University education in the post-covid era by students' perspective

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Abstract

This empirical study analyses 40 short interviews with students about how they would imagine an ideal university education after the COVID-19 pandemic. The results show that students do not aspire to go back but that the experience of online distance learning leads them to think more critically about some topics and aspects of education. They expressly point to the need to change the design of frontal lectures, working with lesson recordings, social aspects of learning and the need to find appropriate solutions for hybrid forms of learning. Some students will be present online, and some physically in the classroom.

Keywords: university, hybrid teaching, lectures, COVID-19, post-covid.

Univerzitní vzdělávání a jeho reakce pandemii COVID-19

Abstrakt

Empirická studie analyzuje 40 krátkých rozhovorů se studenty o tom, jak by si představovali ideální vysokoškolské vzdělávání po pandemii COVID-19. Výsledky ukazují, že studenti nemají touhu vrátit se zpět, ale že zkušenosti s online distančním vzděláváním je vedou k přemýšlení o některých tématech a aspektech jejich vzdělávání. Studenti výslovně poukazují na potřebu změnit design frontální výuky, pracovat s nahrávkami lekcí,

zdůrazňují sociální aspekty učení a potřebu najít vhodná řešení pro hybridní formy výuky, neboť část studentů bude presenční výuce přítomná online a část fyzicky ve třídě.

Introduction

The COVID-19 pandemic has fundamentally changed the educational reality in university education (de Oliveira Araújo et al., 2020; Karalis & Raikou, 2020; Daniel, 2020). The closure of universities and the need to move to online forms of education (Alqahtani & Rajkhan, 2020; Radha et al., 2020) have led to fundamental shifts in all dimensions of education. Publication attention has focused on psychological (Hasan & Bao, 2020), social (Chaturvedi et al., 2021), or methodological and technical (Tartavulea et al., 2020; Iwanaga et al., 2021) aspects of the issue.

Our focus will be on the future, namely on education in the post-covid era (Teräs et al., 2020; Arnove, 2020). A substantial part of the available studies on this topic are speculative, showing some idea of where education should be changing (at different levels) or how it should return to its previous state (Iyengar, 2020).

We agree with Burns (2020), who points out that university responses to COVID-19 and the closure may have been mixed. Still, we now face more comprehensive questions over the future of education in which students must be taken into account. They are the ones who have found education extremely challenging, have been exposed to psychological but also economic risks (Tarkar, 2020; Batubara, 2021) and are now clients of an education system to which they have and can make different demands.

The central question we face is how students envision an ideal education in a university setting, what they expect from it, and how they want to participate. In other words, how do they think higher education needs to be transformed to provide a quality and on-demand service.

The specificity of the Czech higher education environment lies in its accessible nature (Tichý, 2019; Matějů et al., 2009; Matějů et al., 2009b), which may lead to different outcomes than those provided by, for example, Anglo-Saxon education (Neill, 2009; Stager, 1989; Norton & Cherastidtham, 2015). The study will focus on postgraduate students studying for a Master's degree in Information Science and Library Science (McGarry, 1983; Audunson, 2007; Marceli, 2019). These students are specific in that they can be expected to have a relatively advanced level of information literacy (Mackey & Jacobson, 2011; Virkus, 2003), which should and could facilitate online learning at least in part.

1 Methodology

Our study is designed as small-scale research (Layder, 2012; Knight, 2001). It is not of major exploratory significance but aims to capture particular views and attitudes within a specific community. Despite this limitation, these findings can be more general and advanced as a basis for further empirical or theoretical studies.

Our research worked with 40 short (between one and three minutes long) interviews with students at the end of an oral exam. These were students in both the professional and combined form in the Information Studies and Library Science programme in the first or second semester of a follow-up Master's degree. That means that the entire sample had not experienced contact teaching in their studies in the programme.

Students answered how they would imagine their studies when they could return to traditional contact teaching. Due to the nature of the exam (there are always 2–4 students who are tested orally and can respond to each other), it was impossible to record the statements. The author of the research, therefore, made short recordings of them with key themes and messages. If a response contained unclear information or was ambiguous, the research author inquired.

Notes were written into one document. From this, seven themes were identified after repeated readings, to which specific researcher's notes were assigned. These are subsequently condensed in the results section. For this reason, no direct quotations are given, as is usual in qualitative research, but only descriptions of each category. This also ensures the complete anonymisation of the respondents.

The research took place between 2 and 18 June 2021. This is significant because in the Czech environment at this time, there was a legitimate hope that teaching could be contact-based from the following semester. At the same time, the research was carried out in a short period so that external circumstances would not alter the possible moods and attitudes of the students.

The research aims not to capture all students' views and feelings but rather to identify important topics relevant to a more comprehensive study or educational design. From the responses, the researcher excluded those related to a particular course or teacher. These have value for evaluating education in a specific discipline but do not offer a more comprehensive application.

A limitation of the research is the absence of transcripts of full interviews with students, which could have been better coded and analysed in more depth. The second limitation is the relatively small and specific sample of respondents. If we wanted to extend the exploratory power of the research, we would need to work with a more nuanced sample rather than a deliberate selection motivated by availability. A final limitation is the combination of oral examination and research, which could lead to some bias in the results or the concealment of uncomfortable facts directly to the examiner and researcher.

2 Results

In analysing the statements, we identified seven headings that students focused on most. The first was **forms of instruction**. More students stressed that they would be interested in a presessional exam form since the teaching was already online. This was due to the stress of technology (something won't work) and less face-to-face contact. On the other hand, some students pointed out that they found the oral exam in the examiner's office stressful.

Regarding the debated phenomenon of oral exams, it can be said that students welcome this form and see it as a prize – learning now of the exam has a discursive feedback effect for them. However, what they perceive as essential is the presence of an objective basis for oral discussion, whether in the form of continuous tests or assignments.

It is unacceptable, unattractive, uninteresting for students to attend presentation lectures – lectures are supposed to be recorded, executable at any time. If they are already presentational, they are supposed to be linked to assignments. Students expect discussions, group work and other activities that are difficult to implement online or are devoid of some dimension of interaction. Only one student claimed to find traditional lectures enjoyable and desirable. The classical lecture concept in the students' optics is unacceptable and not understood in the post-covid era.

Compulsory attendance at lectures that do not include activities where irrelevant for students. On the contrary, they perceive watching recordings or streams of lectures accompanied by assignments as acceptable.

One student stated that she was studying an online degree course, which would have been unacceptable to her previously, but now she does not see this as a barrier. This shows that the students (part of them) have been able to cope with the online form of education and be taught about transformative forms of learning.

On the one hand, students emphasise the requirement for the activity, discussion, workshop-oriented education, and practice. Still, at the same time, they perceive it as essential to learning something from the lectures. Therefore, some of them recommend that the long teaching blocks (the teaching is organised in 90-minute units) be divided into smaller parts, which properly alternate the different forms (interpretation × application × reflection).

A crucial topic for the students was the **recording of lectures**. Students declared a clear need to record all lectures for several reasons. Apart from the expected ones, namely that they can listen to them at a time that suits them, or the possibility of better study facilities for working students, other aspects emerged. Some students say that they listen to lectures repeatedly (twice or more). Others prefer the possibility of redistributing their time about assignments or discussions within the semester (to avoid forgetting the content, they listen to lectures before discussion blocks). Another

part of the students listens to the lectures at a faster pace because they do not like the speed of the lecturers' speech, others emphasise the possibility to stop a certain point in the lecture, to look up information about it or to listen to it a second time, especially those who take notes during the lectures.

Students liked the format in which they had pre-recorded lectures and teaching texts, then discussed in seminars. In general, it can be said that the demand for lecture recordings by students is simultaneously linked to the need (or request) for active learning. The aspect of stress is also essential – with recorded lectures, students do not have the stress of missing something.

The issue of **hybrid teaching** is closely related to this topic, which seems to be a likely and preferred option for students given the epidemiological situation. Only a minimum of students is interested in a purely presentive form of study. Therefore, they want lectures and seminars to be recorded and streamed, allowing live interaction with students connected via the Internet. They, therefore, expect the teaching to be permanently hybrid.

This leads to how such a lesson should be organised so that everyone can participate in the interaction. It can be said that, in general, a model that favours one group (only those present can discuss and ask questions) is unacceptable to them. Some students want a student service to draw in online classmates, alert the teacher to a question or comment, or translate it directly. A part of the students would prefer the teacher to manage the hybrid activities. Some then suggest a clear division between explanation and discussion, where the hybrid learning model is much easier to work with.

Students also repeatedly raised the topic of **pedagogical competencies of teachers**. The university students made a clear distinction between scientific and pedagogical competencies. On the one hand, they find it extremely valuable to participate in a course with a live teacher who teaches them, gives them feedback, and interacts with them. On the other hand, they accentuate the topic of the lack of teaching skills. The theme of pedagogical competence in the online environment has been significantly reinforced.

The topic that students talk about is also the topic of the **organisation of the study**. It turns out that suitable lessons, available study materials, or lecture notes may not be sufficient for quality teaching. Its good organisational mastery should be understood as faculty – department – lecturer, while all three levels are essential. Online education makes it difficult to make quick and prompt on-site arrangements or make inquiries. Students do not always study quite regularly, and failure to organise precisely leads to significant problems. As in the previous point, students were drawn to specific experiences with specific tutors, which we see as a signal that we need to work with them in a particular way.

Students also reflect on the level of the **physical layout of the learning environment**. Some find it challenging to sit in front of a computer all day and pay attention

to lectures. Some of them perceive it as advantageous to cook or run during lectures, activities that help them with their attention, especially in blocks with more chained lectures. Learning as a process carried out in a seated position is uncomfortable for many students. Voices in the research suggest places to stand (ideally also to walk or stretch a little) in lecture halls during contact teaching, although they point out the problematic social aspect of such a place.

A final theme we have noted in our research is the **social aspect of learning**. Here it is evident that students lack social interaction and meet classmates in other places than online. The feeling that they are not studying alone is essential for satisfaction in their studies. This dimension was often voiced in the context of sharing stresses, concerns, or the opportunity to learn and support each other before an exam. The university corridors where students wait for the oral exam play a significant role in learning and feeling good about it. Students also valued the familiarity of names or a personal contact between students and tutors in formal and informal study programmes.

4 Discussion

This discussion will focus on four aspects of the above seven that we consider novel and transformative post-covid education. We believe the themes of pedagogical competencies of academics, the organisation of studies and the physical arrangement of space to be essential but already sufficiently reflected in other contexts and not very much related to the specificities of education in the current situation.

The research revealed that teaching is central to the students' concerns and they refuse to attend frontal lectures. Traditional frontal lectures and their transformation are an integral theme in higher education pedagogy (Richter et al., 2016; Schumm et al., 2014; Pulcini & Polzonetti, 2018). In this respect, it can be said that the experience of distance forms leads students to demand an approach to the modern discourse of education that is more discussion or workshop based (Dąbal, 2018; Eyerer et al., 2005). This fact is also pointed out by Samueli et al. (2020). They see the experience of teachers and students with COVID-19 as an opportunity to remove what they term 'pathology education', old and dysfunctional forms of education, and replace them with new ones. Burns (2020) stresses the need not to return to ancient forms of education but to seek new educational approaches, concepts, and entire paradigms. The idea of some return to the original ideal world (Eliade, 1954), while philosophically defensible, is inadequate to the current educational environment. We believe that the retreat from (or recording) frontal lectures will enable a significant social and pedagogical change in how we imagine university education.

Lecture notes were a key topic for students (Brecht, 2012; Costley et al., 2017; Makarem, 2015). We believe that the question to be addressed in a university setting is not

whether or not to record lectures but how to work with recordings. Van der Meij and van der Meij (2016) point out that students generally like to learn from video lectures. They also point out that it is crucial for learning outcomes to combine video lessons with some activity, such as writing interim notes or final reflections from each lesson. Ponzanelli et al. (2016) emphasise the theme of student activity and video lesson design. Sharkey and Nurre (2016) point out that what is crucial for compelling video content in education is not the actors' choice but the thoughtful integration of video lessons into the entire learning process. Rickley and Kemp (2020) point out that an instructional designer's professional support and video design impact student learning outcomes. Kokoç et al. (2020) draw attention to the fact that research on video lessons and their design is still relatively beginning. Still, the different accents in video design have a significant impact on learning outcomes. This topic will undoubtedly be one of the transformative elements of university education and can significantly affect its quality and student satisfaction. Recommendations can be made for universities to have a more comprehensive discussion about lecture recordings and their use and consider professionalising them and integrating them more widely into learning materials.

Hybrid learning is the third theme of our research. It is not a new topic (Martyn, 2003; Paine & Fang, 2006; Reasons et al., 2005) – by default, it means a combination of distance and face to face education. However, in our context, it can be understood more narrowly as a specific form of integrating students who are present online and personally into one educational process (Hege, 2011; Hall & Villareal, 2015; Setayesh, 2018; Potra et al., 2021). Beatty (2019) offers a sophisticated methodology on how to implement such instruction, building on He et al. (2015), who highlight that hybrid teaching is linked to the concept of the flipped classroom (Hew & Lo, 2018) and the integration of students from multiple locations into one environment. Experiences with this form of education can be found in many studies (Abdelmalak & Parra, 2016; Wright, 2016; Adeniji-Neill et al., 2018). We believe that the importance of this form of education will increase over time as the spectrum of students with unusual educational pathways becomes more differentiated, as highlighted in the EDUCAUSE horizon report 2021 (Pelletier et al., 2021). Universities will have to struggle to find both adequate technological equipment and, above all, methodological support to deliver education in this way. I believe that the more significant and more challenging obstacle will be working with teachers and students than the actual technological equipment of classrooms.

The fourth theme that students perceive as essential is the social aspect of learning (Koretsky, 2017; Javadi & Kazemirad, 2020; Mas'ud, 2020). Leigh et al. (2020) recommend that in pure distance learning, social interactions should be thought of in the form of, for example, eating together online; de Oliveira Araújo et al. (2020) stress the importance of social interactions for learning. Longhurst et al. see the absence of social interaction as one of the biggest threats to university education in the COVID-19 era. Johnson (2018) emphasises the role of physicality and social connections on the constitution

of knowledge structure and cognition in general. It seems imperative that universities shortly focus on building and fostering social relationships and communities, both in the traditional physical form (Julal, 2013) and online (LaPointe & Reisetter. 2008; Cai & Zhu, 2012).

Conclusion

The research has identified four significant themes crucial for university education in the post-covid era in a Czech environment (and probably not only in the Czech environment). These are the gradual abandonment of the concept of frontal lectures, where students have to be present but at the same time do not have to perform any particular activity. Fundamental rethinking and pedagogical research, as well as the search for inspiration and examples of good practice, can be expected in the field of hybrid teaching and lecture recording. Although 'classic', these topics are gaining importance in the online learning experience and will require careful and demanding support from university centres and instructional designers for their elaboration and quality implementation. Working with social interactions, which are essential for effective learning and student motivation, has been fundamentally constrained by distance learning. It must be stressed that the Czech environment (compared to, for example, American higher education) has relatively undeveloped social activities, and their professionalisation and institutionalisation could greatly benefit the quality of education.

At the same time, it recognises that the research could not cover all dimensions or aspects of education, that it is not complete. Further research on this topic may give more inspiration and suggestions that may be essential for improving the quality of university education.

References

Abdelmalak, M. M. M., & Parra, J. L. (2016). Expanding learning opportunities for graduate students with HyFlex course design. *International Journal of Online Pedagogy and Course Design (IJOPCD)*, *6*(4), 19–37.

Adeniji-Neill, D., Weida, C. L., & Mungai, A. (2018). Hybrid, hybrid flexible and fully online learning through students' eyes. *Journal of Social Sciences*, *14*, 155–168. Wright, D. (2016). The HyFlex course design: A case study on adult and career education courses. *National Social Science Journal*, *48*(2), 88–93.

Alqahtani, A. Y., & Rajkhan, A. A. (2020). E-learning critical success factors during the covid-19 pandemic: A comprehensive analysis of e-learning managerial perspectives. *Education sciences*, *10*(9), 216.

Arnove, R. F. (2020). Imagining what education can be post-COVID-19. *Prospects*, *49*, 43–46.

Audunson, R. (2007). Library and information science education – Discipline profession, vocation? *Journal of education for library and information science, 48*(2), 94–107.

Batubara, B. M. (2021). The Problems of the World of Education in the Middle of the Covid-19 Pandemic. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, *4*(1), 450–457.

Beatty, B. J. (2019). *Hybrid-Flexible Course Design (1st ed.)*. EdTech Books. https://edtechbooks.org/hyflex

Brecht, H. D. (2012). Learning from online video lectures. *Journal of Information Technology Education*, *11*(1), 227–250.

Burns, R. (2020). A COVID-19 panacea in digital technologies? Challenges for democracy and higher education: *Dialogues in Human Geography, 10*(2), 246–249. https://doi.org/10.1177/2043820620930832.

Cai, S., & Zhu, W. (2012). The impact of an online learning community project on university Chinese as a foreign language students' motivation. *Foreign Language Annals*, *45*(3), 307–329.

Costley, J., Hughes, C., & Lange, C. (2017). The effects of instructional design on student engagement with video lectures at cyber universities. *Journal of Information Technology Education*, *16*(1).

Council of Ontario Universities., & Stager, D. A. A. (1989). *Focus on Fees – Alternative Policies for University Tuition Fees. [Ontario]*.

Dąbal, J. (2018). Lecture, workshops or keywords method. Remarks on post-medieval archaeology teaching at university. In *11th International Conference of Education, Research and Innovation*. IATED Academy.

Daniel, J. (2020). Education and the COVID-19 pandemic. *Prospects*, *49*(1), 91–96.

de Oliveira Araújo, F. J., de Lima, L. S. A., Cidade, P. I. M., Nobre, C. B., & Neto, M. L. R. (2020). Impact of Sars-Cov-2 and its reverberation in global higher education and mental health. *Psychiatry Research*, *288*. DOI: 10.1016/j.psychres.2020.112977.

Eliade, M. (1954). *The myth of the eternal return*. New York: Pantheon Books.

Eyerer, P., Krause, D., Stockmayer, P., & Rodriguez, A. (2005). From frontal lecture to learning workshop. (TheoPrax). *International Sustainable Development Research Conference*; Helsinki, June 2005.

Hall, S., & Villareal, D. (2015). The Hybrid Advantage: Graduate Student Perspectives of Hybrid Education Courses. *International Journal of Teaching and Learning in Higher Education*, *27*(1), 69–80.

Hasan, N., & Bao, Y. (2020). Impact of "e-Learning crack-up" perception on psychological distress among college students during COVID-19 pandemic: A mediating role of "fear of academic year loss". *Children and Youth Services Review, 118*, 105355. DOI: 10.1016/j.childyouth.2020.105355.

He, W., Gajski, D., Farkas, G., Warschauer, M. (2015). Implementing flexible hybrid instruction in an electrical engineering course: The best of three worlds? *Computers & Education, 81*, pp. 59–68.

Hege, B. A. (2011). The online theology classroom: Strategies for engaging a community of distance learners in a hybrid model of online education. *Teaching Theology & Religion*, *14*(1), 13–20.

Hew, K. F., & Lo, C. K. (2018). Flipped classroom improves student learning in health professions education: a meta-analysis. *BMC medical education*, *18*(1), 1–12.

Chaturvedi, K., Vishwakarma, D. K., & Singh, N. (2021). COVID-19 and its impact on education, social life and mental health of students: A survey. *Children and youth services review*, *121*.

Iwanaga, J., Loukas, M., Dumont, A. S., & Tubbs, R. S. (2021). A review of anatomy education during and after the COVID-19 pandemic: Revisiting traditional and modern methods to achieve future innovation. *Clinical Anatomy*, *34*(1), 108–114.

Iyengar, R. (2020). Education as the path to a sustainable recovery from COVID-19. *Prospects*, *49*(1), 77–80.

Javadi, Y., & Kazemirad, F. (2020). Usage-based Approaches to Second Language Acquisition: Cognitive and Social Aspects. *Journal of Language Teaching and Research*, *11*(3), 473–479.

Julal, F. S. (2013). Use of student support services among university students: Associations with problem-focused coping, experience of personal difficulty and psychological distress. *British Journal of Guidance & Counselling*, *41*(4), 414–425.

Karalis, T., & Raikou, N. (2020). Teaching at the times of COVID-19: Inferences and Implications for Higher Education Pedagogy. *International Journal of Academic Research in Business and Social Sciences*, *10*(5), 479–493.

Knight, P. T. (2001). *Small-scale research: pragmatic inquiry in social science and the caring professions*. Sage.

Kokoç, M., Ilgaz, H., & Altun, A. (2020). Effects of sustained attention and video lecture types on learning performances. *Educational Technology Research and Development*, *68*(6), 3015–3039.

Koretsky, M. (2017). Cognitive and social aspects of engagement in active learning. *Chemical Engineering Education*, *51*(4), 198–204.

LaPointe, L., & Reisetter, M. (2008). Belonging online: Students' perceptions of the value and efficacy of an online learning community. *International Journal on E-learning*, *7*(4), 641–665.

Layder, D. (2012). *Doing excellent small-scale research*. Sage.

Longhurst, G. J., Stone, D. M., Dulohery, K., Scully, D., Campbell, T., & Smith, C. F. (2020). Strength, Weakness, Opportunity, Threat (SWOT) Analysis of the Adaptations to Anatomical Education in the United Kingdom and Republic of Ireland in Response to the Covid-19 Pandemic. *Anatomical sciences education*, *13*(3), 301–311.

Maceli, M. G. (November 18, 2019). Making the future makers: Makerspace curriculum in library and information science graduate programs and continuing education. *Library Hi Tech, 37,* 4, 781–793.

Mackey, T. P., & Jacobson, T. E. (2011). Reframing information literacy as a metaliteracy. *College & research libraries*, *72*(1), 62–78.

Makarem, S. C. (2015). Using online video lectures to enrich traditional face-to-face courses. *International Journal of Instruction*, *8*(2), 155–164.

Martyn, M. (2003). The hybrid online model: Good practice. *Educause Quarterly, 26*(1), 18–23.

Mas'ud, B. (2020). Understanding the aspects of learning and learners: a conceptual analysis. *Edu Global: Jurnal Pendidikan Islam*, *1*(1), 36–43.

Matějů, P., Ježek, F., Münich, D., Slovák, J., Straková, J., Václavík, D., … & Matějů, P., Konečný, T., Weidnerová, S., & Vossensteyn, H. (2009a). Financování studia a vývoj v nerovnostech v přístupu k vysokoškolskému vzdělávání v České republice a Nizozemsku. *Sociologický časopis/Czech Sociological Review*, *45*(5), 993–1031.

McGarry, K. (1983). Education for librarianship and information science: a retrospect and a revaluation. *Journal of Documentation, (39)*2, 95–122, https://doi.org/10.1108/eb026743.

van der Meij, H., & van der Meij, J. (2016). The effects of reviews in video tutorials. *Journal of computer assisted learning, 32*(4), 332–344.

Neill, C. (2009). Tuition fees and the demand for university places. *Economics of Education Review*, *28*(5), 561–570.

Norton, A., & Cherastidtham, I. (2015). *University fees: what students pay in deregulated markets*. Grattan Institute.

Paine, L. W., & Fang, Y. (2006). Reform as hybrid model of teaching and teacher development in China. *International journal of educational research*, *45*(4–5), 279–289.

Pelletier, K., Brown, M., Brooks, D. C., McCormack, M., Reeves, J., Arbino, N., Bozkurt, A., Crawford, S., Czerniewicz, L., Gibson, R., Linder, K., Mason, J. & Mondelli, V. (2021). *2021 EDUCAUSE Horizon Report Teaching and Learning Edition*. Boulder, CO: EDU. Retrieved from https://www.learntechlib.org/p/219489/.

Ponzanelli, L., Bavota, G., Mocci, A., Di Penta, M., Oliveto, R., Hasan, M., … & Lanza, M. (2016, May). Too long; didn't watch! extracting relevant fragments from software development video tutorials. *Proceedings of the 38th International Conference on Software Engineering* (pp. 261–272).

Potra, S., Pugna, A., Pop, M.-D., Negrea, R., & Dungan, L. (2021). Facing COVID-19 Challenges: 1st-Year Students' Experience with the Romanian Hybrid Higher Educational System. *International Journal of Environmental Research and Public Health*, *18*(6), 3058. DOI:10.3390/ijerph18063058

Pulcini, G. G., & Polzonetti, V. (2018). Managerial Mindsets in the Academic World: The Crisis of Educational Organisations. In *Improving Business Performance Through Effective Managerial Training Initiatives* (pp. 210–222). IGI Global.

Radha, R., Mahalakshmi, K., Kumar, V. S., & Saravanakumar, A. R. (2020). E-Learning during lockdown of Covid-19 pandemic: A global perspective. *International journal of control and automation*, *13*(4), 1088–1099.

Reasons, S. G., Valadares, K., & Slavkin, M. (2005). Questioning the hybrid model: Student outcomes in different course formats. *Journal of Asynchronous Learning Networks*, *9*(1), 83–94.

Rickley, M., & Kemp, P. (2020). The effect of video lecture design and production quality on student outcomes: A quasi-experiment with implications for online teaching during the COVID-19 pandemic. *Available at SSRN 3594531*.

Rickley, Marketa and Kemp, Pavlina. (In Press). Effects of video lecture design and production quality on student outcomes: A quasi-experiment exploiting change in online course development principles. *The Electronic Journal of E-Learning*. Available online at www.ejel.org

Richter, T., Adelsberger, H. H., & Khatami, P. (2016). Bridging the Knowledge Gap between Higher Education and Demands from the Industry. In *Proceedings of ICERI 2016 Conference 14th–16th November 2016, Seville, Spain.*

Samueli, B., Sror, N., Jotkowitz, A., & Taragin, B. (2020). Remote pathology education during the COVID-19 era: Crisis converted to opportunity. *Annals of diagnostic pathology*, *49,* 151612.

Setayesh, S. A. (2018). *The Role of Teaching Presence on Academic Achievement in Fully Online Asynchronous and Hybrid Undergraduate Mathematics Courses*. The University of Texas Rio Grande Valley.

Sharkey, T. C., & Nurre, S. G. (2016). Video tutorials within an undergraduate operations research course: Student perception on their integration and creating a blended learning environment. *INFORMS Transactions on Education, 17*(1), 1–12.

Schumm, M., Soska, A., Joseph, S., Reschke, M., Mottok, J., Niemetz, M., & Schroll-Decker, I. (2014, April). Comparison of frontal lecture and workshop learning arrangements in a software engineering education project. In *2014 IEEE Global Engineering Education Conference (EDUCON)* (pp. 652–658). IEEE.

Tarkar, P. (2020). Impact of COVID-19 pandemic on education system. *International Journal of Advanced Science and Technology*, *29*(9s), 3812–3814.

Tartavulea, C. V., Albu, C. N., Albu, N., Dieaconescu, R. I., & Petre, S. (2020). Online Teaching Practices and the Effectiveness of the Educational Process in the Wake of the COVID-19 Pandemic. *Amfiteatru Economic*, *22*(55), 920–936.

Teräs, M., Suoranta, J., Teräs, H., & Curcher, M. (2020). Post-Covid-19 education and education technology 'solutionism': A seller's market. *Postdigital Science and Education*, *2*(3), 863–878.

Tichý, J. (2019). Financování vysokoškolského vzdělání na principu přenesené ceny. In Helísek, M. (Ed.). *Ekonomický a finanční výzkum: prezentace výsledků doktorandů: recenzovaný sborník příspěvků z 6. ročníku konference doktorandů na Vysoké škole finanční a správní (2019)*. Nakladatelství Vysoké školy finanční a správní.

Virkus, S. (2003). Information literacy in Europe: a literature. *Inf. Res.*, *8*(4), 1–56.

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