer-reviewed, and (3) were published in English. In the case of the review concerning the following phrases in the title: "change management" and "universities", an additional criterion - the subject matter - was taken into account. That allowed to identify publications whose content was directly related to the introduction of changes at universities. The search resulted in 29 articles. While analyzing their content, some articles were rejected while important and available items cited in them were added.

Introducing changes at the university

In the analyzed articles on changes introduced at universities, two main directions of the considerations can be distinguished. The first one is to show the need to make changes in university management. This is the result of the analysis of the university's environment, contemporary conditions of its functioning (Enãchescu & Trapiel, 2014; Mainardes et al., 2013) and the opinions of university stakeholders (Geryk, 2018; Grigorescu & Olteanu, 2014; Urbanovič & Wilkins, 2013). The second direction of considerations is related to the process of implementing changes. Change is defined as "whatever a person himself or other people – reasonable people – consider replacing one situation with another, as long as the change does result simply from the passage of time, it is new, substantial and both relevant and significant" (Fox, 2001, as cited in Shoham & Perry, 2009, p. 228). It is also treated as an organizational change, it is associated with adaptation, i.e. reorganization of structures, new procedures, practices, and thus with organizational culture and leadership (Muluneh & Gedife, 2018). Attention is paid to responses to changes (Ally et al., 2016), barriers and factors for the successful implementation of changes are identified (Grantins et al., 2017; Leitzel et al., 2010), and different models for implementing changes are proposed (Muluneh & Gedife, 2018). At the same time, it should be added that the considerations take into account the specificity of the functioning of public organizations (formality, bureaucracy). Universities' resistance to change is emphasized and differences in the implementation of changes between education and business are demonstrated. It is particularly important to focus on assimilation, i.e. the need for planning, preparation, and awareness of the necessity for change, as well as on shaping adaptability and on the use of systemic management.

The following stages of change management at the university are proposed (Grantins et al., 2017):

1. Determining the need for change supported by current business analysis, external conditions, identification of new opportunities, etc.
2. Developing arguments for change, including a risk and resource impact assessment.
3. Communicating a vision of change, presenting a convincing narrative by demonstrating an improved future situation and the ways to achieve it.
4. Developing a strategy and a plan of changes (specific goals, clear procedures, division of responsibilities, deadlines).
5. Managing the change process (everyday activity – task implementation, adjusting organizational culture).

The description of the process should include the university's stakeholders. Based on Alvaro Delgado-Zapero and Jacek Strojny (2020), the article distinguishes the following stakeholder groups:

- primary group, which includes students, lecturers, university authorities, administrative staff;
- science and technology group, which includes companies, research centers, other universities, the ministry of education, trade unions (associations);

- political and social group, which includes media, NGOs, political parties, primary and secondary schools, and regional administration.

As indicated by Tony Grundy (1997), the introduction of a change depends on the one hand on the attitudes of university stakeholders and on the one hand on the level of impact and influence (Figure 1).

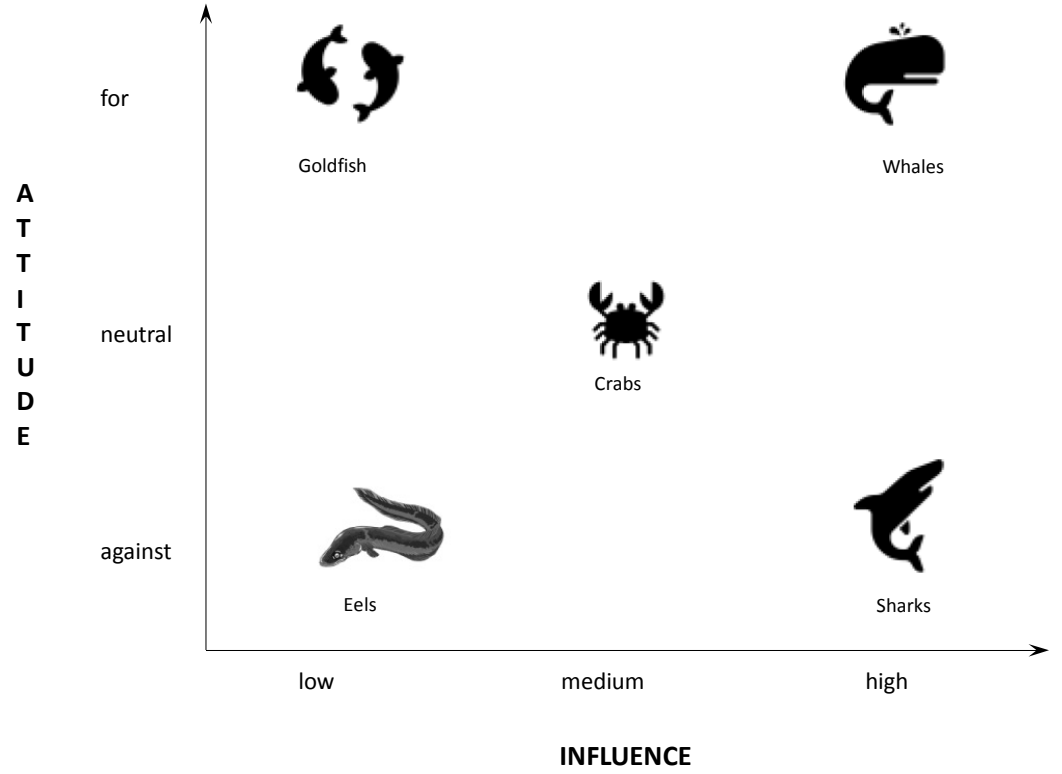
It should be emphasized that the attitude of the stakeholders is influenced by the understanding of the situation and the acceptance of the change (Aydan & Karakaya, 2018). The latter also has an emotional dimension (cf. Sobka, 2014, p. 58). In the case of stakeholders, understanding and acceptance will involve satisfying needs, achieving goals and interests, as well as with meeting expectations. On the other hand – in the context of the process of change – it is necessary to point out the importance of communication (Grantins et al., 2017). Initially, communication is used to increase stakeholders' awareness of the change, then to learn about different stakeholders; groups, as well as their expectations and needs, and then – as feedback – to learn and implement individual actions related to the change.

It is worth adding that students are interested in: creating a better learning environment and conditions, shaping relationships at the university and beyond, increasing responsibility, opportunities for personal development and in striving for achievement, recognition and appreciation (Hoat et al., 2009). As the research results show, they want to influence the functioning of universities also due to their future professional work (Geryk, 2018; Mainardes et al., 2013). The development of various skills, character traits, as well as the possibility of shaping relationships will allow them to better prepare for professional life. Although students are recognized as both internal and external stakeholders (Mainardes et al., 2011), they are not given adequate attention (Geryk, 2018; Mainardes et al., 2013) or are viewed from the perspective of managers, which means that they are not taken into account while decisions are made (Falqueto et al., 2020). This is confirmed, for example, by research results on quality management: low involvement of students was caused by their low awareness and lack of knowledge in this field, not by their reluctance to change or lack of acceptance of the solution (Manatos et al., 2017).

Online learning from the perspective of university stakeholders

Online learning, remote learning and e-learning are terms referring to various methods, solutions and activities using information, multimedia, internet and intranet technologies for teaching and learning (Ferri et al., 2018; Frączek, 2015; Houshmand et al., 2019). It means communicating via electronic media. It is worth pointing to the intensity of the use of technology (Matusiak, 2011, p. 59). Online learning can complement (e.g. by sharing teaching content

Figure 1
The analysis of stakeholders in change management



Source: Adapted from "Accelerating strategic change: the internal stakeholder dimension" by T. Grundy, 1997, *Strategic Change*, *6*(1), p. 55 (https://doi.org/10.1002/(SICI)1099-1697(199701)6:1<49::AID-JSC242>3.0.CO;2-L).

and materials) or replace traditional classes (when classes are conducted exclusively online). Learning can take place in an asynchronous mode (when the students independently perform tasks provided by the teacher at a time chosen by them) or synchronously (communication between the teacher and the students takes place on a specific date, usually in the form of a videoconference) (Szewczyk, 2018).

The analyzed articles consider online learning from the perspective of internal stakeholders: university employees or students. Publications on lecturers show how they perceive the implementation of technology (Scott, 2013), and include information on their concerns (Humbert, 2007; Porter et al., 2016). The importance of: voluntary participation in change, continuous communication, conducting training, organizing meetings aimed at exchanging experiences, motivating and appreciating teachers and supporting them in action, as well as making the necessary changes in the organizational culture is also emphasized (Porter & Graham, 2015; Stoltenkamp & Kasuto, 2011). Ahmad AlHamad (2020), on the other hand, writes about the need to be ready for e-learning. Other authors do the same (Sheiladevi & Rahman, 2016). While describing the implementation of e-learning in Malaysia (ministerial project), they note that although universities had the latest infrastructure and teachers were trained to use it, their attitudes were crucial. In their proposed approach to institutional implementation of blended learning, the team of Wendy Porter (2016) also begins with shaping awareness (exploration). Only the next step is adoption (early implementation), including elements related to the support provided, as well as the strategy and structure of the change.

Taking into account the students' perspective, the analysis focuses mainly on the impact of online learning on knowledge acquisition and achieved results. It is stated that the use of this form of teaching (web-based lecture technologies or mixed forms), through continuous access to the material, contributes to the consolidation of knowledge, and thus to better learning outcomes (Gosper et al., 2016; Yazon et al., 2002). It is also positively perceived by learners, and at the same time considered more difficult than the traditional one (Smal, 2009). First of all, online learning means more effort on the part of the learner. It requires self-assessment, self-motivation and organization of learning – time management, planning or searching for educational materials on the Web, their substantive evaluation and problem-solving. It also causes concerns about understanding the teaching content and weakening interpersonal relationships. This explains the preference for a synchronous form of online learning as well as for learning in small groups with the employment of problem-based learning (Lim et al., 2009). It is worth adding that due to the transition to online learning, the students' involvement not only in studying, but also in university life, may decrease (Mechlińska-Pauli, 2008). For this reason, Sönmez Pamuk (2012) formulates the conclusion that e-learning not only necessitates the access to technology, but also requires its proper use and an appropriate pedagogical approach. According to the author, the use of this form of teaching is favored (by teachers):

- planning the curriculum before the onset of teaching, so as to properly select the content and forms of communication (e-learning tools),
- ensuring that feedback is provided so that the understanding of the teaching content is confirmed,
- organizing periodic meetings (especially in the case of the asynchronous form) to ensure social presence.

The student, apart from having experience, IT and technological competences, should prefer to learn remotely.

In addition to the presented characteristics of online learning, it should be noted, following Kofi Ayebi-Arthur (2017), that it is also an opportunity to learn during a crisis. Reflecting on the situation of education after an earthquake in New Zealand, the author considered communication, the availability of IT infrastructure and the motivation (readiness) of academic staff to use e-learning, and of students to engage in learning in this form, to be crucial for the implementation of the change (technology important for this form of education).

Also, Suzanna Long and David G. Spurlock (2008), when analyzing the implementation of changes, pointed to the key importance of communication and acceptance of change. By pointing to technophobia and structural resistance, the researchers emphasized the importance of trust, the sense of security of stakeholders in terms of the implemented technological solutions and their belief that the change is necessary, possible to implement, including in the financial (cost) context. It can be seen that the topics covered by these guidelines reflect concerns regarding the introduction of innovations that may be the causes of resistance, including implementation costs, fear of personal failure, and loss of status and power.

In addition to students' acceptance of this solution (AlHamad, 2020), their previous experiences with technology are also important for the introduction of online teaching – the more positive they are, the higher the level of satisfaction with online learning is (Smart & Cappel, 2006).

Research methodology

The primary aim of the research was to understand the perception of issues related to the process of introducing online learning as a result of the pandemic by the participants and stakeholders of the change – students. Focus was placed on the social aspects of the changes implementation process.

The following main research questions were formulated:

1. What were students afraid of while starting online learning?

2. Have their concerns diminished while using this form of learning?
3. How did the students perceive the possibility of co-decision-making on online learning, i.e. the choice of the technology used, time of classes, forms of obtaining credit?
4. What actions, undertaken by the university and/or the lecturers, did they perceive as supporting the implementation of changes?
5. How did the students rate online learning when compared to the traditional one? Which form of learning did they prefer?

Taking into account the results of the analysis of the literature on the subject in the context of the emergence of concerns, attention was also paid to:

- experience and skills – both in the use of technology and in studying;
- field of study – taking into consideration that some of them require practical learning (e.g. in such fields as nursing, cosmetology, physiotherapy, automation and robotics or forestry);
- communication, i.e. having information about the change and participation in making decisions about the change.

It was also checked whether the undertaken activities supporting online learning were relevant to the degree of concern related to the change three months after their implementation.

The list of possible student concerns related to the change in learning mode was compiled using a potential problem analysis. The presented (review of the literature on the subject) difficulties of the online learners and the authors' knowledge – i.e. the students' perspective – were used as the basis. Due to the pandemic, the students returned to their family homes. Uncertainty about the development of the situation and the possible date of restoration of full-time classes at universities hindered decisions related to renting apartments or taking up seasonal work (students were afraid that the academic year may be extended). During the pandemic, online learning was the only form used, which could cause tediousness, monotony, deterioration of health (e.g. of eyesight), stress. The students' co-residents also often worked or studied remotely, which worsened the learning conditions.

The research was conducted in May 2020. An electronic survey questionnaire consisting of four sections was used. These were: concerns experienced (about the change and during its duration), the manner of introducing changes, especially in the context of creating a climate conducive to the acceptance of changes (received support, participation in changes), information and opinions on online learning and personal data. Participation in the research was encouraged by posting a message on the student forum with a link to the page. At the same time, the forum participants were asked to send the link to their friends who are also students. The Mann-Whitney U test, the Kruskal-Wallis test and Spearman's correlations were used in the analysis.

200 people took part in the research. Due to the small percentage of participants studying on a part-time basis, as well as at private universities and colleges, the analysis was limited to 189 people studying on a full-time basis.

Most of the respondents were undergraduate students (42%). Graduate students accounted for 36% of the respondents, whereas engineering students for 22%. More than half of the respondents (57.7%) were first-year students. The others were, respectively: second-year students – 17.4%, third-year students – 10.6%, fourth-year students – 9%, and fifth-year students – 5.3%. The largest group was made up of students of innovative economy (14.3%), then of management (11%), logistics (10.6%), mechanics and machine construction (9.5%), economy (8.5%), and forestry and law (5.8% each). Due to the specificity of the studies (Zając, 2005), for the needs of the analyses, the fields of study were grouped taking into account the degree of their practicality. Low, medium and moderate degrees were distinguished.

Most of the respondents were women (61%). The respondents were mainly people aged between 21 and 25 (73.5%), then under 20 (19.6%), and between 26 and 30 (5.8%). People aged between 31 and 40 made up the smallest group (1.1%). None of the respondents was over 40 years old.

Most respondents studied at universities in the Lubuskie (33.9%), Pomorskie (31.7%), Dolnośląskie (12.2%), and Wielkopolskie (10.1%) voivodeships. The smallest number of respondents studied in the following voivodeships: Zachodniopomorskie (4.2%), Podlaskie (3.7%), Łódzkie (3.2%), and Małopolskie and Mazowieckie (0.5% each).

Introduction of online learning in the opinion of the surveyed students

It should be noted that almost half of the respondents (49.7%) stated that they had been informed about the transition to the online form of conducting classes within a week of the announcement of the decision of the Ministry of Science and Higher Education. Every fourth respondent (21.7%) found out about the change in the method of conducting classes on the following day or within two weeks (23.3%). On the other hand, the remaining respondents (5.3%) received this information within a month. The respondents learned about this decision: from the content of e-mails addressed directly to them (42.3%), from information posted on the university's website (33.3%), from social media (12.2%), from the internal IT system (e.g. e-dean's office – 10.1%), and from lecturers (1.6%). A small percentage of people (0.5%) indicated that they were not informed about the new form of conducting classes.

The vast majority of respondents (89.4%) participated in online classes from home. Others participated in them while staying in a boarding house (rented apartment, room, etc. – 7.4%), in a dormitory (1.6%) and at work (1.6%).

It should be noted that almost half of the respondents (49.7%) indicated that more than 75% of planned classes were conducted in the remote form, while 29.6% of the respondents answered that 50% to 74% of the planned classes were conducted in this form. According to 14.3% of the surveyed students, 25% to 49% of the planned classes were conducted online, and according to 6.4% of the respondents – up to 24% of the planned classes were conducted online. According to the respondents' comments on the tasks and materials being sent by lecturers, it appears that some classes were conducted in an asynchronous form, i.e. in the form of an electronic correspondence exchange.

The respondents indicated that the classes were conducted using the following e-learning programs and platforms: MS Teams (61%), Zoom (32%), Discord and Skype (28%), and Google Classroom (26%). It should also be emphasized that the respondents pointed to the use of various solutions by lecturers. They considered it an inconvenience, as getting to know each of them required additional effort (and time).

The students' biggest concerns connected with the commencement of online learning were directly related to the classes, mainly to such issues as: too much material for self-study, insufficient time to write final papers, or disruption of the course of exams (Figure 2). The respondents were also afraid of losing contact with colleagues and of the possibility of shortening the holidays as a result of extending the academic year. The least worrying were issues related to the technological area, e.g. regarding the lack of appropriate equipment and programs to participate in classes and incurring additional, unjustified expenses (e.g. for energy consumption and apartment rental).

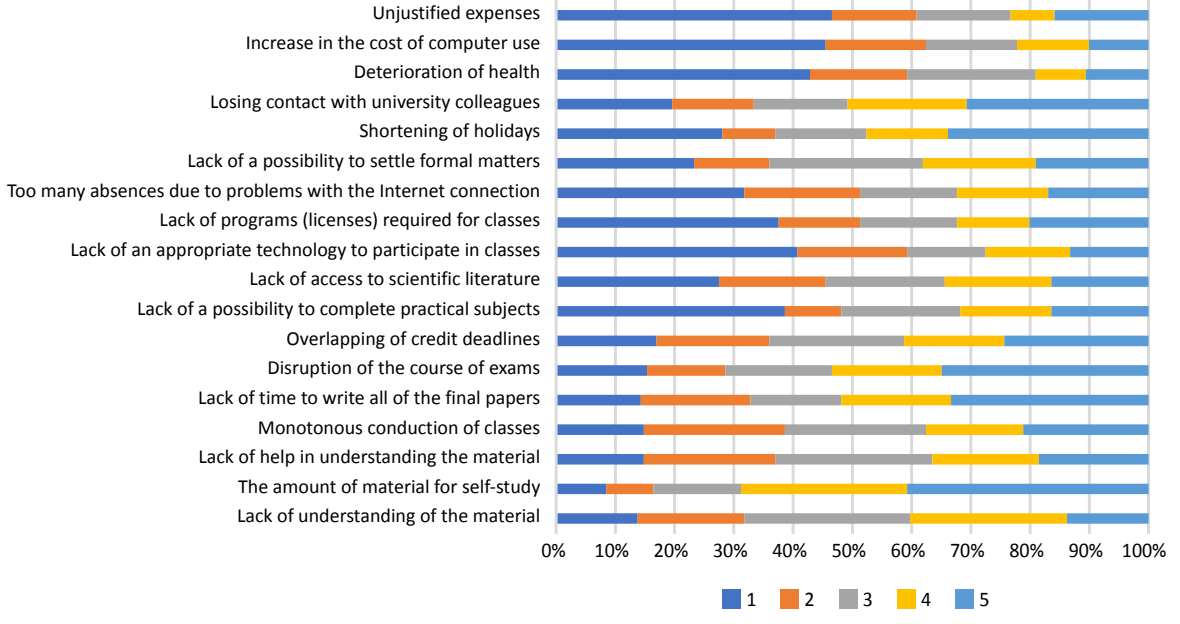
Interestingly, according to 27.5% of the respondents, remote conduction of classes did not affect contact with university colleagues, and according to 29.5% of the respondents, it had a positive impact. According to 37% of the respondents, replacing traditional classes with an online form negatively impacted contact between students. At the same time, it is also worth presenting the respondents' statements about the fact that studying is not only about education, but also about interpersonal relations, and indicating the proposals for periodic meetings, including student events such as Bacchanalia, only in a remote form.

The vast majority of students (88%) indicated that they had not studied remotely before, but some people from this group used multimedia tools (such as Zoom, Skype or Discord). For this reason, it was found that 40% of the respondents have enough experience in using such technologies to participate in the classes.

Although students were participants in the change, their participation in the implementation of online learning should be considered as passive, i.e. limited to obtaining information. Only a small number of respondents (Figure 3) had any impact on the changes. Said impact pertained to the choice of the form of the examination and the hours of classes rather than the conduct of the classes or the type of e-learning platform used. Participation of respondents in decisions concerning exams consisted in choosing their form from the indicated ones (28%) and the possibility of submitting proposals or expressing opinions about the solutions (18.5%). Similarly, the hours of the classes were determined by choosing from the indicated solutions (16.9%), submitting proposals or express-

Figure 2

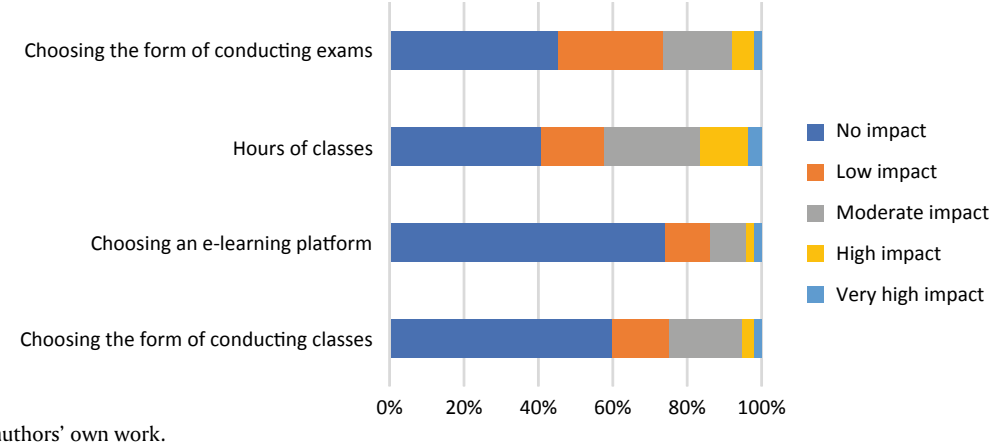
Students' concerns connected with the commencement of online learning



Legend: The degree of experienced concerns, where 1 is low and 5 is high.

Source: authors' own work.

Figure 3
Participation of respondents in decision-making



Source: authors' own work.

ing opinions about the solutions (25.7%). Sometimes the hours of exercises and lectures were set by the students together with the lecturer (12.7%). The respondents participated in determining the method of conducting the classes by selecting from the indicated solutions (15.3%) and by submitting proposals or expressing opinions on the proposed solutions (19.6%). Also in terms of the e-learning platform used, they could choose from the indicated solutions (1%).

According to the results of the Mann-Whitney U test for experience in the use of technology, there is no reason to reject the null hypothesis, and therefore the students' concerns were not derived from this experience. The situation is different in the case of the variable "gender", for the following concerns: the amount of material for self-study ($Z = –2.27$, $p = 0.022970$), overlapping of credit deadlines ($Z = –4.44$, $p = 0.000009$), lack of a possibility to complete practical subjects ($Z = 2.37$, $p = 0.017344$), lack of access to scientific literature ($Z = –2.42$, $p = 0.015415$), lack of an appropriate equipment to participate in classes ($Z = –3.33$, $p = 0.000868$), deterioration of health ($Z = –2.78$, $p = 0.005375$), and unjustified expenses ($Z = –2.44$. $p = 0.014676$).

On the other hand, the results of the Kruskal-Wallis test showed statistical significance with respect to the following concerns:

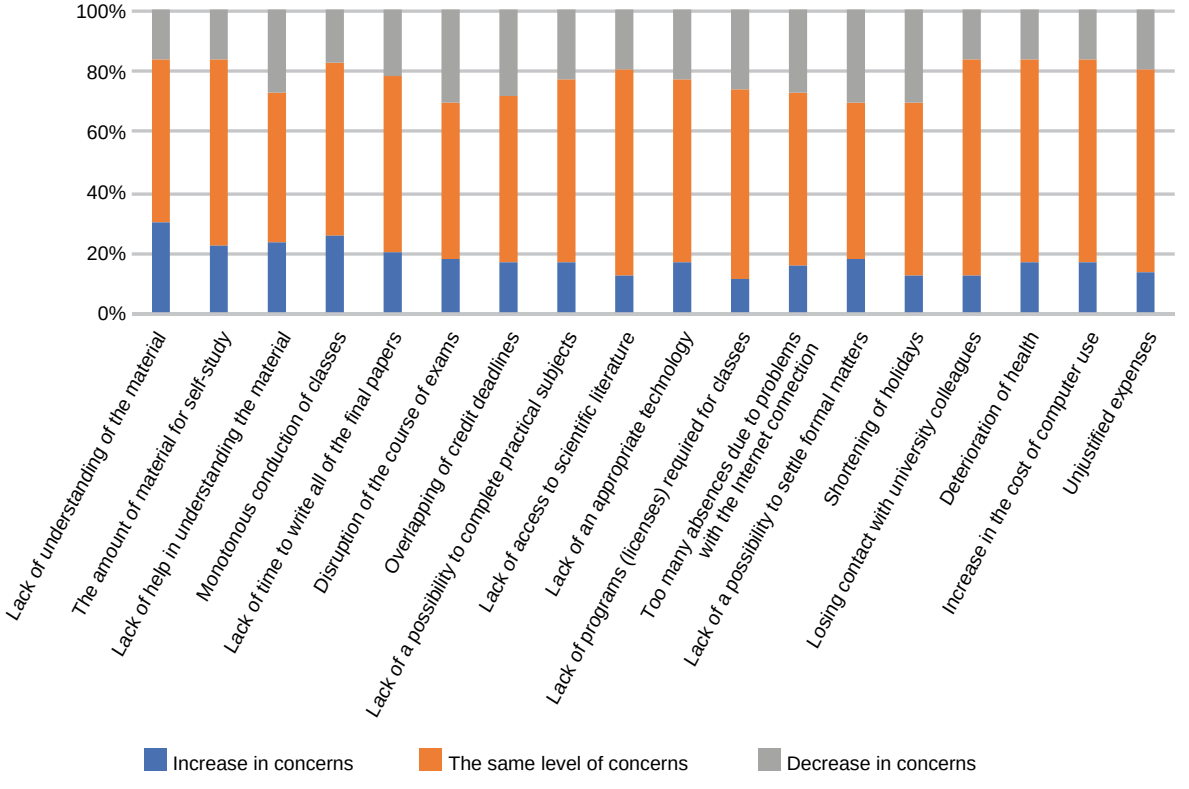
- inability to complete practical subjects for the variable field of study (calculated as the degree of practical learning) ($H = 8.318783$, $p = 0.0156$), and degree of study ($H = 24.05219$, $p = 0.0000$);
- lack of help in understanding the material for the variable year of study ($H = 10.56762$, $p = 0.0319$);
- monotonous conduction of classes for the field of study ($H = 7.375901$, $p = 0.0250$) and degree of study ($H = 6.948026$, $p = 0.0310$);
- disruption of the course of an exam for the variable field of study ($H = 7.916710$, $p = 0.0191$) and degree of study ($H = 10.26924$, $p = 0.0059$);
- overlapping examination dates for the variable year of study ($H = 12.45860$, $p = 0.0142$);
- lack of an appropriate equipment for the variable year of study ($H = 14.03848$, $p = 0.0072$), and lack of necessary programs (licenses) for the year of study ($H = 12.03803$, $p = 0.0171$).

Similarly, the time of receiving information about the introduction of online learning differentiated the groups in the case of concerns: lack of understanding of the material ($H = 16.28212$, $p = 0.0010$); lack of time to write all the final papers ($H = 10.10009$, $p = 0.0177$), lack of a possibility to complete practical subjects ($H = 10.30307$, $p = 0.0162$) or lack of a possibility to settle formal matters ($H = 14.62538$, $p = 0.0022$), deterioration of health ($H = 19.64327$, $p = 0.0002$), increase in the cost of computer use ($H = 21.09237$, $p = 0.0001$) and incurring unjustified expenses ($H = 18.09804$, $p = 0.0004$).

The correlations between the examined variables were also checked by calculating the Spearman's correlation coefficient. The article does not include a table presenting all of the correlations due to the fact that in the vast majority of cases, the correlation turned out to be statistically insignificant. On the other hand, the low result of the correlation analysis concerned: the possibility of co-deciding on the form of conducting classes and concerns about the time for the completion of final papers, the course of the exam, the lack of help in understanding the teaching content. These variables have been listed with the usefulness of the information for future research in mind.

Changes were identified in the concerns experienced due to the introduction of online learning. In the case of many concerns, their degree has not changed over time. A decrease in concerns was noted in the organizational area (settling formal matters, shortening of holidays) and in the area related to classes, regarding credit (disruptions of the course of an exam, overlapping credit deadlines). An increase in concerns was found, however, in the case of a lack of understanding of the teaching content and monotonous conduction of classes (Figure 4).

Figure 4
Changes in the level of concerns related to the introduced change



Source: authors'own work.

Interestingly, the perception of the availability of teachers during online learning positively correlated with concerns about too many absences caused by problems with the Internet connection ($r_s = 0.17$, $p = 0.05$) and the lack of possibility to complete practical subjects ($r_s = 0.15$, $p = 0.05$). The number of classes conducted remotely was also statistically significant in relation to the perception of the lack of help in understanding the material ($r_s = 0.16$, $p = 0.05$). It seems that we can talk about the learning overload with this form of learning and about a kind of anxiety caused by the availability of the lecturer when compared to participation in classes (?).

When analyzing the significance of activities undertaken by the university and lecturers, it is worth paying attention to three of them, i.e. sharing library resources, technical support (providing hardware, software, licenses and assistance in their installation) and those concerning the classes (such as extending the deadlines for submitting term papers, making the lecturers' materials available). In the first case, the results of the Mann-Whitney U test indicate the significance of differences for concerns about: the lack of understanding of the material ($Z = 1.96$, $p = 0.049$), the amount of material for self-study ($Z = 2.08$, $p = 0.037$), and about too many absences caused by problems with the Internet connection ($Z = 3.40$, $p = 0.0006$). In the second case for: lack of understanding of the material ($Z = –2.57$, $p = 0.010$), overlapping credit deadlines ($Z = –2.26$, $p = 0.024$), and lack of possibility to complete practical subjects ($Z = –2.44$, $p = 0.015$). In the third case – the support provided by the lecturers – the importance was given to making own sources available and to the possibility of more frequent contact with the teacher, for concerns about unjustified expenses ($Z = 2.56$, $p = 0.010$), and extending the deadlines for final papers – for the lack of appropriate equipment to participate in classes ($Z = 2.53$, $p = 0.011$), and monotonous conduction of classes ($Z = 2.09$, $p = 0.036$).

It is worth supplementing the presentation of the research results by showing that 32% of the surveyed students liked the online form of classes more, but 68% of the respondents preferred classes conducted in a traditional way.

Summary

Based on the presented research results, taking into consideration the reduction of the uncertainty of the participants of the change and in order to reduce their concerns, people who implement online learning at universities are recommended to:

1. Ensure communication, for example by providing information regarding the change.
2. Involve students in making decisions related to the conducted transformations.

3. Adjust the content and method of teaching to the form of online learning.
4. Take care of social presence through the use of synchronous forms.
5. Limit the tools used, preferably to choose one.
6. Provide support in the field of technologies used, which enable participation in online learning, carrying out practical subjects, and in terms of substantive matters (e.g. access to library resources), which are conducive to learning.
7. Pay attention to students who are beginning their studies.

Taking into account the context of the pandemic situation, it can be noticed that most of the respondents started learning remotely within one to two weeks from the moment of the decision to introduce this form of learning. The transition to another form of learning seems to have taken place quickly, without preparation, and therefore in a manner not conducive to change. On the one hand, the question arises: is the external factor of change, forcing transformations and taking action, conducive to the elimination of negative reactions and the imposition of change? Or maybe the reason for changing the situation and the awareness that its implementation is conducive to meeting basic human needs (such as safety, health) is important? Therefore, the value of the factor forcing the change may be important for the participants. Providing positive answers to the above questions would confirm the thesis about an easier implementation of changes resulting from a crisis. On the other hand, taking into account the subject of the change, i.e. education, a question arises about the involvement of stakeholders in its implementation as early as the moment the crisis situation arises. Although this means postponing the implementation of the change, perhaps joint decision-making would be more conducive to positive feedback from participants and the learning outcomes achieved?

It should be added that the conducted research has limitations. These include: the lack of representativeness of the research sample, the declarative nature of the answers provided and the lack of participation of part-time students.

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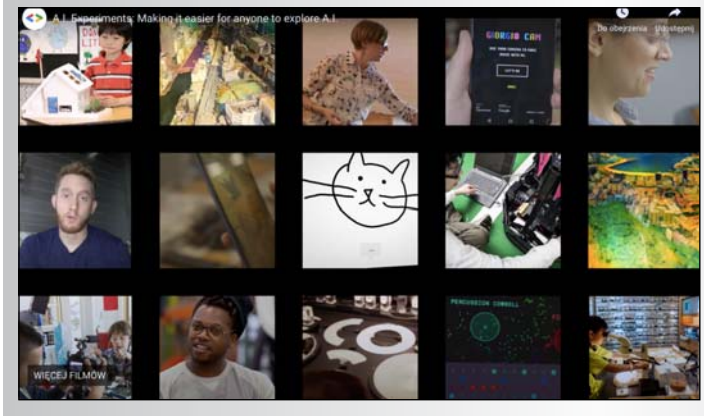

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The use of active learning methods to stimulate student activity in the online course

Abstract

The development of innovations and related changes in the labor market, as well as Ukraine's aspiration toward Euro integration, have led to the need for transformation of teaching media and methods in higher education. The consequence of this is a massive transition to e-learning, both in the native language and in English, which, however, creates psychological and pedagogical problems. These are difficulties for students with self-organization and self-training, establishing interpersonal contacts, maintaining the motivation to learn, and meeting a certain level of foreign language proficiency. The problems for teachers include the need to develop new teaching methods and technologies, changing the role of the teacher and the methods of interaction between participants in the educational process. The article presents the experience of mitigating these problems in the online course, "Fundamentals of Vehicle Certification" in Ukrainian and English by using active learning methods, innovative methods of motivation, and organization of reflection and communication, presenting some sections both in the native and foreign language. The introduction of this course into the educational process in the extramural form of education showed that the methods proposed by the authors reduced these problems, while the number of A and B grades increased. In addition, it was concluded that the effective use of online courses requires their preliminary approbation and further improvement, taking into account the characteristics of the discipline, experience and goals of the students.

Keywords: online course, extramural education, REAL (Rich Environments for Active Learning), active learning methods, gamification

Introduction

Currently, Ukraine is at the stage of reforming all branches of socio-economic activity because of its aspiration to enter the single European area, including the field of higher education. In this regard, within the framework of the Bologna process and in order to implement the Bologna Declaration, it is necessary to create conditions for strengthening the European principles of functioning of the national system of higher education, becoming closer to the systems of other countries of the Bologna process and increasing the responsibility of the main participants of the educational process for the results achieved. These factors, as well as rapid development of innovations and their widespread introduction in all areas of activity form new requirements for learning results. This leads to changes in conditions for specialist training and the need to develop congruent teaching mediums by transforming them into information and communication forms. One of such processes in modern pedagogy is the creation of online courses in both the native and English languages, and the actual problems of their application.

The State National Programme "Education. The 21st Century Ukraine" was established in this regard. It provides for the development of education based on new progressive concepts, the introduction of the latest pedagogical technologies, and scientific and methodological achievements into the educational process, the creation

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of a new system of education information support, and Ukraine's entry into the transcontinental computer information system (Moskalenko, 2015). To implement the programme, the Ministry of Education and Science of Ukraine (2013) introduced an electronic form of education and adopted the "Concept for the Development of Electronic Education in Ukraine".

Historically, education at a distance is represented in Ukraine by extramural education, when students are in a university for a short period of classroom-based orientation sessions (usually 2–3 weeks), then receive materials and assignments for independent work, which they hand in at the end of the semester (another 2–3 weeks). Avdeiuk and Aseeva (2011) mark out several significant drawbacks of this form of education: possibility to communicate directly with teachers is limited by sessions; in some cases, special educational content or its sufficient volume is absent; there is a focus on more hours of students' independent work; the majority of students lack the skills to organize independent work during the intersessional period. This means a lack of systematic training and its low efficiency.

It seems possible to minimize these drawbacks with the help of e-learning. However, despite its high popularity (for example, a third of students studied remotely in the United States in 2016 (McFarland et al., 2018), the market of online education in Ukraine is still in its forming stage. There are no statistics in Ukraine similar to the American ones, however, according to some signs, it can be stated that distance education is being actively developed. It is possible to get an educational degree through distance education (as a form of extramural education) at Ukrainian universities, but the volume of proposals is quite small. Distance learning technologies are developing most actively as additional methodological support for full-time and part-time forms of education.

At the same time, the limited experience in the use of distance learning in higher education in Ukraine has revealed a number of organizational, pedagogical, information-technological and psychological problems. The authors agree with Korobii (2014) that it is possible to solve these problems with the help of using active education methods. For example, Johnson et al. (2006) include problem-based learning, case-based learning, project-based learning, learning by design, inquiry learning, anchored instruction, team-based learning, and collaborative learning. However, their practical implementation requires teachers to create appropriate pedagogical conditions by choosing one or another pedagogical technology, organizing effective communication, using innovative methods of motivation, and organizing reflection. In addition, the development of online courses in both the native and English languages also requires a reconsideration of the teaching methodology, the model of activity and interaction of the subjects of the educational process, professional development of teachers, and exchange of methodological developments.

An important aspect of teacher activities is also studying the characteristics of students' perceptions of educational material during distance learning. It allows timely adjustments to be made and recommendations to be developed and increases the effectiveness of the educational process (Arnavut et al., 2019; Hamid & Yip, 2019).

In this regard, the purpose of the paper is to show the authors' method of mitigating the indicated problems by using various techniques and methods of intensifying students'activities in online courses, researching their effectiveness, and studying the feasibility of using online courses in both the native and English languages in extramural education.

Research methods

The authors studied the regulatory documents mentioned above and the theoretical foundations of developing distance learning courses, analyzed the experience of Ukrainian and foreign colleagues, and designed the "Fundamentals of Vehicle Certification" (FVC) course. After that, the authors conducted a closed, linear, formative pedagogical experiment in vivo for two academic years. In the first stage, the authors collected the characteristics of the control group using questionnaires and prepared the developed course for implementation. In the second stage, students were taught in this course, while in the third stage, the authors improved the course based on the results of students' surveys and invited them to study several sections in English. The experimental results and statistical data processing are described in detail in the Results and Discussion section.

Study context

The FVC online course is designed to train bachelors in the "Automobile transport" specialty. It is studied by 3-year students of full-time and extramural forms of education. According to the curriculum for bachelors developed by the Kharkiv National Automobile and Highway University, 180 hours are allocated for the study of the course. It contains 18 units (some of them are presented in English as well), but teachers are allowed to choose a subset of them depending on the curriculum changes. Educational materials (curriculum, methodology guides, PowerPoint presentations, text resources) were available throughout the semester.

Participants of the pedagogical experiment:

- control group: 15 students (from 25 to 42 years old) who studied in the traditional extramural form without using the online course in the 2016–2017 academic year;
- group 1: 16 students (from 22 to 38 years old) who studied in the online course in Ukrainian in the 2017–2018 academic year;
- group 2: 13 students (from 24 to 40 years old) who studied in the online course in Ukrainian and English in the academic year 2018–2019.

Student activities design

The specific character of the FVC online course suggests that a student must first study a large amount of general theoretical material in order to gain practical skills in the professional field. This factor also contributed to the fact that the authors chose methods of active learning, in particular, cooperative learning, to solve the problems mentioned above. According to Barkley et al. (2014), it can take the form of discussion, mutual learning, problem-solving, organization of information, writing and using games.

In this regard, developing the course, the authors aimed to create an environment as close as possible to REAL (Rich Environments for Active Learning), proposed and described by Grabinger and Dunlap (1995), since it is aimed at promoting learning in authentic contexts, encouraging student responsibility and initiatives, and cultivating collaboration among students and teachers. Grabinger and Dunlap (1995) also marked out the attributes of a REAL: student responsibility and initiative, generative learning activities, authentic learning contexts, authentic assessment strategies, and cooperative support. It is these attributes that the authors of the article sought to implement in their course.

The first attribute is fundamental, because students will not be able to actively develop their knowledge without taking responsibility and initiative for their training and shaping their actions around topics, not goals. It is crucial for students to monitor their progress, learn, correct their mistakes, and analyze the effectiveness of their learning strategies and change them when necessary. The most desirable way to organize reflection would be a weekly questionnaire and for the student to keep a journal where they would record their goals and the techniques which they have found to be effective in achieving them. However, the survey of 300 students of the 4th–5th years showed that only 10% of them set learning goals and analyzed their achievement and their practical significance for their professional activities. The rest either did not ask themselves such questions or were satisfied with the teacher's answer. In this regard, the authors organized reflection in the online FVC course by indirect methods.

Firstly, the goals for each lesson to a large extent reflect what should be remembered and identified, the main components of the activity to be recognized, its content, types, methods, problems, solutions, and results obtained, etc. Secondly, some direct elements of reflection are implemented in the course: weekly questions for self-assessment, pre-course and end of course questionnaires, compilation of memory cards. Thirdly, since reflection is a process of awareness of one's activity, its goal is to create new modes of activity. In the FVC online course, this is implemented in several assignments for the lessons. In addition, a test is also known to have a learning function, so it can also be attributed to indirect methods of organizing reflection. Fourthly, according to the concept of metacognition (Khalin, 2003), reflection can be reflected in tasks that require documentation and notes, and also enable tracking how the student's opinion has changed in the learning process. Forums with problematic questions serve this purpose in the course.

The second attribute of REAL – generative learning activity – implies that students cannot build or develop their knowledge-skills without generation through active participation. That is, for successful training, they must apply the information they are studying, and be deeply and constantly involved in solving real problems by developing and completing projects. In the FVC course, students are invited to complete 11 short-term projects with a duration of one week each, and one final project.

The third attribute of REAL – authentic learning contexts – requires students be not only provided with real problems and situations, but that solving these problems must also be realistic and include complex contexts that require the students to perform interrelated subtasks. They should identify the problem and resources, set priorities and explore alternative solutions with the same initial data, which may require a team approach. In the FVCcourse, 4 out of 11 projects are related to specific work situations that may arise in an automobile enterprise.

The fourth attribute of REAL – authentic assessment strategies – suggests that assessment standards should include complex, multifaceted criteria that can be defined and are reliable for several evaluators. Important criteria among them are project management, research, and project presentation. In order to evaluate these skills when working in a group, the FVC course takes into account the student's self-assessment, assessment of their work by the group leader and assessment of the leader's work by the team members. Taking into account the weighting coefficients of these components, the final system for assessing the work of each student can be adapted to the goals set, depending on the individual, team or competitive assessment system for the specific task.

The last attribute of REAL – cooperative support – is the quintessence of the idea of cooperative learning, which finds its expression in engineering education from short-term informal and formal group activities to long-term less or more structured group-based assignments (Gapinski, 2018).

The organization of teamwork and cooperation is especially relevant for extramural students who do not know each other well and have little contact with each other. In the FVC course, communication begins in the first week through a forum and chat dedicated to getting acquainted, and is supported throughout the course using the group projects described above, thematic forums, question-answer forums, reviews, news, and webinars.

The authors agree with Petrushanko et al. (2013) that discussion is a key teaching method that significantly activates the learning process. Correctly compiled informational materials play an extremely important role in organizing communication: a letter

of invitation to the discussion forum and the webinar, for example.

It is more difficult for the teacher to organize and support constructive communication during the webinar, as it takes place in real-time, and the lecturer needs, in addition to presenting the material, to quickly monitor the activity of the students in the chat, form and direct the discussion with leading questions, comment on individual messages, etc. Therefore, before the webinar, it is advisable for the tutor to compose a chat script.

In REAL, active communication and assignments with a problematic issue also have a motivational effect and attract students more because they want to find out its solution (Grabinger & Dunlap, 1995). Empirical studies conducted in various engineering courses have shown that students achieve significantly better results in cooperative learning (Nerona, 2017). However, taking into account the problems identified in Ukraine in the extramural and distance forms of education, the course authors considered it necessary to use additional methods to motivate the students.

According to the well-known concept about the source of motivation (Ilin, 2003), the educator in the process of his or her activity operates with external motivation and creates such conditions so that the student has internal motivation. Many researchers offer their systems and methods of motivating students in e-learning. The authors decided to combine several of them.

According to Pappas (2015), the FVC online course has: a questionnaire for assessing students at the entrance, clear measurable goals each week, real feedback (question-answer forums, news), support for the relevance of the course, and the formation of significant skills.

According to Sprenger (2014), the following motivation tools were used: whip (lack of evaluation, negative analysis of activities), carrot (rewards), law (learning conditions in the course), expert opinion (participation of the tutor in forums), and support of the tutor (emotions in communication, encouragement and praise in the forums, summarizing each week with an analysis of student activities, creating a welcoming atmosphere, private communication with low-performing students, support in self-respect).

The following methods were used to increase motivation during working with text, both in Ukrainian and in English: creation of a system of questions and questions-answers (self-assessment); discussion of the most difficult topics; the use of text structuring and compression tools, increasing its visibility and information content; immersion in the information space of the text, keywords and phrases; summary.

The system of situations that can occur in the activity when using the concepts and regularities obtained; reproductive activity, its patterns and alternatives; structuring and modelling of activities, including the process of task solving (creating algorithms, models of cognitive activity, mental experiment, etc.); tasks for search activity; hypotheses and questions-hints when solving problem or search tasks; discussion of results, analysis of reasons for the positive or negative consequences of training, the system of rewards and support, and bonuses were implemented to increase motivation in organizing practical activities.

Such methods as discussion on the topic; creating scenarios; discussion of open issues; taking into account the laws of communication and interaction; modeling a possible situation, and visualization were used in order to increase motivation in organizing communication and cooperation.

In addition, elements of gamification can be applied to encourage and maintain motivation at a high level. In the FVC online course, these are:

1. Ranks for success in training: Specialist (in certification); Engineer (in quality); Auditor (in certification of vehicles).
2. Each rank can be obtained in three medals: bronze (for 60% of points); silver (80%); gold (100%).
3. Additional ranks (badges) can be in unlimited quantities: Repeater Bird (for 30 chat messages); Tribune (20 posts in the forum); Chip and Dale (10 answers in Q&A forum); Encyclopedist (passing the test by 100%).

Such methods help create a diverse system of motivation, which attracts the interest of the maximum number of students of various categories and maintains this interest throughout the learning process.

Based on the foregoing, the authors compiled a detailed plan of the tutor's work at all stages of the students' training in the online course:

1. Before the start of the course: to remember its content and features of e-learning; to track possible changes in the area, to adjust the content; to study groups of students, their experience, goals; to discuss this information with the partner-tutor, to take into account his or her recommendations and wishes, and to correct it again if necessary.
2. The first week: to get in contact with the students; to assist in registration and provide other technical explanations; to post an organizational entry in the "News" forum, to draw students' attention to zero week; to motivate the completion of the pre-course questionnaire; to organize the "Getting Acquainted" chat.
3. During the educational process: to organize communication in forums, to assess the tasks and comments in a timely manner; to monitor the Q&A forum; to keep in touch with students who do not manage to study on schedule; to involve leaders in assessing other students; to give them reward points; to keep in touch with the partner-tutor.
4. Last week: to remind students of the test and the final test; to motivate the completion of the end of course questionnaire; to encourage participation in the "Reviews and suggestions" forum; to conduct a final assessment of the students.

5. After the course: to provide a report to the administration; to discuss the results with the partner tutor; to process the student profiles and their comments in the "Reviews and suggestions" forum; to adjust the course according to its results.

It is these actions that help the tutor fulfill his or her immediate functions, as well as to reduce the identified psychological and pedagogical problems.

Results and discussion

In order to evaluate the feasibility and effectiveness of using the online course in the extramural education accepted in Ukraine, the authors conducted a linear pedagogical experiment during two semesters of the 2017/2018 and 2018/2019 academic years. During the first year, the authors wanted to find out whether the course would contribute to greater progress among students compared to extramural education. For this, the authors took the academic results of the previous group as a basis and compared them with the results of the group that studied in the online course in the 2017/2018 academic year (Table 1).

To determine the statistical significance of the results obtained, the authors used nonparametric methods, namely, the Mann-Whitney criterion for independent samples, since the volume of both samples was rather small (less than 30 students in each group) and it is difficult to reliably estimate the law of the control characteristics distribution of the group at each stage of the experiment (Kulaichev, 2017). It was found that the differences could be considered significant for the grades of "C" (14% less) and "B" (11.5% more) at a significance level of 0.05.

The detailed analysis of the academic results showed that the simplest tasks for the students were those that required recall and awareness. 88% of students completed them with a "C" grade or higher. The most difficult tasks for the students were those that required a detailed answer with a multilateral analysis of the problem issue, as well as the development of a practical project (communication programs with clients, motivation of employees of a vehicle repair enterprise, testing of automotive equipment). Only 42% of students received a positive grade (65% of them – "C", 32% – "B", only 1 person managed to get an "A").

After that, the authors conducted a survey of the participants in the online course about their impressions and opinions about it. Overall, this survey confirmed the previously identified problems of e-learning. Although the students found it convenient to study at any time without being tied to a place, they also indicated difficulties with self-organization (28% of students), difficult complex tasks (66% of students), weak interest in forums and chat rooms (45% of students), and low involvement of the tutor (34% of students), the desirable availability of certain sections in English (30% of students).

The authors decided to modernize the course in order to eliminate these problems: to add detailed instructions to forums, to develop chat scripts, to offer tasks with projects for work in small groups, to introduce gamification elements, and to change the tutor's work plan. It was also decided to duplicate 3 units of the course in English, namely those that reflect the subject of the discipline at the international level. After that, the FVC online course became as described above. Then the authors tested the course again in the 2018/2019 academic year (Table 2) in order to evaluate the effectiveness of these changes.

According to the Mann-Whitney criterion, the changes in the "B" (7.5% less) and "A" (9% more) grades are statistically significant. On this basis, the authors can judge the positive impact of the chosen methods of activating students' activities. Compared to the control group, the differences for all grades are statistically significant, which indicates the effective-

Table 1
Students' academic results in the 2017/2018 academic year

E-learning, Group 1		Extramural Education, Control Group	
Grade	**Students %**	**Grade**	**Students %**
C (60–74)	28.5	C (60–74)	42.5
B (75–89)	56.0	B (75–89)	44.5
A (90–100)	15.5	A (90–100)	13.0

Source: authors' own work.

Table 2
Student academic results in the 2018/2019 academic year

E-learning, Group 2		E-learning, Group 1	
Grade	**Students %**	**Grade**	**Students %**
C (60–74)	27.0	C (60–74)	28.5
B (75–89)	48.5	B (75–89)	56.0
A (90–100)	24.5	A (90–100)	15.5

Source: authors' own work.

ness and appropriateness of using online courses in extramural education.

Regarding the units translated, the study showed that 16% of students opened pages in English, 60% of those students worked only with theoretical material, and 40% also worked with assignments. Only 5% of all students studied and fully completed the tasks of all three units in English. In addition, it was found that the average number of theoretical materials studied in English decreased from unit to unit (80%, 56% and 22%, respectively).

Also, the authors asked the participants to characterize the qualitative results that they received after studying in the FVC online course compared to the traditional extramural education. Students were asked to rate each criterion on the scale: "–3" – significantly less, "–2" – less, "–1" – slightly less, "0" – unchanged, "+1" – slightly more, "+2" – more, "+3"– much more. The average values of these criteria are shown in Table 3.

These data show that the methods used can eliminate the identified difficulties of students in studying in the online course.

The experience of the authors of this research showed that the design and use of online courses, regardless of the language, is a complex pedagogical task and requires an understanding of the specifics of e-learning. As a result, the educator needs to change not only the teaching methodology, but also the general model of his or her activity, as well as the methods of interaction of all participants in the educational process. In this case, the authors believe that it would be most rational to divide this task and introduce the roles of "course developer" and "tutor" individually. And effective use of online courses requires their preliminary approbation and further improvement, taking into account the characteristics of the academic discipline, the level of foreign language proficiency, and the experience and goals of the students.

Also, a hypothesis was declared, which was confirmed experimentally, that the use of online courses is more advisable in extramural education than its traditional form. However, it was also revealed that after improving the course and applying the small group method, students still consider complex educational projects to be too difficult. 74% of students received a positive grade (48% of them got a "C", 32% got a "B", 20% got an "A"). Having analyzed the Professional Standard of specialty 273 "Transport", as well as the requests of employers, the authors do not consider it possible to simplify such tasks or replace them with others. According to the authors' view, one of the solutions to this problem could be the use of blended learning.

It is worth noting that the effectiveness of duplication of some sections of the online course in English has not been confirmed. Despite the fact that a fairly large number of students indicated the desirability of duplication of certain sections into English in questionnaires, the percentage of students actually using these materials turned out to be much less (16%). Given the interest of students, it was decided not to remove sections in English from the course, but to leave them for facultative study.

In addition, the authors assumed that some psychological and pedagogical problems identified by other researchers could be mitigated by organizing effective communication, using innovative methods of motivation and organizing reflection. The introduction of the developed course in the educational process has shown the feasibility of these measures. The authors do not insist on the application of precisely those methods that are described in this paper. However, they consider using the methods of intensifying of students' activities in an online course absolutely necessary. Further research may be directed towards studying the influence of other methods on the success of training.

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Table 3

Qualitative indicators of academic results in the FVC online course

Criterion	Group 1	Group 2
Practical skills	More	Much more
Theoretical knowledge	Much more	Much more
Social activity	Unchanged	More
Relation to the profession	Slightly more	Slightly more
Interest in the discipline	Slightly more	More
Learning motivation	Unchanged	More

Source: authors' own work.

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Vaibhav Vashisht

Prashant Gautam

Learning analytics in synchronous online education: Making video conferencing more data-driven and interactivity-focused

Abstract

COVID-19 has been a turning point for online learning across the world, but the remarkable story has been the meteoric growth of synchronous or "live" online education. As instructors around the world have turned to video conferencing platforms to teach, a lot of instructor feedback has recently emerged on a variety of topics. One of the key emerging issues for instructors and institutions has been extracting and consolidating data on student engagement and learning outcomes.

This paper attempts to identify and classify the types of learning data required to understand student learning behavior in synchronous (or "live") online classes based on a multitude of factors such as immediacy, consolidation, and availability to different stakeholders at different points in time. Further, an attempt is made to assess how popular video conferencing platforms address the issues of data generation, presentation, and collation.

Lastly, the paper also proposes an alternative approach that can potentially help create data in an easier, more efficient manner.

Keywords: videoconferencing, online learning, learning analytics, students' data, synchronous education

Introduction

Much has changed in higher-ed instruction in the months following the COVID-19 outbreak. As per a faculty survey conducted by Inside Higher Ed and Gallup (Jaschik & Lederman, 2019, p. 11), only 3% of all instructors in the US had ever taught a synchronous online course. As we now know, this number grew manifold due to the social distancing requirements necessitated by the COVID-19 pandemic. It may be said that learner engagement was expected to be a challenge, and universities intuitively expected that enrolment and retention would be a further challenge. Therefore, it may not surprise many that the demand for learning analytics went up significantly during the pandemic. Two-thirds of all US universities reported an increase in the demand for learning analytics, as per an EDUCAUSE survey (Arnold et al., 2020).

Specifically, the largest increase in demand for data points was in technology usage (videoconferencing, LMS, accessibility tools, etc.). The goals of acquiring learning data varies from institution to institution depending on their ongoing and new challenges, and the context in which they operate. For example, a college or university that has historically struggled with student dropout may seek the data to inform their student success and retention initiatives, whereas another may wish to glean insights about how students are coping with the new modality of instruction. Of all the factors, "Assessment of student activity in online courses" was the most popular as per the survey, with 56% of all the institutions who participated in the survey indicating that it is one of the topics/issues most relevant to student success analytics right now.

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What is learning data and how is it used

Data in teaching and learning does not necessarily have to be digitized and stored in databases. In in-person instruction, much of the information regarding student engagement and course progress is never stored digitally. Often, this information is simply known to an instructor, who has the opportunity to meet students and observe them on a frequent basis. In other words, learning data is information about student engagement, whether it's stored via digital means or is simply known to a teacher.

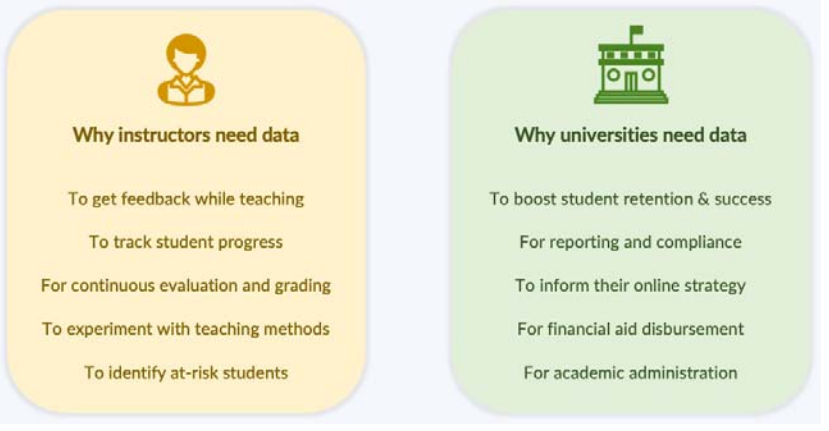
However, there is tremendous value in digitizing, organizing and storing learning data for use by all stakeholders in an organization. While professors can use learning data for purposes such as improving the quality of instruction, receiving immediate feedback from students, and continuous assessment over the course of an academic term, universities can derive several benefits from the data as well. It can be used for student success and retention, institutional accreditation activities, and the disbursement of scholarships and financial aid in a systematic manner.

Instructors' need for learning data

As teaching and learning moved to an online medium in March 2020, it was deemed necessary by the authors to identify the key challenges being faced by instructors. To do so, the authors devised a survey for higher education faculty. The survey was hosted online via Google Forms and the link was shared with verified faculty users of the Acadly app, a product developed and managed by the authors' company. All responses were collected in April 2020.

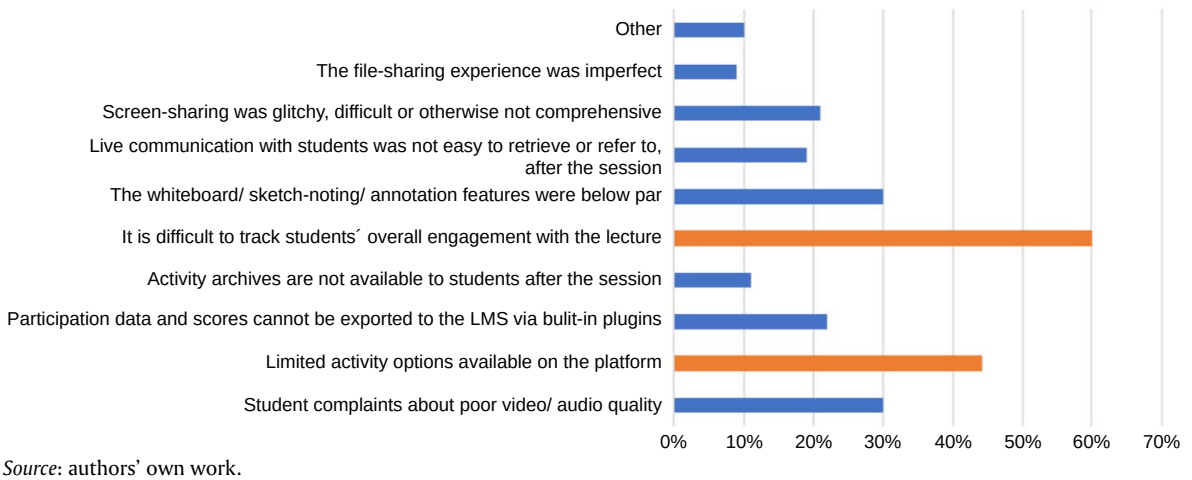
Of the survey respondents, 53% were from the US and Canada, 8% from Latin America, 15% from the EU region, 15% from India, and the others from the Middle East, Australia, and South Africa.

Figure 1
Utility of learning data in a higher education institution



Source: authors' own work.

Figure 2
Instructors' response to the question "If you are teaching, or have taught, synchronous online classes, please select all the issues you faced"



Source: authors' own work.

As illustrated by the survey, the problem selected most by instructors was the difficulty of tracking students' overall engagement with the lecture, an area that is closely related to the domain of learning analytics.

Written feedback was also received from a number of instructors (10% of the survey respondents selected "Other," at which point they were prompted to elaborate), and some of the frequently occurring themes are summarized here.

Data points instructors wish to have about online meeting

Attendance, participation, discussion, preparation, and performance are some of the key metrics that shed light on students' progress in online courses. To break these down, these are some of the common questions that instructors would like answers to:

- Who joined the online class meeting?
- How much of the online class meeting did the students attend?
- Who responded to the polls?
- Who responded to the quizzes?
- Who was active in the chat?
- Who was paying attention to the instructor's screen during the meeting?

It is not enough for the data to just exist (and it does not always exist)

The availability of learning data is only one of the factors around the need for data in boosting learning effectiveness. However, for the data to be truly valuable, there are several other considerations as well:

- the data must be easy to generate without needing too many tools;
- data should be automatically generated by the video conferencing/virtual classroom platform, whenever possible;
- it should be easy to access for the instructor – during and after their online class meetings; real-time availability of the data is necessary but not sufficient; post-class availability is crucial as well;
- it should be easy to access for other stakeholders in the university, such as department-level heads, Information Technology personnel, the Academic Technology team, Instructional Designers, Student Success teams, and others;
- it should be easy to store in the gradebook;
- it should be easy to base day-to-day decisions on.

Answering key questions regarding the data generated in an online class

The following table is a closer look at all the data points that are (or can be) generated every time a class is taught online. The abbreviation "VC" in the table refers to video-conferencing platforms.

As illustrated in Table 1, there are several gaps in how video conferencing platforms currently work, and what instructors and institutions need in terms of learning data. The key factor driving this is that video conferencing platforms have been created for the generic purposes of online meetings. Whether the context is a one-on-one meeting or a classroom, the current set of tools change very little and fall short on a number of factors, particularly with regards to how data is created, organized, and stored.

Table 1

Assessing the quality of learning data in an online class

Data Point	When is the data needed?	Does the instructor have it, using current VC tools?	Does theuniversity have it, using current VC tools?	Source of the data	How should the data be generated? Is instructor action needed?	How easy is it to consolidate and upload to the LMS?
1	2	3	4	5	6	7
Did the student show up?	During and after meeting	Rarely	Rarely	Videoconferencing (VC) platform	Automatically	Very difficult
How long were they there for?	After meeting	Rarely	Rarely	VC platform	Automatically	Very difficult
Who is absent?	During and after meeting	Never	Rarely	Unavailable	Automatically	Very difficult
How active was a student in the chat?	After meeting, usually	Never	Never	Popular VC platforms do not usually report this	Automatically	Impossible
How many times did a student raise their hand?	After meeting	Never	Never	Popular VC platforms do not usually report this	Automatically	Impossible

Table 1, continue

1	2	3	4	5	6	7
How important was a students' chat contribution?	After meeting	Never	Never	Popular VC platforms do not usually report this	Automatically	Impossible
What are the key themes of the discussion?	During and after meeting	Never	Never	Popular VC platforms do not usually report this	Automatically	Impossible
How robustly did a student participate in polls?	During and after meeting	Frequently	Never	VC platform or specialized polling tools	Needs instructor to share polls	Difficult using VC platforms, easier with polling tools
How timely was a student's poll participation?	During and after meeting	Frequently	Never	VC platform or specialized polling tools	Needs instructor to share polls	Difficult using VC platforms, easier with polling tools
How regular was a student's poll participation?	After meeting	Frequently	Never	VC platform or specialized polling tools	Needs instructor to share polls	Difficult using VC platforms, easier with polling tools
How useful was a student's verbal contribution?	During and after meeting	Rarely	Never	Managed manually by instructor	Needs instructor to input data into the LMS	Very difficult
How well did a student perform in quizzes/tests?	During and after meeting	Frequently	Frequently	LMS or specialized real-time quiz platforms	Needs instructor to share quizzes	Impossible using VC platforms, quizzes need to be created in the LMS
How was a student's performance on a per-question basis?	During and after meeting	Frequently	Frequently	LMS or specialized real-time quiz platforms	Needs instructor to share quizzes	Impossible using VC platforms, quizzes need to be created in the LMS
How thorough was a student's revision?	After meeting	Rarely. Data is not available post class.	Never	LMS	Automatically	Very difficult. Instructor must upload all material to the LMS for asynchronous engagement
Did absentees engage with what they missed?	After meeting	Rarely. Data is not available post class.	Never	LMS	Automatically	Very difficult. Instructor must upload all material to the LMS for asynchronous engagement

Source: authors' own work.

Proposed solution: A video-conferencing layer

As noted previously, the authors are creators of the Acadly product, which was launched in 2017 as a "Student Response System," which is the generic term used for products that help instructors boost engagement inside the classroom. Similar platforms include Kahoot, Socrative, Mentimeter, and Poll Everywhere, to name a few. While Acadly was developed as a solution for in-person teaching and learning, the pandemic necessitated a change in the approach to create a product more suitable to synchronous online learning. Currently, about 80% of Acadly's users are from universities in the US, Canada, and the EU.

Based on the survey referenced in Figure 2, Acadly's online version was developed and launched in August 2020, with support for video conferencing via integration with Zoom.

While Acadly retains the video broadcasting portion of the Zoom platform, everything else is replaced by Acadly's own course components. For example, the Zoom chat and Zoom polls are no longer available when instructors use Acadly. Instead, these are replaced by Acadly's own chat and polling options, respectively. Instructors can use Acadly to share

Figure 3
How Acadly tackles the issues of learning data generation and consolidation

Source: authors' own work.

quizzes, polls, word clouds, and videos with students during online classes. It also includes an automatic attendance tracker. It integrates with LMSs like Canvas and Blackboard, and sends all learning data back to the LMS gradebook.

Creating a "skin", or frontend, for a video conferencing platform gives the platform control over several components of the lessons. Notably, all the data points mentioned in Table 1 are collected and consolidated by Acadly automatically. While some of them are available in real-time (during the meeting), others can be exported for analysis after the meeting.

How Acadly works for virtual teaching and learning

The Acadly platform aids virtual teaching and learning on both desktops/laptops as well as mobile platforms. Specifically, in the virtual learning scenario, Acadly delivers the video conferencing via its integration with Zoom, and adds teaching and learning elements of its own, as shown in the following figures and sections.

As shown in Figure 4, the maximizable "Video" unit is powered by Acadly's integration with Zoom, but there are notable additions to the interface from a teaching and learning perspective:

Attendance

The attendance section on the class page in Acadly helps instructors keep track of absenteeism without putting in additional effort. The platform supports a number of attendance-tracking mechanisms out-of-the-box:

- Check-in-based attendance: Tracks students who log in to the class at least once;
- Watch time-based attendance: Tracks the duration for which a student attended the session;
- Action-based attendance: The instructor can launch an "Are you watching?" prompt that

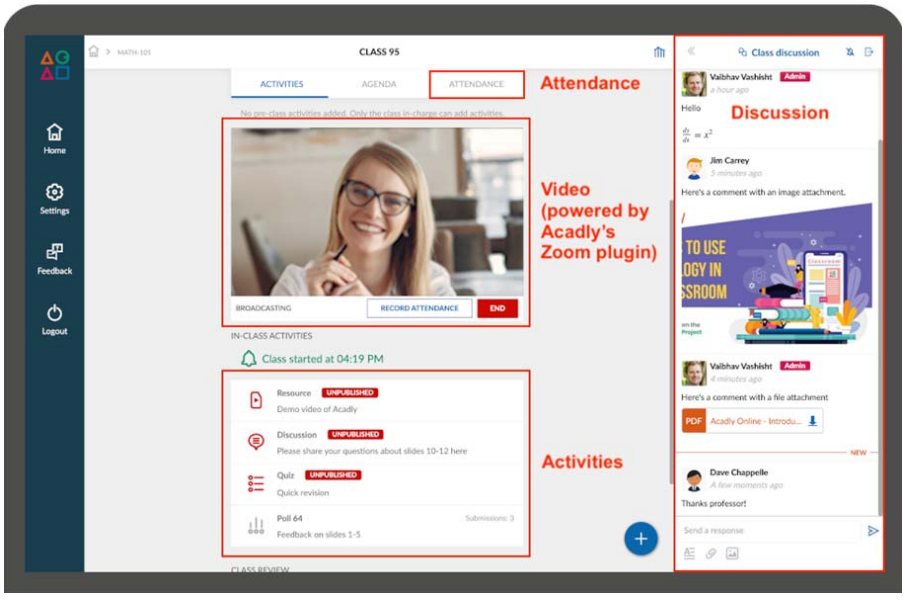


Figure 4
Acadly with Zoom integration – the "Class page"

Source: authors' own work.

appears on students' screens silently. If a student is watching the lecture, they simply need to tap a button on the pop-up on their screens to confirm their presence;
- Manual: The instructor can mark students present, absent, late, or excused manually as well.

Activities

Acadly includes the following activity options that instructors can use to engage their students:
- Polls: Include options such as anonymity, timers, and dedicated discussion threads;
- Quizzes: Include options such as automatic grading, and an on-screen timer;
- Word Clouds: The instructor can summarize open-ended textual feedback from students in the form of "Word Clouds" or a plot of words with sizes proportional to the frequency of their appearance in the discussion;
- Discussions: The instructor can ask students to respond to questions in an open-ended manner;
- Resources: Resources are files, videos, and links that an instructor may want to share with the class.

When a student or instructor navigates to an activity page or attendance page, Acadly minimizes the video unit to a picture-in-picture mode, as shown in Figures 5 and 6.

Figure 5
The attendance section in Acadly

Source: authors' own work.

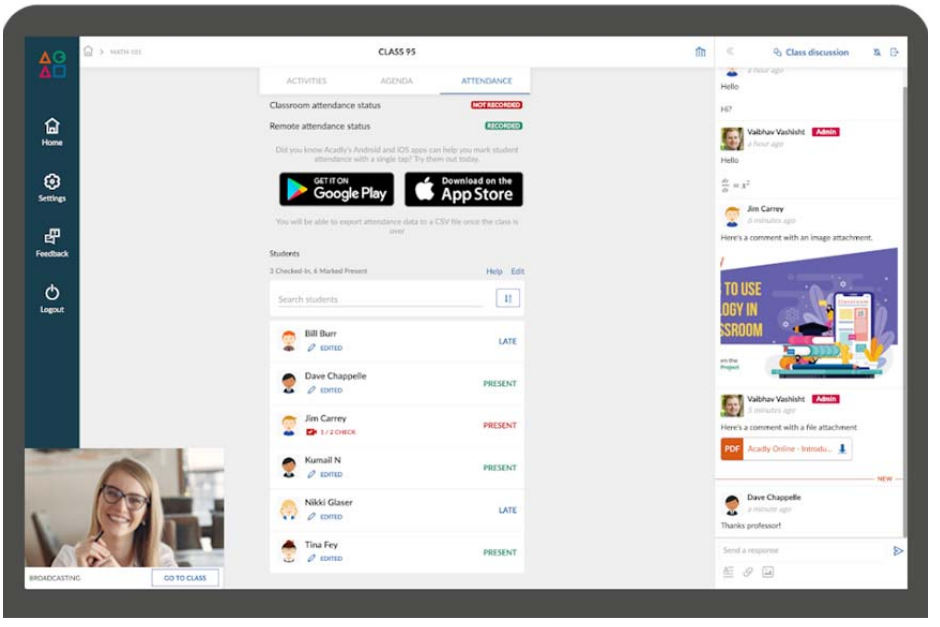
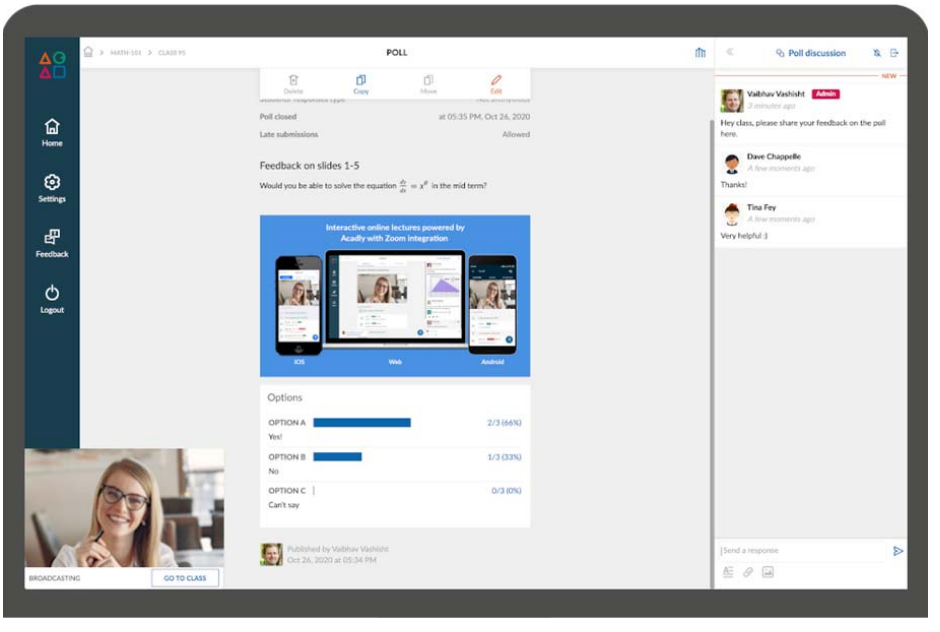


Figure 6
Activities in Acadly (shown in the image below – polls)

Source: authors' own work.



Discussions

The discussions section on the right is meant for communication between the course team members and students, and is built from the ground up without using any of the elements of the Zoom discussion feature. Comments can include mathematical equations and image/file attachments. More importantly, the discussions are not automatically erased after the meeting ends and can continue beyond the lecture hours as well.

Post-class availability

One of the emerging concerns with video conferencing platforms is that neither the activities nor the discussions stay active after an online class meeting. Acadly addresses this by automatically creating class archives, retaining all activities, discussions, and meeting recordings in an organized manner. All the activities created on Acadly can be copied and reused by instructors in the in-person teaching and learning as well. Therefore, any effort spent on the platform can serve to aid post-COVID eventualities too.

Transferring data to the LMS using the LTI standard

The Learning Tools Interoperability (LTI) standard was developed by IMS, a non-profit alliance of education technology tools providers for institutions of higher education. The LTI standard helps education technology platforms connect to the LMS to provide a variety of administration tasks in an automated manner. Tools like Acadly can leverage the LTI standard to link deeply with LMSs and transfer data to the LMS gradebook. Notable LMS providers that support the LTI standard include Moodle, Blackboard, Canvas, Brightspace (formerly known as Desire2Learn), and Sakai.

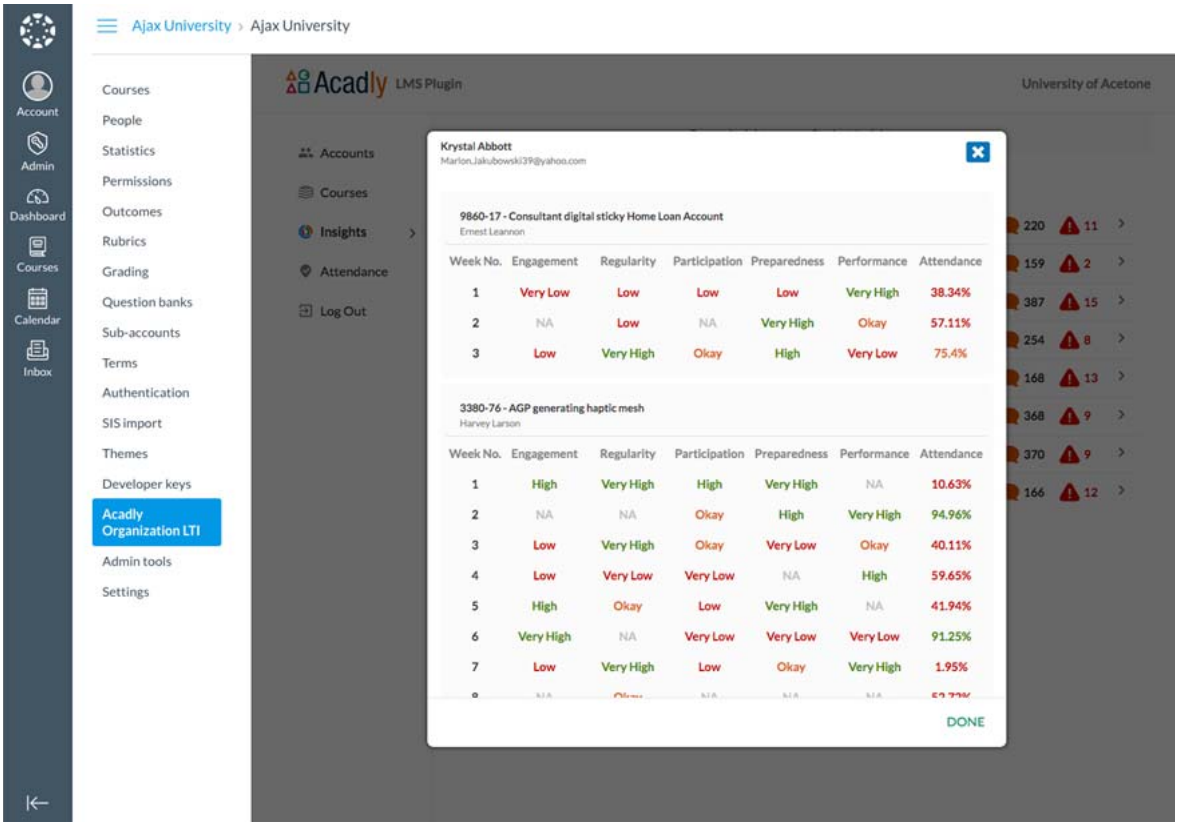
This has notable ramifications for online learning analytics. All data generated during an online meeting can be "synced" or automatically transferred to the LMS by LTI-compatible tools. Leveraging the standard increases the value of the data for all stakeholders in the system.

The Acadly platform uses the LTI standard to make all data regarding attendance, discussions, poll participation, and quiz performance transferable to the LMS with little effort. This can serve as a blueprint for how video conferencing platforms can evolve to better address the online learning needs of a higher education institution.

Conclusions

Given the nascent state of synchronous online teaching and learning, deficiencies in video conferencing platforms from the education perspective are to be

Figure 7
Acadly's LMS plugin



Source: authors' own work.

expected. However, as synchronous learning grows, providers must adapt to the new needs, which can be expected to continue for not only the foreseeable future, but also well beyond the pandemic.

Learning Analytics must be a focal point of conversations on online education, and video conferencing platforms can leverage existing standards such the LTI standard to integrate closely with Learning Management Systems, which are used by several universities.

For video conferencing platforms, an important step in their evolution will be to help universities and instructors acquire learning data that is crucial for the improvement of the quality of education and student success. Tools such as Acadly provide a blueprint for such growth, but the work on this front can still be considered formative and introductory.

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We recommend

Student Feedback in Online Courses – from the Acadly blog

Much has changed in instruction in the last few months, but a lot seems to be the same. Educators perhaps knew that learner engagement would be a challenge, universities and training businesses *certainly* knew that enrollment and retention would be a challenge, and learners may have guessed that attending classes on Zoom wouldn't be the same… this was all intuitive.

Here's the counter intuitive bit: in spite of teaching and learning becoming largely digital, there seems to be lesser data at the end of it all. In teaching and learning, much of the data generated is never stored on a computer. Instead, it often exists in the place where it matters most — the instructor's mind.

However, as things stand today, universities and instructors have little-to-no visibility into crucial data such as virtual class attendance, participation, performance, communication, and student engagement outside of online meetings. Even if this information is available, it is in silos and tough to consolidate.

This blog post along with many other valuable resources can be found at **https://blog.acadly.com**

Dorina Tila

Shifting to blended online learning and its impact on student performance: A case study for students enrolled in economic courses prior to COVID-19 emergency remote instruction

Abstract

This study explores whether student academic performance differs between the face-to-face and online hybrid sections in an undergraduate introductory macroeconomic course offered at a US community college. The data was collected from 414 students enrolled in various sections of the course during five semesters from spring 2016 to fall 2018. The findings show no statistical difference in student performance between face-to-face and online hybrid courses and contribute to the literature specific to the discipline of economics, which unlike other disciplines, has shown discord in findings. The usefulness of such results may extend to US higher education institutions to help them make data-informed decisions about their future investments in online teaching modalities and course design in the discipline of economics.

Keywords: blended learning, hybrid learning, distance learning, online learning, students' performance

Introduction

Technology has affected various industries provoking a variety of feelings, including euphoria of achieving things unthinkable before, satisfaction of being more efficient, frustration of not knowing the new, as well as excitement of learning the new. Education is not excluded from such an experience. While the impact of technology on education includes a spring of topics, this particular study investigates whether student performance is impacted by the use of online instruction, facilitated through technology. This topic is even more vital at the time that COVID-19 pandemic has affected over four thousand US colleges and over 25 million students enrolled in those colleges (Entangled Solutions, 2020) and about 1.3 billion students worldwide (McCarthy, 2020). When face-to-face teaching is replaced with online, the fear is whether student performance may suffer. For example, Allen and Seaman (2006) reported that only 29% of surveyed faculty considered that online courses were able to fulfill learning outcomes the same or better compared to face-to-face courses. In deciding about future investments in online instruction, it is important to make data-informed decisions. This study provides discipline-specific data and pandemic-free data since it was collected in economics courses offered at a US community college during five semesters between spring 2016 to fall 2018. The importance of pandemic-free data is supported also by Hodges et al. (2020), who provides the distinct differences between online instruction and emergency remote instruction that was implemented during spring 2020. The emergency remote instruction was not planned and designed to be performed in an online delivery and, it is not a true representation of a well-designed and well-planned online instruction. While the main purpose of the study is to compare student academic performance in face-to-face and online blended instruction, the usefulness of this contribution extends to the literature in the discipline of economics and to educators' decisions regarding these teaching modalities.

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The traditional modality of content delivery has been face-to-face instruction, but with the advancement of technology and emerging student needs to balance work, family, and school, alternative modes of delivery have been adopted. Depending on the extent of technology use, online activities, and in-person interaction, courses can be distinguished by several categories. Face-to-face courses use in-person instruction with minimal use of technology. However, when instruction is delivered through a combination of in-person and online delivery, it is considered hybrid or blended. The terms "blended" and "hybrid" will be used interchangeably for the purpose of this paper. Specifically, Allen et al. (2007) define it as having "between 30 percent to 79 percent of the course content delivered online" (p. 5). Fortin et al. (2019) supplement this definition by clarifying that online hybrid courses do not simply mean replacement of delivery mode and provision of the same material in an online environment, but also including learning activities dispensed online. This is an important distinction because, as will be shown in the literature review, most older studies dispense content and material online without adding any online activities, such as the online discussions that were implemented in this study. This is another important reason why this study contributes to the literature by using an updated definition of online instruction. Other distinctions are made between synchronous and asynchronous instructions of complete online delivery, which are out-of-scope for the purpose of this paper exploring partial online delivery in hybrid sections.

The demand for these other alternative teaching modalities was increasing prior to the COVID-19 pandemic. Seaman et al. (2018) reported continuous growth in annual distance learning enrolments in US higher education from 2012 to 2016, with a 2016 annual growth rate of 5.6%, while overall student enrolment was declining. The demand for online and hybrid courses experienced growth also in the community college where this study was performed. For example, the "2016 Student Experience Survey" provides a glimpse of students' preference for an increase in the supply of online and hybrid sections in the CUNY system, which is the largest urban public university system in the US with an enrolment of 275,000 students as of 2017. About 45 percent of the respondents reported that they would like their institution to offer more hybrid courses, which is an indication of demand being higher than supply. This scarcity in hybrid courses leads US educational institutions to ponder whether they should increase the supply of such alternative teaching modalities and whether they provide similar value compared to traditional face-to-face instruction. According to Pew Research's surveys conducted on 1,055 US higher education institutions during spring 2011, 51% of the participating presidents considered that online courses are just as valuable as face-to-face courses compared to 29% of the general public (Parker et al., 2011). Allen and Seaman (2006) reported a similar discrepancy in opinions whereby 71% of the participating administrators compared to 29% of the participating faculty considered that learning outcomes were fulfilled the same or better in online courses compared to face-to-face. While this shows a discord in opinions between administration and faculty regarding the quality of online instruction and its equivalence to traditional in-person instruction, scholars have been analyzing this question for several decades. Studies comparing the success of different learning modes are not scarce as expected by the growing effect of technology on our lives. However, these studies differ in context and discipline, definition and implementation of learning mode, limitations of analyses including biases as well as small sample sizes. More importantly, as shown in the literature review, scholars have not reached a converging conclusion on whether online instruction affects students' learning and academic success in the specific discipline of economics.

This study aims to assess the efficacy of online blended instruction compared to face-to-face instruction in the discipline of economics, for which there is no convergence in scholarly opinion and empirical studies' findings. Furthermore, the investigation of this question becomes useful during the time of a pandemic that has led educational institutions to invest more in online instruction and may help them make data-informed decisions in the long-term regarding online instruction in the discipline of economics.

Literature review

Levy (2017) explains some benefits of online learning, specifically for community college students, such as fostering digital readiness, nurturing professionalism, and encouraging the independent learning which are the right ingredients to succeed in a digitally driven workplace. Crawley (2015) explains several benefits associated with hybrid courses, such as building community, helping diverse learners and preparing students for the workforce. Other benefits listed are schedule flexibility and balancing work, family, and school (Gould, 2003; Jackson & Helms, 2008). The benefits derived from the blend of both online and in-class instruction may explain why hybrid courses are the preferred choice among students. Marquis and Ghosh (2017) found that over 50 percent of the students surveyed in their study preferred the hybrid course compared to only 20 percent preferring a face-to-face course. Nollenberger (2017) found similar results from the survey completed by students enrolled in its Master in Public Administration program at Midwestern University. Students valued the benefits of online learning while still preferring traditional in-class teaching, thus making the hybrid teaching mode the one to offer the greatest promise.

While demand and preference for hybrid courses had an increasing trend prior to the pandemic, as shown in US enrolment data reported by Seaman et al. (2018), several studies have investigated the question of whether the delivery format leads to differences in

student performance. Some studies show that hybrid courses may improve performance, which might be due to the offering of flexibility and more options of communication that allows different types of students to showcase their abilities (Dziuban & Moskal, 2001; Gould, 2003; Martyn, 2003; Tseng & Walsh, 2016; Vaughan, 2007). But the majority of studies have shown no significant difference in students' performance between online hybrid courses and traditional face-to-face instruction (Cosgrove & Olitsky, 2015; Gerlich & Sollosy, 2011; Keller et al., 2009; Utts et al., 2003; Ward, 2004). Such "no-significance" findings are strongly evidenced by several meta-analysis studies, such as Means et al. (2010) looking at empirical studies between 1996 and 2008; Bernard et al. (2004) looking at studies between 1985 and 2002; and Vo et al. (2017) looking at studies between 2001 and 2015 covering a range of disciplines such as health and medicine, English literature, psychology, environmental studies, law, etc.

Unlike other disciplines, most studies in economics found a significant difference in favor of face-to-face instruction. The findings from the meta-analysis of Sohn and Romal (2015), reviewing articles published from 2000 to 2012, showed statistically significant higher performances in face-to-face compared to online undergraduate economic courses offered in US higher education. Focusing on specific studies, Brown and Liedholm (2002) analyzed a dataset of 710 students enrolled in the Principles of Microeconomics courses during fall 2000 and found that face-to-face instruction produced better results in terms of exam scores, compared to hybrid and online instruction. Their study did not address instructor bias, as face-to-face and hybrid were taught by different instructors. Also, the hybrid course was supplemented with online materials, such as PowerPoints and practice materials, without offering additional online activities. Coates et al. (2004) compared the scores on the Test of Understanding College Economics (TUCE) of students enrolled in principles of economics courses in three US higher education institutions. The findings showed that students enrolled in face-to-face courses scored higher. The study used a small size sample of less than 100 students, 67 and 59 for face-to-face and online, respectively. Gratton-Lavoie and Stanley (2009) had similar findings in their study of 98 students enrolled in face-to-face courses and 58 students enrolled in online courses of principles of microeconomics at California State University during fall 2001 through fall 2003, again representing a small sample size.

Only a minority of studies to date found no significant difference between face-to-face and online instruction in economics (Bennett et al., 2007; Dendir, 2019; Navarro & Shoemaker, 2000). Navarro and Shoemaker (2000) collected data from 200 students enrolled in a Principles of Macroeconomic course during 1998–1999 and found that students in online modalities outperformed students enrolled in a traditional face-to-face course by using the scores of an identical final exam comprised of a short essay question. This old study had some similarities with the current study as it did integrate online discussions, but they were synchronous rather than asynchronous. Bennett et al. (2007) provides some peculiar results using data from 406 students enrolled in face-to-face courses and 92 enrolled in online courses at Jacksonville State University during fall 1999. The face-to-face instruction outperformed the online instruction in microeconomics, while the opposite was true for macroeconomics. The researchers argued that the difference may have resulted from the more quantitative aspect of microeconomics. The study does not show whether there were any differences in the instructional design between the different modalities which makes these findings difficult to interpret.

This study contributes to this literature by encompassing all of the following features that were missing from prior studies: 1) this is a semi-experimental design comparing control and experiment groups that are analyzed for statistical difference by applying parametric and nonparametric tests; 2) the subjects are all enrolled in the same course taught by the same instructor in various semesters, thereby minimizing subject or instructor bias; 3) the sample pool is large, comprised of 414 students enrolled at one of the largest community colleges in New York City; 4) the data covers a long period of five semesters prior to COVID-19; 5) the online hybrid instructional design includes online activities that utilize the online environment; and 6) the data is up-to-date and provides a fresh view of the efficacy of the hybrid teaching modality in the discipline of economics.

The findings of this study support the argument that shifting to online hybrid economic courses does not inhibit student learning while it includes the associated benefits. This provides a good argument to ponder over the possibility of moving forward into fully online teaching in the long term.

Study description and methods

Data was collected from 414 students enrolled in twelve Principles of Macroeconomics sections at City University of New York (CUNY) Kingsborough Community College during five semesters from spring 2016 to fall 2018. Principles of Macroeconomics is a core curriculum course for most of the Department of Business AAS program degrees at CUNY Kingsborough Community College, and an elective for other majors. Data was collected from 150 students enrolled in hybrid sections, known as the experimental group, and 294 students enrolled in traditional face-to-face instructional courses, known as the control group. All sections were taught by the same instructor. Students were able to see the teaching modality prior to enrolling and they could select the section based on their preferences and the availability of seats. At the beginning of the semester, the students were given the syllabus and were informed that they were enrolled in a hybrid or face-to-face section and were able to change class without penalty. Table 1 shows

the student enrolment in the control and experimental sections for each of the five semesters. Out of 414 students initially enrolled, only 382 students successfully completed the course while 32 withdrew from the course. The difference in attrition rates between the two groups is discussed in the results section.

Table 2 shows the distinction between the control and experimental groups. The traditional face-to-face sections (control group) consisted of 36 1-hour teaching sessions taught three times a week, while each hybrid section (experimental group) consisted of 24 1-hour teaching sessions taught twice a week with an added online component. All teaching sessions consisted of a mix of lectures, class discussions, and organized group work. The learning objectives, the course material and its organization were the same in both types of learning environments. Topics were divided into four modules, and each module contained two assignments. All eight assignments were administered via a Learning Management System (LMS), specifically Blackboard. All quizzes and final exams were administered in class with the use of traditional paper and pencil.

The hybrid course used Blackboard to host additional course materials and various discussion forums that allowed the students to participate in asynchronous dialogues, which was not provided in face-to-face (F2F). In the hybrid sections, the students were required to respond to bi-monthly discussion questions. The instructor would post a question, such as graph the real GDP of a country and identify its most recent recession. The student would write their answer to the question and respond to at least one other peer. The instructor participated in the asynchronous discussion throughout the two-week period and provided a grade followed by an extensive and customized feedback. While students' posts and instructor's responses were visible to the whole class, the customized feedback was visible only to the addressee. These online discussions were not available to the students enrolled in F2F and were replaced with in-class quizzes. Hence, the hybrid sections had a fundamental difference in their instructional design. The one hour a week that was shifted from face-to-face meetings to online instruction utilized the online environment not solely by placing material online, but also by adding additional online activities (i.e., online discussions). As shown in Table 2, the hybrid sections replaced the in-class quizzes with online discussion forums, which comprised 30 percent of the course grade.

The hybrid courses had a change in their instructional design as some aspects of face-to-face instruction were replaced with online activities, such as online asynchronous discussions. The instructor considered this particular instructional design based on the academic freedom and the belief that online asynchronous discussions would meet the learning objectives by giving students different modes of expressing economic arguments that may help shy students (Gould, 2003). Other benefits of online discussions have been previously identified. For example,

Table 1

Student participation in traditional face-to-face and hybrid courses

Semester	Control group Traditional face-to-face	Experimental group hybrid	Total
Spring 2016	36	30	66
Spring 2017	39	30	69
Fall 2017	111	28	139
Spring 2018	39	32	71
Fall 2018	39	30	69
Total no. of students	264	150	414

[*] *Note that no data is provided for fall 2016 since the instructor was not teaching during that semester.*

Source: author's own work.

Table 2

Settings for face-to-face and hybrid courses

Course settings	Control group face-to-face	Experimental group hybrid
Number of in-class Quizzes (30 percent)	4	0
Number of Online Discussion Forums (30 percent) [*]	0	6
Number of assignments [*]	8	8
Weekly 1-hour in-class teaching sessions	3	2

Note: (*) Administered online through LMS.

Source: author's own work.

Hammond's meta-analysis study listed various benefits of asynchronous online discussions identified from studies across different locations and disciplines, such as health and medicine, English literature, psychology, environmental studies, and law. Such benefits included providing opportunities for interaction between learners, increasing of online student engagement and instructor presence, and creating a sense of community (Hammond, 2005). This is also in alignment with a generally accepted online hybrid course as shown by Allen et al. (2007) classification of hybrid as a "substantial proportion of the content is delivered online, typically uses online discussions, and typically has some face-to-face meetings" (p. 6). This provides the reasoning for crafting such instructional design to include online discussions, but it does not serve to evaluate its efficacy. The purpose of this study is not to evaluate the use of online discussions in isolation, but the efficacy of whole hybrid course in comparison to face-to-face, including all of the online learning activities.

The data was collected and analyzed as part of the "Assessing Students' Performance on Multiple Entry Assignments" project which aimed at analyzing students' performance when they were allowed to revise some of their multiple-choice assignments in hybrid and face-to-face courses (Tila & Levy, 2020). During this data analysis, it was found that there was no statistical change in students' performance between hybrid and F2F courses, which was the seed of this paper. Participants received an oral and internet-based consent form regarding student data collection during the first two weeks of classes and online through Blackboard. The consent form described the voluntary participation and the anonymous aspect of the data collected, assured that data collection and analysis would be conducted only after grades were posted, and confirmed the deletion of all students' personal information prior to analysis.

Limitations

This study collected a large sample across various semesters and successfully overcame some limitations, such as instructor bias, by selecting sections taught by the same faculty, and content bias, by selecting different sections of the same course. However, self-selection bias was limited but not eliminated. Students could self-select which section to register based on their preferences and the availability of seat. This may have created differences between samples that might potentially affect the results. Such self-selection bias has been present throughout the prior studies with the exception of a few, which allowed random assignment (Arias et al., 2018). However, as reported by these researchers, such a technique created another layer of selection bias because the students who decide to participate in this random selection do self-select.

Other limitations were addressed, such as student seniority, meaning which year of their undergraduate degree they were completing based on credits accumulated. Table 3 shows that 67% of the students enrolled in face-to-face sections and 65% of the students enrolled in hybrid section were freshmen, meaning in their first year of study. A two-tail t-test shows no statistical differences between the control and experimental groups ($p < 0.62$), suggesting that there was no selection bias based on student seniority. This suggests that any difference in students' performance, or lack thereof, is not attributed to the sample difference in terms of student seniority.

Demographic, gender, race and ethnicity data could have provided some understanding on whether the samples were different due to self-selection bias. The instructor reports to have witnessed no difference between the two sample groups, however, the collection of such data was not available to the researcher. Therefore, the data was analyzed collectively, segregated solely by the online instruction factor in the experimental and control groups.

Results

This study analyzed the impact of teaching modalities on students' performance, specifically traditional face-to-face versus hybrid courses. The data spans a three-year period (five semesters) from 2016 to 2018. The final exam grades and the course grades were collected from 414 students at Kingsborough Community College enrolled in traditional F2F and hybrid sections. The letter grades were translated into a scale ranging from A to F (or a 1 – 5 score), similar to a Likert score, as shown in Table 4. Students who did not complete the course but withdrew, received a "W" letter which is categorized as "W" and distinguished from a failing grade F.

Once the grades were scored between five letters A through W, Figure 2 shows the grade frequency between the two learning environments. The students'

Table 3
Student year of studies / seniority (percentages)

Semester	Control group Traditional face-to-face		Experimental group hybrid	
	Freshmen	Sophomores	Freshmen	Sophomores
Total no. of students	177	87	97	53
Total (percentages)	67%	33%	65%	35%

Source: author's own work.

Table 4
Grade conversion to Likert scale

Letter grade	Letter grade	Score
A+ A A–	A	5
B+ B B–	B	4
C+ C C–	C	3
D+ D D–	D	2
F	F	1
W	W	0

Source: author's own work.

performance was measured through their final grade in the course but also through their grade in the final exam. Both the control and experimental groups completed a similar final exam. Table 5 and Figure 1 show a withdrawal rate of 12.67 percent in the hybrid courses compared to 4.92 percent in the traditional F2F courses, suggesting that hybrid courses experience a higher attrition rate. However, the reason for such withdrawals is not known. Table 5 provides the course grade distribution for each group: control and experimental. The results show a higher percentage of students (35.86%) in the face-to-face sections obtained an A, compared to the hybrid sections (26.72%). Figure 1 shows the graphical results of Table 5 and includes the standard deviation error bars. Such standard deviation error bars overlap, which indicates that most likely such differences are not statistically significant. As will be shown in the next section, parametric and nonparametric statistical tests are performed to draw a definite conclusion to this suggestion.

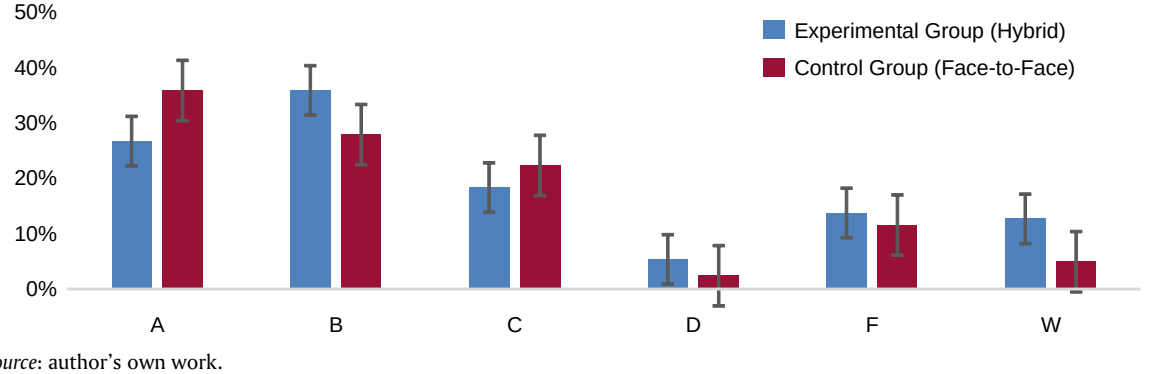
Figure 2 provides the final exam grade distribution for each group: control and experimental. The results show a higher percentage of students (27.09%) in the face-to-face sections obtained an A, compared to the hybrid sections (18.32%). The standard deviation error bars, shown in Figure 2, do not always overlap (e.g.,

Table 5
Macroeconomics course grade distribution (percentages)

Course format	Course grade						
	Observations (N)	A (%)	B (%)	C (%)	D (%)	F (%)	W (%)
Control (face-to-face)	264	90 (35.86)	70 (27.89%)	56 (22.31%)	6 (2.39%)	29 (11.55%)	13 (4.92%)
Experimental (hybrid treatment)	150	35 (26.72%)	47 (35.88%)	24 (18.32%)	7 (5.34%)	18 (13.74%)	19 (12.67%)
Total	414	125 (31.65%)	117 (29.62%)	80 (20.25%)	13 (3.29%)	47 (11.90%)	32 (8.10%)

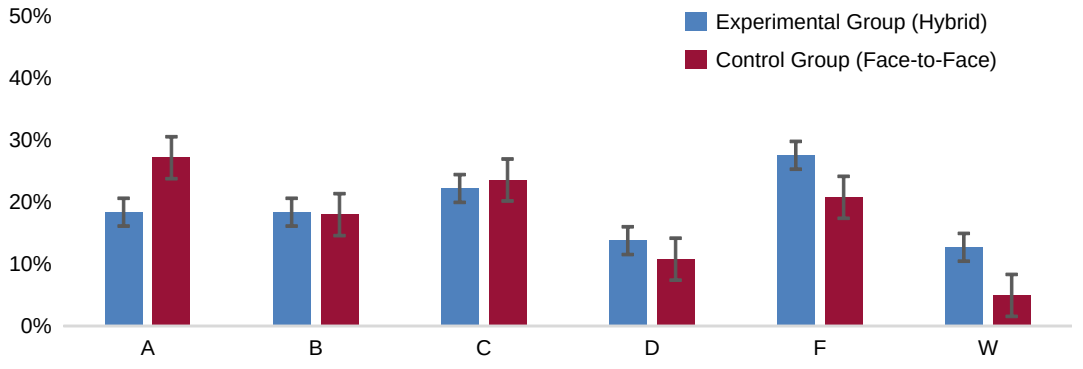
Source: author's own work.

Figure 1
Macroeconomics Course grade distribution (oercentages)



Source: author's own work.

Figure 2
Macroeconomics final exam grade distribution (percentages)



Source: author's own work.

grade A). This provides a clue that such a difference might be statistically significant. As will be shown in the next section, parametric and nonparametric statistical tests were performed to draw a definite conclusion to this suggestion.

Even though the data in Figures 1 and 2 show that course and final exam grades are higher in traditional F2F compared to hybrid courses, it does not confirm that such differences are statistically significant. Therefore, a two sample two-tail t-test was run with the null hypothesis being that the sample of grades from the control group (traditional F2F courses) and the sample of grades from the experimental group (hybrid courses) come from the same distribution and their means are the same. Note that demographic, gender, race and ethnicity data was not collected in this study. Their use in segregating the data was not considered necessary as it would not provide actionable data. In other words, in the event that online teaching had a different impact on different genders, for example, such a finding would not have been actionable as gender would not be used in changing or limiting students' enrolment in college courses. The drawbacks of lacking such data to deal with selection bias are noted in the Limitations section. Hence, the results were observed in aggregate assuming it to be a representative sample of the student body.

Table 6 shows the results of the parametric test using the 1 through 5 grading scale as shown in Table 3 and excluding students who withdrew voluntarily. The results show a p-value of 0.21 which fails to reject the null hypothesis that students perform the same, regardless of the teaching modality: traditional F2F or hybrid. Although the students in traditional F2F performed slightly better than in the hybrid courses as shown by means of 3.74 vs 3.56, respectively, such a difference is not only small as they both translate into the same letter grade (i.e., B), but most importantly not statistically significant.

The t-test is a parametric test that assumes the sample is drawn from a normal distribution. If this assumption is relaxed, then the Mann-Whitney U test is conducted, which is the nonparametric equivalent of the independent t-test (Leech et al., 2014). The two samples, control and experiment groups, could likely be considered randomly drawn from the college student population since this course is an elective. The data are independent because the scores of students do not affect those of other students within and across the treatments. The data is an ordinal scale of measurement fulfilling the conditions for conducting a nonparametric test (Brace et al., 2006). The results are similar to the parametric test: no statistical difference was found on the final grades (p-value of 0.18) while there is a significance difference in the final exam scores (p-value of 0.03*) at 5%, but not at 1%.

Even though the findings suggest that there is no statistical difference between the two teaching modalities, F2F or hybrid, it is important to note that if the performance of particular tasks, such as summative assessments (e.g., final exams), are analyzed, there may be a statistical difference to 5% but not 1% between the

Table 6
Two sample two tail t-test

Course Grades	Observations	Mean	Variance	p-value
Traditional (Control)	251	3.74	1.66	
Hybrid (Experiment)	131	3.56	1.72	< 0.21
Final Exam Grades				
Traditional (Control)	251	3.20	2.17	
Hybrid (Experiment)	131	2.86	2.15	< 0.03*

Source: author's own work.

two teaching modalities. For example, in the hybrid courses, students are able to perform the same as in F2F courses only through receiving higher grades in formative assessments, such as online discussion forums provided only in the hybrid courses compared to multiple choice quizzes in F2F courses, to make up for the lower grades in the summative assessments, like the final exam. Some teaching modalities may focus more on successful multiple-choice exam completions, like the F2F courses in this study, while others may prepare students for more essay-like questions which are deployed through online discussion forums, like the hybrid courses in this study. The students in this study seemed to react to the incentives and formative assessments that were given by the instructor. For example, when the course grade was affected by online asynchronous discussions, the students shifted focus towards these forums. Hence, the question might shift from the use of teaching modality to the instructional design of the course, regardless of the modality. How we want students to learn, through discussion forums, writing, case studies, or multiple-choice questions is an interesting topic that may need further analysis, and these findings suggest that students are reacting to incentives provided by faculty. It is important to note that most prior studies referred to in the literature had no changes in the instructional design between the various teaching modes. Such prior studies in the discipline of economics showed students' performance to be better in the face-to-face instruction. There is no sufficient data to conclude causation, meaning that the instructional design dictated the difference in the results of this study compared to the prior ones, but it might be an indication worth considering in future research.

Conclusion

This study aims to assess the efficacy of online blended instruction compared to face-to-face instruction in the discipline of economics. While most prior findings in this specific discipline show face-to-face instruction outperforming online instruction, this study shows no significant difference. These findings may help educators and institutions in planning future education and in providing a range of teaching modalities, including blended and online. This study shows that, in addition to the benefits associated with hybrid and online courses laid out by prior scholars, the shift does not negatively impact student performance in the specific discipline of economics as measured by the final grades of the students enrolled in the online blended economic courses at a US community college. The findings are based on data collected before the occurrence of COVID-19. The data during a pandemic may be significantly different due to instructional and student differences. Regarding instructional differences, Hodges et al. (2020) shows that emergency online instruction that was implemented during spring 2020 was not planned and designed to be performed as an online delivery and provides significant differences to what is considered planned online instruction. Regarding student differences, other variables that affect their performance, such as health, psychological and economic hardship, are skewed to higher levels of alert caused by the health crisis during a pandemic versus an endemic situation. The pandemic-free data analyzed in this study is collected from a semi-experiment performed with students enrolled in twelve sections of Principles of Macroeconomics taught by the same instructor at a US community college during the most recent three-year period prior to the pandemic. The findings show that student performance does not change whether they are taught in a traditional face-to-face or in a hybrid section with online learning. On a general level, this study reinforces prior findings covering various disciplines taught in US higher educational institutions, that using traditional F2F or online teaching through hybrid courses does not affect student performance. On a more specific level, the study offers an important contribution to the discipline of economics, for which there was no convergence in scholarly opinion and findings. While the objective was the comparison of these two teaching modalities, this investigation becomes useful during the COVID-19 pandemic, which forced educational institutions worldwide to shift to emergency remote instruction. These findings may be useful to US educational institutions to make data-informed decisions in their long-term and post-pandemic investments regarding online instruction in the discipline of economics.

This study also paves the way for future research to explore the implementation of various online activities that would improve student performance. Most prior studies referred to in the literature review had no changes in the instructional design between the various teaching modes and showed that students outperformed in face-to-face instruction compared to online hybrid instruction in economics. This study implemented design changes to include online activities, such as asynchronous discussion forums that enables students to utilize the online environment as an instructional environment rather than a storage of content. There is no sufficient data to conclude causation, meaning that the instructional design dictated the difference in these results compared to the prior findings, but it might be an indication worth considering in future research.

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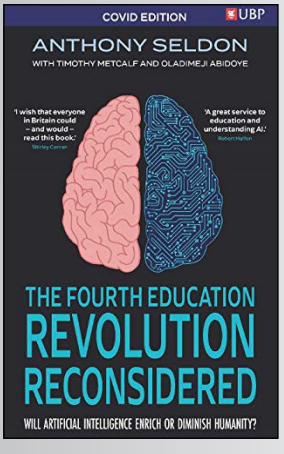
We recommend

Anthony Seldon with Timothy Metcalf and Oladimeji Abidoye,
The Fourth Education Revolution Reconsidered: Will Artificial Intelligence Enrich or Diminish Humanity?



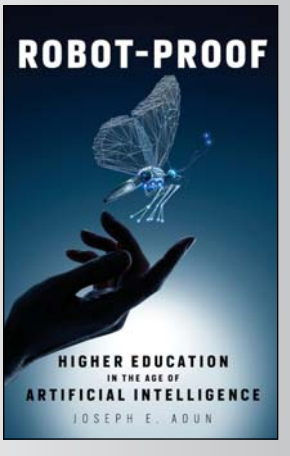
In this book its author stresses that "there is no more important issue facing education than the fast approaching revolution of Artificial Intelligence (AI) and what we term 4.0, the cluster technologies. (…) The history of education is the history of humanity. We are in the early morning of the fourth education revolution, with misty patches and hazy outlines, some tantalizing glimpses of what may lie ahead, but without a clear path yet defined." The author points out the great advantages of the collection, analysis and visualization of very large data sets enabled and delivered by the use of AI. But at the same time, he warns that "all educators everywhere should open their eyes to what is coming towards us. If they do so, then our future will have the best chance to be shaped by us in the interests of all."

Publisher: University of Buckingham Press, The 2020, Covid edition based on the book from 2018, available at **https://www.amazon.com/Fourth-Education-Revolution-Intelligence-Infantilise/dp/1800318243**

Joseph E Aoun, ***Robot-proof. Higher education in the age of Artificial Intelligence.***

How can higher education prepare students for their professional lives when professions themselves are disappearing? In Robot-Proof, Northeastern University president Joseph Aoun proposes a way to educate the next generation of college students to invent, to create, and to discover – to fill needs in society that even the most sophisticated artificial intelligence agent cannot.
Aoun lays out the framework for a new discipline, humanics, which builds on our innate strengths and prepares students to compete in a labor market in which smart machines work alongside human professionals.

From the website **http://robot-proof.com/#about**
Publisher: MIT Press, 2018.



Patrick Dougherty

Aya Shinozaki Dougherty

Building a sense of community in online courses

Abstract

From the first months of 2020, COVID-19 transformed the landscape of education worldwide. Numerous educational institutions were forced to move their courses online due to the circumstances of the pandemic. This was the case at Akita International University in Akita, Japan. As the semester came to a close in July 2020, students were given an opportunity to reflect on their experiences with online education via end-of-term course evaluations, focus groups, and public meetings with university administration. From the results of these opportunities to share experiences in remote and virtual education, the authors were reminded that online learning can be a lonesome endeavor. However, it does not need to be this way. A sense of community, camaraderie, and shared purpose can be developed within the online teaching and learning environment. This article will offer suggestions generated from the authors' experiences. All suggestions have the authenticity of having been successfully utilized in the authors' online classrooms.

Keywords: online education, academic community, ice-breakers, check-in activities, student hallway conversations

Introduction

On March 19, 2020, the president of Akita International University, a small public university in northern Japan, announced that all courses planned for the spring 2020 semester would be held " via online, distance education." (N. Suzuki, personal communication, March 19, 2020)[1]. This decision, which the university president described as "an emergency measure," was due, he explained, to the announcement by the World Health Organization that the circumstances of the COVID-19 illness had spread to the point where it should be considered a pandemic. Along with this announcement that all classes would move online, the start of university courses was postponed by approximately three weeks. The decision was made to utilize the university Moodle© system and Zoom© for course delivery. Aside from some faculties that decided to augment these modalities with other software or additional online venues, the majority of instructors utilized these two functions (along with email), to deliver their courses.

One of the concerns of instructors entering this online environment for instruction was how to ensure that students maintained or developed a sense of community while engaged in online instruction. It was also identified as a concern of students via the notes from a meeting between upper administration and university students (Y. Kumagai, personal communication, August 27, 2020)[2]. As Tucker (2020) explains,

> First students who feel they are part of a learning community online are less likely to feel alone during this time of social isolation. Second, teachers who invest the time and effort needed to develop a sense of community online will have more success engaging students who are learning remotely. (Trucker, 2020)

This article will offer modalities for developing a sense of community among students in an online teaching and learning environment. The modalities are applicable to many online teaching and learning environments at the university level and, with thoughtful adjustment, to courses below the tertiary level.

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[1] E-mail regarding remote teaching for the spring 2020 semester.
[2] E-mail regarding end-of-term student course evaluations.

About Akita International University

A brief mention should be made about Akita International University (AIU), what it is and why the pandemic impacted it in a particularly harsh manner. AIU is a modest sized public prefectural university in Akita Prefecture. Almost unique in Japan, it is a public university that is English medium. From its university website (Akita International University, n.d.) we learn that it has approximately 1000 students. Part of the degree requirement is for AIU students to spend one academic year abroad at one of AIU's 200 partner universities. In exchange for hosting AIU students, AIU's partner institutions send approximately 200 students to the AIU campus to take courses for one or two semesters. Due to the number of international students, and to the degree seeking students from around Japan and Asia, the danger of travel was such that gathering students on campus was not feasible or safe. In his explanation to students about why AIU would continue to only offer course online into the autumn semester of 2020, AIU President Norihiko Suzuki explained (2020, para. 3), that, even though AIU was intending to only allow students to come to the campus who were currently living in Japan, still

> it would be a hazardous situation. We would be accepting students from all over the country, and we would have students from areas, and traveling through areas, that have been impacted by this surge in infections. We do not want to put anyone at risk. …Given all of these circumstances, we have made the difficult, but necessary, decision to continue to have a closed campus and only online classes. (N. Suzuki, personal communication, March 19, 2020).

These circumstances, the same that forced the closing of the campus and movement to online education in the spring, also challenged the faculty to improve the online teaching and learning experience for themselves and their students. As the Dean of Academic Affairs of AIU explained at a faculty department meeting,

> Last spring, students were encouraged by our willingness to move our curriculum online. They were also very forgiving as we struggled to come to grips with the technology. Now, we have a certain comfort level with Zoom and online instruction. As we move into the fall semester … students have the right to expect that we improve their experiences and make the online teaching and learning environment the best experience possible. (P. Dougherty, personal communication, 2020)[3]

Research

Maslow (1968) argued that human beings have as a fundamental component of their psychology a need to feel as if they belong. According to Rosenberg and McCullough (1981), a sense of belonging generally denotes a feeling that one is both important and consequential in relationship to others; basically, that one matters. As interpreted by Elliot et al. (2004) this sense of belonging may be understood as "the perception that, to some degree and in any of a variety of ways, we are a significant part of the world around us" (p. 339). Elliot et al. (2004) further illuminated this sense of belonging as comprising two areas, or categories, of concern. The first category involves the individual feeling that he or she has the attention of others. The second category involves the understanding that there is a "bidirectional" relationship between an individual and his or her peers, or those in his or her social orbit (Elliot et al., 2004, p. 341). This relationship is understood by Elliot et al. (2004) as one in which the individual may be relied on and also may rely on others to fulfill needs, and provide support, as necessary.

Seymour Sarason (1974) in introducing his view of the "psychological sense of community," posited that the self-identity was tied to our sense of belonging to a community. It was, as he termed, one of the "major bases for self-definition" (p. 157). McMillan and Chavis (1986) offered that this sense of community was comprised of four components: (1) membership, (2) influence, (3) integration and fulfillment of needs, and (4) shared emotional connection. Without segueing into details unnecessary for this article, it may be explained that in this context, the first component, membership, is self-explanatory. Individuals need to see themselves as part of a group. The second component, influence, means, according to McMillan and Chavis (1986) that the individual has a sense that he or she may both influence the group and that the group is allowed to influence the individual. The third component, integration and fulfillment of needs, regards the individual's sense as, what Sarason (1974) expressed as "an acknowledged interdependence with others, a willingness to maintain this interdependence by giving to or doing for others what one expects from them" (p. 157). Finally, the last of the four components, shared emotional connection, might be understood as what McMillan and Chavis (1986) identified as the "definitive element for true community" (p. 14). Of the features of shared emotional connection outlined by McMillan and Chavis (1986, p. 14), the authors mention one that is critical to the development of a sense of community within a classroom setting – the "contact hypothesis" which simply explains that the more individuals are allowed to interact, the better are the

[3] English for Academic Purposes Program and Foreign Language Education Programs business meeting.

chances that they will form a bond. This is supported by Strayhorn (2018) who argued that peer interaction is an essential in developing a sense of belonging and, therefore, it is also necessary for successful pedagogy to give attention to developing opportunities for positive student interaction in the classroom.

Definitions of this "sense of community" may be Sarason's "perception of similarity to others, and acknowledged interdependence with others, a willingness to maintain this interdependence by giving to or doing for others what one expects from them, and a feeling that one is part of a larger dependable and stable structure" (Sarason, 1974, p. 157). Or it could be the definition provided by McMillan and Chavis (1986) where the sense of community is described as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together" (p. 9). In essence, and from both definitions offered, a sense of community exists in the minds of the individuals identifying with a group and is (at least psychologically), a supportive development. Regarding developing a sense of community within the milieu of education and participation in a classroom, either physically or through remote education, we can refer to several sources to develop an understanding of where to start the process.

A survey in 2000 of 220 university students in the United States posed two questions as paraphrased here (McGlynn, 2001): (1) In your courses are there teaching methods or techniques that are particularly helpful for your learning and, (2) are there classroom behaviors that teachers have that motivate you to learn? The results of the surveys may be summarized in three points: (1) Students wanted their teachers to know their names and a little about them, (2) they want their instructors to be humane, and finally, (3) they want their teachers to respect them as a person, including their opinions. This fits Toor's (2020) cogent observation, as she forayed into online education in the spring of 2020, that her students, "wanted real-time interaction with me, and perhaps even more, with their peers in the class" (para. 22).

This mirrors other findings that indicate the importance of humanizing and managing the learning environment. Wilkinson and Ansell (1992) explained that the emotional ambiance of the classroom relates to the attainment of academic success, and McGlynn (2001), again, emphasized that it was essential that students begin interacting with one another from the earliest moments of even the first class. Further, and significantly, research indicates that student resilience and attainment are more reliant on the relationships they create in class than on what their instructors instruct them via the course materials (McGlynn, 2001). As Walton and Cohen (2007) argue, the lack of a sense of belonging may impact student academic performance in a negative manner.

In the aftermath of the first semester of online courses, university administration organized opportunities for students to share the experiences they had as they moved into the world of online learning. From these opportunities and in reviewing the results of end-of-term student course evaluations, the vice president of the university outlined several recommendations from students (Y. Kumagai, personal communication, August 27, 2020) which are paraphrased here:

1) Students recommended that ice-breakers be included in the first- or second-class session. With the online learning they felt that they were not really getting a chance to meet their peers and get to know them.
2) Recommended as well, was to have breakout room sessions immediately after a group assignment or project. This could be given in order for the participants to have a chance to exchange contact information and organize a group schedule to complete the assignment or project.
3) Another suggestion was to open the class session earlier, or keep it open for a short while afterward, so that students could simply talk with one another. This basically allows for "hallway" conversations and simply gives the students a chance to connect and interact casually.

Developing a sense of belonging or community in a classroom, according to the research outlined above, is an essential task of the pedagogical process in the classroom. The authors posit that this applies equally, if not more so, in the environment of the online teaching and learning environment. What will be outlined in the following section of this article are specific techniques and activities that may be used to accomplish the teacher task of encouraging a sense of community in their online classroom.

Methods and tools to develop a sense of community in online courses

The authors have utilized several methods and online tools to help students develop a sense of community in the context of their online courses. Some of the ideas would be applicable in face-to-face class settings as well. The methods and tools outlined below were tried in course and class settings during the spring, and first semester, where the authors taught all of their courses online. Anecdotally, the results were encouraging. We have divided the suggestions into ice-breakers, check-ins, and peer networking and communication support.

Ice-breakers

There are four ice-breaker activities will be introduced and explained. These four activities can (and have) utilized the Zoom Breakout Room function and give students the chance to interact with one another to begin (and continue) the process of developing a sense of belonging and community. The four ice-breaker activities are the following:

1. PechaKucha of Me
2. Personal Reference Inventory
3. The 4 "What" Questions
4. Uncommon Commonalities.

Each of the four will be explained, in some detail, below. All were successfully utilized in classroom environments by the authors.

1) PechaKucha of Me:

PechaKucha was developed in Japan in 2003 by two architects – Astrid Klein and Mark Dytham of Klein Dytham Architecture – based in Tokyo (PechaKucha, 2020). The central idea is to make presentations that are short, engaging, and to the point. PechaKucha of Me is an activity that allows students to quickly share a great deal of interesting information about themselves with their classmates.

There are five simple rules for the PechaKucha of Me presentation: (1) the presenter may use only 20 power point slides, (2) each slide has one picture on it, (3) there are no (or very few) words on the slides, and, (4) each slide allows only 20 seconds for explanation. The total time allotted for the whole presentation is approximately seven minutes.

The central idea is that this should be an opportunity to learn about each other. Therefore, among the topics presented in the slides should be the following items:

1. A slide showing the student at a younger age (showing family members is optional and not required).
2. A slide showing the student's hobby or pastime (ideally showing the student practicing the hobby or pastime).
3. A slide showing a trip that the student took that they really enjoyed.
4. A slide showing the student's future dream (career, travel, university, etc. – something to indicate what the student wants to do in the future).
5. Other slides/pictures that can help to show the audience something interesting about the student.

The purpose of the activity is for students to introduce themselves to their peers in the class. They are encouraged to speak about themselves and communicate points about their personalities and lives that they feel comfortable sharing. This allows them to learn about one another, find commonalities, celebrate unique experiences or attributes, and start the process of bonding as a class.

2) Personal Reference Inventory (PRI)

The Personal Reference Inventory (PRI) that the authors have developed was adapted from Berko (1998) and it can be reconstituted with different questions as necessary, but the principle elements should be the same, which means that it is a set of questions geared at getting students to share information about themselves and to learn information about their peers in the class.

In essence, the PRI is a set of questions that are shared with students either before class or via the Zoom Chat Function during the class session. The instructor should be willing to give examples of his or her answers, in order to lessen any shyness the students might harbor. Once the instructor reviews the questions and offers his or her own answers, students should be informed that they will be randomly assigned to Breakout Rooms and, once in the rooms, they should work through the questions. Here they should offer their own answers and listen to the answers of their peers. One of the authors typically instructs his students to select at least one response from each breakout room member to share when the rooms are dissolved in, what is usually a ten-minute time-frame depending on the numbers of breakout rooms and the number of students assigned to each breakout room.

What follows is the list of questions used in a breakout room session at the start of the spring 2020 semester, which was April in Japan:

1. Who is your hero?
2. What irritates you the most about the world?
3. What do you consider to be your greatest accomplishment?
4. What celebrity would you like to change places with?
5. What would be the title of a book about your past?
6. What three words describe your abilities to get along with others?
7. Which part of the world would you like to visit?
8. Which food best describes your personality?
9. What is the most important discovery in life?
10. Who was/is your greatest influence?

The purpose of the PRI is to allow students to share about themselves and to learn about their fellow classmates. The questions can be adjusted or changed as needed. The concept is the same in all cases, as students benefit from learning about each other and developing a sense of community.

3) The 4 "What" Questions

The 4 "What" Questions exercise was developed by the authors and is a simple exercise. It is shorter than the PRI, but equal in many ways in that it elicits a response from students. The questions are either shared before class, in class via the shared screen function in Zoom, or in the Zoom chat function either as a shared file or simple cut and paste and sent via chat to Everyone.

1. What are three things that worry you as you start this course?
   Worry 1:
   Worry 2:
   Worry 3:
2. What is your strength as a student or person?
3. What do you need to work on as a student or person?
4. What would you like to learn in this course?

Similar to the case of the PRI, it is helpful if the instructor shares his or her own responses to the question prompts prior to sending the students into their Zoom breakout rooms. The central purpose for this activity is to give the students a chance to bond or commiserate over shared concerns or worries. A secondary point is that this also allows for the possibility of the class peer group to act as support for their fellow students, helping to scaffold the course through a network of mutual support. Finally, the insights into the minds of students as they embark on the course also grants the instructor a window on how he or she might assist students. If a student is concerned about the homework load, for example, the instructor can take time, if not to diminish the workload, to explain to students why each assignment is essential to support their learning of the material. It can also allow instructors to know specific items that student might want to learn, or take away, from the course. This can be folded into the curriculum if it is not already there, or emphasized if it is already part of the study plan.

4) Uncommon Commonalities

Introduced by Barkley et al. (2004) "Uncommon Commonalities" invites students to learn about their peers and share information about themselves while searching, as the eponymous title of the task implies, for points of commonality among the team membership as well as locating points that are either unique to each member, or are uncommon.

These are the stages of the activity:

1. The instructor assigns groups of four to zoom breakout rooms.
2. Students are given the Uncommon Commonalities Assignment.
3. They are asked to choose a Zoom Breakout Room leader.
4. Groups get together and first list individual things about themselves that define them as people).
5. Groups then discuss each item, finding things that 1, 2, 3, or 4 of them have in common.
6. When the group finds an item that all of them have in common, they list that item under 4; when they find something that 3 of them have in common, the list that item under 3, etc.

The purpose of this activity is to help the students find compatriots among their classmates as well as giving them an opportunity to share things that are special about themselves. In the context of Japan, this exercise supports a cultural affinity for community identity.

Check-ins

Check-ins are classroom activities that can give a quick window into how students are feeling and how motivated they might be at any given moment. They also allow the instructor to diagnose how well students are grasping the topic or absorbing the skill which is under consideration in the class. These simple, check-in activities can help to foster good rapport with students and increase the efficacy of teaching and learning. They can also help break down feelings of anonymity, and this is especially true in larger courses. It can also, as expressed by Angelo and Cross (1993), provide useful information about student learning and motivation with a minimum of time commitment. It can help students monitor their own motivation level and learning. Importantly, it can provide evidence that their instructor cares about them and about their learning. This applies directly to McGlynn's (2001) three points explained earlier regarding attitudes and things that students want from their instructors in the context of the classroom and their learning. The two activities covered in this section will be (1) Anxious/Happy and (2) Zoom Chat Polls and Quick Questions.

(1) Anxious/Happy

At the beginning of a course, or at times during the course such as prior to mid-term examinations, mid-term holidays or vacations, or other significant events, the authors ask two simple questions of students and then assign them to breakout rooms to discuss their answers. The first question is: "What is making you anxious right now?" Or, it might be worded as: "What is one thing in your life that makes you anxious?" The second question is: "What is making you happy right now?" Or again, the instructor might word it as: "What is one thing in your life that makes you happy?" The instructor can then put the students in their break out rooms. They are told to discuss their answers with their peers. Depending on time, the instructor might ask that when students return to the main room, they share one or both of their answers with the class. The instructor might also simply ask the students to articulate their response to him or her individually.

The purpose of the Anxious/Happy check in is simply to allow an instructor to do a very quick survey of student mental and physical wellbeing. It also gives students a chance to commiserate, celebrate, share, and offer support or empathy. It also honors McGlynn's (2001) finding that students want the teacher to know something about them as well as Wilkinson and Ansell's (1992) admonishment that the emotional climate of the classroom matters in relation to academic achievement. Also, knowing someone is interested in one's wellbeing is supportive in most contexts.

(2) Zoom Chat Polls and Quick Questions

Chat Polls

Instructors can make good use of the Zoom chat function by conducting quick chat polls. For example, after covering a topic, concept, or drill, an instructor can ask students to give a Likert scale directly, and anonymously to his or her classmates. Here, the classmates take a scale of 1 through 5, where 1 means that they understood everything clearly and

need no revision and 5 means that they are unclear on the topic, concept, or drill, and desire a repeat. Numbers given between 1 and 5 can indicate the level of clarity across the class and indicate whether time should be spent on revision. It may also indicate if time is better served if the teacher spends time directly helping one or two students who indicated a significant level of confusion. This activity helps the instructor diagnose if any or all of the students have an understanding of the material under consideration or if they all (or simply just a few), need some help or intervention. As the "poll" is done in such a way that each student's response is known only to the instructor, there is a protective element of anonymity.

Quick Questions

Developed with Angelo and Cross's (1993) "Muddiest Point" in mind, this activity – Quick Questions, allows for students to indicate at the end of a lesson if they have any questions, or need any clarification of any points. This can be done as both a break out room activity or simply through the chat function. If it is done as a break out room activity it gives shy students an opportunity to speak with their peers about opaque points that they want clarified and to have the insulation of a group question addressed to the teacher rather than a solo question. In the context of teaching at a Japanese university, this often encourages questions in general due to the hesitancy that some students display when it comes to addressing questions to their teachers. Additionally, this exercise, if done in a break out room setting, often allows for students to share their understanding and answer each other's questions.

If the exercise is done via the chat function, the instructor can direct the students to send their questions to everyone or just to the instructor. This possible anonymity might encourage the shyer students to reply with a question or ask for clarification of some point from the lesson. The purpose of Quick Questions is to give students structure and set time to make sure that they understand what is going on in the class. It provides them with ways to engage with the teacher and with their peers to make sure that class matters and materials are clearly understood.

Hallway Conversations

Prior to the pandemic, when university campuses were open, students would often arrive early to class and chat with each other or possibly stay after class to have a conversation with their peers. Likewise, they would meet in the school hallways and stop to talk. These social interactions should be viewed as important and necessary exercises in building a community and in encouraging a sense of belonging among students. The way that an instructor can allow students to still engage in these "Hallway Conversations" is simple. Let students know that the zoom class session will be opened fifteen minutes early and that the instructor will let students in the zoom session when they arrive, but will not have his or her earphones on or laptop sound on so that students can simply speak with one another if they wish. Likewise, if possible, the instructor can keep the class session open in a similar fashion. This simply provides students with a venue to interact with their peers.

Conclusion

The authors have introduced four classic icebreakers that have some pedigree in face-to-face classrooms but can be, and have been, utilized in the online teaching and learning environment: the *PechaKucha of Me*, the *Personal Reference Inventory*, *The 4 "What" Questions* and *Uncommon Commonalities*. These activities allow the students in an online course to begin and continue the process of community building and networking. Further, the authors have introduced the check-in activities of Anxious/Happy, Chat Polls, and Quick Questions to allow an instructor to check on students' wellbeing and understanding. Lastly, the authors have offered ways that an instructor might allow students to have venues for interaction and conversation, giving them the online space to summon, and maintain a sense of community.

In conclusion, the authors would like to share the words of one of Akita International University's vice presidents. At the end of the spring semester of 2020, after completing the first semester where all university instruction was online, he reminded faculty that, while the challenge of online teaching and learning was new to most faculty and to most students, in light of student responses compiled from the end-of-term student course surveys, students had, in his estimation, responded positively to the experience. In his own words:

> We are all aware of how challenging it was to move our curriculum online. We know that the online teaching and learning environment was new to most of our faculty and almost all of our students. The results show that our AIU students generally valued our institutional and personal efforts in providing quality instruction in the international liberal arts through the use of online mediums. (Y. Kumagai, personal communication, August 27, 2020, para. 2)

Online learning can be a lonely undertaking. However, as the authors have shown, it does not need to be this way. It is important for all who are willingly, or forced by circumstances, to teach online realize that they have the agency to help students develop a sense of community, a feeling of camaraderie, and a sense of shared purpose within the online teaching and learning environment. Indeed, as has been explained, developing a sense of belonging and community in a classroom, should be seen as an essential task of the pedagogical process in the classroom, whether that classroom exists in a brick and mortar building or in the virtual world.

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Consciousness: effect of coaching process and specifics through AI usage

Abstract

The main purpose of the article is to investigate how coaching itself affects a person and evaluate it as an effective tool. The second goal is to find out what the features of coaching with use of an AI based assistant are. The problem of studying the effectiveness of coaching is indicated by the purpose of finding out, based on the results of the work in the session, to what extent the result obtained will lead the respondent to specific actions. To this end, the main measurable metrics were stress level, willingness to act, and clarity regarding the request. The study confirmed that the majority of sessions had a "positive" dynamic in at least one of the consciousness components (increase of clarity or willingness to act and decrease of stress). The key implication is that it is important to keep a coachee away from stress to create space for clarity and willingness to act.

The research results show that an AI-based tool is more effective in new requests with high importance for a client regarding willingness to act and clarity, confidential requests in terms of privacy and sensitivity regarding clarity. A coach is perceived as overall stronger in usefulness, effectiveness and stress reduction. Analyzing the results of the coach-AI-assistant interaction, the study shows that AI broadens the vision of coaches.

From the point of view of the threat of the coach-bot interaction, there is a bottleneck that emerged during the feedback process during the study. In several sessions, coaches were not able to develop an emotional connection well enough through written dialogue – due to the absence of face-to-face contact. One of the key outcomes regarding the "client-coach" interaction is the high importance of emotional contact.

Keywords: AI-assisted tool, coaching process, stress reduction, clarity increase, coaching effectiveness, confidential request, human coach-bot

Introduction

Coaching is a relatively new direction in working with human consciousness which has been showing continuous growth. According to a study by the International Coaching Federation, there were approximately 71,000 coach practitioners worldwide in 2019, an increase of 33% on the 2015 estimate. Today, coaching is used both in private practice and in the corporate sector. HR departments of companies use coaching sessions to develop employee skills: soft skills, communication, and leadership skills. The number of corporate managers using coaching skills has risen by 46% in five years. An even more significant growth in coaching services in Russia is predicted in 2020. This is caused by changing to a remote "work from home" format in many companies due to the pandemic and, as a result, the need to support employees who find it difficult to adapt to the new conditions. Disadvantages in remote work, according to Ipsos research (2020), are seen by three quarters of Russians, or 78% of respondents. Thus, every third respondent (34.5%) admitted that it is difficult for them to concentrate at home, and their work efficiency decreases. Almost the same number answered that it was difficult for them to distinguish between personal life and work (33.8%). Employees may lose contact due to the lack of daily, face-to-face teamwork, and in

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addition, interpersonal conflicts may arise, provoked by the remote work and a lack of communication. In this regard, companies, faced with a lack of employee motivation to work, are looking for effective methods and technological solutions for effective personnel management. In turn, employees are also independently seeking support. For individuals, requests are most often related to key areas of life: relationships/family, personal development, career, health, finance. Coaching fits in here as an independent working format for an employee or a private person who, with the support of a professional coach, can work out their request and start active and positive actions in one of the life spheres.

Being by origin a method of sport and clinical psychology, coaching is significantly less scientifically studied. Although the years of coaching development have demonstrated proven practical results, this area still lacks objective and unbiased measurement means for its effectiveness.

Methodology and literature review

Coaching, as a methodological approach, is a structured dialogue between a coach and a coachee in a session format, within which a person's resources are explored, a vision of a situation is created and the person's awareness of the topic of their request is manifested. The result of the session is a qualitatively new awareness of the request and the desire to start active actions for sustainable and positive changes in a sphere of life. The coach's toolkit contains deep, open-ended questions, various techniques and models, and the level of competence is confirmed by certification. The coaching approach differs from psychological counseling, mentoring, advising or any other consulting service. Coaches do not teach, or advise, but accompany and support their coachee in the process of their conscious dialogue. In this regard, it is especially important to research and confirm the effectiveness of this process and the client's effectiveness, expressed in readiness for specific actions, to better understand oneself and the qualitative changes in one's life. A review of the recent literature shows that there are very few research papers on the subject of the impact that the coaching process has on stimulating awareness and motivation of pursuing the goal, as well as the factors influencing the coachee's assessment of a session's effectiveness.

Generally, there are two basic approaches to coaching performance measurement most authors focus on in their research. The first is based on the coachees' subjective perception of their progress during one or a range of coaching sessions. The Coaching Effectiveness Survey (Tooth et al., 2013), a tool created by the Institute of Executive Coaching and Leadership, Australia, covers some metrics the coaching clients were most satisfied with during their coaching sessions in intrapersonal and interpersonal areas and their self-efficiency. The other contributors to the client self-reflecting approach to coaching effectiveness measurement are Grant (2014), Sonesh et al. (2015) and Theeboom and co-authors (2013) trying to identify the metrics behind coaching clients' satisfaction with the coaching process.

The second approach focuses on the structure of the coaching process and the competences of coaching professionals. The 8-component model of coaching effectiveness (Kilburg, 2001) introduces key elements of coaching effectiveness including characteristics of the coachees' problem, coach session organizational setting, structure of the coaching containment, feedback, and others. Another example of this approach is Joo's (2005) conceptual framework for successful executive coaching, combining areas such as executive coaching, training and development mentoring, 360-degree feedback, mentoring, career consulting and such. This research emphasizes the weight of coaching techniques regarding the client's progress.

Coaching by AI

Most research on AI-based coaching is dedicated to life and well-being coaching for people suffering from different diseases, where digital solutions were serving as a partner to clinicians, and the educational process was enhanced by coaching chatbots. Stephens and his collaborators (2019) successfully measured the influence of an AI-based coaching solution through the dynamics of such metrics as depression and anxiety, registered by the clients' self-reporting. Sqalli and Al-Thani (2019) investigated the use of AI-based health coaching technology for helping patients manage their chronic diseases for extended periods of time: the study accepted behavioral changes of the patients due to long-term AI-based coaching as a metric of coaching effectiveness.

According to a world-renowned coach, Clutterbuck (2018), today coaches need to embrace AI technology and integrate it with their practice. The artificial intelligence algorithms bring new ways of conducting coaching practice in a digital environment, make coaching more affordable for various layers of society, and also influence the perception of the coaching process both by the coachee and the coach.

The coach-AI partnership, according to Clutterbruck, fulfils several functions:

- it provides real-time information about what is going on in the conversation,
- it allows instant access to other sources of relevant and potentially relevant information,
- the AI can suggest questions and lines of enquiry (meaning that the coach can spend less time thinking about what to ask next),
- the coach can check his or her intuitions for confirming or disconfirming evidence,
- it creates opportunities for in-depth review of each coaching session, from the perspective of alternative approaches for the coach (for example, "You chose not to follow this clue, but how might the conversation have gone if you did?") or better wording of questions. This is a learning process for both the coach and the AI.

The topic of interaction between a coach and an AI-based assistant is very promising but requires a significant amount of accumulated data. Despite this, today the influence of AI on coaching effectiveness seems to be underinvestigated and challenging, yet it is a relevant and acute problem for the whole professional coaching community.

Therefore, the present study (performed from June, 2020 until September, 2020) contributes to the area of research of the coaching effectiveness measurement problems, including in particular the role AI-based service could have in it.

The study's aim is to evidence the effect that the coaching process has on human consciousness by measuring 3 metrics: clarity regarding the request, willingness to act, and stress level. The authors believe these are the aspects of consciousness which define the ability of a person to act successfully. In this way, the study is also intended to explore the role an AI-based service has in the coaching process and the way it contributes to recognition of the coaching methodology, which focuses on ways to strengthen the mind. The authors used an AI-based tool called Mentorbot. The service is a bot within the Telegram messenger application, where the client can schedule a convenient time for a session with a human coach. During the session, the AI bot helps as an assistant to a human coach, offering them relevant questions from the Mentorbot dataset library in the form of tips. The AI-based bot also helps the coach draw up a report on the results of the session, analyzing the client-coach written dialogue and highlighting important words and phrases that the client or coach noted as significant. Thus, Mentorbot guides a coach to improve their dialogue during the session, using a coaching method as a basis to explore clarity and mindfulness in the client's request. Mentorbot analyzes the session dataset with NLP algorithms, and the TensorFlow, Keras, Pymorphy, FastText and LSTM architecture frameworks. A self-learning algorithm recognizes the most relevant questions and offers them at the appropriate time. The bot evaluates communication – the coachee's words, phrases, signs and emojis in the dialogue, as well as the time, speed and delay of responses in correlation with the topic of the question, drawing conclusions about insights, difficulties and the emotional state of the respondent.

Hypotheses of the study

The study's guiding questions were:

1. How does the coaching process affect such aspects as clarity, willingness to act and stress level?
2. How does an AI-based service for online coach support influence the coaching process and what are the implications of the findings for coaches, those coached and the wider environment?

The authors concentrated on three hypotheses:

- there is a strong measurable effect on the coaching process.
- there may be categories of requests (and coachees), where an AI-based service is more effective than a personal coach and vice-versa.
- an AI-based service helps coaches to ask effective questions.

Considering all the above, the authors designed the research, involving a focus group of 33[1] participants (men and women of different ages, occupations and positions). The research represents a combination of qualitative and quantitative methods. The basis of the experiment is a series of individual coaching sessions. Each participant had two coaching sessions, one in-person session with a human coach and one AI-assisted session by a human coach. To maintain the objectivity and comparability of the sessions' results and decrease noise, the order of the sessions varied (first AI-assisted then in-person, and vice-versa), with most of the coaches performing personal sessions and through the AI-assisted tool.

Organizationally, each session lasted 60 minutes, respondents could go through no more than one session per day and the next session no earlier than two days later. Preparation for the session included the formation of a request; respondents were asked to prepare a request for each session that did not overlap in meaning with the request in the second session. The face-to-face sessions were held with coaches in person in the same room, or in video format online, while the AI-based sessions were held exclusively in the format of written dialogue within the Mentorbot service in the Telegram messenger application. The structure of each session contained the necessary steps: contract, experience creation, steps, value, gratitude.

The result of every coach session was measured with:

- questionnaire for respondents to assess the emotional state and quality of the session (with the focus on clarity, willingness to act, stress level) at the beginning and at the end of the session (adding the effectiveness of the results), using both open and closed questions to obtain quantitative and qualitative data. The stress level was based on the respondents' self-measurement as a stress scale from 1 to 10 and a stress type: exhaustion, resistance, alarm, in the questionnaire.
- EEG during the sessions (brain activity and the dynamics of the mental state) to collect more objective evidence of brain activity during the session. The participants were asked to talk about their coaching request for two minutes, two times, five minutes before and after the coaching session. The choice of EEG headset was mainly defined by the study settings and the participant profile. Since these were mostly adult participants in the

[1] Certain answers for particular question were excluded from processing as not applicable/inappropriate. Minimum number of responses for each question or metric was 30.

study participating during a working day, the EEG set had to be (a) quick to wear, and (b) easy and comfortable to use (that is, no gel and wires could be used). We therefore chose the wireless EEG headset with the largest number of electrodes presently available – Emotive Epoc+. Emotiv Epoc+ is a 16-channel EEG headset mounted according to an International 10-20 system: AF3, AF4, F7, F8, F3, F4, FC5, FC6, T7, T8, P3, P4, P7, P8, O1, O2. Emotiv Epoc+ does not require gel, but instead uses saline hydration that provides comfort for the participants while securing high quality EEG recordings. Electrodes P3 and P4 were used as references. Sampling rate was 128 Hz. The Emotiv Epoc+ was connected to a Raspberry Pi – a small, single-board computer – by means of Bluetooth, which collected the EEG data until they were transferred to a computer for further analysis. The entire setup for each participant took less than 10 minutes and was performed by a single person. Their brain activity was registered while they were talking, in order to collect data on their stress and frustration levels. The stress level characterizes the condition of the participant's nervous system, influenced by reflecting on their life issue, which was associated with the objective of the coaching. The dynamics of the frustration level had an inverse correlation with the participant's ability to focus on the life issue being discussed with the coach. The lower the level of frustration is, the more aware and clear the person is about the objective of the coaching.

- Independent component analysis (ICA) was used to remove artifacts related to muscular movements, heart beats and oculographic noises (eye movements and blinking). The FastICA algorithm was used to detect and extract artificial components. Fast Fourier Transformation (FFT) was applied to convert data from time domain into time-frequency domain with five frequency bands: delta (0.5–4 Hz), theta (4–8 Hz), alpha (8–13 Hz), beta (13–30 Hz), and gamma (30–48 Hz).
- Separate questionnaire to compare the formats of AI-assisted and in-person sessions with each other.
- Questionnaire for coaches after each session to assess the effect of the AI tool's assistance during the session, and a final questionnaire, recapping the experience of all sessions with the AI-based tool.
- Big Five personality traits test, also known as the five-factor model (Raad & Mlačić, 2015) in order to define the personality types of the participants – it is possible that there is a correlation between the personality type of the coachees and their perception of the coaching method, which affects their progress in coaching. The participants completed the test before the first coaching session. For the purpose of this study, three of five factors were taken into consideration: Extraversion, Conscientiousness and Neuroticism.
- The prefrontal relative gamma power (its exhibition and inhibition) was measured for stress assessment. For frustration assessment, the alpha asymmetry model in the frontal cortex was used (physiological arousal in the right and left frontal cortex).
- The authors equate the level of stress with the level of physiological arousal.
- To confirm the stress indicators, skin-galvanic reaction was also measured in half of the cases as an additional marker.

Detailed analysis

The analysis of the research results shows that most sessions (89%) had a positive dynamic in at least one of the consciousness components (increase of clarity or willingness to act and decrease of stress). A minimum of a quarter of respondents had dynamics in all of them. The most visible effect was recognized in the stress indicator.

Studying *willingness to act* relates to the idea that the more a person is aware and conscious about a situation or problem, the easier it is for him or her to act. This indicator was measured through the questionnaire only. In the sample, the willingness to act increased in 35% of all cases (from 1 to 6 points on a 10-point scale). The average increase among all of the cases was 0.5 points (which means that the increasing effect outweighed the decreasing one). The average increase for those with positive dynamics was 2.5 points. Sessions with increased willingness to act occurred evenly between coach- and AI-assisted sessions (36% of sessions with 2.3 points and 33% of sessions by 2.6 points, respectively), which in turn does not reveal any dependence of the results on the format of the coaching session.

The *stress level* component was measured through both subjective assessment by the respondents and EEG. The results of the measurements differ. Stress decreased in 80% of cases by the subjective perception of the respondents and in 52% of cases by the EEG data. A detailed review of the data revealed that only half of cases (53%) declared by respondents as stress reduction were confirmed by EEG. Meanwhile, most of the EEG results (85%) were confirmed as stress decrease by the respondents. There are two outcomes that may be useful for further study: EEG data are more reliable as most of them were also confirmed by the respondents, and the possible reasons for the discrepancies between the respondents' subjective perception and the EEG measurements represent an interesting effect that needs further research.

The authors used the cases of intersection between the EEG and clients' responses to measure the effect of coaching on stress reduction. 43% (28 out of 66) demonstrated stress level reduction. As EEG dynamics doesn't evidence the amount of the effect, only the fact of its presence, the authors used the respondents'

assessment on a 10-point scale to assess the effect of the dynamics. The stress level decrease across the whole sample was 2.7 (which again means that those who decreased their stress level experienced a stronger effect than those who increased it). In the cases with positive dynamics, the average level of stress reduction was 3.6 points.

Sessions reporting stress reduction with the AI-assisted tool amount to 45%, and with a coach, to 55%. The data also show that in cases with stress increase (by EEG), the clients felt stress reduction after sessions with the coach more often (14) than after AI-assisted sessions (9). This could evidence that personal contact could affect the perception of stress reduction due to other emotions and emotional contact with the coach. Moreover, the respondents indicated a high stress level after a session with the AI-assisted tool twice as often as after sessions with the coach. Emotional contact with the coach was confirmed by 27 respondents and by 15 respondents during sessions with the AI-assisted tool. In the feedback, the clients noted "emotional contact", "empathy", and "emotional involvement" as advantages of face-to-face work with the coach. The data indicate that regarding stress reduction, results are achieved through face-to-face work with a coach more often than through the AI-assisted tool.

Clarity regarding the request was also measured through both subjective assessment by the respondents and EEG. The results of the measurements do not match in full. In this way, clarity increased in 64% of cases by 3.1 points (54% from the initial measure), according to the respondents' assessment in comparison to an average increase of 1.7 points across the whole sample. EEG evidenced clarity increase in 42% of sessions by an average of 1.9 points (calculated with relative questionnaires).

Intersection of the respondents' assessment of clarity increase and EEG measurement was noted in 25% of all cases. These sessions showed an average increase of 3.8 points (69% of the initial value). A comparison of the EEG and respondents' assessments also showed that in 84% of cases with clarity increase by EEG, it was confirmed by the respondents through the self-assessment. This is similar to what was noted for the stress level component. This supports the idea that EEG data provide a more reliable assessment: there is no assurance that the dynamics exists using subjective assessment, and the use of EEG can be more reliable. There are also open questions regarding subjective interpretation of the results which do not correspond to the EEG measurements, and the reasons for such differences. Probably, there could be more relevant indicators, providing a closer relation to the subjective perception.

The share of sessions resulting in clarity increase was equal for coach- and AI-assisted sessions (64%). But the average increase in sessions with a coach was 0.7 points higher than in the AI-assisted sessions.

For this component, the number of cases showing a difference between the EEG and questionnaire for coach- and AI-assisted sessions was the same. And this shows that the format of a session does not have a decisive effect on the distortion of the results of clarity by subjective perception in relation to the EEG.

All of the evidence stated above shows that the coaching methodology has an effect in most cases (about 90% of the research sample) with on average positive dynamics through the sample, which means that the positive cumulative effect is greater than the negative one. Herewith, the format of a session overall didn't impact any of the indicators under review, except for the stress level, which was better with the coach than the AI-assisted tool. There were no significant differences in distribution across all sessions with a positive effect between the coach and the AI-assisted format. Both through the coach and the AI-assisted tool, progress on the metrics under study could be achieved with equal probability. Some minor difference in favor of a coach was noted regarding stress level reduction and average increase in clarity. Also, in sessions with a coach, the clients felt stress reduction which was not confirmed by EEG more often than after AI-assisted sessions. This could be a result of more intense emotions during the sessions and emotional contact with the coach. There is a connection between the parameters, but we did not find any statistical correlations because there was not enough information to draw this conclusion.

The analysis noted that willingness to act was more affected in the cases where the initial level was below average (less than 6 points on a 10-point scale). If a client is not ready to act, the probability that he or she will feel more readiness as a result of the coaching session is higher. Their average dynamics in the sample increased by 3.8 points.

The analysis also revealed a correlation between clarity and willingness to act. In sessions with initially low clarity, the willingness to act was lower than the average in the sample by 1.6 points. For these requests, the willingness to act increased by 2.6 points (against an average increase in the sample by 0.5 points). For the requests with initially high clarity, the willingness to act was 6% higher than the average in the sample. There is also a correlation in the sessions: where clarity increased, the increase of willingness to act was twice as high as the average in the sample (1.1 points against 0.5 points). This could potentially evidence that clarity regarding the request is closely connected to the willingness to act, when clarification during the sessions creates significant prerequisites for motivation for actions, when the situation becomes clearer. Besides, the coaching effect in willingness to act is potentially higher for those who have low clarity in their request.

One more correlation was noted between willingness to act, clarity and stress level. The results show that when stress increases or doesn't change (by EEG data), the willingness to act in two thirds of cases (64%) and clarity in a third (32%) remained the same or reduced.

Altogether, the stress level was reduced according to the subjective feeling of the respondents in sessions with an increase of willingness to act (100%) or clarity

(96% by EEG or 85% by questionnaire, 45% of which had a significant reduction of stress by 4 or more points).

Thus, a subjective feeling of stress reduction appears along with a better understanding of the situation and an increased willingness to act. This could be important for the coaching process: the coach must be aware of raising the client's stress level. It is important to keep a coachee away from stress to create space for clarity and willingness to act. This could be an important implication to move toward the goal.

One of the key focuses of the coaching methodology is to create more clarity and expand consciousness, and the study proves the rationality of this focus, i.e. it generates useful results for clients. To be effective, coaching has to work with clarity, in which the willingness to act is higher and the stress level is lower. Another way to work is to reduce the stress level and raise clarity and willingness to act. Besides, working with willingness to act could be a way to reduce stress. The data show that it is easier to raise willingness to act for requests that have less significance for clients (in sessions with an increase of willingness to act, 71% had requests with low importance for the clients). This can be used to improve the effectiveness of the coaching approach via the selection of tools and session strategy.

Comparison of the results with the types of personality indicated that clients with a high level of conscientiousness achieve better results. Their average dynamics regarding willingness to act and clarity is similar to others, but the stress reduction is higher.

The authors also aim to get an understanding of the factors influencing the coachees' perception of a session's effectiveness. To do this, the respondents were asked to assess the usefulness of the sessions.

The clients assessed 89% of all sessions as useful. Among these sessions, the most recognized effect was stress reduction in 85% of cases (by questionnaire) on average by 3.6 points, the second was clarity, which increased in 69% of sessions (by questionnaire) on average by 3.1 points, and the third, willingness to act, which increased in 37% of sessions on average by 3.2 points.

However, those who raised their willingness to act by 2 times more than the average assessed the session as very useful (answers "very useful" and "most useful"). This evidences that significant growth in the willingness to act is recognized as an extremely useful result of a coaching session. In sessions with stress reduction and increase in clarity 2 times higher than the sample average, the proportion of sessions rated as extremely useful was 65%. This may indicate that obvious change in the willingness to act is recognized as the most noticeable result, which is and perceived to be beneficial.

If there is no obvious connection of the format of the session with the overall result, are there any factors that could influence the effect of the format? The study used such characteristics of requests as the importance for the client, confidentiality, novelty and emotionality.

The newer the request is, the more effect it may have in terms of clarity. The analysis shows that new requests (several weeks) had an increase of clarity of 3 points on average, while for old requests (over a year) it was 1 point.

Clients preferred to address new requests to the AI-assisted tool and older ones to the coach: 7 out of 33 sessions with the AI-assisted tool were related to requests aged "several weeks", and 2 with the coaches. The service based on artificial intelligence may be interesting to clients for processing requests with a high degree of novelty. At the same time, the clarity of the new request for the client did not affect the choice of the session format.

Requests aged over several months (moderate level of novelty) were distributed between the coach- and AI-assisted sessions without significant differences. 71% of such sessions showed an increase of clarity. But sessions with a coach demonstrated an increase of willingness to act and clarity more often than sessions with the AI-assisted tool. Thus, clarity increased in sessions with a coach in 77% of cases by 4 points (with the AI-assisted tool, in 63% of case by 2.5 points) with an increase of willingness to act in 40% cases with a coach (and in 14% of cases with the AI-assisted tool).

Despite the fact that the willingness to act had an approximately equal distribution of sessions with increased value between the coach and the AI-assisted tool (with the coach having a slight advantage – 36% vs 33%), in sessions with requests which were important for the clients, a higher percentage of the AI-assisted sessions had increased value (17% with an average increase of 0.4 points), than sessions with a coach (12% with an average increase of 0.1 points). In the feedback, the respondents noted that they received a "problem solving algorithm", or an "action plan" from the Mentorbot. Probably, due to a specific result expressed in an action plan, it was easier for the respondent to understand particular actions and be ready to start. The data of the sample showed that important requests were better processed through the AI-assisted tool regarding the willingness to act.

The same dynamics was noted for important requests regarding clarity. Sessions with a coach had an increase in clarity in 58% of important requests and a decrease in 16%. Sessions with the AI-assisted tool had a higher percentage of increase – 65%, and a lower percentage of decrease – 9%. This indicates better results of the AI-assisted tool for important requests regarding clarity as well. The same pattern of results relates to confidential requests regarding clarity. The AI-assisted tool had more sessions with increased clarity than the coach (12 vs 10) and fewer sessions with decreased clarity (0 vs 4).

At the same time, the clients assessed the results of the sessions with the requests important for them as useful in 38 cases out of 42. Out of them, sessions performed by a coach were assessed as useful 95% of the time (58% of them "most useful"), by the AI-assisted tool – 87% of the time (43% of them "most useful"). Moreover, of all of the respondents who had important

requests, 22 showed a preferred format, with 16 being in favor of a coach and 6 in favor of a mentor bot. Likewise, the respondents with confidential requests, comparing two sessions as more effective, made a choice in favor of a coach 14 times, in favor of Mentorbot – 7. Herewith, the same respondents redistributed, assessing the comfort of a session: 11 preferred a coach and 12 – Mentorbot. Confidentiality was assessed as high with both a coach and Mentorbot. But such a metric as willingness to delve into the request was higher for Mentorbot (94% vs 83%). We hypothesise that there is a difference between the perception of information safety (confidentiality), privacy, and frankness. The client can feel safe about information being kept confidential, but not ready to be open and frank enough personally with a coach. Probably, these sessions involved sensitive subjects of requests.

Considering the fact that the respondents felt the usefulness of the coaching through a significant increase of the willingness to act and the fact that the AI-assisted tool was more effective for important requests regarding the willingness to act based on the sample, but overall, sessions with a coach were perceived as more useful for important requests, there should be some other factors that the respondents saw as useful except for the willingness to act. The data indicate that the results of the AI-assisted tool for important requests regarding the willingness to act and clarity, and confidential requests regarding clarity are better than the coachs' results.

Summarizing, there were certain types of requests which were better processed through the AI-assisted tool – requests with high importance for a client regarding willingness to act and clarity, confidential requests in terms of privacy, and sensitivity regarding clarity. Coach was overall stronger in perception of usefulness, effectiveness and stress reduction.

Influence of AI-based service on coaching process

The authors intended to study how the AI-based service for online coach support influenced the coaching process; what the implications for coaches were. Specific questionnaires were developed in order to obtain data on the coaches' experiences with the Mentorbot. The coaches completed the questionnaires after each session as their experience could vary from session to session.

The results of the research show that the coaches used AI-assisted tool's suggestions in all sessions. All coaches were satisfied with the tool at 6 and more points on a 10-point scale. In 94% of sessions, the suggestions were assessed as extremely helpful (over 7 points on a 10-point scale). In 81% of sessions, the suggestions were useful in the key moments of the sessions. In 26 sessions out of 33, the coaches confirmed that Mentorbot's support broadened their vision, and in 32 sessions, they changed the course of the session based on its suggestions. The average value of usage of the bot's suggestions was 25%.

In 64% of the sessions, the coaches assessed the value of the AI-assisted tool with the words "support" and "coach-partner". In 21 sessions, this support was in the form of options for questions. The key values were indicated as:

- Support – AI-assistant helped ask questions through suggestions for each question,
- Research on the request – with deep, quality and timely examples of questions,
- Session dynamics / Speed – convenient functionality of ready-for-use templates, which saved the coach typing time and increased the dynamics of the session.

Conclusions

The authors explored the average effect of the coaching approach with focus group progress on a scale from 1 to 10 in their clarity, willingness to act and stress level, which organized the ability to move toward the goal. The study confirmed that the majority of sessions had a "positive" dynamic in at least one of the consciousness components (increase of clarity or willingness to act and decrease of stress). On average, the whole sample had "positive" dynamics for each indicator, which means that the positive cumulative effect was greater than the negative one. For all sessions assessed as useful by clients, stress reduction had the most recognized effect, the second one was clarity and the third one – willingness to act.

The research also revealed a correlation among willingness to act, clarity and stress level. The results show that when stress increases or does not change, the willingness to act in two thirds of cases and clarity in a third remain the same or are reduced, and vice versa. The key implication is that it is important to keep a coachee away from stress to create space for clarity and willingness to act. To be effective, coaching has to work with clarity, in which the willingness to act is higher and the stress level is lower. Another way to work is to reduce the stress level and raise clarity and willingness to act. Besides this, working with willingness to act alone could be a way to reduce stress.

While exploring the influence of the coaching process on certain aspects of consciousness, the authors of this research intended to deepen the understanding of the interaction between AI and participants of the coaching process, identifying patterns, advantages and better implications of purely in-person and AI-assisted approaches.

The AI-assisted tool better processes relatively new requests, requests with high importance for the client regarding willingness to act and clarity, and confidential requests in terms of privacy and sensitivity regarding clarity. A coach is overall stronger in perception of usefulness, effectiveness, and stress reduction.

The study of the interaction of a coach with Mentorbot shows the percentage of sessions, where the AI bot generates questions that improve the effectiveness of the dialogue. In 94% of sessions, the suggestions were assessed as very helpful, and in 81%

of sessions, the suggestions were useful in the key moments of the sessions. The AI-assistant broadens the vision of coaches. The key values were indicated as: support, values research in the request, and session dynamics/speed.

The obtained results allow us to argue the overall effectiveness of the coaching process to work with consciousness, and the usefulness of AI-assisted tools to provide coaching services in certain areas without loss of quality, resulting in opportunities to spread the practice to regions with insufficient qualified resources and make coaching more affordable, including a decrease of costs, etc. The study also provides significant research capacity to continue exploring coaching as a methodology of working with consciousness, and multiplication of its effectiveness.

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Response of the labor market to the needs and expectations of Generation Z

Abstract

We are witnessing a generational change in the labor market. The baby boomer generation is being replaced by the representatives of Generation Z. The different environment both generations grew up in, as well as technological advancement over these several decades, are reasons these generations have completely different characteristics. The conditions a given generation grew up in influences the needs and expectations in private and professional life. This becomes a challenge for employers who have to adjust workplaces to their requirements. Moreover, a workplace atmosphere can be the important determinant of an employer's competitiveness in the labor market. Literature studies have shown that, although there are many studies on Generation Y (preceding), there are few studies describing Generation Z (succeeding) in the labor market, thus creating a research gap. The purpose of this study was to explore how companies adapt to generational change in the labor market, i.e. to characterize both the ways and the extent to which enterprises adjust workplaces to the specificity of employees representing Generation Z. The main focus of the study were issues related to a friendly office atmosphere, the latest technology, ambassador programs, internships and apprenticeships, benefit packages, onboarding and CSR. According to the research results, enterprises make changes in order to adapt to Generation Z, however, they do not promote these changes excessively. Firms and organizations should consider developing reports on their efforts to adjust to generational change in the labor market.

Keywords: Generation Z, labor market, workplace, managing generational diversity, competitiveness, human capital, organization management

Introduction

The progress of society as a result of both economic and technological development causes constantly changing conditions of all market segments, including the labor market where entrepreneurs compete for a specific resource. As the result of economic growth, new jobs are created and the demographic decline in Poland (together with the negative migration balance), results in difficulty in finding a person willing to take up employment. Willingness to hire better employees requires competitiveness in the market. Employers are competitive about the components of remuneration (base, bonuses, allowances, anniversary awards) and other material aspects of employment, such as a business cell phone or car (Serafin, 2014, pp. 43–44). However, when the number of these material incentives is similar, intangible assets grow in significance.

Firstly, these assets concern the working conditions and atmosphere in the workplace. Although employee preferences vary greatly, they are similar among a given generation. The word "generation" is understood as "an identifiable group that shares birth years, age, location and significant life events at critical developmental stages" (Kupperschmidt, 2000, p. 66). These features shape common expectations and needs of a given generation's representatives. Likewise, it is important that the representatives of Generation Z (born after 1995) enter the labor market that respects their habits, preferences and expectations (Kirchmayer & Fratrièová, 2020).

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There are still few studies concerning this subject when it comes to Generation Z (Dolot, 2018). Studies in the field of social sciences distinguish common features of Generation Z (the youngest generation in the labor market today). However, as far as is known, there is no scientific study on the initiatives implemented by entrepreneurs in order to encourage representatives of Generation Z to work for them. The reason behind it is the small amount of time since the generation entered the labor market and therefore, an inability to analyze the issue in detail. This study somewhat fills this research gap – its theoretical and cognitive goal is to present selected practices of entrepreneurs competing in the non-material dimension. The practical goal, on the other hand, is to evaluate these practices and prepare recommendations to optimize these activities. Achieving these goals is to answer the following research questions: what common features do the representatives of Generation Z share? What are their expectations regarding the workplace and the atmosphere in it? How do employers meet these expectations? In what processes do changes all result?

The article is structured as follows: the first part consists of the definition of Generation Z and discusses its characteristics. The second, empirical part is based on the analysis of secondary data and involves a description of the implementation of workplace adjustments that will measure up to the expectations of Generation Z in Poland. This is followed by a discussion of the issue and summary.

Literature review

Today, on the labor market there are people representing various generations (Hysa, 2016). They create the market and determine the current situation in it (Hysa, 2016; Luscombe et al., 2013). Among the aforementioned generations, the following should be distinguished: Boomers (Baby Boomers, 1946–1964), Generation X (1965–1979), Generation Y (1980–1994) and Generation Z (1995–…) (Berkup, 2014).

Literature studies have shown that various authors have different approaches to the definition of Generation Z, particularly, determining the years of birth of its representatives. The age range defined in individual scientific studies is presented in Table 1 (see also Dolot, 2018). Although the most common name of this generation is Generation Z, the authors have also been using different names. Table 2 shows alternative names for Generation Z.

Table 1
Different estimations of years Generation Z was born in

Authors	Years
Biernacki, 2016; Domagalska-Grędys, 2017; Kroenke, 2015; Kuczerska & Smoląg, 2018; Żarczyńska-Dobiesz & Chomątowska, 2014	born after 1990
Gajda, 2017	born after 1994
Berkup, 2014; Fratrièová & Krichmayer, 2018	born after 1995
Bejtkovský, 2016	1995–2001
McCrindle, 2014	1995–2009
Bencsik et al., 2016; Koulopoulos & Keldsen, 2014; Seemiller & Grace, 2016	1995–2010
Dimock, 2019; Knight, 2014	born 1996 and after
Bresman & Rao, 2017	born after 1997

Source: authors' own work.

Table 2
Alternative names for Generation Z

Author	Names
Gajda, 2017	Generation M (Multitasking), Generation C (Connected Generation), net generation (constantly connected).
Levickaite, 2010	Children of Internet, Digital Generation, Digital Natives 87F ****, Media Generation, .com Generation, iGen 8F *****, Instant Online.
Żarczyńska-Dobiesz. & Chomątowska, 2014	Generation "C" (from the words connected, communicating, content-centric, computerized, community-oriented, always clicking), as well as iGeneration, Gen Tech, Gen Wii, Net Gen, Digital Natives, Gen Next, Post Gen.
Dolot, 2018	C Generation, R Generation, iGeneration, Gen Tech, Online Generation, Post-Millennials, Facebook Generation, Switchers, "always clicking".

Source: authors' own work.

Characteristics of Generation Z

The approach of scientists towards determining the age range result from various adopted sociological characteristics that allow it. In his research, while defining common features of people who make up the Generation Z, Dimock (2019) takes into account political, economic and social factors. Generation Z has very similar personality traits to Generation Y (the previous generation) (Kuczerska & Smoląg, 2018; Żarczyńska-Dobiesz & Chomątowska 2014). The list of features of Generations Y and Z is presented in Table 3.

The conditions in which Generation Z grew up determine their features. Generation Z consists of people who grew up in the internet world and remained online (Biernacki, 2016). The time of technological development in which Generation Z grew up made them feel at ease when using new technologies (Gajda, 2017). It can even be said that they are used to technology (Żarczyńska-Dobiesz & Chomątowska, 2014). Generation Z is technically fluent, connected to the web, incorporating technology into all aspects of their lives (Kirchmayer & Fratrièová, 2020). What is more, the fact of being surrounded by technology all the time made it a part of them (Gaidhani et al., 2019). Representatives of this generation live simultaneously in two worlds – real and virtual (Lazányi & Bilan, 2017, p. 79; Żarczyńska-Dobiesz & Chomątowska, 2014). Some researchers go further and claim that for Generation Z, the virtual and real worlds are the same reality (Hysa, 2016). The representatives of Generation Z treat cyberspace the same way they do reality. This results in a lack of hesitation when introducing information about themselves to the internet (Pandit, 2015, pp. 17–18).

Some researchers perceive the adolescence of Generation Z as a unique historical context that provided them with many opportunities to enter the virtual world (Fratrièová & Krichmayer, 2018). The internet breaks the barriers of communication, and network guarantees contacting people around the world. This gives the opportunity to work at any time and on any day of the week, regardless of the time zone (Berkup, 2014; Żarczyńska-Dobiesz & Chomątowska, 2014).

On the other hand, communicating with the other representatives of Generation Z only virtually, causes interpersonal skills deficiencies, particularly in the area of establishing contacts and relationships with others. In addition, it makes them bad listeners (Bejtkovský, 2016). Moreover, some of their friends have never seen them in the flesh because they met online and using instant messaging may make it more

Table 3

Comparison of Generation Y and Generation Z

Generation Y	Generation Z
Familiar with new technology.	The most tech-savvy generation, born in a digital world. They keep up with the new technology and are really close to it.
Optimistic about life.	More realistic and cautious, materialistic when it comes to life. They are afraid of the future.
Confident.	Confident.
Variety is normal for them.	Even more tolerant and accepting when it comes to diversity, they are themselves as a generation, internally very diverse.
The "me, for me" generation, looking for fame and fortune. They recognize the problems of corporate social responsibility.	Generation "we", more socially oriented, strongly interested in the problems of corporate social responsibility. Even more involved in the issues of global warming, hunger, wars, etc. Honesty and non-discrimination are more important to them than money status.
Learning process, development planned in advance, long-term building of a professional career.	Learning, development according to the principle of just-in-time learning, they want to achieve everything and know everything immediately, at one's command and preferably online. They don't like the vision of building a long-term career and have a specific approach to gaining knowledge. It is important for them to find information quickly.
They strive for balance between professional and private life.	Professional and private life is to exist as a whole. They want to be themselves and be guided by the same values in both.
Educated, intelligent.	Even more educated. Growing up in "online mode" and social games, they have developed a variety of competences valued on the labor market very early and are not afraid of taking risks and making decisions quickly.

Source: „Pokolenie Z na rynku pracy – wyzwania dla zarządzania zasobami ludzkimi", A. Żarczyńska-Dobiesz and B. Chomątowska, 2014, *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, 350*, p. 408 (https://doi.org/10.15611/pn.2014.350.36).

difficult for them to maintain a long-term relationship (Cook, 2015; Gouws & Tarp, 2017; Harber, 2011; Singh, 2014). Żarczyńska-Dobiesz and Chomątowska (2014) called it the impairment of verbal communication skills and establishing interpersonal contacts in the real world.

Generation Z representatives are self-confident, open-minded and creative (Kuczerska & Smoląg, 2018). They prefer to work in a group rather than individually (Hysa, 2016). Moreover, they want to achieve success at work quickly and build their position in a short time (Hysa, 2016). The constant connection to technology and performing several actions simultaneously shaped the multitasking skill in Generation Z (Fratrièová & Krichmayer, 2018; Hysa, 2016). The representatives of this generation are characterized by mobility and knowledge of foreign languages. Unlike the older generations, they do not consider these things a barrier (Hysa, 2016). They are eager to communicate with representatives of other cultures, they like to participate in international internships and strive to constantly improve the processes that surround them (Hysa, 2016).

Generation Z representatives value respect and keenly express their opinion on any subject. They are also energetic and they willingly use their creativity at work (Sidorcuka & Chesnovicka, 2017). Employers can benefit from Generation Z's commitment to work (Half, 2015), however, if any problems arise, they do not like to be given advice and prefer to solve the problems themselves or seek solutions on various platforms. They search for information on interesting topics on the Internet and use do-it-yourself guides (Gaidhani et al., 2019).

Generation Z dislikes the hierarchical structure of organizations (Kuczerska & Smoląg, 2018) and their routine. To them, the willingness to seek diversity is more important than stability at work (Hysa, 2016). Due to their generation characteristics, they expect a change in the attitude of employers (Gajda, 2017). From the point of view of the study, the fact that they can easily change jobs if an employer is unable to provide them with rapid development, is important (Paszkiewicz, 2017).

The diversity of generations in the labor market translates into challenges in managing teams in organizations. Employers face challenges in terms of both recruiting new staff and managing the current one (Iorgulescu, 2016). The biggest challenge for employers is attracting employees who most closely match the policy of a given company (Sidorcuka & Chesnovicka, 2017). The desire to develop a company creates new workplaces. The generational change forces contemporary employers to change their approach to new employments, and above all, to be more flexible (Kroenke, 2015).

"A corporation's success and competitiveness depend on its ability to embrace diversity and realize the competitive advantages and benefits" (Bejtkovsky, 2016; Osoian & Zaharie, 2014). It is necessary to get to know the generation's values, needs, motivations and apply adequate human resource management methods (Żarczyńska-Dobiesz & Chomątowska, 2016). Adapting workplaces to the generation's individual needs and career opportunities are the most important non-material factors influencing the decision-making process (Fratrièová & Krichmayer, 2018; Gajda, 2017). Gaidhani et al. (2019) reviewed the literature and presented the following Generation Z expectations towards employers and the place of employment. The representatives of Generation Z:

- prefer to work for a leader with qualities such as honesty and integrity;
- expect that the channel of communication is recognized and comfortable environment is present;
- prefer transparency, and treat self-reliance, flexibility and personal freedom as non-negotiable aspects;
- have to be given adequate freedom to ascertain themselves and get immediate acknowledgment;
- favor face to face communication and want to be taken seriously;
- wish managers listened to their ideas and valued their feelings;
- prefer work environment that nurture mentoring, learning and professional development opportunities;
- consider technology a crucial part of their private lives and work.

Research methodology

Literature review proves that there are many publications concerning Generation Y and their specific situation on the labor market. However, to the best of our knowledge, there are no studies regarding specificity of Generation Z with particular reference to Poland. Therefore, the research consisted of two stages, of secondary and primary character, respectively. The first was aimed at exploring the processes of adapting enterprises to the specificity of Generation Z. Rich and diversified sources of secondary data, such as 11 company reports, 4 industry analyses and information available on the websites of 21 companies were used. After conducting a critical analysis of the collected data, it was possible to identify the most common techniques used by enterprises to meet the needs and expectations of Generation Z. The second stage supplemented and extended the results of the first, and its aim was to recognize motives behind the processes of workplace adjustments to the needs of Generation Z. In four companies that were earlier identified as those implementing adaptation processes, an in-depth interview (IDI) was carried out with representatives of HR departments. Such a choice of enterprises was explained by the results of the first stage indicating which companies conduct the most intensive activities. The interviews with companies consisted of the following questions: does the company notice the need to adapt to Generation Z? Are

there any changes made in the company in view of Generation Z entering the market? If so, what are these changes? Are the applied solutions innovative or are the existing solutions modified?

Results

Entry of any new generation to the labor market forces employers to adapt to new, specific attitudes, expectations, and a particular style of work and cooperation. It is worth noting that currently, despite the coexistence of several generations on the labor market, enterprises focus primarily on the needs of Generations Y and Z. Generation Z, although similar to Generation Y, pays attention to other things when it comes to the work environment than their older colleagues do. What is more, Generation Z is perceived as being the most demanding. On the basis of the mentioned requirements of Generation Z and interviews with HR departments of large employers in Poland, the following enterprise changes, resulting from the entry of Generation Z into the labor market, are listed:

- creating a friendly atmosphere at work;
- making the latest technologies and equipment available in the company;
- creating ambassador programs;
- offering internships and apprenticeships for students and graduates;
- offering benefit packages;
- enabling supervisory support during the first days of work;
- involving employees in CSR activities, e.g. corporate volunteering.

An example of a competition that selects the best employers in the country is "Top Employers Poland". Top Employers Institute examines employers in terms of their personnel policy. The priorities for companies in 2020 were primarily organizational and cultural changes, employee involvement and talent strategy. In 2020, as many as 61 Polish employers became laureates of this study. These included Accenture Polska, Bank Pekao, Coca-Cola Poland Services, DHL Polska, Kaufland Polska Markety, Orange and Polski Koncern Naftowy ORLEN S.A. (Top Employers Institute, n.d.). Employers want to be perceived as offering a friendly workplace atmosphere, respect for the employee and understanding. Based on the interview with several companies, it appears that the atmosphere at work for the youngest generation is extremely crucial, as hierarchy is uncomfortable for them.

Employers today, wishing to meet the requirements of Generation Z, must also adapt their technologies and equipment in their enterprise. Generation Z, having extensive experience with the latest technologies, require from the employers, the newest technological solutions at a workplace. An example of how companies adjust to these requirements is the leader of Polish banking – PKO Bank Polski. Thanks to the cooperation with the Emplocity start-up, the bank implemented a tool that uses artificial intelligence in the recruitment processes. Emplobot is an intelligent recruitment chatbot which, during an interview with a candidate, asks about professional experience, skills, availability and financial expectations, and based on the questions asked, it creates a candidate's profile and adjusts it to recruitment conducted by the bank (PKO BP, 2019). Generation Z prefers online training. An employer that offers such a solution is, among others, Tauron Group. Most of the training provided by this employer takes place on a special e-learning platform. E-learning is a solution that is used nowadays in many companies in Poland.

Ambassador programs are one of the popularity-gaining forms of cooperation between students and employers. The ambassadorial program is designed to promote a given enterprise at universities or job fairs. The work of a brand ambassador includes: organizing events promoting an organization on university campuses and informing students about job offers or internships via social media. In return, the ambassador usually receives a given company's gadgets, electronic equipment, trainer support, free training or the possibility of an internship after the completion of the ambassador program (Albrychiewicz-Słocińska & Robak, 2017). The most popular ambassadorial programs visible at Polish universities include programs of companies and organizations such as: PZU, ING Bank, Pekao Bank, Santander Bank Polska, BGŻ, BNP Paribas Bank, Skanska, Capgemini, NIVEA Polska, Tiger, RedBull, KPMG, PwC, Delloite, EY, Maspex and Grupa Azoty. One of the most attractive ambassadorial programs is the program of PZU. This program offers ambassadors not only training, integration, networking, consultations with recruiters and the possibility of further cooperation, but also an academic scholarship (PZU, n.d.).

Young people entering the labor market do not often have professional experience. Therefore, entrepreneurs organize internships and apprenticeships for students and graduates to help them gain their first experience. Today, most Polish companies offer internship programs. They provide flexibility that is valued by the Z generation. Internships are often implemented according to a student's schedule or by mutual agreement considering working hours between the employer and the trainee or apprentice. This form of employment may be paid or unpaid. Payment, however, is not the most important thing for the representatives of Generation Z, as they want to gain valuable experience. National Bank of Poland is one of the institutions where it is impossible for a person without experience and appropriate knowledge to get employed. NBP offers young people both paid and free student internships. The student internship lasts 2 or 3 weeks and is aimed at obtaining materials for diploma theses in the field of economics, banking and finance. On the other hand, "Internships of the NBP President" is an annual program aimed at preparing the most talented graduates of domestic and foreign universities to take up employment on the Polish and European labor market (NBP, 2019).

Another form of employer adaptation is in the offering of benefit packages. The information obtained from the companies interviewed proved that benefits are one of the most crucial things for Generation Z. Currently, employers offer an extensive range of benefits: from medical insurance, through prepaid cards to even tuition fees. When competing for an employee, the employer wants to provide the best non-wage benefits. According to research, as many as 90% of employers in Poland offered some of these benefits (Staszic Institute, 2019). The bank that has a wide "Well beiING" package in its employment offer is ING Bank. The additional benefits that the bank offers its employees include a dozen or so additional days off from work, the possibility of using sabbatical, the possibility of working from home, medical care, employee pension plan and group insurance, cancer prevention program, cafeteria program or multisport packages and the co-financing of language courses or training as a part of employee development (ING, n.d.).

Onboarding, defined as the process of an employee being supported by their employer in adapting to the new workplace and it is extremely important from the perspective of a newly hired person. One of the types of adaptation to a new workplace is assigning a "company buddy". This person's task is to, among other things, familiarize the employee with a company, its policy, structure, rules and organizational culture, as well as answering all questions, explaining tasks and conducting integration processes with this company's team (Kaźmierczak, 2017). The presence of a "company buddy" is one of the ways for employers to adapt to the Z generation. PwC is an example of an enterprise where the employee is accompanied by a buddy during the first days of work. As part of the WEX summer internship program for 1st and 2nd year students, the offer gives them the opportunity to gain their first professional experience (PwC, n.d.).

The last type of adaptation of employers to the Z generation is the commitment to corporate social responsibility (CSR). CSR in relation to sustainable development means maintaining the balance point between caring for a company to achieve its goals in terms of ecological, social and economic aspects. Corporate social responsibility develops its idea by focusing primarily on the natural environment, external shareholders and general social welfare (Kazojć, 2014). Generation Z consists of people who spend a lot of time on the Internet and are filled with information about the need to care for nature and their community. In Poland, BNP Paribas Bank became the leader of the Responsible Companies Ranking in 2019. The bank's Corporate Social Responsibility and Sustainable Development Strategy consists of 12 commitments under four pillars of responsibility – economic, workplace, social and environmental. All the activities undertaken by the bank are carried out in accordance with the principles of corporate governance and include, among others, openness to customer needs and initiatives for local communities, limiting the negative impact of operating activities or long-term financing of the economy (BNP Paribas, n.d.).

Discussion and conclusion

Every two generations that are successive share some common features. It is no different in the case of generations Y and Z. Managing generational diversity becomes significantly more visible among employers, especially within the area of adaptation to Generation Z. The analysis of the information available on portals of different companies, as well as conclusions drawn from the reports of the companies being interviewed, allow one to conclude that the adaptations for Generation Z are becoming more and more prevalent. As companies emphasize, these adaptive changes have existed for years, but they are constantly improved and modified in connection with the new generation in the labor market.

Generation Z includes people born after 1995 who are characterized primarily by multitasking, openness, creativity, mobility, entrepreneurship and what is more, they willingly use the latest technologies. It should be noted that features that distinguish them from other generations the most are: self-reliance, freedom, individualism and addiction to technology and speed. It is believed that they spend little time in the real world because they are always online.

Generation Z primarily demands a work-life balance, a friendly atmosphere at work, support of development and the opportunity to prove themselves. The analysis showed that new employees, who start their adventure in a new workplace, can count on the support of a "buddy". It has also been noticed that in companies, employees do not categorize themselves by position and everyone calls each other by their first name. As a result, the atmosphere in a company is more relaxed and friendly.

More and more companies focus on developing the best possible atmosphere in their workplaces and invest in the latest equipment and technologies that are provided for employee use. Thus, enterprises more and more often use remote work solutions or offer flexible working hours. Enterprises are more willing to create internships and ambassador programs. It is an interesting offer among Generation Z due to their frequent lack of professional experience. What employers also offer is a benefit package perceived positively by the representatives of Generation Z. A noticeable adaptation of employers to the changing generations is their social responsibility. Z's also pay attention to whether a given company is involved in CSR. It is noticed that the number of employers who care about CSR and are involved in social initiatives is increasing.

All of these are only part of all the changes and adjustments that can be observed in enterprises operating in Poland. The reason for these adjustments is employers' competition for employees based on intangible assets, as they create jobs adapted to the Generation Z. It should be noted that not every em-

ployer changes the environment of their company due to generational changes in the labor market, but there is a noticeable growing tendency of such behavior. Any activities of enterprises that result in opening up to Generation Z will affect the reduction of unemployment among young people and the possibility of dynamic development in line with their expectations.

Further research could be aimed at finding the importance of an implementation adjustment process concerning generational change, especially focusing on small and medium-sized enterprises. An analysis of large company reports showed that although some of them try to adapt to Generation Z in the labor market, they do not promote them excessively. Firms and organizations should consider developing reports on their efforts to adjust to generational change in the labor market. Information concerning this subject could become a strong advantage in the area of competing for an employee. These reports should be publicly available so that all interested parties have access to them.

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We recommend

The voice of Generation Z

Link to the report: **https://rainmakerthinking.com/wp-content/uploads/2018/09/THE-VOICE-OF-GENERATION-Z_Final.pdf**