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Technicized University – Are the Technological Changes an Opportunity or a Threat?

Abstract. The university's classic formula refers to the importance of an in-depth relationship between the professor and his students. However, one can get the impression that currently students' expectations towards the university have changed significantly, which is why higher education institutions are currently facing a paradigmatic change. In this article, the author analyses selected phenomena of technicalization of the university, indicating the possibilities and potential threats to the identity of academic institutions.

Keywords: university; cloud computing; technicization; sts

> *In a world connected by a communication technology network, for the first time in history, all people, all ethnic and religious groups, all populations have the same present*
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> Ulrich Beck (2012, p. 27)

The classical vision of the academy assumed a community of lecturers and students who, since the establishment of universities in the Middle Ages, have been focused on the joint search for truth (von Humboldt 1946, p. 230). Universities have historically contributed to the development of cities, gathering in their walls distinguished scientists, field experts and attracting huge crowds of interested students (Markowski 2003, p. 76–81; Wolaniuk 2010, p. 57–59). Over time, universities have transformed themselves seeking again their own mission and vocation, up to modern times. The thing is, however, that nowadays the university has become a completely different place students' perception. It is expected to provide not only up-to--date and practical knowledge, but also a kind of immediacy and responsiveness similar to that known from computer and mobile applications. Today, the student does not want to listen to lectures or read from the page; he rather expects to gain personalized access to content in the on-demand mode (similar to the VoD service) in the time appropriate for him and in an accessible form. To implement the new university paradigm, however, you need technical support, which is already

available today and is gaining increasing popularity. What I mean is cloud computing and available SaaS / PaaS / IaaS services. Streaming of video content must be scaled depending on the device used (resolution for the phone, tablet, laptop) and the available link (quality of data transfer so that there are no buffering breaks) and available from anywhere on earth around the clock. No supply gaps, interruptions in service availability, or bugs in the application should take place because the student-consumer is fussy and accustomed to this level of service in the digital world. In order to keep pace with changes and become an attractive place for young people, the university needs changes in the area of the IT infrastructure. This goal can be achieved either by building its own ICT resources or by using solutions available on the market, such as cloud computing.

This article focuses on showing the current technological changes in the field of higher education. These changes are not of a particular nature but rather global trends and may affect the functioning of the university to varying degrees. The author wishes to sketch selected dimensions of university digitization and technicalization, emphasizing the fields of possibilities and potential threats. The reference point is the classic university vision widely adopted in the European higher education model.

1. A classic vision of the academy

Taking up the subject of changes in the perception of the role of the university and the selection of teaching tools and forms necessary to perform its functions, it is impossible to recall the classic idea of the European university. The traditional understanding of the university as the highest institution of higher education implies the accomplishment of a particularly momentous mission of seeking truth and shaping the young generation (Twardowski 1933, p. 268). Tadeusz Czeżowski argued that academic education intertwines into two worlds: the strictly scientific and the practical-vocational one. He described the role and mission of universities as follows:

> They serve science, and are also the highest vocational schools for lawyers, doctors, teachers, etc. […]. Both of these university goals are not incompatible with each other, but complement each other. Thorough preparation for the profession requires basing on scientific foundations, and the path of scientific cognition can only be shown by those who work in science; therefore an academic teacher can only be a scholar, not even the most perfect practitioner. At the same time, the task of vocational education does not bother, but it certainly helps theoretical scientific work in universities; in this way science maintains contact with life and its problems, and from among the masses entering the universities for practical purposes of achieving academic education, individuals may be selected that devote themselves solely to science. For both purposes served

by universities, the first goal, science, is the basic one, because vocational training is based on it (Czeżowski 1926, p. VII–IX; cf. Tyburski 2004, p. 266–267).

In this sense, the university serves and fulfils social expectations and is not detached from practice (Sowa 2009, p. 14). In accordance with the academic *ethos*, universities not only carry out educational tasks, but also bring up and socialize to specific, socially respected values. Thus, higher education should ensure standards in theoretical, methodological, and ethical preparation (Brzeziński 2004, p. 54).

However, at present, the student-centred university has found itself in a difficult situation of paradigmatic and unwanted but necessary revitalization of its own idea. One of its symptoms is the technicization of the university and the emphasis on a modern form of providing knowledge. This change may be an opportunity for universities to increase their reach, their own prestige or interest in talented students. On the other hand, it may also be a threat to the academic identity established as the result of a long-lasting process, which can be reduced to a tool for transferring knowledge rather than shaping the character.

2. The desire for modern form

Student statements and trends in global higher education seem to clearly communicate that the current formula of academic classes is running out. The classic idea of the Humboldt University, where a master-scholar is at the centre and a group of students around him, is currently in crisis, as some young students of science define their own educational needs differently. Traditional methods such as "blackboard-chalk" or a lecture read out from notes are unattractive to the young generation especially in the era of the increasingly common digitization of various areas of life. Today, the virtual world is gaining value for young students and students themselves because it is now the natural environment for them to function. If you can shop online, pay bills online, visit an online museum, experience online gameplay, why cannot you graduate online? Well, you can, although in Poland relatively few universities give such an opportunity.[1]

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[1] On the Polish market of educational services, the Polish Virtual University (PUW), which is part of the Łódź AHE, offering a complete cycle of first and second cycle studies in various fields (with the need to visit the university periodically, at least during exam sessions) remains unique. It is also worth mentioning that other universities in Poland offer selected fields of study in an e-learning form – e.g. computer science at the University of Information Technology in Łódź (WSInf) or management at the University of Banking in Poznań (WSB) – or individual online courses – University Open UW or E-learning Platform UWr. Cf. https://www.puw.pl (access: 21.10.2019); http://wsinf.edu.pl/p-3-Studia-Online (access: 21.10.2019); https://www.wsb.pl/poznan/studia-i-szkolenia/studia-ii-stopnia/kierunki-i-specjalnosci/zarzadzanie-studia-online (access: 21.10.2019); https://www.uo.uw.edu.pl/kursy (access: 21.10.2019); https://e-edu.cko.uni.wroc.pl/ (access: 21.10.2019).

Online studies are gaining popularity worldwide. In Poland, this form of education is only at the initial stage of development, although it is steadily increasing.[2] Several academic centres offer this formula, and they are often of a hybrid character because physical presence during exams is required. However, there are more and more smaller courses appearing in the network, which can be an alternative to selected subjects in college. This phenomenon is particularly visible in the area of technical sciences, where the materials available online are more modern and freshly developed and touch on current technological problems and solutions more than those available as an attachment to academic classes. Often, the content transmitted at the university has an expiration date from a decade or two ago, which can mean a sense of meaninglessness. However, this is more a problem on the side of a very fast rate of data growth, rather than an "academic slowdown". In today's reality, we are dealing with a kind of information flood and a dynamically changing approach, like in a kaleidoscope, to the implementation of technical solutions. In a sense, this is the specificity of technical and natural sciences, while in humanities and social sciences, the level of stability is much higher, although here we can also see acceleration caused by the overflow of the global information buffer.

In modern online courses, the form of communication is also different, focused on a clear message, practical implementation, and based on interactive examples. There are frequent practices of sharing completed tasks in a public repository so that students can practice practically presented content. An example would be GitHub, where the lecturer can place files with the application source code and tasks for self-implementation. The issue of the modern form is slightly different when it comes to humanities and social sciences. There, access to the code repository can be completely unattractive, but even interactive forms with links to sources and links to additional information gain value. Listed comments and short factual summaries synthesizing a given batch of text will also be useful. Certainly, students would also appreciate the possibility of translating "on the fly" from different languages of specific pages or selected fragments. Such a mechanism is already available on the pages of Microsoft technical documentation, so in terms of technology, it can be implemented in an educational context. Also from the level of mobile applications, such a solution is gaining popularity – an example is the Uber company and its ordering application, in which a customer who is calling a taxi can write a message to the driver in his native language, and the driver can read it in his own. This approach definitely puts on the convenience of use.

Reflections on changing the form of communication should also be differentiated in terms of the level of advancement of the student of science and his intern-

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[2] In 2015, the eLearning rate in selected countries was as follows: India 55%, China 52%, Malaysia 41%, Romania 38%, Poland 28%, Czech Republic 27%, Brazil 26%. Cf. https://elearningindustry.com/elearning-statistics-and-facts-for-2015 (access: 14.10.2019).

ship in the academic space. There is no doubt that propedeutic and introductory classes are implemented differently, where the teacher is often treated as a medium for information transmission, and the matter is quite different when it comes to some advanced courses taught by the same lecturer, seminars, or finally joint classes faculty research projects. In the case of the latter, there is little to fear for weakening the individual relationship of the master and students. It would be difficult to replace this personal relationship with an online meeting (video conference, mail, chat). However, if the problem is the distance between the student and the university, it is often possible to consult at dedicated points in different cities.[3] It does not have to mean that a new approach to online study will herald the end of the traditional university and its liquidation in favour of expanding the online course network. These two forms can and should complement each other.

3. I choose when and where

An area connected with changes in the form of transfer of knowledge in an educational context is also the expectation of time adjustment to the needs of the modern recipient of educational services. The goal is to optimize the relationship of personal performance to the time spent on education. This is not just about reducing learning time, but harmonizing the hours reserved for education with the time of your own highest productivity and the opportunity to focus attention. The problem is that students may present individual differences, which means that their effective working hours will be different. The traditional approach to academic education cannot meet this type of requirement, because it imposes rigid lecture and seminar hours based on the employee's schedule and the statistical probability of the most cognitively effective time in a 24-hour period. Unfortunately, this approach does not seem to suit modern students at all, as it imposes a framework within which they must function. Studies are currently expected to be flexible and to focus on the needs of academic education recipients.

The Education on Demand formula, similar to the VoD (Video on Demand) service that allows you to choose the time and scope of the content you want is the way to achieve this goal. This approach is naturally coupled with the choice of an attractive and modern form of communication because it allows you to choose the medium (various electronic devices or various applications) and context (e.g. a comfortable sofa at home, a table at a cafe, a conference room, a train compartment) when consuming the content served by a service provider.

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[3] An example are the online studies at the already mentioned WSInf in Łódź, where consultations with lecturers in Łódź or university facilities in other cities (e.g. in Bydgoszcz) are possible. Studies in other countries also work on a similar principle – e.g. in Spain, see https://www.distancelearningportal.com/countries/24/spain.html (access: 19.12.2019).

From a technical perspective, it is necessary to provide adequate infrastructure that can handle the increased use of applications and network traffic. Here, there is a need to replace the application architecture from monolithic to distributed in order to be able to scale it more easily. When the need arises, it is easy to increase the available resources (CPU, RAM, disk space), and when the interest decreases, return to the initial state. It is the ideal space for implementing cloud computing services whose primary goal was to provide scalability and granular access to services.

For obvious reasons, such optics place education recipients as customers or consumers and academic teachers as providers of educational services. From their early age, the young generation is socialized to the role of consumers using things. Access to enjoyment must be immediate, even at the price of credit, to be able to consume promotion (Bauman 2006, p. 18). Consumers themselves are also transformed into goods (Bauman 2007, p. 150). In the era of massive higher education, there is also a necessity to significantly reduce the academic relationship – to tear it away from the educational and ethical layer and reduce it to mere transfer of knowledge. In this approach, the mechanistic implications and treatment of scholars as learning machines or information vending machines, similar to coffee vending machines in the university lobby should not be surprising. It is therefore right to ask Baudrillard (2006, p. 107) about the weave of masses and media – do they serve releasing (emancipation through information) or stupidity (manipulation by targeted communication)?

4. Always up to date

Another concept guiding the construction of a new vision of the academy is the desire to be constantly up to date according to the journalistic principle of "yesterday's information is no longer needed". This approach mainly concerns the content presented in lectures in the sense of their compliance with current trends and the needs of economy. Thus, the observed deficiencies in the lecture content or too old and outdated references are treated as bugs that require repair and can no longer appear (fix, bugfix) in the next edition of the course (next release). The dynamic formula adopted has the form: "current is what is needed here and possible to apply in practice". This type of approach has probably been borrowed from the agile software development methodology (cf. Chmielecki 2018, p. 98–104). Nevertheless, it is difficult to reach the level of timeliness in the era of information overflow, especially taking into account the fact that academic institutions react with some delay to new products and changing fashions. It seems that the syncretic combination of (1) modern course platforms run by practitioners embedded in modern approaches and (2) classic studies in a traditionally academic form may be the best strategy

for updating the mission of universities. At the initial level, students could choose from a wide range of courses within one or another educational platform (Moodle, Udemy, Pluralsight, etc.) to supplement their practical skills with theoretical knowledge to improve their own research workshop at a subsequent levels.

It should be added that as the student's level of advancement increases, the educational or character-forming role of the university increases, as such a student has already potentially become saturated with knowledge available as part of online courses, and expects something more to understand the topic he is interested in. In this area, the classic ethos of the university has definitely something to offer to a young student of science – from advanced classes, laboratories to seminar meetings where, together with the master (under his supervision), he is honing his research and methodological skills. These can be "hands-on practice" classes in technical sciences or re-reading a selected fragment of a philosophical work, its exegesis and joint discussion on the conclusions. In any case, this formula of personal relationship and collaboration brings an undoubted value to the student himself, as well as to the master-scholar. They both need this relationship.

5. However…

The new vision of the academy can be an interesting complement to the classic approach, but opens the field for many new threats. Ulrich Beck warns that these are new, previously unknown technological threats, and because of their indeterminacy, it is difficult to protect against them and provide the required level of protection (Beck 2012, p. 28). You also cannot pretend that these threats do not occur because all participants of the educational game will face their consequences. The key issue then becomes access control to the resources of the academic network, including personal data and other confidential information. I am talking here about the scientific texts of employees, research reports, grades from student exams, or their diploma theses. The cafeteria, however, is much wide because the university, not only for legal (Act of May 10, 2018 on the protection of personal data) but also for financial reasons, regulates access to data. It is, after all, the lead in research on a specific financed issue that public funds, sales of books and magazines, as well as the prestige of the scientific unit itself.

A big problem, which also appears in the classical academy, although in the new vision it can take on an enhanced form, is the question of the level of motivation and independence of students. Although the new form of educational services creates a number of possibilities, it strengthens the sense of self-agency, influences the choice of content, removes communication barriers, and those resulting from disability, but it also transfers the emphasis on the independence of students. Therefore, the issue of motivation becomes absolutely crucial. If it is missing, it will not result

much from a change in the educational paradigm. It can happen, as Erich Fromm said, that concern for freedom will be useless if the game is not about freedom but about unwanted responsibility (Fromm 1978, p. 154).

6. Is university technicalization an opportunity or a threat?

It is difficult to answer the question concerning the balance of profits and losses of universities following the technicalization path. Certainly, undoubted advantages can be pointed out, such as increasing the attractiveness and potential acquisition of many new and talented students, including students from distant regions of the country or from abroad, as well as students with disabilities that impede mobility. On the other hand, however, there is a justified risk of "shallowing" the academic relationship to mere transfer of knowledge or changing the university into a kind of "course stall". Therefore, awareness of risks and active prevention are key, as the trend of technicalization and digitization is becoming more and more popular every year and there is no indication that it will be reversed.

Modern university is undoubtedly digitizing, offering more opportunities using technology and the Internet. It is obviously heading towards distributed technologies known from cloud computing. Probably the most advanced in this matter is the example of the American University of Notre-Dame which largely uses the possibilities of cloud computing. Over 80% of its resources and services have already been transferred to the cloud in the form of SaaS, PaaS and IaaS solutions (Williams 2019). In this case, the university works closely with the leader of the Amazon Web Services cloud solutions (AWS) to ensure a flexible infrastructure for on-demand education and virtualized content in classroom education (Firment 2018). In the European space (also taking into account the context of Poland here) the percentage of digitalization seems to be much lower, although, over the years, the percentage increase in digitized works as well as entire areas of educational services can be observed. However, the question about the ethical consequences and decision to choose a strategy to combine the classic concept of the university with the needs of modern education remains open.

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