

EVALUATING ONLINE REAL ESTATE EDUCATION QUALITY DURING AND AFTER COVID-19

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ARTICLE INFO	ABSTRACT
<i>Keywords:</i> <i>real estate, real estate education, online education, COVID-19</i>	This paper investigates how students enrolled in real estate programs at the Krakow University of Economics (KUE) responded to various models of online and hybrid learning implemented during and after the COVID-19 pandemic. Drawing on five rounds of survey-based research conducted between 2020 and 2023, the study traces the evolution of student attitudes over time, particularly as instructional methods and faculty preparedness developed. While the research focuses on a single Polish institution, many of the observed trends align with patterns documented in other countries. The findings yield several actionable recommendations for enhancing online instruction in real estate education, including the use of synchronous formats where feasible, the integration of diverse pedagogical strategies, and the promotion of student well-being through meaningful interaction. Simultaneously, the study underscores the limitations of poorly coordinated hybrid models. In light of recent warnings from the Global Preparedness Monitoring Board (GPMB, 2024) regarding the high probability of future global health crises, the experiences discussed here may inform the development of more flexible and resilient teaching approaches within real estate education under conditions of uncertainty.
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1. Introduction

This paper focuses on online education as part of universities' real estate education. The issue is analysed in the context of changes in general education under the Fourth Industrial Revolution, also known as Revolution 4.0 and Industry 4.0 (Schwab, 2018), which accelerated significantly due to the COVID-19 pandemic. The publication matches the scientific discussion executed, e.g. by academics associated with the European Real Estate Society (ERES), regularly presenting their research on various forms of education (online, hybrid, etc.) in cyclic education seminars. It should be emphasised that although the COVID-19 pandemic and the fourth industrial revolution are global phenomena, they had different dynamics depending on the country/region, exerting different impacts on distant education models, both on the global and European scale. The research presented in the paper aims to identify the changes in the students' opinions on the online teaching models during and after the COVID-19 pandemic, on the example of the largest university of economics in Poland in terms of

student population, which has been educating real estate students for over fifty-five years. The added value of the publication is that contrary to most research, the presented results are based on five rather than one cyclic survey research carried out regularly between December 2020 and December 2023. Such an approach enables capturing changes in the online education models and their perception by the party of most interest, i.e. students, both during and after the pandemic.

2. Online education in the field of real estate in the European academics' research

Online tertiary education is by no means new. In 1987, The University of Phoenix launched the first online studies, while ten years later, The California Virtual University offered over fifteen hundred distance teaching courses (Goltz-Wasiucionek, 2011). No wonder that academics from all over the world, including Australia (Reid, 2003; Henry, 2018), North America (Piotrowski & Vodanovich, 2000; Knowles & Kerman, 2007; Shea, 2007; Moloney & Oaskley, 2010),

Asia (Zhang et al., 2012), Africa (Bosch, 2009) and Europe (Ferrer-Cascales et al., 2011) had carried out scientific investigations on distance teaching long before the COVID-19 pandemic. Nevertheless, the research on the subject matter intensified when the pandemic struck. A simple test confirms the statement above. If one enters the “online education” phrase into the Web of Science base, identifying 176,027 scientific texts as of 2 January 2024 (starting from 1974), and limiting the search scope to the period 2020-2024, the database shows 79,471 research papers, which means

45% of all papers. It is therefore not surprising that online education also gained traction among real estate scholars during the COVID-19 pandemic. A clear indication of this trend is the increased number of presentations focused on online teaching at the annual Education Seminars of the European Real Estate Society. These contributions, summarized in Table 1, primarily involve case studies of universities, faculties, or individual courses at international institutions that have recently adopted or significantly explored online or hybrid teaching methods.

Table 1

A review of the presentations on online and hybrid real estate education delivered during annual education seminars of the European Real Estate Society include years 2020-2023

Author and year	Title of research	Type of research	Conclusions
Éamonn D'Arcy (2023)	Some Insights on our Digital Real Estate. Journey at the Henley Business School	Desk research	The COVID-19 pandemic served as a steep learning curve for digital academic delivery, prompting rapid adoption of tools such as asynchronous lectures and virtual field trips. In the post-pandemic phase, this has evolved into broader integration of digital elements through Digitally Enhanced Learning, combining blended platforms and digital assessments with a growing focus on developing students' digital competencies and academic identity.
Gianluca Mattarocci (2022)	Technology opportunities, virtual mobility opportunities and inclusion issues: evidence from the EDUSC project	Case study focused on the results of the ERASMUS+ KA2 project named EDUSC that involved companies (Confia and Kiron), universities (University Carlos III Madrid and the University of Rome Tor Vergata), and an association (YERUN) coming from five different European countries	Technology is changing the higher education and the Covid-19 experience has boosted the adoption of new teaching methodologies in the universities.
Ellen Geurts (2022)	Blended education curriculum design to engage students in social justice debates of our future cities – understanding motivations, needs and perspectives of stakeholders	Case study of a blended course for MSc students at the Faculty of Architecture, University of Delft (Netherlands)	The fourth industrial revolution (4IR) landscape, which encompasses the trend towards more impact of technology, provides both challenges and opportunities for the real estate sector but also for real estate education (for instance hybrid forms of education).
David Akinwamide (2021)	Towards a Sustainable PropTech Education: Digital Intelligence and Smart Pedagogy (2021)	Desk research	There is a need to develop a new smart pedagogy suitable for technology enhanced learning process, plan and programmes in the curriculum development of real estate higher education.
Bartłomiej Marona (2021)	Real Estate Education in the COVID-19 landscape: A case study of Krakow University of Economics	Survey research (Poland)	The research presents the results of three surveys carried out during the COVID-19 pandemic among real estate economics students at the Krakow University of Economics. The students' opinions on the quality of online teaching vary, but there is a consensus that some online techniques should be continued after the COVID-19 pandemic.
Laura Gabrielli (2020)	Online teaching challenges and future approach	Survey research among the students of the University of Venice (Italy)	Online teaching has created new opportunities and discrimination between students, primarily related to internet connection quality.
Yawei Chan (2020)	Carrying out group work in real estate course online amid the pandemic	Case study - Delft University (Netherlands)	The main research question was how a real estate education programme, including group work, can be conducted online during the pandemic. Based on the example of Delft University, it was stated that evaluating students' group work and motivating students to spontaneously interact and execute tasks

The strong interest in online education among real estate academics during the pandemic years, as illustrated in Table 1, reflects a broader academic shift toward remote teaching methods. While existing studies have addressed this topic from different perspectives - ranging from student feedback on institutional changes (Gabrielli, 2020), to single case studies (Mattarocci, 2022) and literature-based analyses (Akinwamide, 2021) - this study expands on prior work by offering a broader and more longitudinal view. It is based on five rounds of survey data collected between December 2020 and December 2023, covering student experiences before, during, and after the main phases of the pandemic. This design enables a more nuanced understanding of how student attitudes evolved in response to shifting teaching formats and levels of institutional preparedness. The following section outlines the research methodology in more detail.

3. Material and methods

This study, as previously noted, was based on an online survey that included both closed- and open-ended questions. The closed-ended questions were designed to compare students' evaluations of different modes of instruction (e.g., in-person, online, and hybrid) across multiple semesters, allowing for the identification of any changes in perception over time. In contrast, the open-ended questions provided more nuanced insights typically associated with qualitative research, such as capturing a detailed understanding of students' experiences - particularly valuable in the context of distance and hybrid learning, which remains underexplored in many respects. The research was carried out five times on a representative population of students studying the "Real Estate and Investments" specialty at the KUE, the largest university of economics in Poland in terms of student population. Each wave included a different cohort of students due to the long time span of the study. Participation in the survey was voluntary, and the data were collected anonymously in accordance with institutional ethical standards. The questionnaire consisted of 11 items: six closed single-choice questions and five open-ended questions. Because the study had a qualitative character, no statistical tests were used; the analysis was limited to descriptive statistics and the qualitative interpretation of the open-ended responses.

It is worth noting that the instructional model at

Krakow University of Economics evolved over the course of the pandemic in response to changing public health conditions and national forecasts. Initially, from March to September 2020, teaching was primarily asynchronous. In the 2020/2021 academic year, the university adopted a nearly fully synchronous format. Beginning in October 2021 and continuing through the 2023/2024 academic year, a hybrid model was introduced, combining on-site instruction with synchronous online classes. The first research, with a population of fifty-three students, was carried out in late November and early December 2020. The research focused on assessing the teaching model during the summer term of 2019/2020, which was the beginning of the pandemic (March - September 2020) and the winter term of the academic year 2020/2021 (October 2020 - February 2021). The second research covered a population of forty-one students in June 2021 and mainly focused on obtaining students' opinions on the successive term of studies, i.e. summer term 2020/2021 (March 2021 - September 2021). The third research was conducted in late November and early December 2021 on a population of forty-five students. Similarly to the research from late March and early April 2022 (thirty-six students) it applied to the education model executed in the academic year 2021/2022. The last research covering forty-four students was carried out in late November and early December 2023. It was the first research in the post-pandemic period when no sanitary restrictions were in force either in the university or in Poland in general (the state of epidemic emergency was officially cancelled on 1 June 2023).

4. Results

As mentioned before, some questions in the survey questionnaire were closed-ended and did not change throughout the research stages in order to allow for relevant comparative analysis. It should be highlighted that students' opinions on the teaching model at the KUE changed over time as new education models emerged (from asynchronous online models through purely synchronous to hybrid models).

The lowest number of positive opinions was reported in the research carried out in late November and early December 2021 (see Figure 1). It was the only time when less than 50% of opinions on the given education model were positive. It mainly resulted from the fact that the hybrid model valid then and implemented in October 2021 did not fully correspond to the pandemic

situation in Poland (when the research was carried out, i.e. in November 2021, the mean number of COVID cases in Poland amounted to 17,160 and was similar to the number of cases in November 2020 (20,937) when the University went 100% online). Many opinions in the research underlined this aspect. A (female) student noticed that *"Many classes were lost because lecturers had to stay at home and did not decide to inform us that the classes were cancelled, so I travelled to the University in vain several times. No such things happened during online education – even when lecturers had to stay home, e.g. because of their child's quarantine, they could run classes online. On-site education means that many classes are postponed to times inconvenient for everybody. In my opinion, at least lectures could be held online. First and foremost, it reduces the risk of infection,*

and I think there is no difference between online and onsite lectures". Another (male) student noticed, evaluating the education model applicable back then, that the *"hybrid mode has all disadvantages of the onsite mode, prevents people from self-quarantine if they observe any coronavirus symptoms and under the obligation to participate in classes forces meetings with healthy people that can be susceptible to infection".* Another opinion mentioned that the model does not work during aggravated pandemic situation in Poland, *"As the last year economy students, do we really have to attend onsite classes? I could fully understand it if we were the University of Technology students, but I do not consider the solution right for the University of Economics, like ours".*

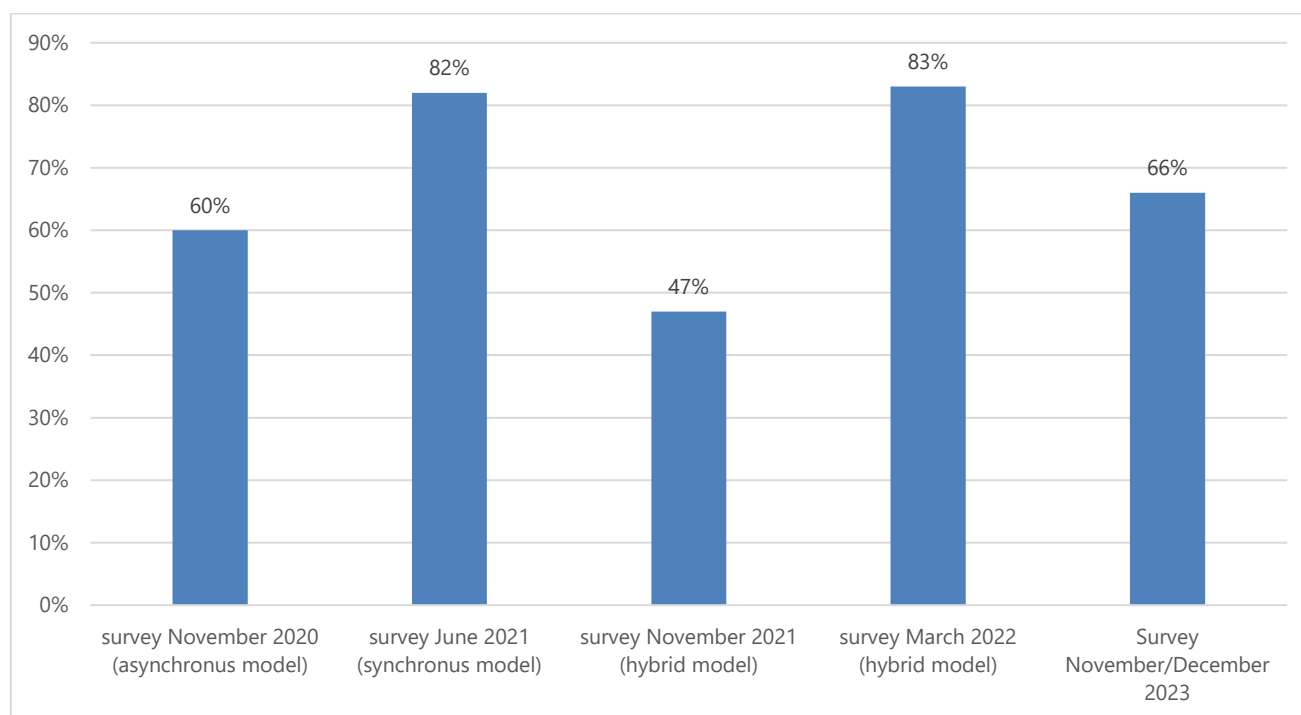


Fig. 1. Positive opinions of the surveyed students on the education model at the Krakow University of Economics valid during the research period. Source: own study.

It should be emphasised that the hybrid model was valid at the KUE (some obligatory classes on-site and some online) also during the last two survey research projects and was more positively evaluated (83% and 66% of positive opinions, respectively). The penultimate research was conducted in late March and early April 2022 when the number of COVID-19 cases in Poland was apparently decreasing, and the monthly average numbers were also much lower (the mean in March 2022 was 9,544 cases versus over 17,000 ones in the previous research). Most probably, this is why no single critical opinion was expressed on the hybrid model in

the March 2022 survey (and also in December 2023), mainly due to concerns related to the pandemic and health aspects.

Moreover, the relatively low number of positive opinions (60%) in the first survey research should be highlighted. It evaluated the original distance education model introduced at the KUE when the pandemic started. The model developed in a highly spontaneous way was mainly asynchronous; it was not clear how long it would function. That is why much lower scores than those in the second survey (June 2021 – 81% of satisfied students) come as no surprise.

It should be highlighted that the students participating in the second research had completed nearly the whole academic year with 100% of synchronous online classes using one software (there was more freedom in this respect earlier), and students and lecturers had more experience using new technologies in academic education. Consequently, it comes as no surprise that most students are for using distance teaching methods in the future, even when the COVID-19 pandemic is over (see Figure 2). A relatively low number of students (53%) expressing positive opinions on online teaching methods in the first research is not surprising, either. The students remembered the initial and not consistently successful attempts of using distance teaching at the KUE. On the other hand, the last research (November/ December 2023) reveals the highest enthusiasm for using online methods in the future. The opinions collected in the last research, such as "significantly improved distance teaching level", "the quality of online classes has improved significantly compared to the beginning of the pandemic" and "

better-adapted distance teaching methods (e-learning, presentations) and improved skills in using MS Teams, ZOOM and other platforms" dominated the respondents' answers. They explain why over 90% of students would like to see some distance teaching methods continued in the future.

Even though the research results unequivocally reveal that students appreciate online teaching and a vast majority of them would like to see this form of teaching continued in the future, shifting fully to online teaching would not be positively welcomed. The respondents' descriptive answers to open-ended questions in all five survey research items, where students could indicate the most important advantages and disadvantages of the online model, are a testimony to the statement above. It is impossible to quote all answers, but based on a qualitative analysis of the collected empirical material, four key negative aspects of the online teaching model were identified, and the results are summarised in Table 2.

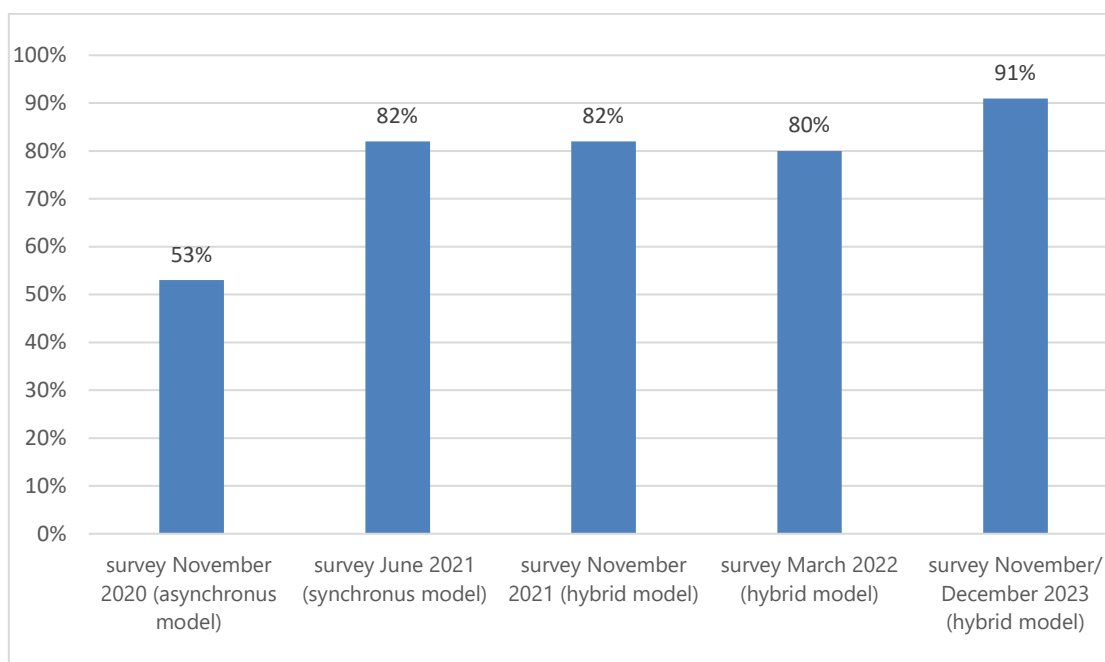


Fig. 2. Respondents' answers to the question of whether distance teaching methods should be continued in the future in a specific scope.
Source: own study.

Table 2

Students' negative opinions on online teaching	
Category	Sample answers provided in the surveys
Human relations/contacts	"... during online classes, we do not meet any new people/ develop relations with colleagues. For me, contact with people, conversations with them, and exchanging opinions is the essence of studying".
	"... it is a challenge to actively participate in discussions or establish close relationships with other students".
	"A lack of face-to-face contact made learning more about people from our group difficult, which negatively affected group work during classes".
	"Hampered contact with teachers and other students".
Concentration	"it is hard to stay focused, so you acquire less knowledge".
	"It is harder to concentrate during lectures due to many distractors".
	"Online classes require student's higher motivation to focus on the ongoing class".

Health issues	<i>"Difficulty focusing, being distracted by other activities, eyestrain after many hours of looking at the screen".</i>
	<i>"distance teaching triggered a depressively apathetic lifestyle, which only added to the stress related to many responsibilities, with no trace of a living soul around you to share the peculiar reality (unless we consider square and often black windows in ZOOM)".</i>
	<i>"... higher mental burden (sense of isolation)".</i>
	<i>"online teaching triggers depressive and apathetic conditions".</i>
Technical conditions	<i>"Deteriorated health (eye vision, sedentary position in front of computer)".</i>
	<i>"Technical problems occurring in teaching platforms, e.g. incorrectly displayed presentation".</i>
	<i>"Teachers who organised lectures at the University often had Internet issues, resulting in sound and vision glitches during lectures".</i>
	<i>"Relying on an uninterrupted Internet connection is a disadvantage".</i>

Source: own study.

The selected answers summarised in Table 2 represent the opinions of students participating in all parts of the research very well. Limited human contact seems to be the major drawback of online classes. Although some opinions emphasised limited or hampered contact with lecturers, the dominant narrative highlighted a lack of student relationships, including limited opportunities to establish new or consolidate previous relationships. This is somehow related to another negative aspect of the distance teaching model, i.e. health deterioration. Even though some respondents mentioned physical conditions (eyestrain, back pain, etc.), there were dominant concerns related to mental health due to alienation and

lack of people-to-people contact. Moreover (more rarely), some answers highlighted poorer concentration during online classes. There were some opinions concerning technical problems, resulting either from Internet connection issues (on the lecturers' and students' sides) or difficulty sharing the teaching materials in the right way (it applied, e.g. to videos and similar formats rather than presentations).

During the research, the students were also asked about the positive aspects of the distance teaching model. Similarly to the previous case, some answers were selected, grouped into categories and summarised in a table (Table 3).

Table 3

Students' positive opinions on online teaching	
Category	Sample answers submitted in the research
Everyday logistics	<i>"You do not have to take time off work; it saves time".</i>
	<i>"The advantage is that you can combine them with work more easily, especially when your schedule is relatively cohesive".</i>
	<i>"Saving time is the only advantage of online classes because we do not commute to the University".</i>
	<i>"You do not waste time commuting".</i>
	<i>"it is more convenient because you can participate in classes wherever you are".</i>
	<i>"You don't have to get up early for classes".</i>
Accessibility of materials	<i>"Availability of presentations and good visibility of all teaching materials when you watch them on your computer screen (sometimes you cannot see everything well on-site when an overhead projector is used)".</i>
	<i>"Possibility to record/ replay some more challenging topics".</i>
	<i>"Taking full advantage of lectures (you can hear/see everything in detail)".</i>
	<i>"clear courses where you can find any information you need".</i>
Saving money	<i>"You can participate in classes being away from Krakow – this way you save money (renting a flat, etc.)".</i>
	<i>"Lower costs of commuting".</i>
	<i>"In my opinion, it makes some issues easier, e.g. travelling to and from Krakow, eliminates housing problems, reduces food issues, minimises the necessary budget".</i>
	<i>"Lower costs (no housing costs)".</i>
Freedom during classes	<i>"Comfort resulting from being at home".</i>
	<i>"Easier and less stressful contact with teachers".</i>
	<i>"Possibility to make bio breaks, drinking or eating something during lectures/classes".</i>
Pandemic-related health issues	<i>"Distance education in the current pandemic situation has nothing but advantages; the most important one includes the possibility to participate in online classes when I am ill, which would prevent me from partaking in on-site classes and require catching up with the material. Lower concern about getting coronavirus, possibility to self-quarantine if any coronavirus symptoms occur and not forcing such persons or those who reveal no symptoms (meaning the majority) to meet healthy persons".</i>
	<i>"Possibility to participate in classes when you are ill, which normally prevents you from leaving home".</i>

Source: own study.

Similarly to the disadvantages of online classes, the advantages were also divided into several categories. In all five research parts, answers were applied to each

category, but their intensity varied. The last research, i.e. carried out in 2023, makes the best example. Contrary to other research, only one respondent

vaguely mentioned the health aspect by saying, "time-saving, lower susceptibility to diseases; even though the lectures last until late hours, you do not experience as much burden as when you had to be on-site and then come back home. [...] It is a great advantage for people living far from Krakow". In the post-pandemic period, health issues turned out to be far less important, and students identified the most significant advantages of online education in improved everyday logistics and saving money, mainly related to commuting and renting a flat in Krakow ("Possibility to learn from home with no obligation to commute or rent a flat in Krakow").

5. Conclusions

This research reveals that student attitudes toward online education at KUE evolved over time but were broadly in line with findings from other international studies (Tavitiyaman et al., 2021; Dascalu et al., 2023). Several of the trends observed in this study are consistent with findings reported across European and international universities, particularly regarding students' evolving expectations toward online and hybrid formats. While well-documented challenges were present - such as stress caused by limited direct interaction (Knowles & Kerman, 2007; Henry, 2018), technical or hardware-related issues (Piotrowski & Vodanovich, 2000), and difficulties with motivation and self-discipline (Dascalu et al., 2023) - students increasingly came to appreciate certain advantages of remote learning. Similar perspectives have been noted in other global studies (Alkhudiry & Alahdal, 2021).

A key insight from this longitudinal study is the significant improvement in student perceptions of online learning: only 53% of respondents expressed positive views in the first wave of data collection, compared to 91% in the final wave. This shift appears to reflect improved teaching quality, particularly the greater use of diverse instructional techniques - such as flipped classrooms, case studies, tutorials, and quizzes - alongside better faculty preparedness. These developments are in line with international trends and expectations regarding online instruction (Los Santos, 2022).

Based on these findings, the following recommendations are proposed for educators aiming to enhance online and hybrid learning practices:

- 1) Prioritize synchronous instruction where feasible, to foster engagement and real-time communication.
- 2) Invest in ongoing digital training for academic staff, ensuring their confidence and competence

with evolving tools and platforms.

- 3) Use varied, interactive teaching methods to maintain interest and accommodate diverse learning styles.
- 4) Address students' psychological and social needs by creating opportunities for interaction and peer support.

Poorly structured hybrid models - characterized by inconsistency, lack of coordination, or unclear expectations - should be avoided, as they were least appreciated by students in this study.

Looking forward, future research should continue to monitor both student and instructor perspectives on online education. Following suggestions made in other studies (Maatuk et al., 2022), expanding the scope to include teaching staff and extending the research across selected European universities in the field of real estate economics would offer further valuable insights.

Although rooted in the Polish higher education context, this study offers lessons that are relevant far beyond national borders. Educators in the United States, Australia, and elsewhere may find the findings useful in designing more responsive, resilient, and student-centered online learning environments. As noted in the Global Preparedness Monitoring Board's 2024 report, *The Changing Face of Pandemic Risk*, the possibility of future global disruptions remains high. "The next pandemic won't wait for us to perfect our systems" (GPMB, 2024). In this context, higher education institutions must develop flexible, scalable, and inclusive models of instruction that can be rapidly adapted to meet emerging challenges.

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