Digital Transformation for the University of the Future: A Perspective

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The university of the future looks bright for those who engage in digital transformation. This article should be of great interest to university leaders, students, faculty, and education practitioners in the field.

With the COVID pandemic and threatening variants upon us, everyone has had to "pivot" and adapt to "new normal" conditions. This has been especially true of universities and how education is delivered to their students. We have witnessed growing trends in moving from digitization to digitalization to digital transformation. According to Gartner, digitization is evolving from analog to digital forms. The next level is digitalization, where, according to the Brookings Institute, in the United States, digitalization is transforming the world of work. Finally, moving toward nirvana (if you will), organizations (including universities) should be involved in digital transformation, which takes digitalization to a higher level in terms of being able to deal better with change overall.

In the case of universities, we have been slow in adopting the same type of digital transformation practices being applied in industry. Research from EDUCAUSE indicates that only 13% of college and universities are engaging in digital transformation efforts.[1] For the university of the future, we envision that digital transformation must take place in many areas (from student learning to financial health to IT systems and so on) to "stay alive." My new book series, "Digital Transformation: Accelerating Organizational Intelligence," published by World Scientific Publishing,[2] may be helpful in understanding and promoting these principles.

One key change where universities have had to adapt quickly is the use of online learning. This trend will

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continue in the future in terms of universities providing "knowledge as a service" to their constituents. The use of personalized adaptive learning, learning analytics, augmented reality, gamification, and the like will become even more prevalent (and expected) in the coming years for universities to be competitive in the marketplace. We will also continue to see partnerships between universities and companies, such as Apple, Google, Meta, and so on, to further enhance the educational and delivery mechanism offerings to students and perhaps even privatize some of these new educational curricula.

DEVELOPING A DIGITAL TRANSFORMATION STRATEGY FOR UNIVERSITIES

In June 2021, the European Union project Universities of the Future held a final conference to discuss its results for Industry and Education 4.0.[3] The partners produced their "Blueprint for Universities of the Future,"[4] which featured three Industry 4.0 challenges. These included 1) a lack of understanding of how to prepare for future work, 2) a lack of a skilled workforce, and 3) a lack of vision for technology. The partners postulated that we need to educate (essentially using IBM's approach) "T-shaped" individuals who have a deep understanding of domain-specific skills as well as a breadth of knowledge of systems-oriented and transferable skills (including interpersonal skills, digital skills, the ability to learn, project management, and so on). The partners envisioned scenarios for 2040 in which higher-education institutions (HEIs) have close cooperation with and serve as bridge builders among industry, government, and nongovernmental organizations. They also expect HEIs to offer upskilling in addition to academic degree education and to experiment with new models of learning [including artificial intelligence (AI)-assisted virtual assistants]. Interdisciplinary education was also cited as a key approach that would be prevalent in the years ahead.

Liebowitz[5,6] posits that universities of the future will have to apply more data-informed approaches to education as accountability and cost consciousness become increasingly important in the competitive landscape. The formula for success is "the right prescription is digital transformation." For universities to be successful in their digital transformation efforts, there are four key components: 1) active participation of the "consumers" of digital transformation efforts, 2) data and analytics, 3) change management processes, and 4) innovation.

ACTIVE PARTICIPATION OF THE "CONSUMERS"

Without the active participation of the ultimate users of the digital transformation effort, the likelihood for success will be greatly minimized. Let me give you a personal example. At one of the top universities where I was teaching, there was a university-wide digital transformation effort through the creation of an enterprise resource planning system that would revolutionize the way we did business. After a failed attempt by a major consulting firm to design the system, another company was hired to pick up the pieces. The bottom line: it took 14 years to actually design, develop, test, implement, and roll out this system throughout the university.

However, due to failures to reach out adequately to the faculty during the design phase (for example, to plan how faculty members could use the system to get reimbursed for conference travel expenses), the final product was almost impossible to use. There were other modules that were equally difficult to navigate and use, and this caused more confusion and aggravation. This is a prime example of not involving users enough in the requirements stage of a major digital transformation effort as well as during the design, development, testing, implementation, and conversion steps. An important part of this effort should also have been on "change management," but unfortunately, there wasn't enough focus concentrated in this area.

DATA AND ANALYTICS

In today's and tomorrow's environments, data-driven and data-informed decisions will become paramount.[7] Evidence-based research will continue to be a key element of demonstrating proper student learning outcomes at universities. Even though we have seen the continued importance of "assessment" and applying data and analytics for informed decision making, we shouldn't forget about the other part of the equation in terms of applying one's experiential learning and "intuitive awareness" to solving problems.[8]

We are already seeing the impact of AI, machine learning, and analytics as part of large digital transformation efforts at universities. Sarirete et al.[9] indicate how AI is reshaping how we live, learn, and work. Separately, the C3.ai Digital Transformation Institute (https://c3dti.ai/) was established, in 2020, to be a research consortium among leading universities and industry to conduct research and educate practitioners in the science of digital transformation, which, according to C3.ai, operates at the intersection of AI, machine learning, cloud computing, the Internet of Things, big data analytics, organizational behavior, public policy, and ethics. Through the years, we have also witnessed how intelligent chatbots can be very successful, even serving as teaching assistants to help students with course-related questions.[10] Certainly, the milieu of data, analytics, and advanced computing techniques will continue to be an important part of university

digital transformation efforts in the near future.

CHANGE MANAGEMENT

Every initiative, whether as sophisticated as a digital transformation effort or something simpler, such as switching to a Mac from a PC, needs to have the proper change management processes in place. Many executives feel that digital transformation is about "technology." However, to be successful, having the right culture, people, and processes will greatly outweigh technology.[11] Coupled with the "softer" side of digital transformation is having the right change agents and change management processes interwoven throughout digital transformation design, development, and implementation. Poor change management and an inability to scale digital transformation efforts due to inadequate resources are cited as two big reasons why digital transformation efforts fail.[12] Careful attention to these factors will help ensure successful digital transformation efforts in the future.

INNOVATION

As we have witnessed during the past few years with COVID-19, universities had to be innovative to quickly pivot to online delivery for students, engaging employees in telecommuting and virtual environments, fostering new ways of generating revenue in demanding times, and creating initiatives to distinguish themselves from their competitors. Many universities are already developing data science and AI multidisciplinary clusters across their campuses to further leverage the impact of these technologies in the future. At Columbia University, through the Data Science Institute, more than 370 faculty are participating in data science-related projects across various schools. Other universities are embracing digital transformation efforts by removing data silos that hamper student and faculty engagement.

With Web 3.0 upon us, universities are trying to think creatively about how best to apply a new wave of technological innovation. For example, Perez[13] points out that the Imperial College Business School, in the United Kingdom, is moving into "precision education" in which AI and machine learning will form the underpinnings of a more personalized, adaptive approach to student learning. Universities will continue to partner with industry to improve the learning and teaching experience, such as engaging with Noodle Factory, in Singapore, a company that produces an AI-powered teaching assistant platform (https://noodlefactory.ai).

Since universities will need to be held more accountable in the future, learning analytics will play an increasing role. Companies, such as Civitas Learning (https://www.civitaslearning.com), are working with universities to try to improve student success through the use of data-driven analytics. At one of my former universities, University of Maryland University College (now the University of Maryland Global Campus), we worked with Civitas to determine how well community college transfer students would fare in our program, and we could predict within the first eight days, with 85% confidence, which students might be at risk.

Kaputa et al.[14] argue that we need "knowledge leadership" for universities in the future. This implies that new paradigms for knowledge transfer and learning need to be built and supported by senior university leaders. Part of this knowledge transfer will lead to new social innovations to support lifelong learning. Digital transformation in this context should include technological, organizational, and social pillars on which a university can thrive.

Digital transformation is critical for universities, businesses, government, and not-for-profits to be successful in the years ahead. Senior leaders must be aware of economic and demographic trends and should start now to prepare their future efforts. During the past few years, we have seen the world change as an impact of the COVID-19 pandemic. There is still, for example, a shortage of computer chips, due to supply chain issues, which will affect many aspects of industry and university sectors. University leaders must provide "knowledge leadership," along with appropriate financial resources, to help ensure survivability for their institutions. Without strategic thinking, universities and colleges will fall behind, and their future may not be sustainable. C

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