1.2.3 Building the University needed in the next few years

Introduction

Universities have long been recognised as central institutions for knowledge generation, dissemination, and nurturing intellectual growth. The advent of future technologies is set to alter the nature of work and shake the foundation of cultures worldwide. Thus, there is a need for university curricula to be more responsive to the rapidly changing demands of society. Wissema (2009) criticises still existing the supply-driven nature of university curricula, which are often driven by academic traditions or lecturers' interests. While a growing body of artificial intelligence experts believes that if socio-political-economic systems stay the same, and technological acceleration, integration, and globalization continue, then half the world could be unemployed by 2050. It is therefore essential that all sectors work together to adapt to this rapidly changing landscape and ensure a sustainable future (Glenn C. Jerome et all, 2020). Thus, there is a rising call for a revised social contract between universities and society. While rich with historical depth and tradition, universities' traditional role is being challenged to adapt and evolve to address the current crises and serve an increasingly diverse population of learners (McCoy C., 2023). However, universities' long-range strategies to tackle these issues remain elusive (Glenn C. Jerome et al. l, 2020). Thus, the traditional university model should be transformed profoundly in response to the digital age's demands and society's evolving needs. The question arises: How can universities balance their timeless historical depth with timely, regenerative activities that will meet the rapidly changing needs of tomorrow's society?

This report summarises the latest trends in the changing landscape of universities as multifaceted institutions that transcend traditional academic boundaries, redefine the learning and research process, and facilitate a symbiotic relationship with society.

Evolving Learning Process

J.G. Wissema's (2009) outlined three phases of university development, from the medieval university through the Humboldt University to what he refers to as the third-generation university. The third-generation university, as Wissema (2009) described, is characterised by seven key attributes:

1. Exploitation of know-how becomes the third university objective as universities are seen as the cradle of new entrepreneurial activity;
2. Operates in an internationally competitive market;
3. Network universities, collaborating with industry, private research and development (R&D), financiers, professional service providers and other universities via their knowledge carousel;

4. Research is largely interdisciplinary;
5. Multicultural organisations with a wide and diverse range of staff and students;
6. Cosmopolitan. They operate in an international setting. They employ the English language for all courses as the new lingua franca;
7. Becomes less dependent on state regulation.

Wissema (2009) discussed a shift towards a more holistic approach to learning. He predicted strengthening digital learning forms, such as MOOCs (Massive Open Online Courses) and SPOCs (Small Private Online Courses), as well as various kinds of blended learning. The demand for learning becomes more centralised, focusing on problem-based learning at the expense of disciplinary fundamentals. There is a rise in the modularisation of teaching to accommodate the needs and tastes of students who demand multiple modules tailored to their needs rather than whole curricula. This shift towards tailor-made and customised learning, which was expected in 2009, became one of the key transformations in the University 4.0 (Bert van der Zwaan, 2017). University 4.0 incorporates a more holistic approach to learning. In addition to providing specialised education in various disciplines, universities now emphasise the development of cultural competencies, creativity, critical thinking, entrepreneurship, and ethical values. This holistic learning approach equips students with the skills necessary to thrive in a rapidly changing and interconnected world (Bert van der Zwaan, 2017). Also, Glenn C. Jerome et al. (2020) encourage University 4.0 to make Tele-education free everywhere, ubiquitous, and life-long learning systems (Glenn C. Jerome et al., 2020). In parallel to STEM (and/or STEAM -science, technology, engineering, arts, and mathematics), create a hybrid system of self-paced inquiry-based learning for self-actualisation; retrain teachers as coaches using new AI tools with students (Glenn C. Jerome et al., 2020).

The evolving learning process in universities will involve a shift away from the traditional focus on acquiring disciplinary knowledge and towards a more interdisciplinary approach (Bert van der Zwaan, 2017). Glenn C. Jerome et al. (2020) recall it as a shift of education/learning systems more toward mastering skills rather than just mastering a profession.

In a world where the half-life of skills is decreasing rapidly, it's essential to focus on durable competencies. This involves the development of soft skills such as leadership, communication, critical thinking, agency, comfort with uncertainty, and problem-solving, as well as the ability to use knowledge generated from large data systems and expert systems, which remain relevant and valuable regardless of specific job requirements or industry trends. Students must be able to extract knowledge from these systems and apply it to their studies. The future curriculum should also focus on developing strong academic skills, such as asking the right questions and extracting knowledge from data. In addition, universities shall increasingly emphasise the importance of internationalisation, with students encouraged to spend time abroad and develop an understanding of the world beyond their own region. Finally, universities will also focus on developing leadership skills, as this will be essential in the complex society of the future. This will involve the development of the T-shaped professional, with a broad academic base and the ability to take personal responsibility for building a better society (Bert van der Zwaan, 2017). The vertical column of the ‘T’ represents in-depth knowledge in a particular discipline, while the horizontal bar represents the ability to apply knowledge

across different disciplines, indicating a more holistic approach to learning (Wissema, 2009).

Glenn C. Jerome et al. (2020) also emphasise the increased focus on developing creativity, critical thinking, and entrepreneurship (individual and teams), but also increased demand for such skills as human relations, philosophy, art, self-employment, social harmony, ethics, and values, to know thyself to build and lead a meaningful working life with self-assessment of progress on one's own goals and objectives. Include futures as history is included in the curriculum. Alternative visions of the future, foresight, and the ability to assess potential futures should be taught (Glenn C. Jerome et al., 2020) to develop future-oriented consciousness.

Project-based Learning

Project-based learning has emerged as a prominent methodology within this new learning paradigm. Students engage in real-world projects that require interdisciplinary collaboration, problem-solving, and innovation. This approach fosters practical application of knowledge, enhances teamwork, and cultivates entrepreneurship, preparing students for the challenges of the modern workplace (Bert van der Zwaan, 2017).

A significant aspect of project-based learning is its focus on entrepreneurship. Wissema (2009) acknowledges the compatibility of teaching entrepreneurship within scientific education, highlighting that this integrated approach prepares students for the modern workplace's challenges. By engaging in entrepreneurship, students gain firsthand experience in navigating the complexities of innovation, from the initial idea stage to implementation.

Furthermore, Wissema (2009) discusses the importance of partnerships in innovation. This aligns with the emphasis on teamwork within project-based learning, where students learn to collaborate with various stakeholders to bring their innovative ideas to life. As the masterclass projects are conducted in an open learning environment, and participants receive the information they need through MOOCs and a range of other activities such as workshops and news from teachers and entrepreneurs, training, group learning exchange sessions (using Virtual Reality teleconferences with other teams from abroad), through self-reflection, site visits, participation in competitions, internships or employment (some implement the project as part of their work), as well as cultural competency skills, which have been validated as part of the student's global competency portfolio (Bert van der Zwaan, 2017).

Through project work, students are mentored by lecturers, entrepreneurs and co-working professionals who are pursuing a higher level of excellence, such as an industrial PhD or a DBA in entrepreneurship combined with research and commercialisation, or individuals who are enrolled in accelerated micro-courses to complement or extend their skills or to upgrade their career path (Bert van der Zwaan, 2017).

Indeed, education should not be viewed as a finite game where students graduate with fixed skills and knowledge. Instead, it should be seen as an infinite game where new skills and knowledge are continuously acquired and updated throughout one's life.

This shift in perspective necessitates the use of emerging technologies, such as blockchain, which can be used to verify credentials earned outside of formal degrees. For example, students' project progress and results could be evaluated every six months using a 360-degree evaluation system, which also assesses soft and networking skills, emotional intelligence and autonomy competencies (Bert van der Zwaan, 2017). This approach would validate and incentivise continuous learning, further solidifying the role of universities as facilitators of lifelong education (McCoy C., 2023).

McCoy C. (2023) highlights the constraints in the current education system: rigid credit hour structure. This system, which forms the bedrock of traditional university education, places unnecessary limitations on the flexibility of educational design. If universities are to serve the diverse needs of learners, they must move away from such constraints and towards a model that values and supports lifelong learning.

Innovation in higher education should aim for efficiency and strive to sustain existing offerings while disrupting traditional education with new delivery models. These new models should cater to non-traditional learners, who often find the current system inaccessible or irrelevant. This disruption, while challenging, is essential for the evolution of higher education and its ability to serve all learners (McCoy C., 2023).

Restructuring universities to align with this new vision is not an easy task. It requires a baseline understanding of equity issues, leadership development, clear problem definition, and thoughtful technology utilisation. Only with this foundation can universities begin to implement tools such as modality matrices, learning taxonomies, and formative assessments, which can help shape education's future (McCoy C., 2023).

Transformative Research Process

In University 4.0, research is pivotal in bridging the gap between academia and society. Wissema (2009) delves into the evolution of industrial research, outlining the emergence of four regimes: trial and error, technology-push, market-pull, and strategy-steer. This shift reflects the changing nature of university research, moving from a solitary endeavour to a collaborative exercise involving multiple stakeholders. Research is a key link in the value chain, transforming ideas into tangible innovations. There, faculty, students, companies, and government agencies come together to create and commercialise knowledge. Wissema (2009) notes that these collaborations form patterns that shape the university's research and commercialisation efforts. He highlights the significance of technology in the research process. Moreover, he discusses the shift in the approach towards technology, moving from a need to have all essential technologies in-house to a recognition that access to technology can be sufficient. This transformation foresees the integration of research into value chains, such as innovation and sales of technical services. A clear example of this is the use of artificial intelligence and data analysis tools to streamline and enhance the research process. Furthermore, the concept of open sourcing-in research has gained prominence, acknowledging that no single entity can master all required technologies. This has led to an increased emphasis on collaboration and knowledge sharing facilitated by digital platforms like MOOCs.

University 4.0 should embrace digital tools and technologies to enhance research. Massive Open Online Courses (MOOCs) and artificial intelligence (AI) provide avenues for

knowledge sharing, remote collaboration, and data analysis. This infusion of technology into research broadens access to knowledge and accelerates the pace of discovery (Bert van der Zwaan, 2017).

Overall, challenge-oriented institutes need to become dominant players in research and interdisciplinary co-creation research centres, where faculty members from different faculties can work with representatives of companies, students, government agencies and other stakeholders. Qualified corporate employees would be invited to spend their sabbaticals here, while academics would be encouraged to spend their sabbaticals in business or public sector institutions. Research institutes would provide access to advanced testing equipment and other resources necessary for advanced research, as well as access to laboratory services. These institutes would provide an important part of large companies' innovation and community-oriented solutions. Supporting university technologies, promising student start-ups, university spin-offs, and university start-ups would make an important contribution to regional development (Bert van der Zwaan, 2017).

Glenn C. Jerome et al. (2020) emphasise that directors of national science labs and other leaders in the S&T community should devote more effort to making current science and future technology understandable to the general public. Create national policies and standards for the IoT that stress future cyber security systems, forecast synergies among the full range of new technologies and their potential impacts (e.g., artificial intelligence, robotics, synthetic biology, nanotechnology, quantum computing, 3D/4D printing, IoT, drones (and other autonomous vehicles), VR and AR, cloud analytics, conscious-technology, semantic web, holographic communications, blockchain, and telepresence). National S&T leaders should be part of the national team that creates, regularly updates, and implements their country's national S&T strategy. S&T and legal communities should collaborate nationally and internationally to establish legal frameworks and treaties that anticipate future liability requirements to deter technological hazards and encourage technology befitting humanity.

Conclusions

All authors agree that the transformation of universities in the University 4.0 era brings about new opportunities and challenges. By leveraging interdisciplinary collaboration, project-based learning, digital tools, and a commitment to lifelong learning, universities can better prepare individuals to navigate a complex and interconnected world. As the lines between knowledge creation, transfer, and application continue to blur, universities will play a pivotal role in shaping the future of education and advancing society as a whole.

The consensus is that the future dynamics of work and technology necessitate a global and long-term perspective. The global aspect is essential because even if a country successfully transitions to the new economy, mass migration from neighbouring countries that do not adapt as well is a likely consequence. A long-term view is crucial because it compels us to consider cultural changes that may stem initially from artificial narrow intelligence, robotics, and drones, and later from more advanced technologies like artificial general intelligence, quantum computing, and synthetic biology.

Educational change is undeniably vital, but so too are changes in government, business, scientific and technological research, and our understanding of the purpose of work. It's important to devote equal attention to the challenges the higher education system faces in this transition and to identify actions that can facilitate a smoother transition.

Generally, technological capacities improve faster than we anticipate, but their application usually takes longer than seems reasonable. However, this may change as the Internet and artificial intelligence applications are spreading rapidly, making it easier to share and apply new technological capacities worldwide much faster than in the past. Consequently, we have less time to adjust to change. By looking further into the future, we can create more time to adapt.

As the world becomes increasingly complex, so too are the actions needed to navigate this transition. Various people and institutions with different interests and skills will need to carry out many actions. While it's not necessary to implement all the actions suggested in this report, we need to do more than just incorporate STEM into more educational systems.

Annex: Examples of Best Practices

The UTS Animal Logic Academy: A Model for University-Industry Collaboration (The Future of Universities – Lessons from Hollywood, 2023). In an innovative move, the University of Technology Sydney (UTS) and Animal Logic, a renowned Australian animation studio, have created the UTS Animal Logic Academy. This collaborative endeavour aims to develop graduates who are ready to take on the industry with their skills and knowledge. The Academy was established in response to a clear need within the animation industry: the demand for graduates with strong technical skills and the ability to collaborate effectively on large projects. With this in mind, the program was designed to provide students with the necessary expertise and experiences to meet these industry demands.

The UTS Animal Logic Academy stands out for its innovative approach to learning. The program is based on a project-based learning model, where students work on practical assignments that mirror real-world industry projects. Complementing this hands-on approach is a condensed 1-year structure and an industry-like schedule, immersing students in a realistic studio environment from day one.Developing such an unconventional model required a substantial commitment from the university. Breaking from tradition and working closely with industry experts to design the program was a challenging process, but one that ultimately resulted in a unique and effective educational experience for the students. While the initial setup of the program was costly, the benefits are manifold. The Academy provides an alternative learning pathway with a strong focus on employability, benefiting not only the students but also the university and industry partners. The return on investment is evident in the form of well-prepared graduates ready to contribute to the industry from their first day on the job.

Replicating this co-created model in other contexts, however, is not a straightforward task. It requires significant financial commitment, trust in industry advice, and a delicate balance between maintaining the partnership and preserving the value of a traditional university education. Yet, the potential benefits suggest that exploring such models is a worthwhile endeavor.

Programs like the UTS Animal Logic Academy demonstrate the value of university-industry collaborations. They offer to diverse learners alternative pathways to education and career success, showcasing how such collaborations can transform the educational landscape and prepare students for the challenges of the 21st century.

Noodle Partners: Adapting Universities for the Future (https://highered.noodle.com/)

Noodle Partners is an organisation that assists universities in their journey of adaptation and modernisation. It provides a suite of services encompassing marketing, enrollment, learning design, and technology integration, helping universities navigate the complex landscape of modern higher education.

One of the key challenges universities face today is the commodification of degrees. Increasingly, students are focused on the bottom-line costs of their education, often prioritising this over the brand and quality of the institution. This shift in focus has left many universities struggling to define and communicate their unique value proposition.

In this environment, it becomes critical for universities to develop a clear identity and articulate clear outcomes for their programs. This goes beyond merely meeting credential requirements; it involves differentiating these programs in a way that resonates with prospective students and provides them with clear, tangible benefits.

Balancing quality and value is a challenging task, but it is not impossible. Universities need to identify their niche strengths and excel in these areas rather than trying to be everything to everyone. By specializing and focusing on what they do best, universities can provide a high-quality education that also delivers value for money.

Agility is another key factor in the success of modern universities. Agile campuses are those that seamlessly support students, regardless of their modality of learning. Rather than treating online learning as a separate, parallel universe, these campuses integrate online and offline learning experiences to provide a comprehensive educational experience.

Looking to the future, it is clear that services and systems must be designed with flexibility in mind. They should be able to support students and faculty regardless of their location, providing them with the tools and resources they need to succeed in an increasingly global and digital educational landscape.

One way to provide value and differentiation is to focus programs around regional needs, faculty expertise, or target students. This approach allows universities to tailor their offerings to their student's specific needs and interests, providing a more personalised and relevant education.

Finally, in an increasingly commoditised market, it is important for universities to prioritise quality experiences and student support over simply chasing low costs. By doing so, they can ensure that their students receive a high-quality education that prepares them for success in their chosen careers.

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