

How has COVID-19 fostered e-learning practices in higher education?

Lessons learned and perspectives for post-pandemic blended learning formats

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1. Introduction to ide3a
2. Literature review findings & proposed survey (15 min)
3. Discussion Round (15min)

ide₃a

international alliance for digital e-learning, e-mobility and e-research in academia



e-learning

- Develop different teaching formats (multidisciplinary & international)
- Create digital teaching material for MOOC
- Develop a serious game 'ConnectiCity'



Summer Semester

Lecture Series:
Critical Infrastructure
& Digitalisation

Winter Semester

School
„Smart Sensing“

School
„Smart Buildings“

School
„Smart Cities“

Literature review findings & proposed survey

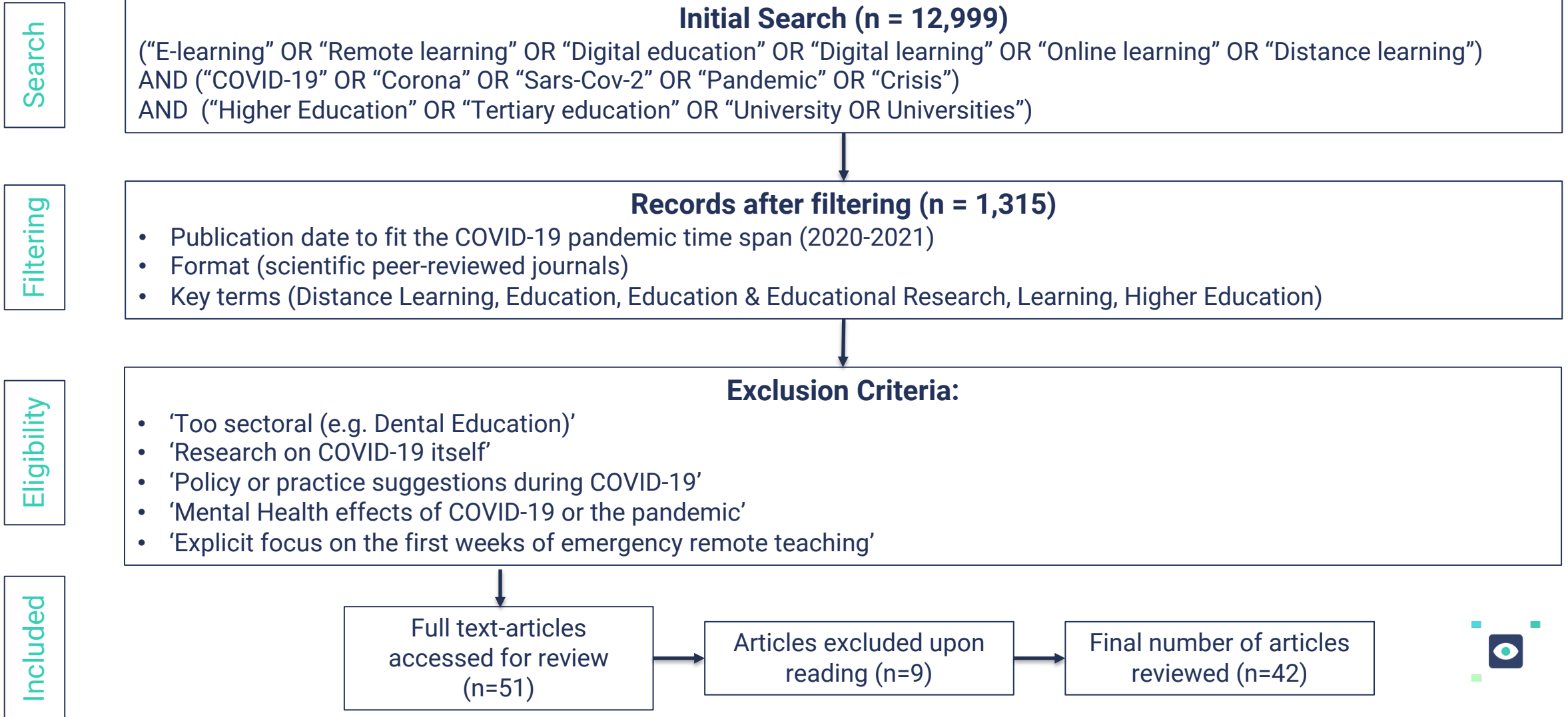


Table 1. Overview of Literature Review Outcome

	Early Stage Pandemic (Feb - May 2020)	Mid Stage Pandemic (June - Sept 2020)	Late Stage Pandemic (Oct 2020 – Feb 2021)	Total
General impact within Europe	4	3	4	11
General impact beyond Europe	8	8	0	16
Student perspective within Europe	1	4	2	7
Student perspective beyond Europe	2	5	1	8
Total	15	20	7	42

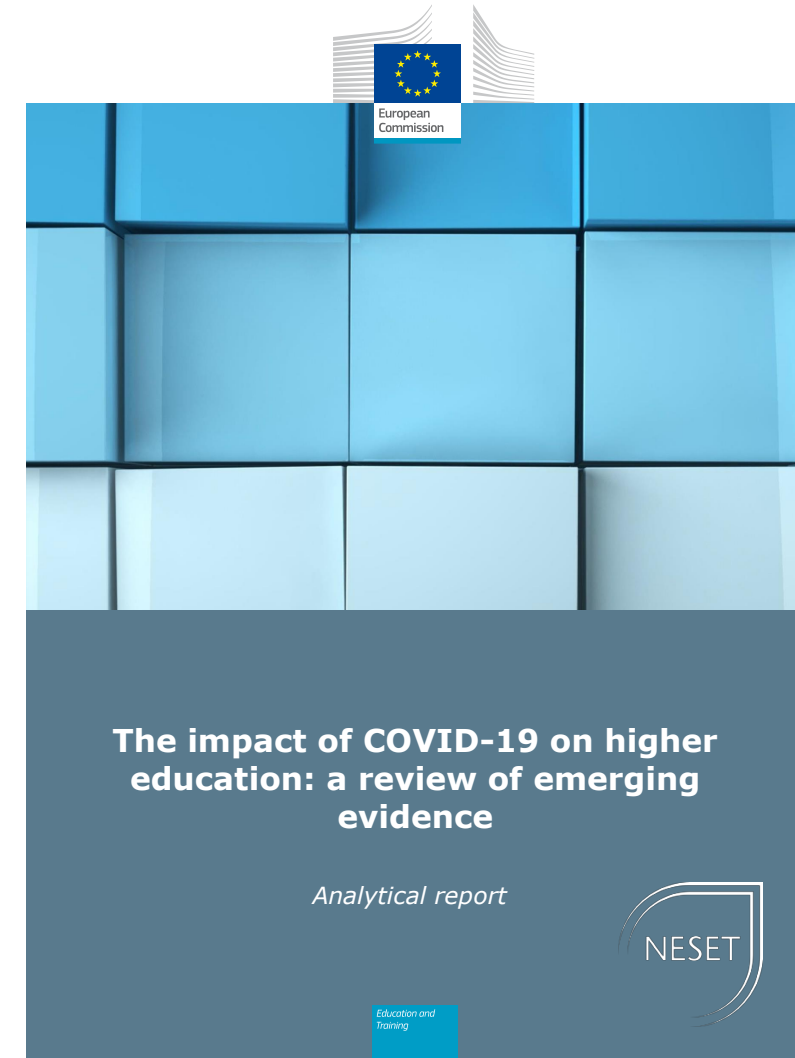
Methodological approaches

- Early stage publications → qualitative analyses
- Mid & late stage publications → doubled the use of surveys (60%)

Content focus

- Sectoral analyses (50%)
- Small sample sizes & single-university studies (26%)
- Only one global study (n=30,383) by Aristrovnik et al. (2020)

1. E-learning is not the same as emergency remote education
2. The rapidness of the shift exposed large gaps in digital readiness
3. Leveraging the benefits of digital education formats could lead to a paradigm shift in didactics



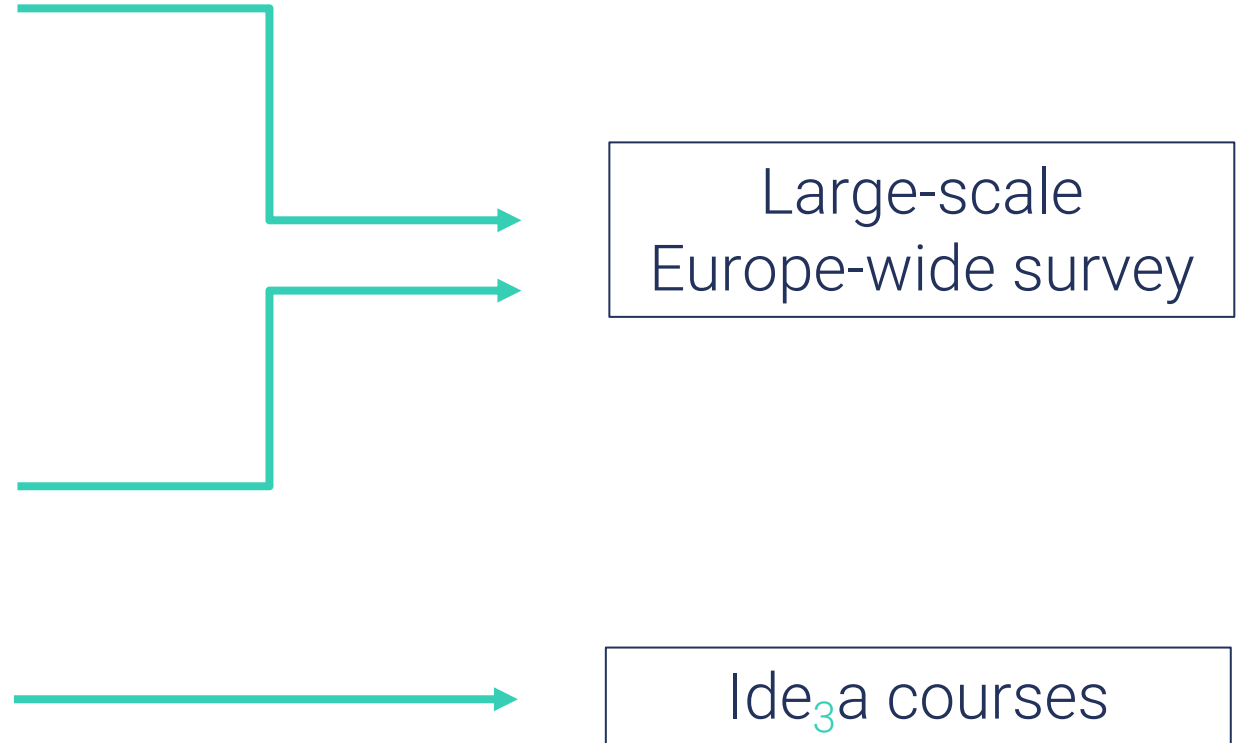
1. In how far is a didactic paradigm shift desired by instructors and students post-pandemic?
2. What conditions have influenced the effectiveness of emergency remote teaching?
3. Which formats are best suited for post-pandemic teaching?

Hypotheses:

H1: Attitude towards using e-learning post-pandemic is different between students and instructors.

H2: Institutional support positively influenced perceived usefulness of e-learning among instructors.

H3: Blended learning formats are more effective for learning success than digital synchronous and asynchronous formats



Technology Acceptance Model (TAM):

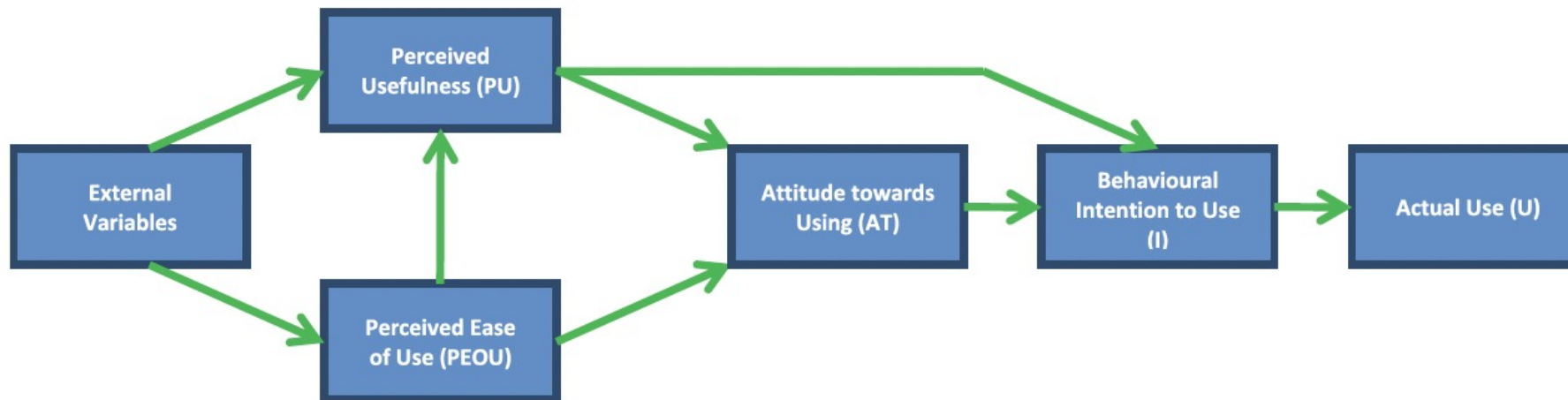


Figure 1. Technology Acceptance model (Davis, 1986). From “Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors.” by Abdullah, F., & Ward, R. (2016) *Computers in Human Behavior*, 56, 238–256. <https://doi.org/10.1016/j.chb.2015.11.036> Copyright 2015 by Elsevier Ltd.

Survey Methodology

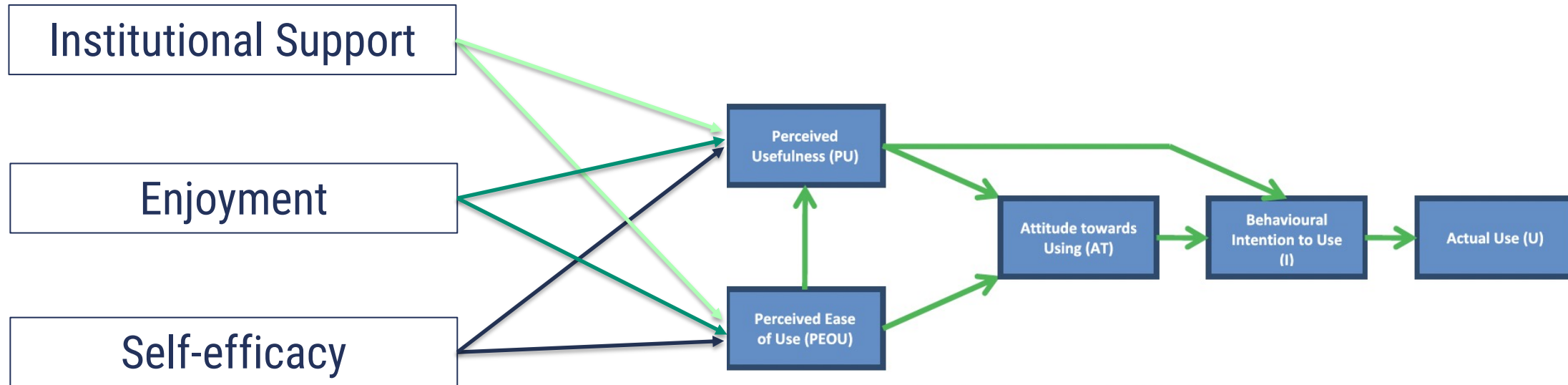


Figure 2. Extended Technology Acceptance Model for e-Learning Post-COVID-19. Adapted from “Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors.” by Abdullah, F., & Ward, R. (2016) *Computers in Human Behavior*, 56, 238–256. <https://doi.org/10.1016/j.chb.2015.11.036> Copyright 2015 by Elsevier Ltd.

(Abdullah & Ward, 2016; Rizun & Strzelecki, 2020; Scherer et al., 2019)

Survey Methodology (item bank from COVID-19 TAM studies)

TABLE 4 | Assessment of construct reliability.

Construct	CA	Measurement instrument/item
Perceived usefulness	0.69	Teaching with digital learning media will worsen my course grades. Teaching with digital learning media has more advantages than disadvantages. The use of digital learning media in teaching is advantageous overall.
Perceived ease of use	0.62	My lecturers' instructions on how to use the digital learning media are difficult to follow. It is difficult to learn how to use the digital learning media in the learning process.
Behavioral intention	0.87	I intend to use digital learning media for self-study purposes in the next semester. I intend to use digital learning media in the next semester when preparing projects, papers and assignments.
Perceived enjoyment	0.92	Learning with digital media is pleasant for me. Learning with digital media is fun for me.
Attitude	0.82	I understand the crisis as an opportunity for the spread of digital education in universities. I welcome the increasing relocation of educational processes to virtual space, i.e., presence teaching being replaced by online teaching. I am confident that in the virtual semester, teaching content can be taught without major obstacles.

Figure 3. Assessment of Construct reliability. Adapted from "Students' Acceptance of Technology-Mediated Teaching – How It Was Influenced During the COVID-19 Pandemic in 2020: A Study From Germany." by Vladova, G., Ullrich, A., Bender, B., & Gronau, N. (2021). *Frontiers in Psychology*, 12(January), 1–15. <https://doi.org/10.3389/fpsyg.2021.636086> Copyright 2021 by the authors

Table 1. Items used in the survey.

Perceived Usefulness (PU) [35,48]	
PU1	Using distance learning would enhance my effectiveness in studying.
PU2	Using distance learning would improve my course performance.
PU3	Using distance learning would improve my productivity in courses.
PU4	I find distance learning useful for my studies.
Perceived Ease of Use (PEOU) [35,48]	
PEOU1	I find distance learning easy to use.
PEOU2	Mastering distance learning would be easy for me.
PEOU3	My interaction with distance learning is clear and understandable.
PEOU4	It would be easy for me to find the required information using distance learning.
Attitude Towards Using (ATU) [35,48]	
ATU1	I dislike the idea of using distance learning. (R)
ATU2	I have a generally favorable attitude towards using distance learning.
ATU3	I believe it is (would be) a good idea to use distance learning for my study process.
ATU4	Using distance learning is a foolish idea. (R)
Intention to Use (ITU) [35,48]	
ITU1	I intend to use distance learning during the semester.
ITU2	I will return to distance learning often.
ITU3	I intend to use distance learning frequently for my study process.
Enjoyment (ENJ) [32]	
ENJ1	I find distance learning process enjoyable.
ENJ2	The actual process of using distance learning is pleasant.
ENJ3	I have fun using distance learning.
Self-Efficacy (SE) [32]	
SE1	I am confident of using distance learning even if there is no one around to show me how to do it.
SE2	I am confident of using distance learning even if I have never used such a system before.
SE3	I am confident of using distance learning even if I have only the software manuals for reference.

Note: R = reversed item intention.

Figure 4. Items used in the survey. Adapted from "Students' acceptance of the covid-19 impact on shifting higher education to distance learning in Poland." by Rizun, M., & Strzelecki, A. (2020). *International Journal of Environmental Research and Public Health*, 17(18), 1–19. <https://doi.org/10.3390/ijerph17186468> Copyright 2020 by the authors

Table no. 4. Factors influencing online teaching

Groups of factors	Factor loading	Mean	N
Institutional support			
University adapted well to online teaching	0.841	4.066	362
Support received	0.799	3.831	362
Universities' online platforms are adequate	0.754	3.751	362
Courses are easily transformable in online format	0.735	3.737	114
Universities have online platforms	0.682	3.818	362
Students are quick to adapt to online	0.648	4.193	114

Figure 5. Factors influencing online teaching. Adapted from "Online teaching practices and the effectiveness of the educational process in the wake of the Covid-19 pandemic." by Tartavulea, C. V., Albu, C. N., Albu, N., Dieaconescu, R. I., & Petre, S. (2020). *Amfiteatru Economic*, 22(55), 920–936. <https://doi.org/10.24818/EA/2020/55/920> Copyright 2020 under CC BY 4.0

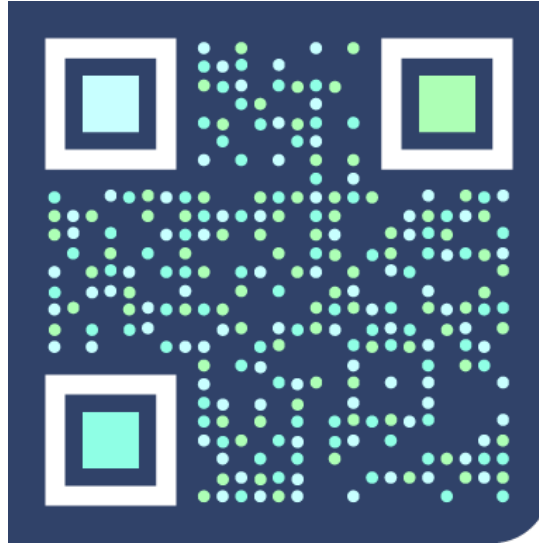
Goals:

- Gather large-scale descriptive data one year into the pandemic
- Test hypotheses surrounding future adoption
- Support ide₃a testbed for blended formats

Interested in collaborating?

- TAM experts
- Large scale distribution





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- Abdullah, F., & Ward, R. (2016). Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors. *Computers in Human Behavior*, 56, 238–256. <https://doi.org/10.1016/j.chb.2015.11.036>
- Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability*, 12(20), 1–34. <https://doi.org/10.3390/su12208438>
- Farnell, T., Skledar Matijević, A. and Šćukanec Schmidt, N. (2021). The impact of COVID-19 on higher education: a review of emerging evidence, *NESET report*, Luxembourg: Publications Office of the European Union. doi: 10.2766/069216.
- Rizun, M., & Strzelecki, A. (2020). Students' acceptance of the covid-19 impact on shifting higher education to distance learning in Poland. *International Journal of Environmental Research and Public Health*, 17(18), 1–19. <https://doi.org/10.3390/ijerph17186468>
- Scherer, R., Siddiq, F., & Tondeur, J. (2019). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Computers & Education*, 128, 13–35. <https://doi.org/10.1016/j.compedu.2018.09.009>
- 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. <https://doi.org/10.24818/EA/2020/55/920>
- Vladova, G., Ullrich, A., Bender, B., & Gronau, N. (2021). Students' Acceptance of Technology-Mediated Teaching – How It Was Influenced During the COVID-19 Pandemic in 2020: A Study From Germany. *Frontiers in Psychology*, 12(January), 1–15. <https://doi.org/10.3389/fpsyg.2021.636086>

Discussion Round



What has been your experience during COVID-19?

Did you receive or give support for didactic adaptation during emergency remote teaching?

What methods are you using to evaluate the effectiveness of your emergency remote teaching?