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# Addressing students' perceived value with the virtual university concept

## Abstract

Since the beginning of the COVID-19 pandemic, digital transformation has significantly accelerated in many industries, including somewhat slow-changing higher education. The epidemic situation pushed students, faculties, and administrators to experiment to a much greater degree with online classes, digital cooperation, and virtual student services. For the majority of the academic community, this situation created a completely new reality. Indeed, the digital experience in higher education was for some community members quite challenging, if not traumatic. Fairly soon, however, the digital experiment proved successful in many areas. In some cases, even more effective than conservative practices.

The Virtual University Concept (VUC) has been a topic of debate for quite some time, but only now has it found a receptive audience in all sectors of the academic community. In the following articles, the authors will attempt to conceptualize the virtual university as an innovative way to address contemporary challenges for Higher Education Institutions (HEI), specifically their ability to identify, create and capture value for students. The concept of the VUC is grounded in a literature review, the professional experience of the authors, as well as the student survey, which was conducted in one of Cracow's private colleges. The authors have listed fundamental areas of focus that need to be addressed before attempting to model the VUC. They include the technical and technological capacity of a HEI, faculty development, cost management, innovation, and students' and employers' value perceptions. All this must be done with the goal of providing value to key stakeholders at a reasonable cost. All the authors' inquiry streams seem to suggest that if well designed and implemented, the VUC can be a source of significant value to students and therefore should be considered in HEI expansion and turnaround strategies.


**Keywords:** virtual university concept, perceived value, distance learning, e-learning, Higher Education Institution (HEI)


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## Introduction


The outbreak of the pandemic related to the spread of the SARS-CoV-2 virus at the beginning of 2020 caused temporary restrictions on the functioning of educational institutions in many countries around the world. On March 30, 2020, as the pandemic was accelerating, educational institutions of all levels were closed in 167 countries. Schools were closed for the longest periods in India (60 weeks), Argentina (59 weeks), and the United States (58 weeks). In Poland, schools were closed for 43 weeks (UNESCO, n.d.). Due to the pandemic, the World Health Organization introduced a state of epidemic on March 11, 2020 (World Health Organization, 2020). On that day, the operations of HEIs in Poland were severely limited by government order, and thus institutions of higher education faced the difficult task of ensuring education continuity, which


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conveniently could be attained by the use of Internet-based, distance learning solutions<sup>1</sup>.

Distance learning and e-learning are well-known tools supporting the teaching process at universities and colleges, however, before the outbreak of the pandemic, they were not widely used (Zbarachewicz, 2020). According to the study “E-learning in European Higher Education Institutions”, almost all higher education institutions offered digital learning. In Germany, Spain, Switzerland the United Kingdom, and Poland, more than 50% of students are involved in distance learning, whereas in Italy, France, and Turkey these activities are least popular (Gaebel et al., 2014). The same study also addressed students’ motivation to engage in online learning. It was found that the most popular motive among students was the opportunity to combine work and study (69% of respondents).

A few months after the pandemic pushed many HEIs into launching virtual classes, many intuitions began to evaluate the students’ online experience. A major Polish university specializing in training educators based in Cracow conducted a survey in May and June 2020 ( $n = 1927$ ) to assess students’ satisfaction among certain other issues (Długosz & Foryś, 2020). The researchers report that 40% of students evaluated the experience as good or very good, and 35% evaluated it as average. Only 25% of students described the experience as negative. However, when requested to compare the experience with traditional campus-based learning, only one in five students said that remote learning was better. The reason for this interesting discrepancy may lie in the survey students’ replies regarding the pros and cons of remote learning. Predictably, the advantages included savings in time and money, and the safety and comfort of their homes. The disadvantages, however, include overload of study material and assignments, lack of motivational stimuli, and lack of direct contact with peers and professors. These findings illustrate clearly that online learning is not just about moving classes into cyberspace.

The authors’ institution, the College of Economics and Computer Science (WSEI), just like other similar HEI in Poland and around the world, had to face the challenge of transferring their operations into cyberspace. Although the WSEI leadership had been planning to increase its digitalization even before the pandemic, the move online was earlier than anticipated. Nevertheless, the college was able to start providing most of the classes online in just three days. To support the seamless move into cyberspace, many training sessions for students and processors were offered just before the launch, as well as throughout the semester. Student support initiatives were also introduced, including psychological support and social engagement.

Although it is too early to attempt a meta-analysis of the remote learning experience forced upon students due to COVID-19, some already published research suggests that many students found the experience generally satisfying and that potential drawbacks of online learning can be effectively countered by substantial benefits (Fatani, 2020; Sharma et al., 2020; Surahman & Sulthoni, 2020; Zeng & Wang, 2021). The research proves that the introduction of distance and e-learning as the basic channel of the didactic process at a higher education institution is indeed a complex process. Understandably, the emergency launch of remote learning forced institutions to focus on the priorities they were able to deal with at short notice, resulting in varied evaluations of online learning. However, a college or a university wishing to fully capitalize on the benefits and possibilities of distance learning needs to realize early during the venture that it requires a profound digital transformation of organizational, managerial, didactic, and scholarly systems, with the aim to adapt to the environment and its changes and the needs of all stakeholders (Mazurek, 2019; Seres et al., 2018), as well as to improve, expand, and provide new functions or redesign the products or services already offered (Sandkuhl & Lehmann, 2017).

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### Conceptual framework

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The transition of higher education institutions to remote teaching and, in many cases, their digital transformation forced upon them by the pandemic constitutes a significant organizational change that results from the need to adapt. Although the change is unprecedented, the contemporary HEIs had been, at least to some extent, prepared by the widespread use of the Internet and many examples of successful distance and e-learning initiatives (e.g., edX, Coursera, many universities globally already offering online degree programs). During just one generation, the Internet has become a resource supporting multidirectional communication, research, transactions, and co-creation of value (Goliński, 2011). The potential benefits of using digital technologies mean that a rethink is needed of HEI stakeholders’ needs and that the value higher education has to offer needs to be redefined.

To sum up the considerations on the scope of distance learning and referring to the current situation caused by the pandemic, this kind of learning is not limited to an unconventional educational (training) service based on Internet technology. The discussion around the definition of distance learning touches on many aspects. Online learning is by definition a beneficial change in various areas of a university’s activity (schools, training centers), established at the HEI or outside it, being a response to the needs of students

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<sup>1</sup> The discussion surrounding distance learning and e-learning covers many aspects. The subject of the analysis may be technology, technology sources and features, the way technology is adapted and used, and people implementing them at the HEI. There is also a problem with distinguishing between synchronous, asynchronous and hybrid rates.

(course participants) or a crisis. It is an evolutionary improvement of study programs and adaptation of them to new market requirements (student needs). Thus, the scope of distance learning in this approach concerns numerous elements (educational service, internet solutions, the process of managing study programs, incremental improvement), which should follow from the values adopted at the university and the quality standards of distance learning.

### Perceived value

The concept of customer perceived value in higher education has not gained sufficient attention in scholarly literature so far, even though it offers great theoretical and practical potential (for example, see Stach & Bąk, 2009). The concept was introduced to management studies by Peter Drucker in 1954. He pointed out that price is not an indicator of the value of a product or a service, but it is merely one of the multiple factors that the customer considers when assessing a marketing offer (Drucker, 1998). Zeithaml's research suggests four ways to understand value: value as low price, value as what one expects from a product, value as what one gets in return for what one pays, and what one receives in return for what one provides (Zeithaml, 1988). The key role of the concept of value has been fully appreciated in marketing. Kotler and Armstrong (2008) propose that the purpose of marketing is to create value for customers and to capture this value from customers in return. To Grönroos (2006), marketing refers to a customer focus that permeates organizational functions and processes and is geared towards making promises through value propositions enabling the fulfillment of individual expectations.

Expanding further our understanding of the value concept, it is useful to account for both the perspectives of the value-creator and value-receiver.

Thus from the HEI perspective, value may be perceived in at least two ways:

- as a basis for marketing orientation, i.e. a perspective that helps to understand the market and students' needs and to create an educational

offer in such a way that it can become the potential source of competitive advantage,

- as a general experience of a student-consumer, who partly co-creates and affects their satisfaction and perception of the HEI.

Likewise, from the perspective of a student-consumer, value can be understood in many ways, including a sufficiently low price, quality obtained at the price paid, a benefit-cost ratio, or the sum of all customer expectations (see Tab. 1).

The benefit-cost ratio-based operationalization of customer value can be useful from the managerial viewpoint and has been successfully employed in Osterwalder's Value Proposition Canvas (Osterwalder et al., 2014) because it focuses the value providers' attention on identifying those features of the item offered which are perceived by their customer as either value-enhancing or value-diminishing. This realization becomes an opportunity to actively improve the item offered to highlight the first type and alleviate the second. Inspired by the benefit-cost ratio approach to value, one can come up with a list of value enhancers (or benefits) and value diminishers (or costs) for the HEI (see Tab. 2).

It is, however, important to stress that in some instances, value diminishers may become value-enhancing if a different meaning is attached to them. An obvious example may be the tuition fee, where in some cases the higher the tuition students are expected to pay for a given program, the higher the perceived value, because the tuition cost may be strongly associated with selectivity, and exceptional quality. Yet again, the list of potential costs and benefits will change over time due to advances in technology and social trends, and is strongly context-related. It can be argued that the transition to remote teaching caused by the COVID-19 pandemic has modified the sets of costs and benefits because there has been a profound change in experience and expectations. The unpublished research conducted in the authors' institution provides an insight into what students might nowadays perceive as value enhancers or cost (i.e., value diminishers) (see Tab. 3).

**Table 1**

*Selected ways in which value may be understood and defined*

Understanding of value	Example of a definition
Value understood as a quality obtained at the price paid	Value is defined as a quality-price ratio (Lichtenstein et al., 1990).
Value understood as an attractive price	Value is the ratio of the hypothetical price of a supplier's offer that allows the customer to cross the break-even point – to the best alternative available to the customer for the realisation of the same set of functions (Oliva, 2000).
Value understood as the total of all customer expectations	Value refers to the total benefits a customer believes they will obtain if they accept the market price (Hunt & Morgan, 1995).
Value understood as a benefit-cost ratio	Value constitutes a comprehensive assessment of a product and its acquisition and usage, which is performed by a customer by comparing the received benefits and the incurred costs (Näslund et al., 2006).

Source: *Współtworzenie wartości w marketingu. Przykład szkolnictwa wyższego* (pp. 22–26). K. Dziewanowska, 2018, Wydawnictwo C. H. Beck.

**Table 2**

A list of common value enhancers and diminishers in education products offered by a HEI

<b>Potential value enhancers</b>	Practical effects	<ul style="list-style-type: none"> <li>Acquisition of knowledge, practical skills, understanding of market and business</li> </ul>
	Social effects	<ul style="list-style-type: none"> <li>Making social connections, contacts, learning about diverse cultures</li> </ul>
	Strategic effects	<ul style="list-style-type: none"> <li>Education/diploma/master's or bachelor's degree</li> </ul>
<b>Potential value diminishers</b>	Material costs of studying	<ul style="list-style-type: none"> <li>Study fees, textbook costs, equipment costs (laptop), accommodation expenses, travel expenses</li> </ul>
	Psychological costs of studying	<ul style="list-style-type: none"> <li>Stress related to classes and examinations, missing family, students' and their families' expectations</li> </ul>
	Sacrificed benefits	<ul style="list-style-type: none"> <li>Free time, time spent with family, comfort, mobility (flexibility), traveling, entertainment</li> </ul>

Source: authors' work based on "Making sense of higher education: students as a consumer and the value of the university experience", T. Woodall, A. Hiller, & S. Resnick, 2014, *Studies in Higher Education*, 39(1), 48–67. (<https://doi.org/10.1080/03075079.2011.648373>).

**Table 3**

Post-pandemic changes in perceived benefits and costs related to the transition to remote teaching

<b>Value-adding components</b>	<ul style="list-style-type: none"> <li>More free time (it is not necessary to leave home, travel to the college).</li> <li>Saving money (no rent or travel expenses)*.</li> <li>Higher mobility (the possibility to participate in classes from any location).</li> <li>Comfort.</li> <li>Higher quality of lectures (silence, better concentration).</li> <li>Reduced amount of stress during examinations, classes, and presentation of thesis.</li> </ul>
<b>Cost-related components</b>	<ul style="list-style-type: none"> <li>Lower quality of classes due to technical issues (lack of equipment, poor-quality equipment, slow Internet connection or no connection at all).</li> <li>Weaker social interactions with other students. Difficulties in developing new contacts.</li> <li>A lack or a limited possibility to enjoy the sports, cultural and social events offered by the city.</li> <li>Weaker ties in project teams.</li> <li>Lower quality of some practical classes.</li> </ul>

Note. \* Concerning students who live outside of Cracow.

Source: students' satisfaction after transferring to remote study (2021).

**Virtual university concept**

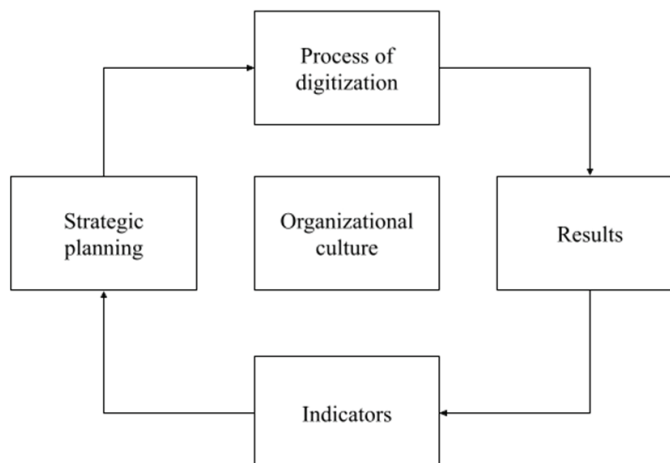
Indeed, the recent experience, literature review, and research results have led the authors to conceptualize a framework that might be referred to as a Virtual University Concept (VUC) of the new normal. To begin, the authors listed five fundamental areas of

focus that need to be addressed before attempting to model the VUC (see Fig. 1).

They include the technical and technological capacity of a HEI, faculty development, cost management, innovation, and students' and employers' value perceptions. Thus the institution of higher education

**Figure 1**

The Virtual University system model – proposal



Source: authors' own work.

needs to have adequate technical and technological capacity and competent faculty and administrators digitally literate and able and willing to innovate. All this must be done with the goal of providing value to key stakeholders at a reasonable cost.

Digitization and virtualization of learning and teaching need to be fully compatible with the mission and vision of a HEI. Once the strategic decisions are made, the focus needs to be on delivering new products (study programs, courses, etc.), improving processes, and delivering new business models (Trias de Bes & Kotler, 2011). Reducing the uncertainty of the process of digitization through its long-term evaluation is vital for the learning process in an organization (Hubbard, 2014). The control system confirms that all conditions (i.e. the necessary resources, process, and values proposition) are effectively applied in practice. These perspectives, taken together in the context of active capabilities, provide the conceptual parameters for the VUC which can be depicted using the business logic triangle proposed by Osterwalder and Pigneur (2002) (see Fig. 2).

The dynamic capabilities perspective offers an exploratory view of the concept of the VUC and allows the authors to argue that the operationalization of the VUC depends on an HEI's capabilities (Teece, 2018).

The digitalization process underlies the value creation capabilities of an HEI and is strongly influenced by the digitalization of an HEI's environment. That is why it is crucial to adjust an HEI's processes and structures to support value creation (Rachinger

et al., 2019). Summed up, this is the use of digital technologies to change an education model and provide new value opportunities; it is the process of switching to a digital mode of education. This paper provides such a framework, organized around key priorities that will be useful for any university's executive team. These areas are remote access; engaging students; accelerating agility and efficiency; reducing operational costs.

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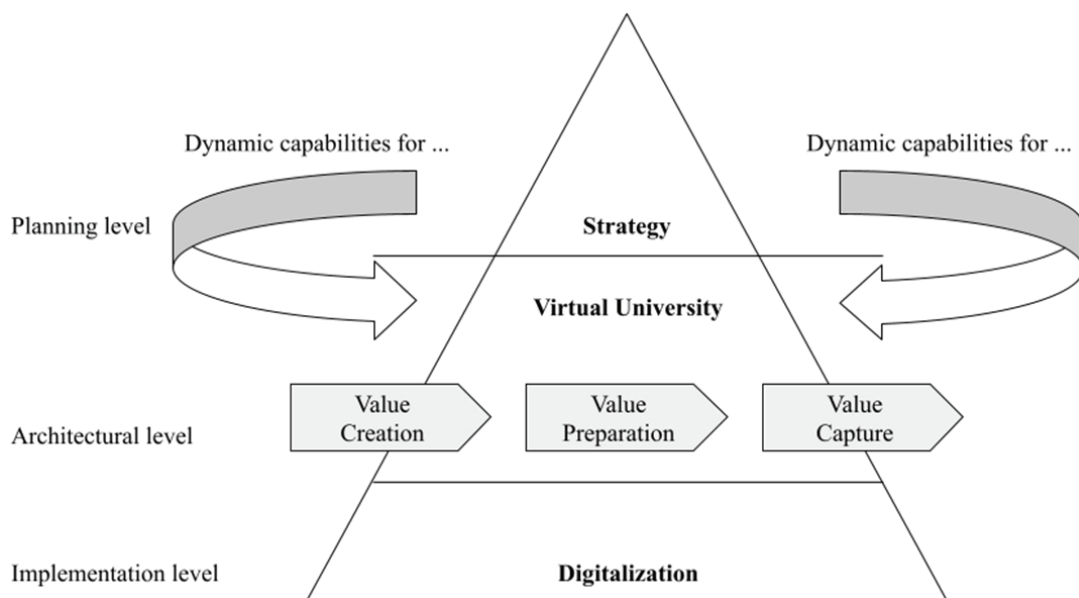
### Methodology

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Academic literature recognizes the multidimensional nature of value, as well as challenges with the operationalization of the concept (Stach, 2009). One way to measure the perceived value in higher education is to use various single or multidimensional scales to examine functional, perceived, emotional or social value as well as different combinations of value types (Dziewanowska, 2018).

In their study, the authors focused on a selected number of core measures implemented in their institution in response to COVID-19 that are associated with e-learning and remote study. The package of remote study solutions that addressed the students' immediate needs included web-based classes, online consultations, extracurricular webinars and training sessions, and online assessments and examinations. The students were offered online services of the Dean's Office, which dealt with all issues concerning the academic progression toward graduation. To

**Figure 2**  
*Conceptual settings – dynamic capabilities perspective*



Source: authors' own work based on an eBusiness model ontology for modeling eBusiness. 15th Bled Electronic Commerce Conference eReality: Constructing the eEconomy (pp. 75–91), A. Osterwalder, & Y. Pigneur, 2002, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.557.8131&rep=rep1&type=pdf>; "Business models and dynamic capabilities", D. J. Teece, *Long Range Planning*, 51(1), 40–49 (<https://doi.org/10.1016/j.lrp.2017.06.007>); "Digitalization and its influence on business model innovation", M. Rachinger, R. Rauter, C. Müller, W. Vorraber, & E. Schirgi, 2019, *Journal of Manufacturing Technology Management*, 30(8), 1143–1160 (<https://doi.org/10.1108/JMTM-01-2018-0020>).

support the learning and studying effort, an online platform (Office 365 and Moodle.org) was made compulsory for all classes which migrated online. Online library services were publicized, although they had been partially in place before. The authors decided to add a “limited presence on campus” measure, although this is a consequence of the safety measures introduced due to the pandemic. Nevertheless, it can be perceived as a total offering component of the educational package and would potentially be valued by students on some occasions. The recent COVID-19 experience and the literature review have led the authors to hypothesize as follows:

- The selected core measures implemented in response to COVID-19 are perceived by students as adding value to their educational experience with the HEI.
- Part-time students perceive the core measures as adding value more often than full-time students.
- Working students perceive the core measures as adding value more often than students who did not have a job.
- First-year students perceive core measures as adding value less often than more senior students.
- The core measures are positively correlated with students' expectations toward the HEI.

To test the listed hypotheses, the authors conducted in June and July 2021 a census-type study by sending an online survey to all undergraduate students currently enrolled in the College of Economics and Computer Science (WSEI) in Cracow, Poland. 957 students returned completed questionnaires, which were checked for errors and inconsistencies and entered into a statistical analysis package (open source PSPP software).

An ordinal level scale was designed to measure the perceived value of the virtual university components as well as students' expectations.

Students' perceived value was measured using a seven-point fully labeled and balanced ordinal scale (used originally in Polish): how was the value

of studying at WSEI affected by the following (list of items)? (1) significantly reduced value; (2) reduced value; (3) somewhat reduced value; (4) had no impact; (5) somewhat added value; (6) added value; (7) significantly added value.

Students' expectations were measured using an unbalanced fully labeled six-point ordinal scale: to what extent your expectations were met: (1) not met at all; (2) met to a small extent; (3) met at 50%; (4) mostly met; (5) met completely; (6) were exceeded.

The data analysis was conducted using parametric tests following the common practice among researchers, supported by empirical findings that confirm their robustness for ordinal scales (Norman, 2010; Sullivan & Artino, 2013; de Winter & Dodou, 2010).

## Findings and discussion

### Sample

The obtained sample covered 71% of male students, with 82.3% of the students between the ages of 19 and 25. 68.7% of students majored in Computer Science. 58% of the sample were first-year students. Almost half of the surveyed students currently live in Cracow, the city where the college is located. The surveyed students follow one of the available modes of study. There were 35.2% of full-time (traditional, campus-based) students and 64.8% part-time students (attend classes on campus on weekends) among the respondents. 31.8% of full-time students and 89.4% of part-time students had a job when taking part in the survey (Tab. 4).

### The perceived value of the core measures

Based on the literature review and the authors' first-hand observations in the last academic year, they hypothesize that the core measures implemented by WSEI are perceived by students as adding value to their educational experience.

The average scores for all the questionnaire items referring to the core measures were between 4.6 and 6.07 on a seven-point scale, suggesting that on

**Table 4**  
*Characteristics of the obtained sample*

Overall academic program				
Year of study	Year 1 = 58.2%		Year 2 = 26.6%	
Academic program	Computer Science and Econometrics = 68.7%		Business Administration = 19.0%	
			Finance and Accounting = 12.3%	
Sample characteristics				
Gender	Female = 28.7%		Male = 71.3%	
Age	19–25 = 82.3%		26–35 = 15.5%	
			36–45 = 1.7%	
			>45 = 0.5%	
Place of residence	Cracow = 47.9%		Other city > 100,000 = 5.3%	
			City < 100,000 = 16.2%	
			Rural area = 30.6%	
Study mode & jobs	Full-time = 35.2%		Part-time = 64.8%	
	with a job = 31.8%		no job = 68.2%	
			with a job = 89.4%	
			no job = 10.6%	

Source: authors' analysis using the open-source statistical analysis package PSPP GNU pspp 1.2.0-g0fb4db.

**Table 5**

*Perceived value of core measures introduced in response to COVID-19*

No.	Items	N	Mean (Std. Deviation)	Decreases perceived value (%)	Changes perceived value (%)	Increases perceived value (%)
1.	Online classes	957	5.36 (1.923)	20.0	9.4	70.6
2.	Online Dean's Office / Registrar	957	6.14 (1.266)	3.4	9.8	86.7
3.	Online consultations	957	5.71 (1.454)	4.1	24.2	71.7
4.	Online training & webinars	957	5.66 (1.385)	4.1	22.2	73.8
5.	Online assessments & examinations	957	6.07 (1.406)	7.1	7.1	85.8
6.	Limited presence on campus	957	4.93 (2.142)	26.3	16.2	57.5
7.	Online platform	957	6.01 (1.286)	4.5	8.4	87.1
8.	Online library	957	4.62 (1.304)	4.2	65.0	30.8

Source: The authors' analysis using the open-source statistical analysis package PSPP GNU pspp 1.2.0-g0fb4db.

average the respondents found all the items on the value-adding side of the measurement scale. The surveyed students found all but one evaluated measure as adding value to their college experience. It is interesting to note that three measures were considered especially value-adding. They include the Dean's Office online services, online assessments and examinations, and the online platform. These were found by respondents to enhance their value experience (86.7%, 85.8%, and 87.1% respectively). Also, online classes and a limited campus presence are among those least valued measures. They also display a much more distributed opinion range, with a significant percentage of respondents finding them to be value-diminishing. 20% of respondents perceived online classes and 26.3% of respondents perceived limited campus presence to be value-diminishing.

The only measure in the core measures package perceived as not adding value was online library services. 65% of respondents stated that the library services did not change the value experience from them. The presented empirical observations seem to support the hypothesis with the somewhat unclear exception of the online library component (for more see Tab. 5).

### Part-time students and students with jobs

Unlike traditional, campus-based full-time students, part-time students attend classes on weekends (usually every second weekend). They tend to be older than the traditional college age, with careers and families. However, not only part-time students have jobs. With financial pressures and job market opportunities, many full-time students find jobs very early in their college life.

The remote mode of study seems especially convenient to those students who have jobs and need to find a balance between study and work obligations. By studying remotely, they are not expected to show up on campus and they can attend classes online and submit their assignments and take examinations via distance learning platforms. By eliminating the need to travel, in many cases, they can save a substantial

amount of time and gain a degree of flexibility in planning their work, college, and home activities. Therefore, the authors have hypothesized that both part-time students and those currently having jobs will perceive virtual university components as adding value to their college experience more often than full-time students and students who do not have jobs.

Again, the hypothesis can be supported by the obtained empirical data. Part-time students and those students with jobs consistently rate higher the value-adding property of each of the core measures. All the mean differences for the measured items are statistically significant (see Tab. 6 and 7).

### First-year students

The first-year students are students that came to college during the COVID-19 pandemic, which started in the last semester of their high school education. At some point in the spring semester of 2020, their schools switched to an online mode of instruction. Their experience with distance learning had largely been improvised and was often far from optimal. This unfortunately may have reinforced a rather negative social attitude toward the value of online studies. Moreover, freshmen usually look forward to campus life and, since the higher education experience is something new and foreign for them, they will probably feel safer in the in-person setting, where they have more traditional contact with professors and college administrators. Thus, the authors have hypothesized that first-year students will perceive the core measures introduced in response to COVID-19 as diminishing the value of their college experience.

However, the authors found that the obtained data did not support the hypothesis. The first-year students all rate the items referring to the core measures in the value-adding region of the scale. Moreover, they seem to perceive five out of eight components as value-adding more often than more senior students. They seem to value more online consultations with the faculty, online training and webinars, online examinations and assessments, and the online platform more than their more senior counterparts (Tab. 8).



**Table 6**

Mean differences in perceived value enrichment potential of selected virtual university tools between full-time and part-time students

No.	Items	N = FT/PT	Mean (std. Deviation)		Levene's Test for Equality of Variances (p-value)	Independent Samples t-test for Equality of Means (p-values) Equal variances (assumed / not assumed)		Statistically significant
			FT	PT				
1.	Online classes	337/620	4.59 (2.014)	5.78 (1.734)	.000	assumed	.000	✓
						not assumed	.000	✓
2.	Online Dean's Office / Registrar	337/620	5.85 (1.414)	6.30 (1.148)	.000	assumed	.000	✓
						not assumed	.000	✓
3.	Online consultations	337/620	5.27 (1.493)	5.94 (1.377)	.001	assumed	.000	✓
						not assumed	.000	✓
4.	Online training & webinars	337/620	5.44 (1.328)	5.78 (1.401)	.017	assumed	.000	✓
						not assumed	.000	✓
5.	Online assessments & examinations	337/620	5.71 (1.552)	6.27 (1.278)	.000	assumed	.000	✓
						not assumed	.000	✓
6.	Limited presence on campus	337/620	4.10 (2.180)	5.38 (1.984)	.089	assumed	.000	✓
						not assumed	.000	✓
7.	Online platform	337/620	5.82 (1.282)	6.12 (1.277)	.402	assumed	.001	✓
						not assumed	.001	✓
8.	Online library	337/620	4.41 (1.197)	4.74 (1.345)	.000	assumed	.000	✓
						not assumed	.000	✓

Note. FT – full-time; PT = part-time.

Source: authors' analysis using the open-source statistical analysis package PSPP GNU pspp 1.2.0-g0fb4db

**Table 7**

Mean differences in perceived value enrichment potential of selected virtual university tools between full-time and part-time students

No.	Items	N = J/NJ	Mean (std. Deviation)		Levene's Test for Equality of Variances (p-value)	Independent Samples t-test for Equality of Means (p-values) Equal variances (assumed / not assumed)		Statistically significant
			J	NJ				
1.	Online classes	661/296	5.59 (1.860)	4.86 (1.970)	.036	assumed	.000	✓
						not assumed	.000	✓
2.	Online Dean's Office / Registrar	661/296	6.20 (1.254)	6.00 (1.285)	.616	assumed	.019	✓
						not assumed	.020	✓
3.	Online consultations	661/296	5.85 (1.429)	5.39 (1.462)	.131	assumed	.000	✓
						not assumed	.000	✓
4.	Online training & webinars	661/296	5.72 (1.412)	5.53 (1.317)	.065	assumed	.056	✗
						not assumed	.050	✗
5.	Online assessments & examinations	661/296	6.21 (1.327)	5.78 (1.529)	.000	assumed	.000	✓
						not assumed	.000	✓
6.	Limited presence on campus	661/296	5.20 (2.091)	4.32 (2.135)	.849	assumed	.000	✓
						not assumed	.000	✓
7.	Online platform	661/296	6.05 (1.278)	5.92 (1.302)	.644	assumed	.141	✗
						not assumed	.144	✗
8.	Online library	661/296	4.71 (1.318)	4.44 (1.255)	.000	assumed	.003	✓
						not assumed	.002	✓

Note. J = has a job; NJ = does not have a job.

Source: authors' analysis using the open-source statistical analysis package PSPP GNU pspp 1.2.0-g0fb4db

## Addressing students' perceived value...

**Table 8**

Mean differences in perceived value enrichment potential of selected virtual university tools between first-year students and more senior students

No.	Items	N = FY/SY	Mean (std. Deviation)		Levene's Test for Equality of Variances (p-value)	Independent Samples t-test for Equality of Means (p-values) Equal variances (assumed / not assumed)		Statistically significant
			FY	SY		assumed	not assumed	
1.	Online classes	557/400	5.46 (1.869)	5.23 (1.991)	.071	assumed	.074	✗
						not assumed	.077	✗
2.	Online Dean's Office / Registrar	557/400	6.3 (1.049)	5.87 (1.477)	.000	assumed	.000	✓
						not assumed	.000	✓
3.	Online consultations	557/400	5.80 (1.370)	5.58 (1.556)	.001	assumed	.018	✓
						not assumed	.020	✓
4.	Online training & webinars	557/400	5.78 (1.327)	5.50 (1.449)	.015	assumed	.003	✓
						not assumed	.003	✓
5.	Online assessments & examinations	557/400	6.20 (1.290)	5.90 (1.538)	.000	assumed	.001	✓
						not assumed	.002	✓
6.	Limited presence on campus	557/400	4.95 (2.107)	4.89 (2.193)	.192	assumed	.674	✗
						not assumed	.676	✗
7.	Online platform	557/400	6.22 (1.051)	5.72 (1.510)	.000	assumed	.000	✓
						not assumed	.000	✓
8.	Online library	557/400	4.69 (1.259)	4.53 (1.361)	.966	assumed	.063	✗
						not assumed	.067	✗

Note. FY = first-year students; SY = senior students, incl. 2nd, 3rd, and 4th years.

Source: authors' analysis using the open-source statistical analysis package PSPP GNU pspp 1.2.0-g0fb4db

### The core measures and the students' expectations

Contemporary students are often called *digital natives* (Prensky, 2001; Stolzer, 2007) because they grew up with access to computers, mobile devices, and the Internet. Even though the use of digital tools, multimedia, and digital student grade books are common within the K12 education in Poland, the pre-university school experience is still rather traditional. Online socializing outside school and extracurricular education are far more common. Teenagers nowa-

days also have extensive and successful experience with online shopping and are very quick to adopt all web-based innovations. Given the broad experience of contemporary teenagers and their Internet and computer literacy, the authors have hypothesized that by the time they enter college or university, the core measures introduced in response to COVID-19 and associated with online learning/studying will positively correlate with students' perception of their expectations toward college/university being met. This hypothesis also seems to be supported by empirical evidence. All questionnaire items referring to the core measures are positively, yet only slightly correlated with the students' expectations scale. All (Pearson's) correlations are statistically significant (at  $p < 0.01$ ) (see Tab. 9). The multiple regression model suggests that all the core measures together account for 15% of the overall students' expectations met.

**Table 9**

The correlation of the core measures and students' expectations

Core measures	To what extent your expectations were met
Online classes	0.282
Online Dean's Office / Registrar	0.252
Online consultations	0.284
Online training & webinars	0.250
Online assessments & examinations	0.190
Limited presence on campus	0.207
Online platform	0.310
Online library	0.258

Source: authors' analysis using open-source statistical analysis package PSPP GNU pspp 1.2.0-g0fb4db.

### Conclusions and implications

Even though online programs have been widely available for many years, there appears to be disagreement regarding their value in formal higher education, even among students themselves. With the COVID-19 pandemic, many HEIs were forced to implement distance learning methods and virtual university measures on a massive scale, regardless of their attitudes towards virtualization of the education process and

prior experience with online education services. This led to the exposure of enormous numbers of students to the experience of online learning and virtual university, with all its advantages and drawbacks. Just as the remote work experience has already changed the working environment and employees' expectations, it is commonly believed that the online education experience of the COVID-19 crisis will change the practices and expectations of the higher education sector, and the value equation perceptions among current and future students.

The authors took advantage of the opportunity presented by COVID-19 and the remote learning/studying measures implemented at the authors' institution to measure the students' perceived value of online studying. The authors assessed the extent to which the remote study/learning measures correlate with students' expectations towards their college. The hypotheses have largely been supported by the data. In general, the online studying/learning measures have been found to be value-adding, and even more so by part-time students and students with jobs. Contrary to the authors' expectations, the first-year students were not less enthusiastic toward online studying, in fact, they found the online studying/learning measures even more value-adding than their senior peers. As expected, all implemented remote study measures correlate positively, although only slightly, with students' expectations with their college.

It is important to remember that the empirical findings need to be judged considering the study limitations. The sample structure does not seem to be significantly different from a sample one may obtain from other HEIs in Poland, yet there is no way to assess its representativeness for the student population in general. The authors have studied only a small subset of online studying/learning measures that are being or can be introduced at a HEI willing to embark on a virtual university project. Despite the limitations, the research findings provide a platform on which future research and conceptual work can be continued.

The COVID-19 pandemic turned the traditional system of education upside down for institutions at all levels, making the unbelievable normal. The return to *business as usual* may prove to be impossible. The post-pandemic education industry is likely to undergo a complex process of adjusting to the reality of the newly obtained experience, novel expectations, and freshly acquired capabilities. The challenge is to find a value proposition with sufficient appeal to all stakeholders to lead the transformation of HEI into the new normal.

It can be argued that many of the online studying measures introduced during COVID-19 will be retained to some extent, probably to be expanded or redesigned when the key stakeholders of HEIs are ready. COVID-19 sped up the digital transformation of many industries around the world, including higher education. Digital transformation is a change driver in the world of science because it offers new technologies based on the Internet with profound implications

for society (Unruh & Kiron, 2017). Even traditional universities, which until now have not looked at digitization and virtualization as a key process, began considering these trends in their new development strategies, because they have proven their value, and they possess enormous potential to redesign higher education to meet the needs and expectations of the new normal – the post-covid world.

To put the presented framework in the context of the authors' research findings, one needs to understand how students' value perceptions fit into the VU concept outlined above. The value offered by the HEI is dependent on the how (technology), who (faculty, administrators), what (innovative programs), at what cost (tuition, sacrifices, pains), and to what end (how it enables achievement of one's goals). Technology, faculty, and administrators are value enablers that are as good as the value creation, preparation, and capture processes allow them to be. It is, however, the digitization process that underlies the value chain that is the game-changer. It can effectively address the issue of the "what" and "at what cost", to allow "the who" to offer the "to what end".

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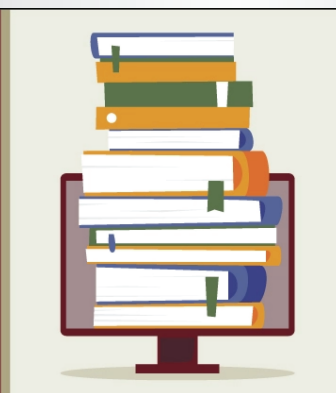
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Two years into the COVID-19 pandemic, much still feels the same, though in some important ways our thinking and behaviors may be shifting in anticipation of longer-term changes in the ways we structure our lives and our shared places and spaces. In higher education, these shifts may reflect an evolution from short-term “emergency” or “reactive” modes of offering education during extraordinary circumstances to making strategic and sustainable investments in a future that will be very much unlike our

past. As this year’s teaching and Learning Horizon panelists gathered to reflect on current trends and the future of higher education, many of their discussions and nominations suggest that change may be here to stay and that there will be no return to “normal” for many institutions. This report summarizes the results of those discussions and nominations and serves as one vantage point on where our future may be headed. This project was grounded in a modified Delphi methodology that seeks to elevate the collective perspectives and knowledge of a diverse group of experts, and the panelists’ activities were facilitated using tools adapted from the Institute for the Future.

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