FUTURE IN HIGHER EDUCATION: DIGITAL UNIVERSITY

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IŞIK UNIVERSITY
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ABSTRACT

Currently, higher education institutions are facing the necessity to adapt their educational delivery methods and operate in a globalized marketplace. Universities must reconsider how they provide access to their courses anywhere and at any time. Not only do they need to meet the increasing digital expectations of Generation Z students, but they also have to be prepared for the upcoming Generation Alpha. The concept of higher education and the evaluation of its main actors, universities, have been widely discussed since the Medieval age. The first-generation University 1.0 emerged as information transfer centers in the 11th Century. Following that, the second-generation University 2.0 appeared as information transfer and research centers in the 19th Century. The 1970s witnessed the emergence of the third-generation University 3.0, which encompassed information transfer, research, and application (university-industry) centers. Subsequently, the fourth-generation University 4.0 flourished as a digitalized university, relying on technological and social innovations during the digital transformation era of the 2000s. The aim of this thesis is to provide a forward-looking perspective on the upcoming fifth-generation University 5.0, particularly its projected rise by the 2030s as a digital university targeting the global market and conducting education activities in a translocal and transtemporal manner worldwide. Through an extensive literature review, this prediction was confirmed, considering the growing impact of digital transformation, technological innovations, and the attitudes and expectations of the existing Generation Z university students and their successors, Generation Alpha. To further investigate this, a research survey was conducted with three different groups: university students, academics, and employers/managers, comprising a total of 346 participants. The survey questionnaire was designed based on four main pillars of questions, employing a composite approach to clarify the eight hypotheses of this study. The findings revealed a significant and linear relationship between the participants' importance assigned to digital education and their importance placed on digitalization. Additionally, a significant and linear relationship was observed between the importance given to digital education and the importance given to university

education. Both students' preferences and university strategies currently exhibit a positive approach towards the hybrid education model. Furthermore, a similar attitude is projected for the future prevalence of virtual education models after the 2030s. As a result, this study anticipates that universities will increasingly offer hybrid model education based on market demand until 2030, with varying adoption rates across different disciplines such as medicine, engineering, social sciences, and others. Beyond 2030, traditional universities will continue to utilize blended learning, while digital higher education institutions of University 5.0 will experience inevitable growth.

Keywords: Digital Transformation, University 5.0, Digital University, Hybrid Education, Virtual Education

YÜKSEKÖĞRETİMDE GELECEK: DİJİTAL ÜNİVERSİTE

ÖZET

Çağımızda yüksek öğretim kurumları eğitimlerini yeni yöntemlerle sunmak ve küresel bir pazarda faaliyet göstermek gerçeğiyle karşı karşıyadır. Bu nedenle üniversiteler, zaman ve lokasyon kavramı olmaksızın derslerine nasıl erişim sağlayabileceklerini yeniden değerlendirmek zorundadır. Bununla birlikte yüksek öğretim kurumları sadece Z Kuşağı öğrencilerinin artan dijital dönüşüm beklentilerini karşılamakla kalmayıp, aynı zamanda yaklaşan Alfa Kuşağı fırtınasına da hazır olmalıdır. Orta Çağ'dan bu yana, yükseköğretim kavramı ve ana aktörleri üniversitelerin gelişim süreçleri tartışılan bir konudur. Birinci nesil Üniversite 1.0, 11. Yüzyılda bilgi aktarım merkezleri olarak başlatılırken, ikinci nesil Üniversite 2.0, 19. Yüzyılda bilgi aktarımı ve araştırma merkezleri olarak karşımıza çıktı. 1970'ler ise bilgi aktarım, araştırma ve uygulama (üniversite-sanayi) merkezleri olarak üçüncü nesil Üniversite 3.0'ı getirdi. Ardından dördüncü nesil Üniversite 4.0, 2000'li yılların dijital dönüşüm çağının atmosferinde teknolojik ve sosyal inovasyonlara bağlı olarak dijitalleşen bir üniversite olarak gelişti. Bu tezin amacı, özellikle 2030'lardan itibaren tüm dünyayı tek bir pazar olarak hedefleyen ve eğitim faaliyetlerini küresel olarak farklı coğrafyalarda aynı anda yürütürken dijital üniversite kimliğini taşıyan, gelecek beşinci nesil Üniversite 5.0'a ileriye dönük bir yaklaşım sağlamaktır. Bu yaklaşım, gerçekleştirilen literatür taramasının sonunda, hem teknolojide yeni gelişimler ve çağdaş anlayış kavramlarının getirdiği sürekli artan dijital dönüşümün etkileri, hem de mevcut üniversite öğrencileri olan Z kuşağı ve onların halefi Alpha'nın beklentileri ile ilgili olarak doğrulanmıştır. Bu çerçevede, bu çalışmanın 8 hipotezini değerlendirmek için üniversite öğrencileri, akademisyenler ve işverenler/yöneticiler olmak üzere 3 farklı grupta 346 katılımcı ile 4 ana soru grubu üzerinde bütünleşik bir yaklaşımla tasarlanmış bir anket ile araştırma çalışması gerçekleştirilmiştir. Elde edilen bulgular incelendiğinde, katılımcıların dijital eğitime verdikleri önem ile dijitalleşmeye verdikleri önem arasında doğrusal ve anlamlı bir ilişki olduğu tespit edilirken, dijital eğitime verilen önem ve üniversite eğitimine verilen önem arasında da doğrusal ve anlamlı bir ilişki olduğu da tespit edilmiştir. Neticede, hem üniversite öğrencilerinin tercihleri hem de üniversitelerin stratejileri halihazırda hibrit eğitim modeline olumlu bir yaklaşım göstermektedir.

Ayrıca 2030'lardan sonra sanal eğitim modeline geçiş öngörüsünde de aynı yaklaşım görülmektedir. Sonuç olarak, bu çalışma, üniversitelerin 2030 yılına kadar hibrit eğitim modelini uygulamaya geçireceğini, 2030'dan sonra ise geleneksel üniversiteler hibrit eğitim modelini kullanmaya devam ederken, Üniversite 5.0 jenerasyonu dijital üniversitelerin kaçınılmaz gelişiminin başlayacağını göstermektedir.

Anahtar Kelimeler: Dijital Dönüşüm, Üniversite 5.0, Dijital Üniversite, Hibrit Eğitim, Sanal Eğitim,

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Ali EŞKİNAT

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CHAPTER 1

1. INTRODUCTION

The digital transformation era has brought about significant changes in the value proposition of universities. As the Covid-19 pandemic environment gradually concludes, concrete indications of digitalization in higher education institutions have become evident on a global scale. In response to this evolving landscape, universities are compelled to reimagine their educational delivery methods and adapt to the demands of a global marketplace. Consequently, they must reconsider how they can provide access to their courses anytime and anywhere. In addition to meeting the growing digital expectations of Generation Z students, higher education institutions must also prepare for the forthcoming challenges presented by Generation Alpha.

From a historical perspective, the global online higher education sector has witnessed an influx of numerous higher education institutions following the pioneering efforts of institutions like the State University of New York (SUNY), University of Phoenix, and University of London. Furthermore, the landscape has been enriched by the presence of prominent companies such as Coursera, Udacity, and EdX, which offer a wide array of degree programs and certificate courses across various educational levels.

Recent global news has highlighted numerous notable innovations within the higher education landscape. Stanford University in the United States, for instance, has taken significant steps towards facilitating the current distance education system by launching its digital classroom (Hadhazy, 2021). Another noteworthy development is the rebranding of Facebook as Meta, accompanied by the announcement of their plans to establish 10 digital university campuses across the United States (Greener, 2021). Gurieva et al. (2019) emphasize the implementation of a digital university model, referred to as University 4.0, with the active support of prominent digital companies.

Similarly, in China, China Communication University has partnered with Baidu's metaverse platform, XiRang, to launch its digital campus (Qin, 2022). The University of Miami in the United States has also made a notable announcement, signaling its entry into the field of metaverse (Terr, 2022). These developments, occurring within a relatively short timeframe, underscore the emergence of new paradigms within the higher education landscape.

However, the implications of this new era extend beyond mere technological considerations. The successful transition to the digital era necessitates a comprehensive approach encompassing political, economic, socio-cultural, and legal frameworks. Simultaneously, the university's perspective on this new digital era must also account for educational technologies, financial aspects, management and organizational structures, marketing strategies, and strategic planning, among other internal components. These facets are crucial in navigating the complexities and demands of the digital landscape.

At present, it is evident that universities are poised at the precipice of adopting a hybrid educational model in response to market demands and the expectations of Generation Z, which is anticipated to continue until 2030. This period can be characterized as the era of University 4.0. Subsequently, the emergence of Generation Alpha, Beta, Gamma, Delta, and their succeeding cohorts is projected to bring forth an undeniable impact of digital transformation in higher education, potentially culminating in the establishment of a fully digital university aimed at the global market, referred to as University 5.0.

Undoubtedly, the Covid-19 pandemic period has served as a catalyst for universities worldwide to adopt online or digital education. However, it is important to recognize that the digital transformation era can only influence the methodology of education, while the essential elements of academic content and the expertise of faculty members will continue to be fundamental pillars of higher education. This has been observed throughout the various historical phases, including University 1.0, University 2.0, University 3.0, University 4.0, and will undoubtedly remain crucial in the upcoming University 5.0, as well as in subsequent stages throughout the history of humanity.

In the 2020s, universities are compelled to gain a deeper understanding of the expectations and values held by their students. As Alexander et al. (2019) argue, higher education institutions are actively developing new strategies to reassess how they can

effectively fulfill their mission. The economic and political pressures have intensified the scrutiny surrounding the value of postsecondary education, particularly in relation to cost, accessibility, and the preparedness of graduates for the workforce.

Undoubtedly, envisioning the future of higher education necessitates a substantial consideration of the transformative innovations brought forth by the digital age. The advancements in digital technologies have unleashed unprecedented possibilities and have the potential to reshape the landscape of higher education.

In this thesis, industrial revolutions and higher education will first be underlined. The historical evolution of the universities from University 1.0 to University 5.0 will come in second place. So, the study begins by providing an overview of the industrial revolutions and their impact on the higher education landscape. Subsequently, it delves into the transformative innovations brought about by the digital age, specifically exploring the roles of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0, and Metaverse. The subsequent section highlights the impending digital storm in higher education, emphasizing the significant components such as Mixed Reality (MR), Artificial Intelligence (AI), Blockchain, and Virtual Assistants, and their profound impact on the university system. Furthermore, the study examines the influence of different generations, including X, Y, Z, and Alpha, on the design paradigm of universities, particularly in relation to the path towards University 5.0. The subsequent section identifies key trends that will shape the future of higher education, including the transition from University 4.0 to University 5.0, representing the shift from a digitally enhanced traditional university to a fully-fledged Digital University. Additionally, the thesis presents the findings of a conducted survey on digital universities and their outcomes. Lastly, the Conclusion section provides a comprehensive summary of the research and its implications.

CHAPTER 2

2. INDUSTRIAL REVOLUTIONS

Since the advent of the First Industrial Revolution (Industry 1.0), higher education has been profoundly influenced by the successive waves of industrial transformations, leading to the growth and evolution of universities as key players in society. This chapter aims to examine the concept and development of higher education institutions in relation to the different industrial revolutions and their specific periods. The central objective is to understand how universities have progressed in tandem with these industrial movements. Additionally, the changing role of universities during these revolutions will be explored, providing insights into their evolving functions and significance.

According to Penprase (2018), the aftermath of the First Industrial Revolution witnessed the emergence of a new vision for curriculum, characterized by increased diversification of degree programs and the introduction of innovative general education initiatives aimed at providing students with a broader range of elective courses. This paradigm shift in education, often referred to as "The New Education" by Harvard President Charles W. Eliot (OECD, 2013), marked a departure from the prevailing classical education system, as eloquently outlined in the Yale Report of 1828 (Penprase, 2018). This transformative shift in educational philosophy was significantly influenced by the infusion of the German university model, particularly in the realm of postgraduate research. Consequently, the United States witnessed the establishment of numerous research universities, and this model of graduate education reverberated not only within the US but also across the globe.

The Second Industrial Revolution, spanning from 1860 to 1900, was characterized by the emergence of new manufacturing technologies powered by electricity (Tan, 2013). This transformative period gave rise to what has been described

as the "new economy" (Levin, 2010), bringing about significant changes in various sectors. During this time, there was notable progress in access to universities and the proliferation of diverse higher education institutions in Europe and the United States, as highlighted in a study on the global flow of tertiary-level students by the UNESCO Institute for Statistics (2016). The advent of strong new technologies played a crucial role in facilitating the establishment and rapid growth of the higher education sector. In fact, according to the UNESCO Institute for Statistics (2016), the first two industrial revolutions in the United States saw the establishment of numerous innovative educational institutions, funded both publicly and privately. The Morrill Act of 1862, enacted amidst the American Civil War and at the onset of the Second Industrial Revolution, aimed to expand educational opportunities for the working classes and ensure higher education accessibility for all, particularly those from laboring backgrounds (Penprase, 2018).

According to Bourdieu and Richardson (1986), the establishment of universities during this period was driven by the objective of producing a continuous supply of skilled technicians and engineers who could contribute to the practical aspects of life. Penprase (2018) provides examples in the fields of agriculture and mechanic arts, highlighting how institutions like Stanford University (1885) and the University of Chicago (1890) were made possible through private philanthropy, fueled by the substantial revenues generated by emerging industries such as railways, oil, and steel. Furthermore, a multitude of smaller colleges, including Pomona College (1887), the University of Southern California (1880), and Throop College (1893), which later became Caltech, were also founded during this period. These institutions emerged in the decades following the onset of the Second Industrial Revolution, with social and economic advancements playing a significant role in their establishment towards the end of the nineteenth century. Interestingly, the majority of these newly established universities were coeducational and contributed to the greater involvement of women in both industrial and academic realms.

According to Penprase (2018), it is crucial to acknowledge that the societal and educational transformations brought about by the industrial revolutions are intertwined with various factors, including economic cycles and significant geopolitical shifts of the time. These include the westward expansion and growth of the United States, the industrial advancements of Japan and Germany, as well as the profound impact of global conflicts, which disrupted economic activities while fostering the development

of science and technology. In the aftermath of the first two industrial revolutions, a notable surge in the establishment of new higher education institutions, equipped with innovative curricula, played a pivotal role in providing the managerial and technical expertise necessary to harness the sustained economic growth and industrialization that characterized the twentieth century. Subsequent significant changes in the higher education landscape of the United States following World War II further accelerated this progress, facilitating the culmination of the societal transformations initiated by the preceding industrial revolutions.

According to Penprase (2018), the Third Industrial Revolution, characterized by the advent of computerization and web-based connectivity in the 1980s and 1990s, has begun to manifest its impact on society, politics, economics, and education, drawing on historical evidence. The proliferation of digital technology has facilitated increased diversity on university campuses and accelerated the globalization of academic research, making the expansion of access to higher education even more crucial during this transformative period.

According to Penprase (2018), a significant development resulting from the Third Industrial Revolution was the advancement of online education, which reached its peak around 2012. Massive Open Online Courses (MOOCs) emerged as a promising alternative to traditional formal higher education, aiming to increase access to higher education for millions of previously underserved students worldwide. Furthermore, the transformation of higher education through online classes is an ongoing process, with a growing emphasis on integrating high-quality, synchronous, in-person learning environments with digital technologies. This hybrid approach enables students to acquire knowledge and skills asynchronously, facilitating a more efficient learning experience.

According to Penprase, both liberal arts and research universities have demonstrated increased efficiency in delivering lectures to students from diverse backgrounds by embracing online and technologically enhanced teaching methods, thereby opening their campuses to a globalized academic community. A noteworthy trend is the collaboration among small liberal arts colleges, leveraging digital technologies to enhance traditional in-class education through online synchronous or asynchronous courses and incorporating social media tools in subjects like mathematics and languages. The Liberal Arts Consortium for Online Learning (LACOL) serves as an example of this collaborative effort, where leading liberal arts

universities in the United States are exploring the application of these technologies (Huang, 2007). Additionally, UNESCO/Council of Europe (2001) highlights the partnership between online education firms like Coursera and EdX with larger universities to develop innovative and interactive structures for online courses. This collaboration has resulted in the creation of numerous micro-credentials that can be stacked, linking multiple online courses with in-person faculty consultations and opportunities for students to engage in significant original capstone projects (Penprase, 2018).

According to Mishra (2012), educational strategies pertaining to the Fourth Industrial Revolution should build upon the advancements of the Third Industrial Revolution, which witnessed the rapid growth of hybrid/online and in-person education, as well as the seamless integration of synchronous digital classes and a diverse range of asynchronous educational materials. The adoption of blended or hybrid teaching methods and the enhancement of online and flipped courses are expected to create a more effective learning environment that caters to the diverse needs of students. In fact, MIT's Future of Education Report emphasizes the importance of leveraging online courses to enhance residential education for undergraduate students, offering greater course flexibility and modularity.

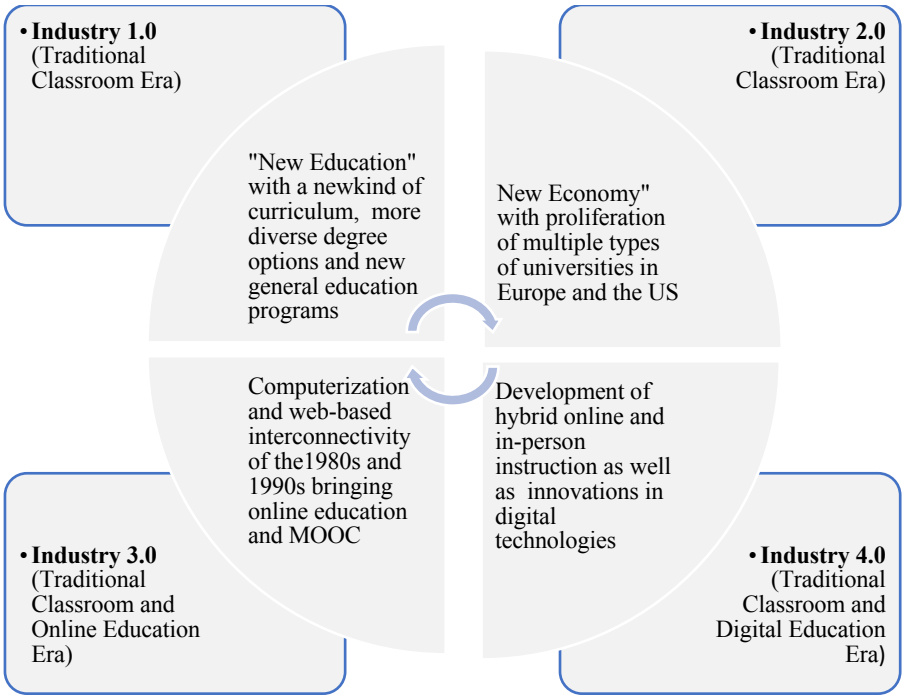


Figure 2.1 Higher education during the industrial revolutions Ref: Levin, R. C. (2010). The rise of Asia's universities. *Foreign Affairs (May/June)*. Mishra, A. (2012). China has become preferred destination for medical education. *University World News, Global Edition*, *238*. OECD. (2013). Education Indicators in Focus–2013/05 (July). UNESCO Institute for Statistics. (2016). *Global flow of tertiary-level students*. UNESCO Institute for Statistics. https://uis.unesco.org/en/uis-student-flow. Penprase, B. E. (2018). The fourth industrial revolution and higher education. *Higher education in the era of the fourth industrial revolution*, *10*, 978-981.

At this juncture, Banerjee (2015) highlights Harvard's highly popular CS 50 course as a prime example of an effective hybrid learning environment. Meanwhile, Bharti (2015) focuses on MIT's Introduction to Electrical Engineering course, which supplies instructional material solely online and reserves in-person sessions for laboratory and maker space activities, allowing students to construct and test robots. Additionally, the MIT Circuits and Electronics class has been offered as an online lecture for residential students, who have found the course to be less stressful and have appreciated the convenience of scheduling as well as prompt feedback on their coursework. Undoubtedly, the first three industrial revolutions have instigated profound societal, economic, and educational transformations, resulting in substantial curricular innovation and the establishment of new universities.

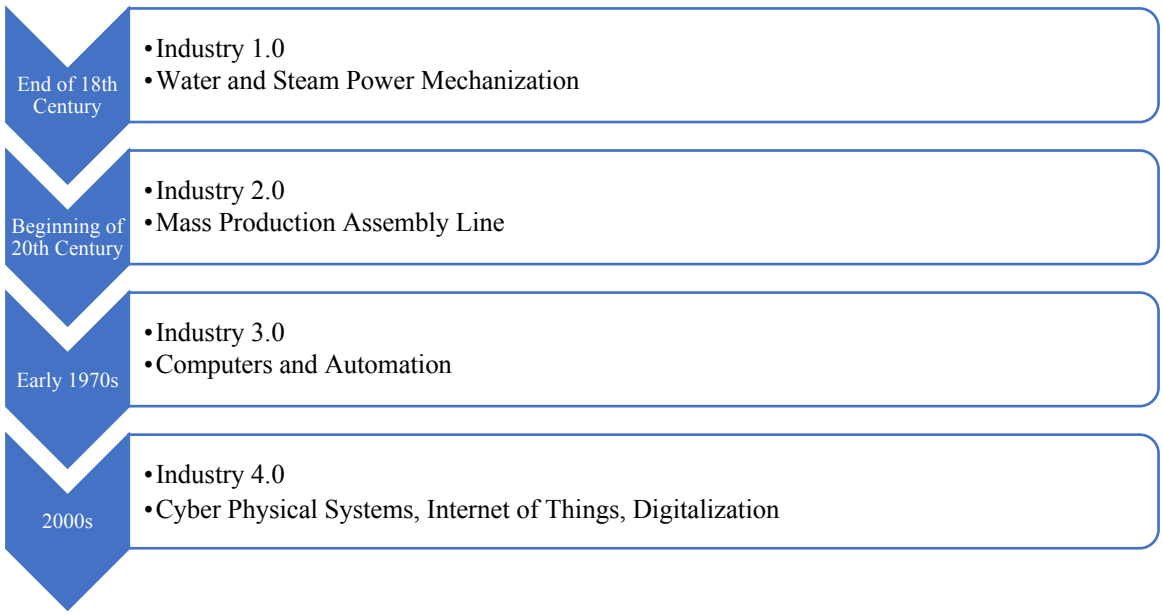


Figure 2.2 Evolution of industrial revolutions

Penprase (2018) highlights that unlike the earlier industrial revolutions, the 4th Industrial Revolution is distinctively characterized by the compounding effects of various technologies, which possess the capacity for exponential growth in scale and simultaneous decreases in cost. This rapid and dynamic technological advancement necessitates a more agile response from the education sector compared to the slower

pace of societal growth and subsequent actions of educational institutions observed during previous industrial revolutions.

Baygin et al. (2016) argues that throughout history, significant technological advancements have taken place, particularly within the realm of industry. These advancements have led to the emergence of industrial revolutions, enabling humans to play a central role in the production process. In light of this, the implications of the fourth industrial revolution, also known as Industry 4.0, on production are of utmost importance. In order to effectively adapt to this new era, it becomes crucial to educate and train qualified human resources. Consequently, the influence of Industry 4.0 on higher education is inevitable, as it demands the development of educational programs and strategies that align with the requirements of this transformative age.

Accordingly, this chapter aims to analyze the impact of industrial revolutions on higher education institutions, shedding light on the evolutionary progression of university generations in conjunction with these significant historical shifts. The subsequent chapter will delve into a comprehensive exploration of the historical evolution of university generations, providing a detailed examination of their development over time.

CHAPTER 3

3. HISTORICAL EVOLUTIONS OF UNIVERSITIES

The concept of higher education and the evolution of its main actors, namely universities, have been extensively discussed, encompassing a historical period that dates back to ancient times. The emergence of higher education, its historical background, its gradual development, and its significant impact on humanity, leading to its esteemed status, all contribute to a continuous process of historical evolution. The concept of the university has evolved over time, progressing from 1.0 with a focus on teaching, to 2.0 incorporating research, advancing to 3.0 with the establishment of university-industry partnerships, and embracing 4.0 through the digital transformation. Anticipating a promising future, the paradigm of 5.0 envisions a fully digitalized university. Therefore, the purpose of this chapter is to explore the periods in which university generations have grown under these influential circumstances. The objective is to examine the reflections of these determinants on the current and future structure of universities. The chapter begins with an introductory overview, followed by an examination of the First Generation (University 1.0): Universities as Information Transfer Centers. Subsequently, the Second Generation (University 2.0): Universities as Information Transfer and Research Centers is discussed. This is followed by an analysis of the Third Generation (University 3.0): Universities as Information Transfer, Research, and Application (University-Industry) Centers. Next, the Fourth Generation (University 4.0): Digitalized University is highlighted. Finally, the study emphasizes the main goal of University 5.0, which envisions a concept of a pure Digital University in the future, expected to materialize after the 2030s.

Ellis (2020) argues that the study of higher education and learning throughout history involves a comprehensive examination of global perspectives, starting with ancient civilizations and continuing through the Middle Ages, Renaissance, Enlightenment

and key developments in higher education in the modern era Finish. While the focus is mainly on the development of the European university concept and its global reach, the importance of other forms of higher education is also recognized. Particular emphasis is placed on the role and importance of learned societies and colleges as centers of funding for education and research in the late eighteenth and nineteenth centuries. Furthermore, Ellis (2020) highlights the influence of the post-World War II period, in which the growing importance of the research university shaped the historiography of higher education and gave the university a prominence as an institution.

Doğramacı (2012) argues that the history of higher education can be traced back to various educational institutions and centers of learning established in different parts of the world. For instance, the schools established by the Han Dynasty in China, the museum and library in Alexandria, the Nizamiye Madrasa in Baghdad, and the Double Madrasa in Kayseri and Konya in Turkey, such as the Karatay Madrasa and the Double Minaret Madrasa in Erzurum, all played significant roles in the development of higher education. Furthermore, the establishment of renowned universities in Europe, including the Universities of Bologna, Paris, and Oxford, during the 11th and 12th centuries, marked a pivotal period in the emergence of modern university structures.

According to Perkin (2007), higher education institutions have been a necessity in developed civilizations to educate their elites in matters of administration. However, the concept of a university, as an institution of higher learning encompassing teaching and scientific inquiry, and characterized by academic freedom and corporate autonomy, emerged in medieval Europe. It was during this period that universities became distinct entities with their own structures and values, providing a platform for intellectual exploration and advancement. The establishment of universities in medieval Europe marked a significant milestone in the evolution of higher education.

Perkin (2007) further argues that various civilizations throughout history, such as imperial China, medieval India, Islamic societies, pre-Columbian America, and feudal Japan, had educational institutions designed to train individuals for specific roles within their respective political or religious systems. These institutions, such as Confucian schools, Hindu gurukulas, Buddhist vihares, madrasas, Aztec and Inca temple schools, and Tokugawa han schools, focused on imparting high culture, doctrine, and specific skills to their students, be it in the realms of literature, mathematics, or religious practices. However, Perkin suggests that these educational

systems often offered limited opportunities for critical thinking, questioning, or independent analysis.

According to Perkin (2007), a comparable assertion can be put forth in relation to the monastic schools that existed during the early medieval era in Europe. These schools played a crucial role in safeguarding biblical studies and classical education during the time period that spanned from the decline of the Roman Empire to the 12th century Renaissance. The ancient Greek athenaeums and lyceums also possessed certain similarities to the medieval European university. For instance, they fostered speculative thinking and challenged established power structures. However, unlike universities, these ancient Greek institutions lacked the organizational framework that contributed to the enduring existence and institutional stability of universities.

At this juncture, Perkin (2007) underscores that since the 12th century, a distinct and enduring institution of higher education has emerged and persisted primarily in Europe, assuming various forms throughout history. Initially conceived as a cosmopolitan setting, where scholars from diverse regions of Christian Europe could convene and communicate in Latin, this institution has not only withstood the test of time but also adapted to a multitude of social and political contexts. Its resilience is evident in its ability to transcend the original cosmopolitan environment and successfully navigate through changing societal and political systems.

After playing a significant role in dismantling the hierarchical structures of the medieval era, universities underwent a process of nationalization within emerging nation states during the religious conflicts between Protestants and Catholics. During this period, universities became instrumental in propagating the ideologies of warring factions. Subsequently, the rise of the Scientific Revolution, social sciences, and new philosophies during the 18th-century Enlightenment partially diminished the influence of universities, posing a risk of their potential decline. In fact, as Perkin (2007) highlights, the French Revolution abolished universities in France and its conquered territories, only to revive them in the form of grandes écoles and the Napoleonic University of France.

Simultaneously, traditional universities, often referred to as old school universities, experienced a revival in Scotland. Moreover, a novel institutional model emerged in Germany, where teaching and research were integrated, and subsequently spread throughout Europe, the United States, and Japan. This reimagined university structure effectively responded to the demands of the Industrial Revolution,

successfully adapting to the needs of the evolving society. As Perkin (2007) suggests, although the adjustment came relatively late, the university system demonstrated remarkable resilience and became aligned with the requirements of the era.

During the same era, the colonization efforts of European powers, particularly Spain in the 16th century, and later Britain and France in the 17th century, led to the establishment of universities in other continents. These universities were introduced to regions such as America, India, Africa, Australia, New Zealand, China, the Middle East, and Japan. This expansion of universities served as a means of promoting Western modernization and was influenced by nationalist ideologies as well as the anti-colonial sentiment that emerged in response to Western dominance in Asia and Africa (Perkin, 2007).

Perkin (2007) concludes that in the aftermath of World War II, higher education experienced a global surge, leading to its reemergence as the central institution in a new type of society. This post-industrial or professional society witnessed the remarkable advancements in manufacturing and agriculture, partially attributable to the scientific research conducted by universities, technical colleges, and research centers. Consequently, a significant portion of the population shifted towards the service sector, necessitating specialized and high-level training.

According to Aktan (2007), the 1980s marked a shift towards privatization and free-market economy, coinciding with the collapse of the Soviet Union and the Warsaw Pact. This era, epitomized by leaders such as Reagan and Thatcher, witnessed a transition from the expectation that the state would provide goods and services to a new belief in the efficacy of free-market mechanisms between individuals and governments on a global scale. This transformation has also affected the field of education, particularly higher education, which has increasingly been seen as a quasi-public service. As a result, private sector organizations have emerged as providers of tertiary education services across various regions of the world.

In the 21st century, private universities have become major players in the rapidly expanding and highly dynamic business sector. This trend can be attributed to an unprecedented demand for higher education, coupled with governments' inability or unwillingness to provide adequate support. As a result, private higher education has taken center stage (Erguvan, 2013). Altbach further explains the prevalence of private higher education in countries like Japan, Taiwan, South Korea, and the Philippines, where private institutions have historically been at the forefront of the education

systems. Latin America has also experienced a significant shift from state-funded to private universities, with at least half of the students in Mexico, Brazil, and Colombia now attending private colleges. Furthermore, many countries in Central and Eastern Europe, as well as the former Soviet Union, have witnessed the rise of private higher education institutions, which have greatly enriched their educational landscapes.

Wissema (2009) describes the development of the university from a historical perspective, distinguishing three distinct generations: the medieval university, followed by the research university (Humboldt University), and finally the emergence of the high-tech, science-technology-driven entrepreneurial university . In particular, the COVID-19 pandemic has been a catalyst for a digital revolution in science and higher education (Strielkowski, 2020).

As highlighted by Akhmetshin et al. (2021), humanity is entering a new phase in the development of academia and higher education, which will give rise to the fourth generation of online and digital universities. These digitalized universities are characterized by providing hybrid education, leveraging the advancements in digital technologies. Moreover, it is anticipated that by the 2030s, the pure digital university will have a significant presence in the global market, marking the advent of the fifth generation.

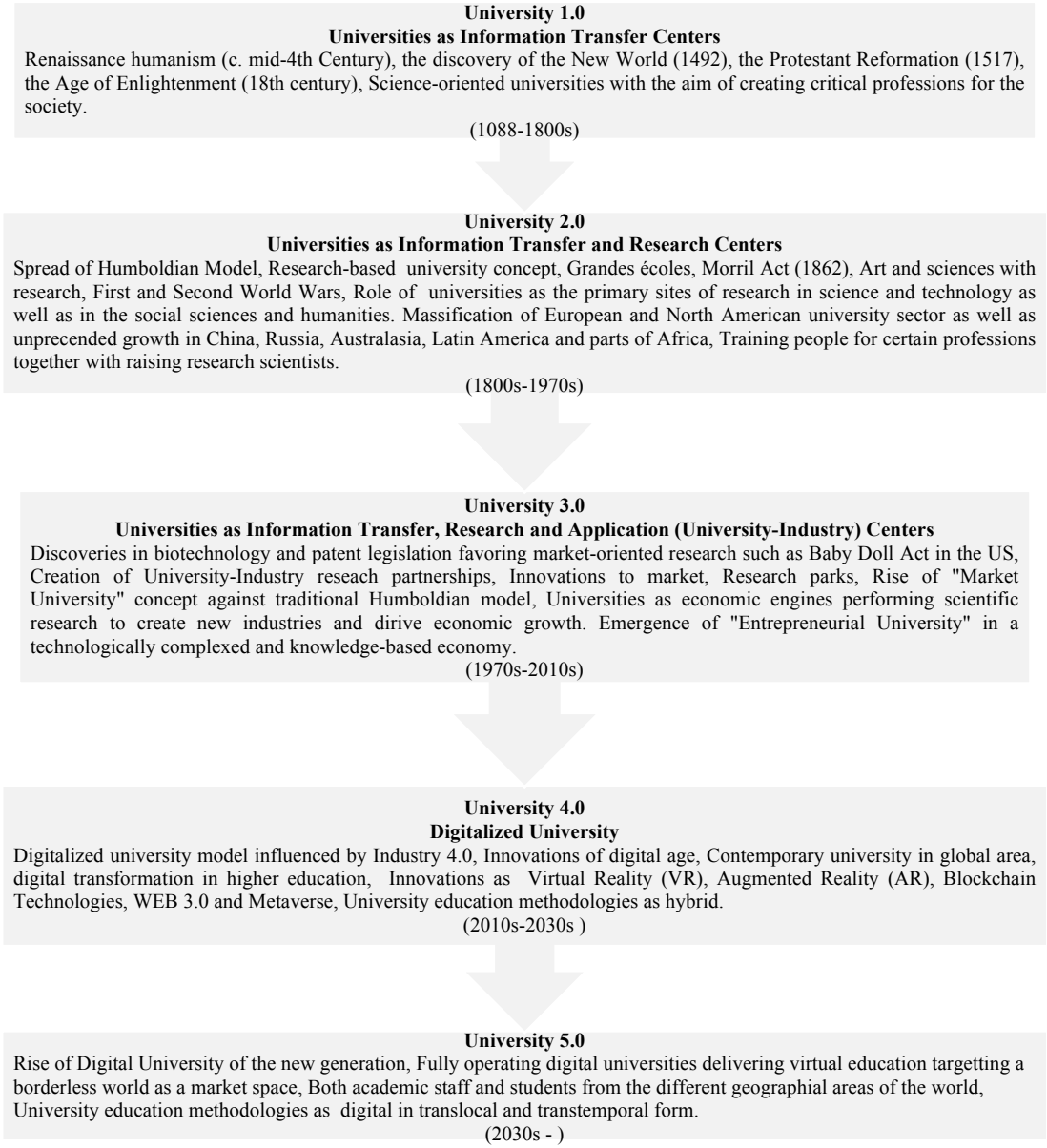


Figure 3.1 Five generation of universities

3.1 First Generation Universities (University 1.0)

During the Classical Period, the first generation of universities emerged as centers of knowledge and information. The University of Bologna, established in 1088, holds historical significance as the precursor of European universities, characterized by its corporate structure. Similarly, the University of Paris, founded in 1208, is recognized as one of the earliest universities where students and professors from various disciplines converged.

The origins of medieval universities can be traced back to the schools of the Roman Catholic Church. These institutions were primarily established with the purpose of training professionals, conducting scientific research, contributing to societal improvement, and fostering critical thinking. Throughout their development, external factors played a significant role in shaping the universities' curricula. The emergence of Renaissance humanism in the mid-14th century, the discovery of America in 1492, the Protestant Reformation led by Martin Luther in 1517, the Age of Enlightenment in the 18th century, and the political revolutions, particularly the French Revolution in 1789, all had an impact on university education. These events influenced the evolution of university curricula, placing increased emphasis on human rights and international law.

As Gacar (2016) explains from a historical perspective, the establishment of the first university in the United States occurred 548 years after the founding of its European counterparts. Harvard University, established in 1636, holds the distinction of being the first university in the United States. Subsequently, the Collegiate School of Connecticut, founded in 1701, underwent a transformation and became Yale University. Another significant development took place in 1740 with the establishment of the University of Pennsylvania, which owes much of its creation to the influential efforts of Benjamin Franklin.

Indeed, according to Rashdall (1936) and Lowe and Yasuhara (2016), the university, as a distinct institution, is inherently tied to the historical context of medieval Europe and is characterized by its specific spatial and temporal existence.

The development of higher education in Europe was thus strongly influenced by the interrelationships of knowledge and ancient practice. The school system's curriculum, consisting of Triads (Grammar, Logic, and Rhetoric) and Quadratics (Arithmetic, Geometry, Music, and Astronomy), draws heavily on the rich knowledge of ancient Greek and Arabic scholarship that gave rise to the dominant sexual influence. The University of Medieval Europe" (Ellis, 2020).

3.2 Second Generation Universities (University 2.0)

European universities in the 19th and 20th centuries shifted their focus towards research and scientific pursuits, which played a significant role in shaping the modern concept of a university. During this period, their philosophies and institutional

structures were designed to prioritize and advance research endeavors, thereby shaping the trajectory of higher education institutions as we know them today.

Anderson (2004) argues that the University of Berlin, founded in 1810 with the support of Wilhelm von Humboldt, is widely regarded as the starting point of the modern university. However, the basic elements of the research university model had emerged in Prussia and Hanover long before 1789. Ellis (2020) argues that Göttingen's development of linguistics, which focuses on the critical study of language and classical literature, played a particularly important role. Göttingen is considered the birthplace of science, and the scientific body of knowledge forms the basis of the modern research university. On the other hand, Anderson (2004) points out that second-generation universities are often associated with the Humboldt university model developed by Wilhelm von Humboldt. During the Prussian Reformation, Humboldt attracted an increasingly educated middle class to support his ideas for a comprehensive education system.

Berman (2012) believes that the concept of higher education emerged in the early 19th century, and its central idea is the overall integration of research and learning. The model seeks to bring together the fields of art, science, and research to advance not only general common sense but also cultural understanding. In fact, several elements of the Humboldt model had a major impact on the emergence of the concept of the research university and also influenced the American model. Beginning with the University of Virginia and continuing to Johns Hopkins University, American universities were among the first to adopt various German educational and scientific principles that were widely recognized as valid in the 20th century.

Geiger (2004) asserts that the principles underlying the concept of the research-based university had a profound impact not only in Germany but also internationally. The higher education systems across central, northern, and eastern Europe were heavily influenced by the ideals of the Humboldtian University, which emerged as a strong competitor to the post-Revolutionary French grandes écoles. Universities adopting the Humboldtian model provided students with the opportunity to tackle complex and challenging issues, leading to significant scientific breakthroughs that have had notable economic benefits.

According to Ellis (2020), the concept of academic independence was fostered within a framework of strict state control in Prussia. The model of the research university gradually expanded across the Protestant states of Germany before making

its way to the Catholic regions. Throughout the nineteenth century, it gained influence in northern, eastern, and southern Europe, including Scandinavia, Russia, and Greece. Subsequently, the model reached the United States, Britain, and finally France. As argued by Clark (2008), the German research university played a crucial role in disseminating European science and scholarship on a global scale.

According to Anderson (2004), the evolution of the university concept in the 19th century and its relevance to the differentiated roles of teaching and research, as well as the characteristic features of national higher education systems, remain significant today. This can be attributed to various factors, including the Enlightenment, the reorganization of universities under Napoleon's policies following the French Revolution of 1789, and notably, the influential Humboldtian model developed in Germany. While the Enlightenment is often credited with transforming universities in England and France, its impact on other nations should be examined more closely. In countries like Scotland, Italy, and Holland, for instance, it was university professors who played a key role in developing and teaching enlightened principles.

At this juncture, Anderson (2004) asserts that the universities in France were abolished in 1793 as the French Revolution of 1789 brought an end to attempts to reform them. The renaissance of higher education began with the establishment of law schools and medical schools in 1795, but major changes did not come until Napoleon's time. Founded in 1808 as a centralized, secular state institution with several faculties, the Napoleonic University was not reinstated as an independent entity. The Napoleonic system was characterized by an emphasis on vocational training, the transfer of general literature and science education to secondary schools, the separation of teaching and research, and a differentiated system of respected higher education institutions, including the Ecole Normale Supérieure and the Polytechnique. In Paris, higher schools and research institutes are concentrated. Thus, after Napoleon's military victories, this highly centralized state model of education continued to exert influence in the conquered territories of Europe after 1815.

Anderson (2004) emphasizes that the University of Berlin, founded in 1810 through the major effort of Wilhelm von Humboldt, is widely regarded as the model university of the nineteenth century. However, it is worth noting that the German higher education system developed through innovations around 1810. Key features of the German system include the integration of teaching and research, the emphasis on

higher education in philosophy departments, the freedom of study (Lernfreiheit) for students (in contrast to the rigid curriculum of the French system), and the educational ideals of the Germans. New Humanism's reverence for ancient Greece, the incorporation of autonomy in universities despite government funding, and the concept of academic freedom.

Prominent intellectuals such as Fichte, Schleiermacher, and notably Humboldt played crucial roles as reformers in Prussia, with Berlin University emerging as the epicenter of the national cultural revival. Undoubtedly, the influence of the German model was strongly felt in Central, Eastern, and Northern Europe.

According to Mammadov and Aypay (2020), the concept of research universities also emerged in the United States, where they are recognized as valuable assets for achieving economic growth and national objectives. Research universities prioritize research as a central part of their mission, often described as research-based or research-intensive institutions. The proliferation of research universities is not a coincidence but rather a result of long-term federal and state policies. A significant milestone in the development of research universities in the United States was the signing of the Morrill Act by the federal government in 1862, which conferred substantial power to universities in the modern economy of the 20th century. It was during this period that the foundations of today's research universities in the United States were laid. Johns Hopkins University, established in 1876, is widely recognized as the pioneering research university in the country. In addition to knowledge production and advanced graduate education, research universities in the United States play a crucial role in serving the public interest and acting as primary sources of information. In the knowledge-based economy of the 21st century, research universities have emerged as key institutions in the global information society.

Mammadov and Aypay (2020) further argue that leading up to World War I, there was a simultaneous rise in global scientific collaboration and international tensions. The devastating effects of the war resulted in the dismantling of the existing university systems, and their previous international character was never fully restored. While it is important to acknowledge the shortcomings of the pre-1914 universities, they still stand as significant achievements of bourgeois and liberal culture.

3.3 Third Generation Universities (University 3.0)

According to Powell et al. (2017), as university-trained scientists proved their worth during World War I and World War II, universities served as major research centers in various fields including science and technology, social sciences, and humanities Institutional awareness is enhanced. Furthermore, in countries around the world, universities are widely recognized as key institutions for developing future leaders. The postwar period saw remarkable growth and progress in the university sector in North America and Europe, as well as in China, Australia, Russia, Latin America and parts of Africa.

According to Niinikoski (2011), the 1970s witnessed advancements in biotechnology and the implementation of patent legislation, such as the Bayh-Dole Act in 1980 in the US, which favored market-oriented research. These developments marked the beginning of research collaborations between industry and higher education institutions, aiming to facilitate the rapid and significant commercialization of innovations. Interestingly, similar collaborations in the United States, like the Stanford Research Park, can be traced back to the post-World War II era. Following the recommendations of the OECD, a similar trend emerged in industrialized nations worldwide (Niinikoski, 2011). However, it is important to note that this shift towards the market-driven university as an economic engine, which originated in the US, diverges from the principles espoused by Humboldt (Berman, 2011).

According to Berman (2011), the conflicting approaches of the Humboldtian tradition and the market-driven idealism in higher education have led to significant consequences in the last decades of the 20th and early 21st centuries. In his book, Creating the Market University, Berman (2011) examines the reasons behind the dramatic shift of academic science towards the market. He highlights that universities in the United States now function as economic catalysts by conducting scientific research that leads to the creation of new industries, fosters economic growth, and maintains the nation's global competitiveness. However, it is important to note that just a few decades ago, these same universities maintained a distinct separation from the business world. Undoubtedly, innovation has played a pivotal role in this transformation.

According to Berman (2011), the elevation of inventors to the status of heroes has a long history in American society. However, neither governments nor economists

paid much attention to the critical economic role of innovation until the 1960s and 1970s. The late 1970s saw a confluence of factors, including industry concerns about the decline in America's ability to innovate, a growing number of economic research institutions emphasizing the importance of innovation, secular economic stagnation, and broad political interest. Promote invention. This change has affected policy areas as diverse as patents, taxation, pensions and science policy, and has led to approaches that emphasize the economic importance of academic science. In the early 1980s, the University played a major role in the rapid expansion of patent applications, biotechnology entrepreneurship and the university's industrial research centers.

In fact, the Bayh-Dole Act passed in 1980 in the United States put university technology transfer activities at the forefront of innovation efforts (Link & Scott, 2017). Existing literature focuses on general trends in patenting activity and how universities are responding to the law (Nelson, 2001; Hall, 2004; Mowery & Sampat, 2004) and the establishment and functioning of university technology transfer offices (Siegel et al., 2003).

Additionally, Link (2002) highlights the significant contribution of university research parks to the national innovation system in the United States, warranting special attention to these areas. Research parks facilitate the exchange of information between universities and tenant companies, stimulate regional economic development, and enhance market competitiveness.

Bok (2009) presents a thought-provoking perspective by asserting that 'everything in a university is for sale if the price is right,' examining the increasing commercialization of American universities in the context of a technologically complex, knowledge-based economy. Building upon this argument, Leyva (2021) contends that over the past four decades, the neoliberal paradigm, which places emphasis on marketization, commodification, and the utilitarian value of higher education and research, has been widely implemented and exerted significant influence.

In their study, Macheridis et al. (2020) explore how university instructors at two Swedish higher education institutions navigate the challenge of bridging the gap between research and instruction. The authors examine the incorporation of skills-oriented vocational training within the instructional framework, which may or may not align with the traditional Humboldtian approach that emphasizes research-based

teaching. This divergence can be attributed to the increasing pressure in higher education to enhance graduates' employability.

Feola et al. (2021) introduce the concept of an entrepreneurial university model and highlight the pivotal role that universities have played in driving science- and technology-focused economic growth in recent years. Drawing on Etzkowitz's (1993) framework, the entrepreneurial university model expands the conventional missions of education and research by incorporating a third purpose: contributing to economic growth through the transfer of research findings from the laboratory to the economic system.

From an economic growth perspective, Algieri et al. (2013) emphasize the significance of the relationship between industry and universities in shaping countries' economic development policies. Several studies have shown a close association between universities' research investments and innovative efforts, and the economic development of specific regions. The strong linkages between universities and a country's manufacturing system facilitate technology transfer and the commercialization of research discoveries.

Çiftçi (2010) acknowledges the global expansion of universities, characterized by academic staff and student mobility, international investments, and competitive pressures. This changing landscape has necessitated a transformation in the role of universities to ensure their survival. Many universities have shifted away from the traditional focus on education and research and have embraced an entrepreneurial and value-creating role. Çiftçi (2010) refers to these universities as third-generation universities, highlighting their entrepreneurial identity. In contrast, first-generation universities were primarily science-oriented institutions focused on cultivating critical professions, while second-generation universities combined professional education with research training. Third-generation universities provide an environment conducive to entrepreneurial objectives.

3.4 Fourth Generation Universities (University 4.0)

According to Moşteanu (2021), universities are institutions of higher education where human capital is developed through processes such as instruction, learning, research, and innovation. In the age of digital transformation, the transition to a digitalized university has become advantageous for the overall economy. Investing in

the development of human capital is considered a sensible and sustainable approach to promote economic progress.

Patomäki (2019) asserts that the purpose of modern universities has been redefined globally in terms of success in global competition. The concept of University 4.0 or the digitalized university model has emerged as universities strive to adapt to the demands of Industry 4.0, which influences the required knowledge and skills of human capital. The transformation to University 4.0 is crucial for universities to graduate qualified human resources.

In their article on World-Class University in the Era of Digitalization, Pavlov and Zashchitina (2020) explore the trends and possibilities for universities to attain leading positions in national and global rankings. They emphasize the significance of digitalization, which has been the most significant development in higher education since 2020. The evaluation criteria used by top international and national rankings, evolving models for building top-tier universities, the role of digital transformation in higher education, and an analysis of existing trajectories and internships at top-tier universities in the field of digitalization are discussed as immediate concerns.

Digital transformation is a sustainable reality of our time. Mystakidis (2022) mentioned that breakthroughs such as virtual reality (VR), augmented reality (AR), blockchain technology, and Web 3.0 have paved the way for the emergence of virtual universes. Metaverse is a post-reality universe that merges physical reality with digital virtuality, solving the limitations of traditional web-based 2D e-learning technology in online distance learning.

Leading technology and software companies like Facebook and Microsoft view Metaverse as the future of the internet and invest substantial amounts of money in this domain. For instance, Facebook's acquisition of Oculus for $2 billion in 2014 and its employment of thousands of engineers for metaverse investments are well-known examples. While virtual and augmented reality technologies are currently prevalent in gaming and entertainment industries, it is predicted that the field of education will undergo a significant digital transformation with the adoption of Metaverse.

In a recent study conducted by Braud et al. (2022, March) at The Hong Kong University of Science and Technology's Center for Metaverse and Computational Creativity, a comprehensive framework is put forth for the advancement of an augmented reality (AR) campus metaverse. Through an evaluation of different environments and currently available sensing platforms, the researchers effectively

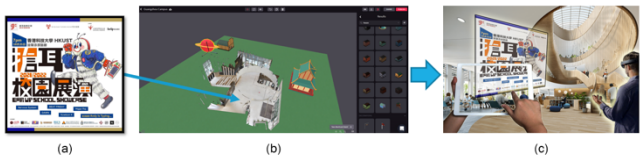
showcase the practicality of implementing a campus-wide AR metaverse. This groundbreaking research sets the foundation for the eventual creation of a metaverse specifically tailored to their university campus.

(a) Art and Exhibitions (b) IoT Data Visualization (c) Situated Navigation

Figure 3.2 Example applications on an AR campus metaverse. Reference: Braud, T., Fernández, C. B., & Hui, P. (2022, March). Scaling-up AR: University Campus as a Physical-Digital Metaverse. In *2022 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)* (pp. 169-175). IEEE.

(a) Outdoor b) Large Indoor (c) Distinctive Indoor (d) Transitional (e) Viewpoint

Figure 3.3 Primary environments on the university campus. Reference: Braud, T., Fernández, C. B., & Hui, P. (2022, March). Scaling-up AR: University Campus as a Physical-Digital Metaverse. In *2022 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)* (pp. 169-175). IEEE.



(a) (b) (c)

Virtual content (a) is placed within the global world model through the external content editor (b) to be displayed in AR (c)

Figure 3.4 Content edition for AR metaverse. Reference: Braud, T., Fernández, C. B., & Hui, P. (2022, March). Scaling-up AR: University Campus as a Physical-Digital Metaverse. In *2022 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)* (pp. 169-175). IEEE.

3.5 Fifth Generation Universities (University 5.0)

When reflecting on the four distinct generations of universities throughout history, it becomes necessary to ponder the fundamental objective of higher education in the modern era. Consequently, it is of utmost importance for the future of higher

education to wholeheartedly embrace the revolutionary advancements brought forth by the digital age.

At this juncture, the paradigm of University 5.0 is poised to flourish, driven by the major technological advancements brought about by digital transformations. While the digitalized traditional universities of the University 4.0 generation are experiencing a period of success in the 2020s with hybrid education models that combine digital impact and cater to the changing priorities of Generation Z students, the shift towards a purely digital university and the emergence of the University 5.0 generation are not far off. By the 2030s, digital universities of the University 5.0 generation will be widespread, aiming to target the global market without borders, leveraging innovative circumstances and the influential force of Generation Alpha students.

The digital university, distinct from formal or hybrid education models, will provide education to students from all around the world. The education process will be free from medium constraints as all the content and 3D lectures will be translated in real-time between academics and students. Moreover, group studies and customized programs will enhance student engagement, allowing them to learn by doing.

The concept of the new University 5.0, also known as the digital university, serves as the main subject of this thesis, and a survey was conducted to analyze relevant information.

In conclusion, this chapter examined the emergence and growth factors of five different generations of universities. University 1.0 introduced instruction in the medieval age, followed by the research-oriented University 2.0 in the 19th century. University 3.0 incorporated industry relationships in the 1970s, while the digital transformation of the 21st century gave rise to the digitalized University 4.0. Consequently, a new generation of university, University 5.0, is anticipated to emerge after the 2030s. The following chapter will explore the innovations of the digital age from the perspective of major technological components.

CHAPTER 4

4. INNOVATIONS IN DIGITAL AGE

The concept of innovation has emerged as a prominent feature of the 21st century, transforming various aspects of the business world. Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0, and Metaverse represent contemporary innovative components that have significantly influenced the digitally transformed world. Higher education is not exempt from these changes. As we progress from a digitalized university to a digital university, these cutting-edge software innovations will continue to play a crucial role. This chapter aims to explore the nature, growth, and impact of these innovations on digital transformation, particularly within the realm of higher education. The primary objective is to elucidate the growing influence and transformative power of these tools on the higher education system. Consequently, this chapter will commence with an examination of Virtual Reality, followed by an exploration of Augmented Reality. Subsequently, the focus will shift to Blockchain, followed by an analysis of Web 3.0. Finally, the chapter will conclude with an exploration of the potential of Metaverse.

4.1 Virtual Reality (VR)

In the present era, virtual environments have been created for various purposes, including games and education. Users can access these virtual environments through their computers or smart devices. Typically, these experiences are provided through 2D graphics and visuals, although 3D glasses have also been developed to enhance the viewing experience. However, in all of these experiences, the user remains physically outside the configured virtual system. Today, virtual reality glasses enable users to enter these fictional worlds and actively participate in the game or educational activities. For example, with the Oculus glasses developed by Facebook, students can

receive education in a virtual classroom with participants from all over the world. Notably, Facebook acquired Oculus, a virtual reality gaming startup, for 2 billion dollars as part of its efforts to establish digital universities.

The definition of Virtual Reality (VR) as stated by Zheng et al. (1998) describes it as a sophisticated interface between humans and computers that replicates a lifelike world, granting participants the ability to traverse through a simulated environment. Jaron Lanier, the founder of VPL Research, is credited with coining the term 'virtual reality'. Furthermore, in his 1984 science fiction novel Neuromancer, William Gibson introduced the concept of 'cyberspace', which is regarded as the most advanced manifestation of virtual reality. In cyberspace, data manifests as radiant metropolises. To access cyberspace and navigate its information highways, individuals employ specialized virtual reality equipment, which grants them the physical freedom to move within this synthetic realm.

According to Hodgson et al. (2019), Virtual Reality (VR) and Immersive Virtual Reality (IVR) have gained recognition in the field of education for creating instructional materials in the classroom. Lecturers at universities have high hopes for IVR, as it offers an immersive and three-dimensional experience that can significantly enhance student engagement. These materials can be recorded using 360-degree video and viewed on smartphones equipped with motion-sensored head-mounted displays (HMDs). They can also be accessed on notebook PCs and tablets, providing a more limited VR experience. Furthermore, Patiar et al. (2017) emphasize that VR allows users to visualize environments and objects in two to three dimensions, experience simulated scenarios, explore virtual locations, interact with simulated clients or patients, carry out experiments and procedures, and actively participate within the virtual world.

Patiar et al. (2017) suggest that institutions have adopted three-dimensional and 360° VR video recording as an alternative educational approach. Non-immersive virtual tours incorporating photographs, films, and interviews with key stakeholders can be created to allow students to explore fundamental concepts and practice skills in a course. Furthermore, Chang et al. (2009) argue that students can be immersed in new settings through 360° viewing, even in locations that may be distant, difficult to access, or politically insecure. This allows students to practice procedural processes, examine virtual places up close, and develop new disciplinary concepts. Students can also visit

different areas and witness natural phenomena in various seasons and climates, providing opportunities for field trips and geography education.

According to Choi et al. (2020), virtual reality is a constantly evolving technology that is increasingly being integrated into the teaching and learning process at universities. VR has the potential to transform the teaching process, enhance student learning, and engage students in unprecedented ways.

4.2 Augmented Reality (AR)

Augmented Reality (AR) can be defined as the modification or enhancement of physical reality through computer-generated elements. This experience requires the use of 3D glasses and other related technical equipment. Unlike virtual reality, where the user is fully immersed in a fictional environment, augmented reality intertwines the physical and fictional environments. It enriches the physical environment in real time and allows interaction with physical objects. For example, one can engage in conversations and interact with a holographic image of a person or use AR glasses to view the state of an ancient city 2,000 years ago or examine a hologram model of a product before making a purchase.

Kluge et al. (2022) highlight that extended reality (XR) technology is an emerging instructional tool in the university sector. The future of learning and instruction is believed to lie in virtual/extended reality. Such claims are gaining prominence in the university sector. Extended reality (XR) refers to the coexistence of virtual and real worlds in a unified environment. It facilitates human-machine interaction and encompasses virtual reality (VR), augmented reality (AR), and mixed reality (MR).

4.3 Blockchain

Blockchain is a decentralized technology that ensures a high level of data integrity, immutability, and privacy. In traditional systems, data and transaction records are stored in a centralized manner, where they can be accessed and altered by a central authority. However, this centralized approach poses certain vulnerabilities, such as the risk of irregularities, cyber-attacks, technical malfunctions, data corruption, or loss. Limited backups can be created, but the security of the data relies solely on the

central authority. As a result, incidents like the loss of customer assets due to the seizure and deletion of a bank's information systems, or the deletion of ownership information from the title deed system, can occur.

Blockchain technology provides a reliable system by establishing a network of tens of thousands of computers or more, collectively known as the Blockchain Network. Transactions are verified and records are stored on each computer within the network. Mathematical algorithms are developed to enable computers to perform these tasks and transactions. Blockchain technology finds applications in various areas such as digital currency systems, real estate trading, and supply chain management.

In this network, users engage in operations such as money transfers, real estate transactions, or purchasing goods at a grocery store. These transactions are recorded in a ledger, which is controlled and validated by the Blockchain Network. Once validated, the records are added to the chain of blocks. It is worth noting that the Blockchain Network consists of a large number of computers, and each approved record (block) is stored on all these computers. As a result, unauthorized access and tampering with the system become exceedingly difficult, as a hacker would need to gain control of at least 51% of all the computers in the Blockchain Network.

The blockchain system operates in a decentralized manner, involving thousands of computers that maintain a shared data or transaction ledger. Unlike traditional centralized systems, the records in a blockchain are stored in a distributed structure. The system itself performs the necessary verifications for transaction execution, and any of the participating computers in the network can perform these verifications. This eliminates the need for intermediaries such as banks for money transfers and notaries for vehicle transactions.

The blockchain system eliminates the need for intermediaries by utilizing secure smart contracts. These smart contracts enable direct transactions between parties, without the involvement of intermediaries. All transactions are securely recorded and distributed across the entire network, ensuring transparency and immutability. The terms and conditions specified in the smart contracts are automatically executed by the system. As a result, the reliance on trusted third parties and their services is rendered unnecessary.

According to Raimundo and Rosário (2021), the emergence of blockchain technology in the intersection of information and communication technologies and higher education has marked a significant turning point. Blockchain operates as a

decentralized system, where a network of peer-to-peer computers manages a registry of transactions. This innovative technology has introduced notable advancements in data management mechanisms within the university sector, enhancing efficiency, efficacy, privacy control, technological advancement, and security.

According to Arishi et al. (2018), the initial purpose of blockchain was to serve as a control mechanism for Bitcoin. However, Mitchell et al. (2019) argue that it has since evolved into a technology that is widely recognized as a foundational element for various decentralized applications. Salah and Eldahshan (2020) highlight the usefulness of blockchain as a tool for organizing sensitive data, particularly in sectors such as higher education, healthcare, supply chain, and Internet of Things (IoT). Furthermore, Lam and Dongol (2020) emphasize that higher education can be understood as a system comprising two main actors: students and higher education institutions.

According to Hölbl et al. (2018), the inherent features of document authenticity, transparency, immutability, and trust make blockchain technology a natural fit for the Higher Education (HE) sector. These features also position it as a suitable category for blockchain adoption. Taking this idea further, the authors propose the concept of a global blockchain-based university credit platform, similar to the European Credit Transfer and Accumulation System (ECTS). This platform would facilitate the processing, administration, and monitoring of students' acquired credits from completed courses. It would be utilized by students, universities, and other relevant stakeholders.

Fedorova and Skobleva (2020) emphasize the importance for universities to actively engage with the development and expansion of blockchain technology, as it holds the potential to become a highly effective disruptive innovation. They argue that blockchain technology addresses the challenges faced by both the university system and society at large. The benefits of blockchain technology include decentralized open data, the prevention of fraud, secure information storage, and reduced transaction costs associated with data inspection, control, and validation.

During the second decade of the 21st century, the global education system has undergone significant changes due to the rapid growth of new technologies and the digitalization of the educational sphere. Higher education is not only becoming more accessible to a larger population but also increasingly personalized. According to a study conducted by HolonIQ (2018), a global market intelligence company, education

is expected to face a major challenge due to population growth. By 2035, it is projected that there will be approximately 2.7 billion students globally, compared to the current figure of just over 500 million. The continents of Asia and Africa, where nearly 90 percent of the population is under 30 years old, will contribute significantly to this increase in the number of students. The use of digital technologies is expected to play a vital role in professional education. It is estimated that by 2030, the global education market will reach a value of around 10 trillion US dollars, with K-12 education accounting for 5.5 trillion US dollars and higher education accounting for 2.5 trillion US dollars.

It is evident from the projects and research conducted in the field of blockchain technology in higher education that this innovation has gained significant attention and has made its mark in the educational landscape. Its implementation has transformed the concept of interaction between students and academic staff, making higher education more personalized and accessible. Furthermore, according to Fedorova and Skobleva (2020), there is a growing need for personal strategies focused on lifelong education, and blockchain technology provides the necessary resources for their implementation. However, it is important to note that the introduction of blockchain technology in education may lead to disparities between online and offline learning opportunities. It should be acknowledged that most educational institutions that have adopted blockchain technology are still supplementing traditional forms of instruction with these technologies.

Research in the field of blockchain technology has been rapidly expanding, with technological advancements and solutions serving as catalysts for academic investigations. As highlighted by Fedorova and Skobleva (2020), earlier studies focused on identifying specific applications of blockchain in education. However, there is currently a growing trend towards incorporating a wide range of university services into blockchain initiatives. These initiatives encompass various aspects such as educational process management, storage of degree-related information, administration of scholarships, development and maintenance of student and graduate portfolios, utilization of cryptocurrency transactions, and leveraging the opportunities presented by new pedagogical approaches. The adoption of educational blockchain technologies brings several significant benefits, including the establishment of a unified learning environment, fostering networked communities, facilitating the

sharing of technological and scientific knowledge, and safeguarding the intellectual property rights of network participants.

According to Alam and Benaida (2020), the integration of a creative blockchain-based architecture into the Internet of Things (IoT) platform for the education system holds promise for enhancing effective communication within the 5G network. The Internet of Things has experienced significant growth, particularly in areas such as smart home technologies, intelligent cities, e-Health, e-learning, and distributed intelligence, driven by advancements in 5G technology. However, concerns regarding confidentiality and security persist. In situations where multiple parties need to share data without placing trust in a central authority, blockchain technology offers distinct advantages. Blockchains facilitate secure and automated data exchange, virtually eliminating the possibility of fraud.

According to Haugsbakken and Langseth (2019), blockchain technology represents a significant digital trend that will impact various sectors, including universities. However, universities have traditionally been slow to adopt new digital technologies within their organizational infrastructure. Nevertheless, universities and other higher education institutes (HEIs) enjoy a high level of trust and confidence from the public and society at large. As blockchain technology continues to evolve, it becomes imperative for universities and HEIs to explore its potential implications and adapt to societal shifts in order to leverage its benefits for research and education.

Kamišalić et al. (2019) distinguish two main approaches to implementing blockchain-based solutions in the higher education sector. The first approach is student-centric, where students assume responsibility for their credentials and can share evidence of their achievements directly with stakeholders, eliminating the need for intermediaries in the verification process. The second approach is institution-centric, focusing on facilitating and streamlining various activities of educational institutions, such as payment processes, accreditation procedures, international collaborations, joint degrees, and accreditation of learning goals. The authors emphasize that both approaches face distinct challenges, including organizational, legal, administrative, and data privacy concerns. Their review of existing research on blockchain implementation reveals a growing trend of using blockchain to support organizational processes within educational institutions.

Lizcano et al. (2020) highlight the significance of adopting a blockchain-based approach to establish a trustworthy model for open and ubiquitous higher education.

They emphasize that the current training of the future workforce poses significant challenges to higher education institutions. The knowledge and skills required for this training can be acquired from various formal and informal platforms, channels, and methods. Assessing students' acquired knowledge and skills to enhance their future employability is a complex task. Additionally, the reliance on paper-based academic curricula, the challenges associated with certifying and verifying these documents, and aligning them with actual knowledge necessitate the development of innovative management solutions in higher education.

Guustaaf et al. (2021) propose a Blockchain-based education project that harnesses the capabilities of a jointly distributed and decentralized ledger. They explain that blockchain technology enables the recording of transaction histories across diverse networks, making it highly beneficial for digital certification, record-keeping, and other related aspects in universities. This technology presents a recent opportunity for advancing higher education strategies.

4.4 Web 3.0

From the historical point of view, first, there was Web 1.0. In the 1990s, the Internet began to be made available to people. World Wide Web technology was established, and the first websites were launched, whereby editors started to enter information. At this time, people could access these websites and the information within. However, people were to be only able to read as they could not change or add information themselves.

With the emergence of Web 2.0, characterized by interactive websites and mobile applications, individuals began actively participating in content creation through platforms like Twitter and Facebook. The proliferation of smart devices and mobile applications further facilitated access to information and enabled users to conduct various activities without relying solely on websites. This shift in user behavior had a profound impact on the digital landscape, leading to the decline and eventual disappearance of once-prominent companies like Altavista and Yahoo, who struggled to adapt to the changing dynamics of the online ecosystem.

Web 2.0, as defined by O'Reilly (2007), encompasses web applications that facilitate interactive information sharing, interoperability, and collaboration. Liu et al. (2012) further elaborate that Web 2.0 technology creates a user-centric, social,

customized, interactive, and participatory environment. It empowers users by valuing and trusting the content they generate and distribute. Notably, blogs, wikis, podcasts, virtual environments, and social networks have been widely discussed in the literature as prominent examples of Web 2.0 technologies.

Web 1.0 and Web 2.0 are both characterized by centralized structures, where data and services are accessed through a central server. The administrators of these central servers or systems enforce the rules and regulations governing the platform. Consequently, the publication and modification of data are subject to the permissions granted by the central management. However, the advent of Web 3.0 eliminates the need for a central server. In this new paradigm, individuals will have the ability to exchange information and services directly with each other through the use of smart contracts. This represents a more decentralized and liberal internet, promising faster and more cost-effective access to data. It is important to note that these claims are supported by various scholarly sources.

As Web 3.0 emerges, decentralized applications (dApps) are expected to replace traditional applications, and projects in the realm of augmented reality/virtual reality (AR/VR) supported Metaverse are anticipated to replace conventional websites. Peer-to-peer data transfers will become the norm, eliminating the need for intermediary servers. In the current centralized system, platforms like Twitter host and deliver data, while profiting from it without necessarily compensating the individuals who generate the data. However, in the Web 3.0 era, it is envisioned that individuals who produce data on the internet will have the opportunity to earn income when their data is accessed.

Blockchain technology is envisioned to serve as the foundational infrastructure for Web 3.0. Smart contracts and digital wallets will facilitate data transfers, enabling parties to enter into mutually agreed upon contracts for data exchange. Data producers will have the option to make their valuable information accessible to others by uploading it to a platform and receiving cryptocurrencies in return, which will be deposited into their digital wallets. Additionally, the introduction of semantic networks aims to establish a common language that can be understood by all computers and software, ensuring that data is readable and accessible across different systems. The development of protocols will enable automatic translation of generated data into this universal format. However, it should be noted that interoperability challenges exist in the current landscape, as different software may struggle to detect and interpret

information produced by other software. Efforts are being made to address this issue and establish a universally understood format.

The advent of Web 3.0 is expected to bring about significant changes in our lives, starting with the integration of augmented reality (AR), virtual reality (VR), and Metaverse environments. The successful implementation of this revolution relies on several key factors, including the advancement of communication infrastructures, the adoption of semantic network technology, and the development of Blockchain-based systems and applications. These prerequisites are crucial in paving the way for the seamless integration of Web 3.0 and the realization of its transformative potential.

According to Filipčić (2022), WEB3 is viewed as a collection of enabling technologies that hold the potential to significantly transform various industries, including the realms of research and education. Moreover, Gururaj et al. (2020) assert that individuals are on the cusp of a new digital era known as Web3. With its underlying technology, Blockchain, Web3 has the capacity to revolutionize people's lives, much like the Internet has done over the past two decades.

In the study conducted by Zarrin et al. (2021), blockchain technology is acknowledged as a disruptive innovation that presents a decentralized solution for both communication and transactions. In accordance with this viewpoint, Liu et al. (2021) assert that the decentralized nature of blockchain technology has the potential to bring about significant societal and structural changes. In a centralized platform, the reliance on a regulated database becomes essential in order to provide benefits to users, thus necessitating the presence of a trusted third-party service provider. Conversely, decentralization implies that the database is not dependent on a single organization or administrator, but rather distributed among all participating peers.

Filipčić (2022) claims that WEB3 is an early manifestation of the growing influence of blockchain technology on technological progress, which has already had a significant impact on society and the economy. The potential impact of WEB3 technologies such as blockchain is considered limitless as they can revolutionize various fields including banking (DeFi), law (privacy), research (data sharing) and the emergence of new forms of ownership (NFT).). Recently, there has been increased interest in the use of WEB3 in education and research, with initiatives such as k12crypto and k20educators. While Web1 was limited to tech-savvy individuals, and Web2 posed centralization challenges, Web3 is seen as a catalyst for the development of an inclusive and trusted platform built by people from diverse backgrounds.

4.5 Metaverse

The notion of the metaverse was initially introduced by Neal Stephenson in his novel Snow Crash, which was published in 1992 (Stephenson, 2003). In the novel, the metaverse is portrayed as an imaginary realm. However, with the advancements in Virtual Reality (VR) and Augmented Reality (AR) technologies, digital realms have begun to merge with our own reality. These digital realms encompass a variety of virtual landscapes, such as cities, music venues, commercial hubs, and shopping centers, among others. The term 'metaverse' can be defined as a shared virtual platform that encompasses all of these digital realms, constructing a fictional universe in which these digital environments exist. Through the utilization of VR and AR technologies, individuals can access metaverse platforms, fully immersing themselves in a digital universe and participating in its virtual experiences.

Virtual and augmented reality technologies have primarily found extensive use in the gaming and entertainment industries. However, the concept of the metaverse holds the potential to significantly expand the application areas of these technologies. With the metaverse, individuals will have the ability to create three-dimensional avatars and immerse themselves in a digital universe where they can engage in various activities such as work, education, travel, recreation, shopping, and even symbolic ceremonies like marriages. This digital universe aims to provide users with a wide range of experiences and mimic the functionalities of their physical lives within a virtual environment.

Prominent technology companies, including industry giants like Facebook and Microsoft, perceive the metaverse as the future of the internet and have made substantial investments in this field. For instance, in 2014, Facebook acquired the company Oculus for a significant sum of $2 billion (Solomon, 2014; Greener, 2021). Furthermore, as part of their strategic plans, Facebook has announced its intention to generate 10,000 job opportunities within the European Union over the next five years, specifically to contribute to the development of the metaverse (Reuters, 2021). These substantial investments by technology companies highlight the growing importance and potential of the metaverse in shaping the future of digital experiences and online interactions.

While the concept of the Metaverse has started to make its way into our lives, its full realization and implementation in the envisioned sense will necessitate the

development of numerous new technologies, protocols, innovations, and discoveries. The evolution of the Metaverse will be a gradual process, as various products, services, and capabilities integrate and become widely adopted in a cohesive manner.

At the outset of 2023, the successful implementation of the Metaverse necessitates the establishment of an internet access infrastructure that is currently non-existent, as the existing internet infrastructure was not designed to accommodate an experience of this magnitude. The requirements of the Metaverse surpass those of conventional applications such as video conferencing or video games, demanding a higher level of simultaneous internet access infrastructure. Presently, participation in Digital Worlds is possible within controlled parameters, limited by the constraints of existing technology and communication infrastructure, thus constraining the scale of activities that can be carried out concurrently.

In a recent study by Şentürk et al. (2022) focusing on the Metaverse and its applications in education, it was highlighted that the advancement of virtual reality technology has been made possible by the continuous growth in computational power of computers and the declining cost of production. As a result, virtual reality has witnessed widespread adoption across various sectors, including military and education. The shift towards digital learning during the COVID-19 pandemic in 2020 has further underscored the need for an educational system that fosters interactive engagement between students and teachers. Over time, the incorporation of virtual reality applications in educational research has yielded significant improvements in user experiences. Consequently, the utilization of virtual reality in education has expanded from primary schools to higher education institutions, aiming to enhance the overall learning experience.

As highlighted by Bengoechea and Bell (2022), the metaverse consists of avatars operating within a three-dimensional virtual world, surpassing the boundaries of physical reality. It is conceptualized as a post-reality cosmos, an enduring and interconnected multiuser environment where physical and digital realms coexist. The construction of a metaverse necessitates the employment of Web3 technologies, including non-fungible tokens (NFTs), blockchain, smart contracts, and cryptocurrencies, which form the foundational infrastructure for its development. Web 3.0 represents an evolution from the current WEB 2.0, which is predominantly controlled by major technology corporations like Google, Apple, and Amazon. Web 3.0 aims to establish a decentralized and more egalitarian version of the internet. The

metaverse itself can be characterized as a hybrid reality, blending physical and digital elements to provide users with novel experiences. Consequently, it is crucial to discuss the implications of the metaverse, particularly in the context of higher education, and consider how educational programs should be adapted to equip graduates with the skills required for the virtual labor market.

Bengoechea and Bell (2022) also discuss the concept of extended reality or cross reality, which encompasses various technologies and digital environments where data is displayed and projected. Cross realities encompass augmented reality, mixed reality, and virtual reality (VR), each offering users the ability to perceive and interact within artificial digital environments created by technology. The Acceleration Studies Foundation (ASF) identifies two key dimensions of the metaverse: the range of technologies, spanning from augmentation to simulation, and the spectrum of identity, where avatars serve as representations of human users (Lee et al., 2022).

The existence of online distance education predates the concept of the metaverse. However, the COVID-19 pandemic has significantly accelerated the adoption of online or digital learning across all levels of education globally. Online education can be categorized into two modes: synchronous e-learning, where participants engage in interactive online sessions simultaneously using web conferencing platforms like Zoom, and asynchronous platforms, such as Moodle, which offer users the flexibility to access e-learning content at their own pace and convenience (Bengoechea & Bell, 2022).

According to Bengoechea and Bell (2022), it is evident that traditional professions like lawyers, doctors, nurses, and architects will persist as long as fundamental human needs exist. However, in the 21st century, higher education must align with the requirements of an emerging metaverse labor market. This market cannot be satisfied solely by traditional 4-year university degrees, but rather demands highly sophisticated and job-specific skills. The metaverse will not only revolutionize the way people work but also transform their skillsets and training development, significantly reducing the time required to acquire new skills. To support employee training and provide career guidance, AI-enabled digital coaching staff can be constantly available. In the metaverse, every object, whether it's a training manual, machine, or product, can be interactive, displaying 3-D images and delivering step-by-step instructions. Additionally, VR simulations can become commonplace, offering highly realistic serious game scenarios that enhance employees' learning experiences,

such as practicing conversations with difficult clients or delivering sales presentations. By offering transferable skills, higher education can adapt to meet the demands of the metaverse labor market.

As emphasized by Purdy (2022), it is crucial for employers, educators, and training centers to develop training provider-accredited and appropriately recognized standards for skills acquired in the metaverse. This proactive approach can foster the production of more flexible skills while preventing a decline in quality. By establishing these recognized standards, metaverse-based workers and future employers can benefit from quality assurance measures, ensuring that the skills obtained within the metaverse are robust and reliable.

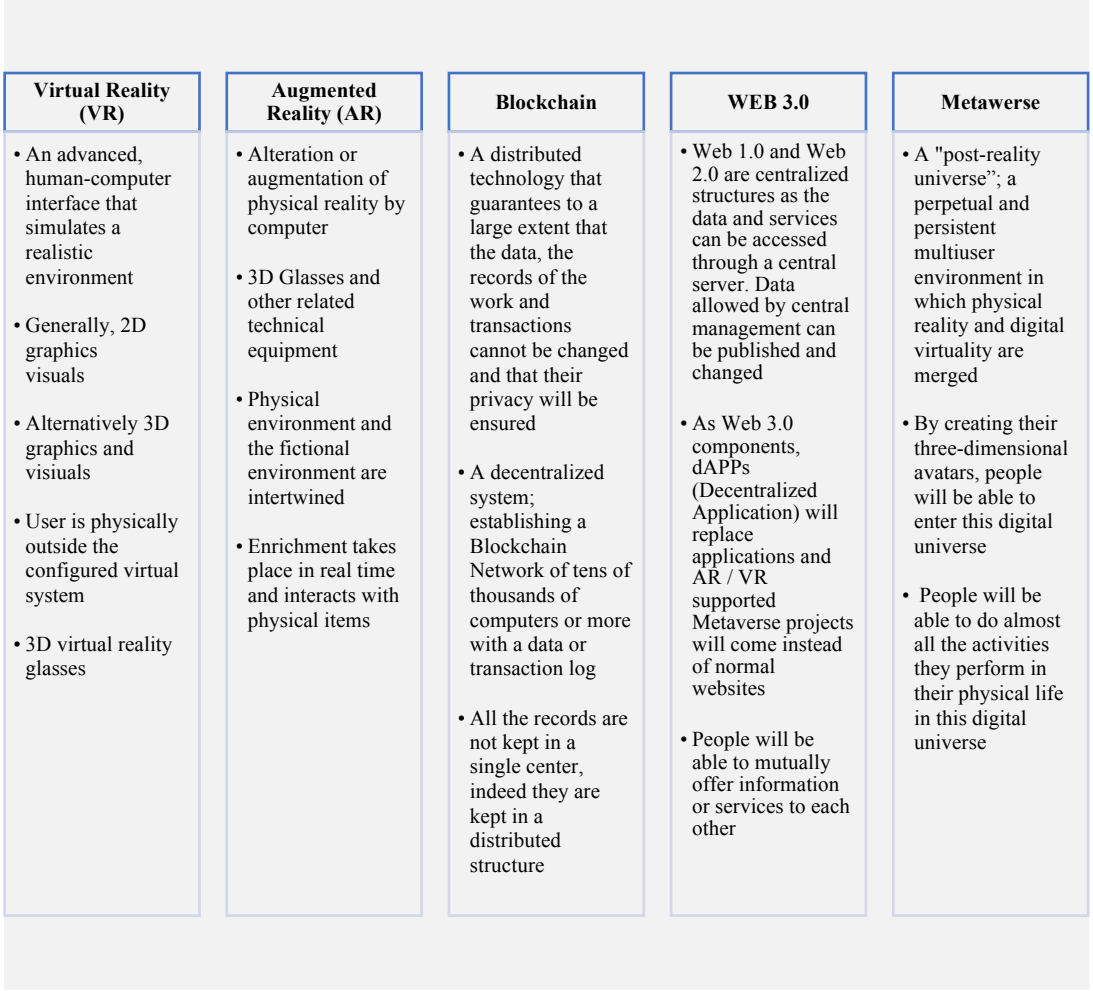


Figure 4.1 Innovations of digital age

There is no doubt that the metaverse represents a novel form of reality, merging physical reality with digital virtuality to offer users contemporary experiences. Higher

education has already embraced aspects of the metaverse, providing students with immersive learning experiences through augmented reality (AR) and experience-based education through virtual reality (VR). VR enables education that simulates real-world scenarios, such as virtual surgeries and ship simulations, eliminating potential risks. Additionally, as Bengoechea and Bell (2022) highlight, virtual reality has eliminated the need for animal experimentation by allowing such studies to be conducted virtually, providing the same course material without causing harm to living creatures.

However, the adoption of the metaverse in education also presents significant challenges. Firstly, the high cost of metaverse technologies makes them inaccessible for many educational institutions. Secondly, the effective utilization of metaverse technologies relies on teachers' comfort and competence in their implementation. Thirdly, there are perceptual, physical, and psychosocial risks associated with the metaverse, including addiction, social isolation, withdrawal from the real world, cybersickness, nausea, radiation exposure, and potential negative effects on the perceptual development of children and adolescents. As with any new technology, caution must be exercised in the utilization of the metaverse.

Despite these challenges, the metaverse holds great potential in the economy, with numerous corporations implementing a metaverse corporate strategy by establishing a presence in the virtual world. The metaverse labor market is expected to expand in parallel with the metaverse economy, giving rise to new professions such as cryptocurrency specialists, crypto attorneys, NFT creators and meshers, and smart contract readers. These emerging professions require specific skills that may not be acquired solely through traditional four-year degrees but through job-specific training and development.

This emerging trend underscores the importance of collaboration among businesses, educators, and training institutions to establish approved criteria for metaverse-acquired skills that are also certified by training institutions. As with the introduction of any new technology, the metaverse presents both opportunities and threats. Additionally, the environmental impact of WEB 3 technologies poses challenges and is incompatible with the Net Zero objective. Higher education must prepare graduates for both the real world and the metaverse by equipping them with transferable skills, ethical values, and an understanding of the risks associated with this new parallel reality.

This chapter identifies the major components of the digital transformation era, including Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0, and Metaverse, and discusses their impact on the higher education sector. The following chapter will address the digital storm towards higher education on learning practices, including mixed reality, artificial intelligence, blockchain, and virtual assistants.

CHAPTER 5

5. DIGITAL STORM TOWARDS HIGHER EDUCATION

We are currently living in a world characterized by constant technological advancements, where the realm of software has permeated all aspects of our lives, driving the age of digital transformation. As a result, new technologies such as artificial intelligence, virtual reality, augmented reality, and mixed reality have emerged as significant players. The inevitable forces of change and development have already had a profound impact on higher education, akin to a perfect storm. Consequently, this chapter aims to explore and elucidate the key factors contributing to this reality and their effects on the digitalization of the higher education system. The primary objective is to clarify the role of digital disruption in the process of digitalizing universities. Following an exploratory introduction, this chapter will focus on the learning practices in the context of this era of digital disruption within the higher education system. It will address key determinants such as mixed reality, artificial intelligence, blockchain, and virtual assistants employed in universities.

Siau (2018) argues that reduced financial opportunities from traditional funding sources such as state governments and the revolutionary effects of artificial intelligence (AI) will transform higher education. To prepare students for the changes in the labor market driven by AI, machine learning, and automation, higher education must alter and evolve rapidly and continuously. Ongoing organizational and curriculum modifications would be required for a university to maintain its relevance and survival. The article cites several sources that discuss the impact of AI on the economy, governance, and education.

The article discusses the need for universities to assist their students in adapting to the rapid and irresistible growth in technology and the impact of artificial intelligence (AI) on higher education. The article suggests that higher education cannot

be left out of the atmosphere of historical evaluations caused by reformations in various industries as a result of the emergence of AI and machine learning. The article cites studies by Siau and Wang (2018) and Wang and Siau (2019) that express the unsustainability of continuing business as usual in the face of AI. The article highlights the importance of research in providing valuable insights and perspectives on higher education in the AI era. The article also cites several sources that explore the impact of AI on teaching and learning in higher education and the ethical considerations that must be addressed.

In their article Industry 4.0: Managing the digital transformation Ustundag and Cevikcan (2017) mentioned that Industry 4.0 education technologies could be divided into three basic categories. The first category relates to virtual labs and augmented reality for educational purposes. The second category uses gamification in education, while the third concentrates on learning analytics.

- *Virtual Labs* and *Augmented Reality*: Virtual labs and augmented reality are technologies that can be utilized for educational purposes to facilitate interaction between the system and the student. Virtual labs refer to software for interactive learning based on simulations of real-world events, which permits students to investigate a subject by comparing and contrasting several circumstances, to pause and start the application for reflection and note-taking, and to get Internet-based practical experimental experience. On the other hand, augmented reality is a live, direct or indirect view of a physical, real-world environment whose components are enhanced by computer-generated sensory input like sound, video, graphics, or GPS data. The article suggests that the interactivity enabled by these platforms may facilitate effective learning, particularly in situations where constructing real Industry 4.0 labs would be extremely expensive or unfeasible. The article also cites several sources that explore the potential of the metaverse, which is expected to use augmented and virtual reality (AR/VR) in combination with artificial intelligence and blockchain to create new educational environments (Ustundag & Cevikcan, 2017).
- *Gamification*: Gamification involves the integration of game design elements and mechanics into non-game contexts. Its primary objective is to enhance user engagement and productivity in various domains. In the realm of learning systems, gamification plays a crucial role by capturing learners' interest

through game elements such as storytelling, immediate feedback, leveling, and progress indicators. By incorporating gamification, real-world tasks can be simulated with increasing levels of difficulty, fostering a sense of challenge and accomplishment. Additionally, social learning can be facilitated by encouraging social interaction and healthy competition among learners (Ustundag & Cevikcan, 2017).

- *Learning Analytics (LA)*: Learning analytics (LA) entails the utilization of data analytics in the context of e-learning. It involves the analysis and collection of information about learners and their circumstances with the aim of understanding the extent of learning and improving future actions. By leveraging learning analytics systems, the learning process can be personalized, adaptive content can be generated, learner achievements can be enhanced, and teachers can become more effective in their instructional practices. Given the diverse research domains and application fields encompassed by Industry 4.0, it is crucial to foster adaptive and effective learning environments. Through the implementation of customized learning systems, students can acquire comprehensive knowledge in their chosen areas of study (Ustundag & Cevikcan, 2017).

McCluskey and Winter (2012) contend in their publication titled 'The Idea of the Digital University: Ancient Traditions, Disruptive Technologies, and the Battle for the Soul of Higher Education' that the sociotechnical obstacles and disruptions catalyzed by the digital revolution have not spared universities in the 21st century. The authors highlight the emergence of education models that provide learners with new avenues for education, surpassing traditional pathways to degrees and credentials. These models enable individuals to enhance their skills and knowledge through affordable, modularized online tools, thereby establishing sustainable learning practices. As a result, universities are increasingly forming partnerships with online course providers and creating alternative options for students to explore educational content at their own pace. By embracing these changes, universities can better meet the evolving demands of learners and facilitate their progress towards degrees or certifications.

McCluskey and Winter (2012) assert that the primary attention on creating physical learning environments is a temporary trend, whereas a similar emphasis on virtual learning spaces might not arise until much later. Although there are various digital platforms that offer pre-packaged solutions for collaborative learning and real-

time meeting spaces, the advancement of learning spaces integrated with extended reality (XR) technology has the capacity to offer students more immersive and customized experiences compared to current advancements in online course design.

According to McCluskey and Winter (2012), there has been a significant surge in the use of hybrid learning models as an alternative to fully online courses. Originally, hybrid learning was defined by the balance of in-person and online components. However, it has since progressed to incorporate digital tools that are most effective in achieving the learning goals of the course. Contemporary options for hybrid learning designs encompass media-enhanced digital platforms, customized or adaptable courseware, and videoconferencing systems that allow for synchronous remote activities among students.

The notion of digital equality becomes a significant factor to consider. McCluskey and Winter (2012) introduce the concept of digital equity, which pertains to guaranteeing equal availability of technology, specifically broadband internet capable of accessing unfiltered and uncensored content, thus facilitating complete participation on the internet. However, universal access to broadband differs across countries and is affected by multiple factors, including economic status, educational attainment, gender, age, disability, native language, as well as national, regional, and cultural circumstances.

On the other hand, McCluskey and Winter (2012) also recognize the intricate complexity of the various elements associated with global digital equality, placing emphasis on the difficulties encountered in achieving digital literacy. Digital literacy encompasses a comprehensive comprehension of the digital landscape, empowering individuals to collaborate in content creation and adapt to new environments. Educational institutions face the responsibility of not only encouraging the utilization of digital tools and resources among all members of the institution, but also utilizing strategic technologies to cultivate critical thinking and problem-solving skills. Furthermore, there is an increasing need for expertise in curriculum design to assist academic staff and subject matter experts in the creation and implementation of adaptive learning platforms, competency-based learning methods, gamified learning experiences, as well as the integration of virtual or augmented reality and other digital learning innovations.

As an example of modern-era learning methodologies, McCluskey and Winter (2012) delve into the concept of mobile learning. Mobile learning has become a

prevalent practice driven by the widespread use of smartphones and tablets, with both students and educators heavily relying on their mobile devices throughout the educational process. Consequently, mobile learning experiences incorporate mobile-friendly content, synchronization across multiple devices, and the ability to access educational materials anywhere and anytime, prioritizing connectivity and convenience over a reliance on specific applications. Moreover, the increasing use of augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies has made mobile learning more interactive and collaborative.

5.1 Learning Practices

According to McCluskey and Winter (2012), mobile learning, often referred to as m-learning, has existed in various forms since the 1980s when pocket and mobile computers were initially introduced. The modern era of mobile learning has experienced rapid growth with the advancement of smartphones and tablets, which now possess capabilities comparable to those of laptop or desktop computers. With the widespread availability of internet connectivity and the increasing ownership of smartphones worldwide, cellular mobile devices have become the primary means through which individuals access educational materials. In addition to smartphones and tablets, mobile learning is expected to encompass smartwatches, headset displays that support augmented reality/virtual reality/mixed reality (AR/VR/MR), and Internet of Things (IoT) devices. A significant proportion of students in the United States, approximately 79% as of 2018, access online courses using mobile devices, with access to course texts being the most preferred feature.

According to McCluskey and Winter (2012), the importance of mobile-platform readiness in high-quality courses, particularly online and hybrid courses, is emphasized by widely recognized standards such as the Open SUNY Course Quality Review Rubric (OSCQR) and Quality Learning and Teaching (QLT). These technologies can be integrated to enhance the overall learning experience. For instance, the University of Memphis has implemented the Gamified Learning Using Kahoot! project, which leverages interactive gaming technology accessible on mobile devices to provide immediate feedback and class data, fostering student engagement. Additionally, National Taiwan Normal University has developed the CloudClassRoom (CCR) mobile technology, enabling smartphones to serve as effective interactive

learning tools. CCR allows students to respond to instructors' questions, with the responses automatically collected and analyzed. This real-time data provides instructors with an approximate understanding of students' learning progress.

5.1.1 Mixed Reality (MR)

According to McCluskey and Winter (2012), mixed reality (MR) represents an emerging environment where the digital and physical realms intersect. This hybrid space integrates digital technologies into real-world settings, creating virtual replicas that blur the boundaries between reality and virtuality. Through virtual reality, users can be fully immersed in simulations like flying or exploring Mars, while augmented reality overlays digital data onto physical surroundings, such as providing additional information about museum exhibits. Holograms and 3D displays further contribute to the creation of mixed environments. MR's key characteristic is its interactivity, which holds significant potential for learning and assessment. Learners can engage with virtual objects, bringing underlying data to life and facilitating the development of new understanding.

According to McCluskey and Winter (2012), mixed reality (MR) encompasses a range of technologies. In virtual reality (VR), the user wears a headgear and interacts with a fully computer-generated environment. Augmented reality (AR) utilizes a head-mounted display or a mobile device to overlay images or other content onto the real world. MR incorporates overlays derived from AR but, similar to VR, allows for interactive and controlled experiences.

According to McCluskey and Winter (2012), the global MR market is anticipated to experience significant expansion, with predictions estimating its value to reach $100-$200 billion by 2022. Within this market, the educational sector is expected to contribute over $7 billion. However, it should be noted that a limitation of current educational MR applications is their limited user capacity, often allowing only a small number of users at a time.

Regarding the implementation of MR in higher education, McCluskey and Winter (2012) highlight the University of Pennsylvania Libraries' PennImmersive initiative and Yale University's Blended Reality: Applied Research Project as notable examples of collaborations between campus departments and academic researchers to explore the potential uses of MR in research, teaching, and learning. When institutions

decide to introduce MR technology on their campuses, the broadest accessibility for users is often achieved by making it available through the library or other student-accessible areas. Makerspaces or media labs are common locations where such technology is provided. For instance, the North Carolina State University Libraries offer equipment lending and usage spaces. The Miami Beach Urban Studios at Florida International University and The Wilbur Powerhouse at Lehigh University are expansive makerspaces that provide a range of technologies, including MR, to both the campus community and the surrounding areas.

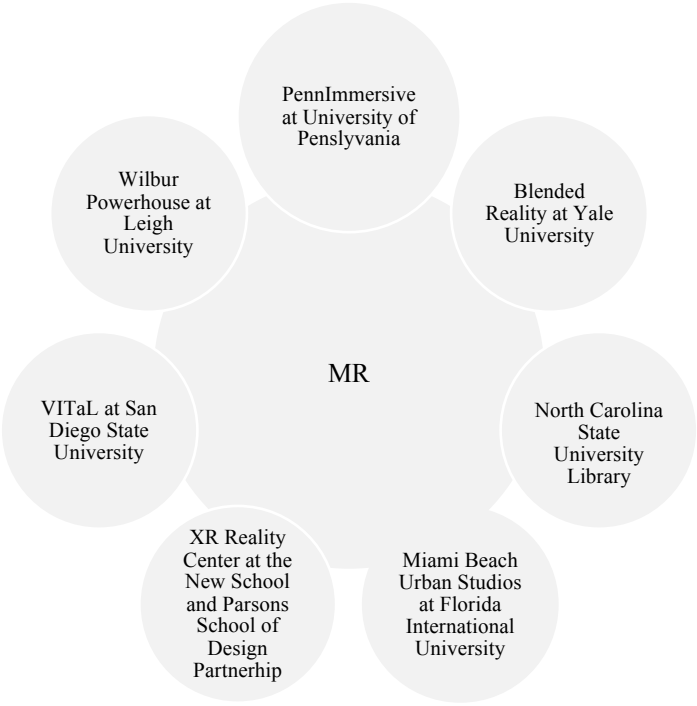


Figure 5.1 Mixed Reality (MR) in the US universities

McCluskey and Winter (2012) argue that MR technology is particularly well-suited for experiential teaching. Virtual reality (VR) can transport viewers to locations that are typically inaccessible, such as art museums, archaeology sites, refugee camps, or even fictional settings like the Mesozoic Era or Mars, through simulations and 360° videos. VR allows users to engage in physically impossible actions, such as manipulating entire environments or navigating inside veins, as well as practice risky scenarios like firefighter training. Augmented reality (AR) enables users to interact with virtual objects overlaid onto the physical environment, such as visualizing electromagnetic fields. By significantly expanding the range of tasks and experiences available to learners, MR technology facilitates experiential learning in ways that were

previously inconceivable. However, it's important to note that reflection and self-assessment, crucial components of experiential learning, may not be directly facilitated by MR technology. In general, MR is most effective for achieving learning objectives that involve repetition, such as developing clinical skills, or exposure, such as fear extinction.

In the realm of art education, McCluskey and Winter (2012) outline how MR technology enables students to engage with materials and experiences that might otherwise be inaccessible. Through MR, students can employ immersive environments to envision, evaluate, model, and reconstruct entire settings, surpassing the capabilities of traditional computer-aided design used in disciplines like architecture and stage set design. By interacting with simulated objects and environments, students can develop their design sensibilities while also fostering scientific literacy, problem-solving skills, and content knowledge in various fields such as urban planning, biology, and astronomy. However, for successful integration of MR into teaching and learning, it is essential for instructional designers and instructional technologists on campus to become proficient in this technology, enabling them to support teachers in effectively incorporating MR into their pedagogical practices.

In the realm of higher education, notable applications of immersive technologies can be found. For instance, the Virtual Immersive Teaching and Learning (VITaL) initiative at San Diego State University (2022) offers a diverse range of immersive tools, including virtual reality, augmented reality, and mixed reality, for integration across the pedagogical spectrum. Another noteworthy example is the collaborative effort between The XReality Center at The New School and the School of Fashion at Parsons School of Design, where they developed a virtual reality-based immersive learning experience centered around a 1920s evening coat (The New School, 2018). These initiatives highlight the growing utilization of immersive technologies in higher education for enhancing teaching and learning experiences.

5.1.2 Artificial Intelligence (AI)

According to McCluskey and Winter (2012), Artificial Intelligence (AI) refers to the utilization of computer systems to perform tasks and actions that have traditionally relied on human understanding. Recent advancements in computer science have led to the development of intelligent computers that demonstrate

increasingly sophisticated reasoning capabilities. AI incorporates algorithmic machine learning techniques to generate predictions and facilitate tasks and decision-making processes that simulate human-like abilities. The continual advancements in AI programming, data analysis, and network infrastructure contribute to the expanding possibilities for its application across various domains, including the field of education.

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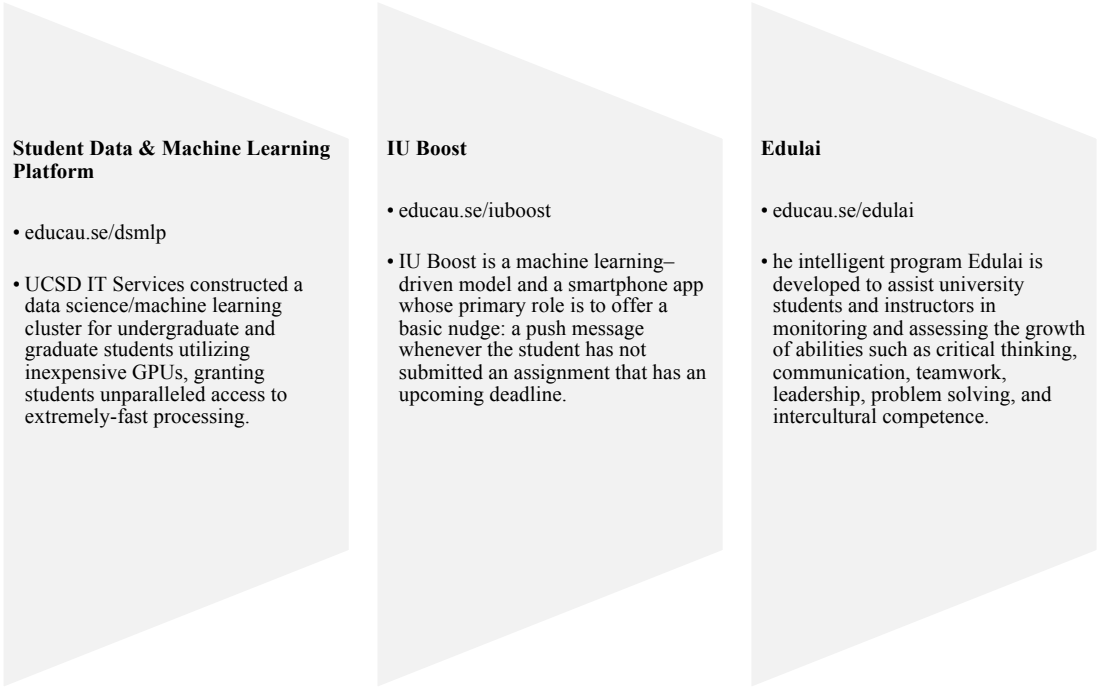

Figure 5.2 Artificial Intelligence in practice Reference: McCluskey, F. B., & Winter, M. L. (2012). *The idea of the digital university: Ancient traditions, disruptive technologies and the battle for the soul of higher education*. Washington, DC: Westphalia Press.

According to McCluskey and Winter (2012), AI has emerged as a promising tool for educational applications due to its potential to personalize learning experiences, alleviate workloads, and enable analysis of extensive and intricate data sets. However, concerns regarding issues of fairness, inclusivity, and privacy have tempered the widespread adoption of AI in education. Despite these apprehensions, the market value of AI in the American education sector is projected to surpass $85 million by 2022, exhibiting a compound annual growth rate of approximately 48%. This upward trajectory is also observed on a global scale, as higher education institutions collaborate with industry partners to develop AI-driven solutions aimed at reducing college expenses and empowering students to tailor their learning experiences according to their unique needs.

McCluskey and Winter (2012) emphasize the significance of Engagement in promoting student success and providing effective support. In contemporary education, there is a growing emphasis on proactively identifying students' learning needs to facilitate their progress in achieving learning outcomes and successfully completing certificate or degree programs within the expected timeframe. In this regard, AI has emerged as a valuable tool, enabling pedagogical approaches like adaptive learning that leverage computer systems to tailor content to the specific requirements and projected needs of individual students. Additionally, AI utilizes institutional data to empower schools and universities with insights into important metrics such as retention rates, intervention strategies, and program performance. As institutions increasingly rely on data mining techniques, the demand for advanced data analysis capabilities also rises.

5.1.3 Blockchain in Higher Education

McCluskey and Winter (2012) contend that Blockchain technology operates as a decentralized digital ledger primarily associated with supporting cryptocurrencies. It utilizes a distributed data structure, wherein ledger records are replicated across multiple locations. The decentralized nature of Blockchain eliminates the need for a central authority, resulting in a highly secure model based on the mutual trust among participants. This disruptive potential has attracted attention from various industries, including the field of education. However, the widespread implementation of Blockchain in higher education is still a few years away. Currently, educational

institutions are actively researching the potential applications of Blockchain technology, such as in the realms of transcript management, smart contracts, and identity verification. Proponents believe that Blockchain has the capability to revolutionize industries that heavily rely on intermediaries, like banks, by offering a comprehensive ecosystem solution with decentralized verification and storage. In the context of higher education, rather than the broad-scale adoption of Blockchain technology itself, its impact may lie in the legacy it leaves and the inspiration it provides for innovative solutions.

McCluskey and Winter (2012) discuss the current focus of attention on blockchain technology in universities, particularly regarding the potential applications in transcripts and academic records. In the context of digital tools, new possibilities have emerged to create alternative transcripts that offer extensive information and artifacts to showcase a student's learning journey. Blockchain presents an opportunity to further advance this concept by establishing an immutable and comprehensive record of both formal and informal learning experiences. It empowers individuals to have control over the information stored in their learning record and the accessibility granted to different parties. A blockchain-based transcript could encompass a wide array of details, such as program and degree information, certifications, badges, micro-credentials, co-curricular involvements, internships, employment history, and other demonstrated competencies. This comprehensive record could accompany students as they transition between educational institutions, serving as a reliable documentation of their learning achievements and facilitating the smooth transfer of credits across universities.

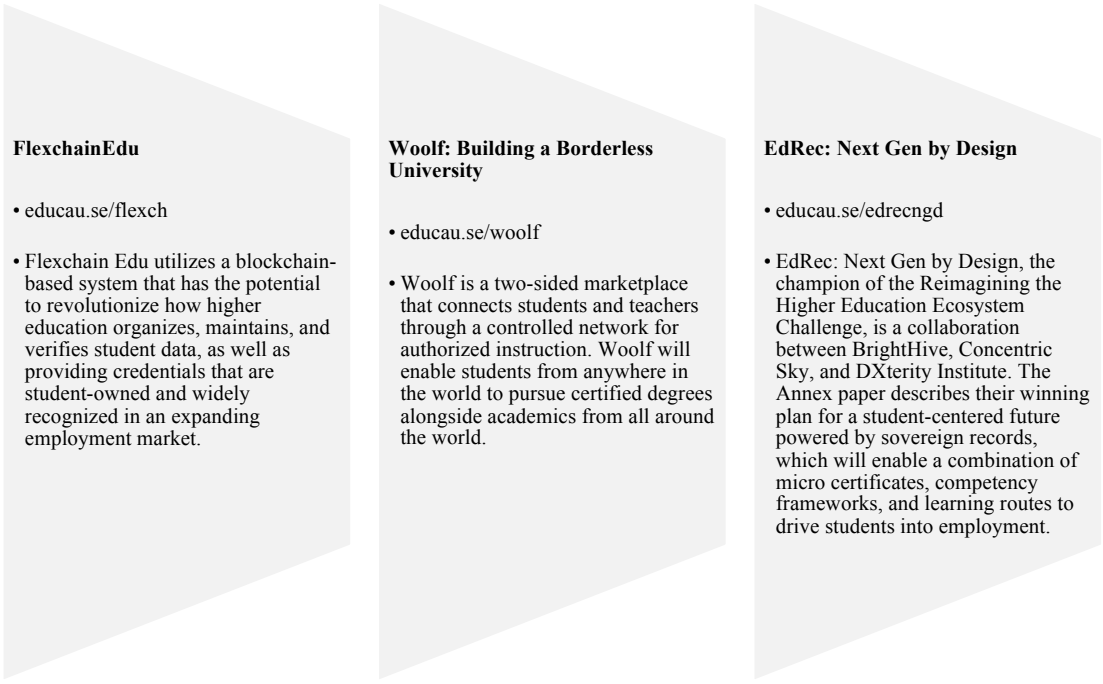

Figure 5.3 Blockchain in practice Reference: McCluskey, F. B., & Winter, M. L. (2012). *The idea of the digital university: Ancient traditions, disruptive technologies and the battle for the soul of higher education*. Washington, DC: Westphalia Press.

According to McCluskey and Winter (2012), the relationship between higher education and blockchain technology can be viewed from two distinct dimensions. Universities are actively exploring the adoption of blockchain applications for both administrative and educational purposes. For example, the University of Nicosia in Cyprus has implemented a blockchain platform that enables students enrolled in a digital currency course to receive their academic credentials securely. Similarly, the Central New Mexico Community College has introduced digital certificates that allow students to have control over and share their verifiable credentials. Columbia University, in collaboration with IBM, has established a blockchain technology incubator accessible to Columbia academics, students, and the broader startup community. Moreover, MIT has embraced blockchain by issuing digital certificates using a blockchain-based tool and offering a self-paced course titled "Blockchain Technologies: Business Innovation and Application."

With the expansion of education to encompass lifelong learning, which now extends beyond traditional academic contexts to include workplace training, professional associations, workshops, and other formal and informal learning opportunities, blockchain technology emerges as a promising solution for individuals

to accurately record and document their knowledge and skills (McCluskey & Winter, 2012).

5.1.4 Virtual Assistants

According to McCluskey and Winter (2012), virtual assistants have emerged as a valuable tool in providing students with essential information and support services. One notable example is the development of chatbots, such as the AgentBot employed by Siglo 21 University in Argentina, which offers academic assistance to students through 24-hour chat support. In the United States, several institutions are currently piloting the use of Amazon Echo Dots to provide students with a range of information, including academic advisement and financial aid assistance. Northeastern University has also implemented the Husky Helper virtual assistant, which utilizes AI and machine learning to address the most frequently asked student questions received by the university's call center over the past three years.

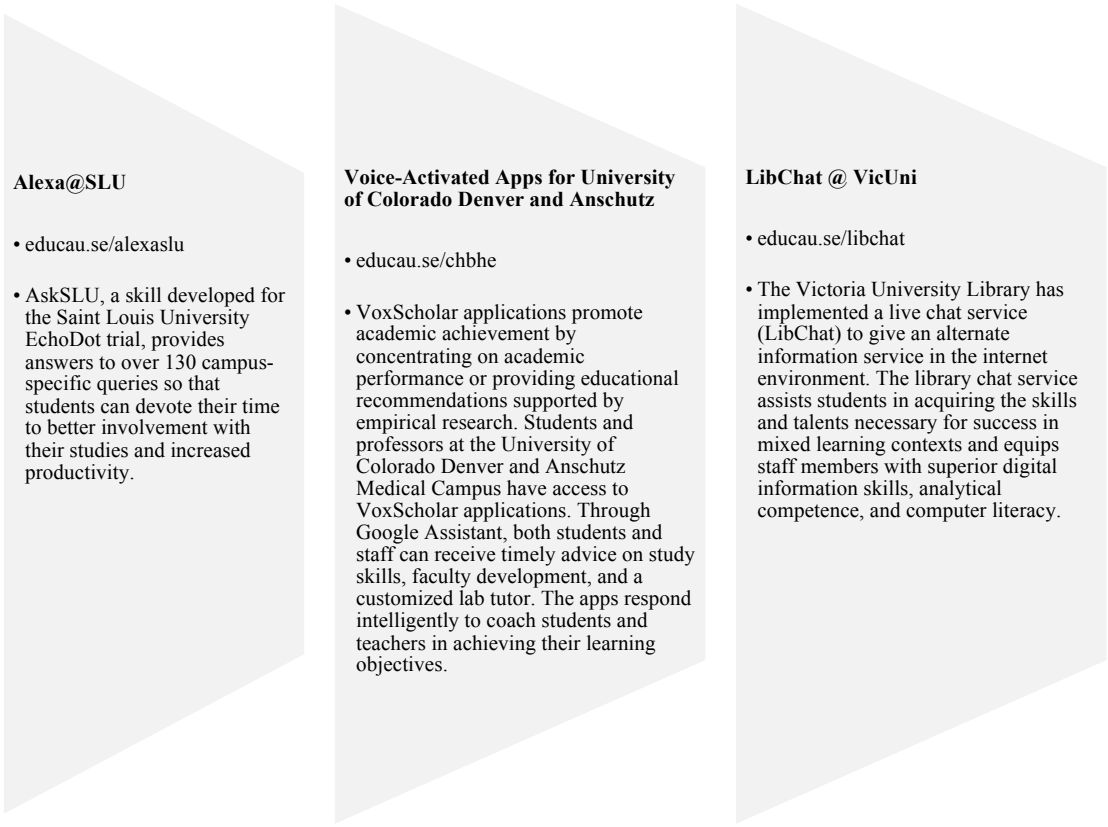

Figure 5.4 Virtual Assistants in practice Reference: McCluskey, F. B., & Winter, M. L. (2012). *The idea of the digital university: Ancient traditions, disruptive technologies and the battle for the soul of higher education*. Washington, DC: Westphalia Press.

McCluskey and Winter (2012) assert that the advancements in virtual assistant technology have significant implications for educational applications across diverse linguistic contexts. The authors highlight the potential for virtual assistants to contribute to research, tutoring, writing, and editing activities. Furthermore, the emergence of virtual instructors and facilitators has the capacity to provide students with tailored and interactive learning experiences, akin to those already offered by adaptive learning platforms. The substantial investments being made in artificial intelligence (AI) within the education sector further indicate the growing interest in and potential expansion of virtual assistant solutions for students.

5.1.5 Overview of Digital Storm

Augmented reality, virtual reality, and mixed reality have emerged as prominent technologies in the digital realm. Within higher education, there is a growing interest in harnessing these digital tools to construct immersive virtual or hybrid environments that facilitate student exploration. This subject holds significant relevance in the contemporary academic discourse.

Alexander et al. (2019) discuss the findings of The Horizon Report, which predict the growing significance of gaming and gamification in educational technology. Market research indicates that the adoption of these innovations was projected to occur between 2012 and 2014. The reports highlight the increasing recognition of digital gaming as an effective educational tool, an area of study and research, and a platform for content development by academics. Additionally, gamification has gained momentum as educators incorporate game-like elements and strategies into the learning process. These observations are supported by factors such as the exponential growth of the gaming industry, the emergence of scholarly discourse on teaching with games, and the high engagement of traditional-age students with computer games.

The preceding chapter delved into the learning practices within the higher education system during the era of digital disruption, with a particular emphasis on the influential factors of mixed reality, artificial intelligence, blockchain, and virtual assistants in universities. In the subsequent chapter, a comprehensive evaluation will be undertaken, exploring various generations including Generation X, Generation Y (Millennials), Generation Z, and Generation Alpha. This examination will encompass

their unique characteristics, attitudes towards digital transformation, and potential implications that Generation Alpha may bring about in the future.

Table 5.1 Determinants of digital storm for higher education

Mixed Reality (MR)	Artificial Intelligence (AI)	Blockchain	Virtual Assistants
• An evolving environment where digital and physical things interact at the junction of the digital and offline worlds • A new understanding based on interactions with virtual objects bringing underlying data to life • 3D pictures into physical space and holograms • A hybrid area combining digital technologies into the real world and generating virtual replicas of real settings, blurring the distinction between the real and virtual worlds • Overlays derived from AR, but, similar to VR being interactive and able to be controlled • Allows students to utilize materials they might not otherwise have access	• Uses computer systems to perform tasks and actions traditionally required human understanding • Employs the foundations of algorithmic machine learning to develop predictions enabling human-like task accomplishment and decision making • Becomes increasingly vital to evaluate ethical issues around data use and inclusion, algorithmic prejudice and spying • Recommended for educational applications tailoring experiences, minimizing workloads and assiststing with the analysis of huge and complicated data sets • Facilitates pedagogical approaches such as adaptive learning tailoring content to the projected needs of each student, works with institutional data to assist schools and universities in understanding retention rates, intervention requirements, and program performance	• Operates as a decentralized digital ledger • Eliminates the function of a central authority over the ledger providing a highly secure model whose integrity is based on the mutual confidence of all participants • All the records are not kept in a single center, indeed they are kept in a distributed structure • Provides transcripts, smart contracts, identity management and success record • Enables students to maintain accurate data of their knowledge and skills • Transcript might incorporate information about programs and degrees, certifications, badges and other micro credentials, co-curricular events, internships and employment, and other competencies and credentials	• Deliver fundamental information and support service requirements for students • Provide academic student help using chatbots • Supply students with information ranging from academic advisory services to financial aid assistance • Utilized for research, tutoring, writing, and editing • Produce the same conversational and customized learning experiences that are already available on a wide range of adaptive learning platforms

CHAPTER 6

6. GENERATION DIFFERENCES: GENERATION X, Y, Z, ALPHA

It is evident that digital universities will play a significant role in the global higher education sector, alongside traditional universities that continue to provide formal education and adapt to the changing world until the 2030s. While Generation Z has been the primary driver of this evolution, Generations Y and Z are reaching their conclusion. As we enter the era of Generation Alpha and Beta, a hybrid model combining digital and formal structures is expected to be replaced by digital education after 2030. Digital universities will continue to thrive and coexist with prestigious research universities that offer formal education. Thus, this chapter aims to explore the transition between generations over time, with a specific focus on Generation Z and Generation Alpha, and their demands for University 4.0 and University 5.0 phenomena. The main objective is to examine the impact of these generations' new requirements, behaviors, attitudes, norms, values, experiences, and lifestyles on the development of the new university model, both until and beyond the 2030s. The chapter will begin by providing a brief overview of Generation X and Generation Y, followed by an examination of Generation Z. Generation Alpha will then be discussed. Next, the transformation of generations in relation to digitalization and work life will be explored from the perspectives of the key generations. Finally, the chapter will conclude by offering reflections on the past and future implications.

Indeed, according to Nagy and Kölcsey (2017), the forthcoming generation, commonly referred to as the Alpha Generation, will soon enter the workforce and become the majority in approximately a decade. This impending shift brings forth new considerations. Ziatdinov and Cilliers (2022) argue that while technological advancements will undoubtedly play a significant role in future teaching and learning

strategies, instructors will also encounter challenges posed by the Alpha Generation as they enter higher education. It is anticipated that a significant proportion of Generation Alphas, with estimates suggesting one in two individuals, will pursue a bachelor's degree. This entrepreneurial generation is characterized by its emphasis on innovation, progressiveness, and continuous growth.

So, even the vision of 2030s higher education will probably be different than that of today in the sustainability of digital evolution with new generations.

6.1 Generation X and Generation Y

As a reflection to the parents of Generation Z and Generation Alpha, Generation X and Generation Y should be paid in attention initially.

According to Levickaite (2010), Generation X refers to the cohort of individuals born in the 1960s and 1970s. It is a demographic, sociological, and cultural group that emerged in Western societies following the baby boomers. The term "Generation X" was coined by American and British researchers Charles Hamblett and Jane Deverson in 1964, highlighting the presence of strongly conformist youth cultures during that period. The term gained popularity in 1991 with the publication of Douglas Coupland's novel, which propagated the idea of deviating from the conventional norms prevalent in Western societies. Coupland (1991) described Generation X as a group of individuals who sought to distance themselves from the pursuit of prestige, wealth, and social advancement commonly associated with modern life. This generation came of age during the rise of home computers, the emergence of video games, and the early stages of the Internet as a social and economic tool.

According to Levickaite (2010), the term "Generation Y" originated from an Ad Age editorial in 1993 and was used to differentiate this generation from Generation X. Generation Y, also known as Echo Boomers or MTV Generation, encompasses individuals born between 1974 and 1980. Additionally, Strauss and Howe (1991) introduced the term "Millennials" to distinguish this group from Generation X. Millennials are also referred to as Generation Next or the Net Generation.

Like previous generations, Generation Y was influenced by political, technological, and societal developments, as well as cultural trends and styles. The rise of new media, rapid advancements in communication technology, and the advent of social networking have reshaped traditional notions of communication, work patterns, and social behaviors. The prevalence of computer and internet technology has had a significant impact on Generation Y, with activities such as computer gaming, flash mobbing, and online dating replacing conventional modes of self-expression and socialization. The widespread use of the internet and the close ties to cultural elements, particularly music and literature, have fueled a demand for popular culture products. These changes have disrupted corporate paradigms and led to the emergence of new supply and demand chain strategies

To elucidate the contrasting approaches to technology between Generation X and Generation Y, Levickaite (2010) highlights that Generation X was influenced by significant technological narratives, such as the renowned Napster story, where Shawn Fanning introduced the concept of free media downloads to the world. In contrast, Generation Y is characterized by the impact of already established technological advancements and innovations. In terms of the technological landscape, Generation X witnessed the advent of personal computers, the rise of video games, and the emergence of the internet as a tool for social and business purposes, while Generation Y grew up in a technologically saturated environment. From a historical perspective, Generation X was shaped by political events such as the collapse of the Berlin Wall, the decline of the Soviet Union, and the dissolution of Yugoslavia, which influenced their cultural outlook. On the other hand, Generation Z is often considered a definitive departure from the counterculture of the 1960s and exhibits a greater interest in technology than in day-to-day occurrences.

6.2 Generation Z

To address the current state of the academic world, Mohr and Mohr (2017) emphasize that a significant proportion of university academics belong to the Baby Boomer and Generation X cohorts (also known as Busters), who are primarily responsible for educating undergraduate students from Generation Y and Generation Z. Bridging the potential generation gap between older and younger faculty members

and students can be an intriguing prospect that allows for a reevaluation of the demographics and needs of today's student body.

According to Seemiller and Grace (2016), the majority of students entering university today can be categorized as Digital Natives. These individuals have grown up in the Information Age and are therefore highly familiar with technology. Additionally, Laskova (2021) adds that Generation Z, often referred to as zoomers or the net generation, places a high value on independence when it comes to their education in the posthuman era and future educational systems.

According to Tapscott (1998), students of the 21st century primarily belong to the millennial generation or are the children of millennials, commonly known as zoomers. Zoomers are individuals born between the mid-to-late 1990s and the early 2010s. They are recognized as the first generation in the Western world to be labeled as digital natives, also referred to as the net generation or digitally proficient self-starters.

At this juncture, various inquiries arise, such as "How does an individual exhibit themselves in different contexts, such as e-learning environments, in the era of posthumanism?" (Braidotti, 2019), "Does technology displace the individual? Who ultimately reaps the benefits of the outcomes?" (Selwyn et al., 2020), and "Does technology foster the hyper-individualization of education?" (Castañeda & Selwyn, 2018).

When examining the literature, Bennett et al. (2008) note that digital natives are often described as the new generation of learners who are born into a technology-centric world and possess advanced technical skills. However, it is important to recognize that while technology plays a significant role in the lives of digital natives, their usage and proficiency with technology are not uniform across the board.

According to Dombrowsky et al. (2018), Millennials are currently emerging as influential players in the economy, corporate world, and lifelong education. Simultaneously, Generation Z is poised to become a significant force in professional, lifelong, and digital education as they ascend to managerial and leadership positions in the new economy. With Boomers retiring in the coming years, the evolution of industries such as healthcare will be expedited. Generation Z will constitute the next cohort of entry-level professionals and workers. It is crucial for higher education institutions and other industries to effectively engage with millennials and develop products and services that meet their needs.

Dombrowsky et al. (2018) emphasize that Generation Z is well-informed, having grown up in the information age. Unlike Generation X, they have been raised with an entrepreneurial mindset. Their major expenses are likely to include housing, transportation, food, clothing, and education. Therefore, they will make prudent financial decisions and seek a demonstrated return on investment, especially when it comes to significant purchases such as education and training."

Dombrowsky et al. (2018) discuss the findings of the 2017 UPCEA Generation Z and Millennial Survey, which revealed that 39% of respondents expressed that the cost of higher education had already influenced their educational plans. The UPCEA (University Professional and Continuing Education Association) Center for Research and Strategy is recognized as a leading association in the field of digital, lifelong, and professional education. Established in 1915, UPCEA currently serves a large number of prominent public and private schools and universities in North America. For over a century, the association has provided its members with valuable resources such as conferences, seminars, research data, benchmarking information, networking opportunities, and timely publications. UPCEA's partners consist of organizations that support the goals of professional, lifelong, and digital higher education.

Generation Z will continue to reshape the initiatives launched by Millennials. Each generation has influenced a key product or service category. Millennials transformed the video, cable, and entertainment sectors. Generation X altered the music and Internet sectors. Generation Z has the potential to revolutionize the financial, technological, and educational sectors (Dombrowsky et al., 2018).

The rapid advancement of technology offers higher education marketers numerous opportunities to leverage competitive advantages. Institutions need to align their programs with the needs of Generation Z to retain their existing students and attract new ones. This may involve strategies such as unbundling education or providing multiple delivery modes (Dombrowsky et al., 2018).

Generation Z is characterized by their demand for customization and the rejection of a one-size-fits-all approach. This shift in expectations extends to education, requiring a comparable mindset. For marketers and program developers in higher education, the key focus is on creating and delivering value. In future academic programs, value cannot be assumed; it needs to be demonstrated. Offering digital classes provides convenience, which adds value to educational offerings. Credentials and materials that enhance employment prospects are seen as valuable. However,

without effective marketing, the value of academic programs may not be fully realized (Dombrowsky et al., 2018).

The gradual emergence of Generation Z as a significant economic force has implications for contemporary higher education systems. Education units that are well-prepared in the areas of professional, lifelong, and digital education will gain a competitive advantage by offering credentials that align with the desires of Generation Z. This includes curriculum content that demonstrates an economic return, educational packages tailored to their needs, and delivery methods that are socially positive or convenient, while also considering global consciousness (Dombrowsky et al., 2018).

As Generation Z progresses into their mid- to late-20s, their purchasing power will increase significantly, thereby impacting professional, lifelong, and digital education units. These units must reassess their curriculum, credentials, delivery methods, enrollment management, and marketing strategies to effectively cater to the evolving adult learner market (Dombrowsky et al., 2018).

In the article titled "Transformation of the Meaning of Learning for the Millennial Generation in the Digital Era," Hardika et al. (2020) discuss the significant changes brought about by the ongoing Fourth Industrial Revolution on a global scale. According to Schwab (2017), these changes encompass various aspects of life, work, and interactions, characterized by an accelerated pace. Notably, Hardika et al. (2020) emphasize that the advancements in automation and data interchange, such as cyber-physical systems, the Internet of Things (IoT), cloud computing, and cognitive computing, pose unique challenges for millennial learners. Consequently, there is a need to redefine the meaning of learning in the mindset of millennial learners within the context of higher education, which requires adapting the thinking and behavior patterns in the learning environment to meet the demands of the digital era.

According to a study conducted by Hardika et al. (2020), there is a significant transformation in the way the millennial generation perceives the meaning of learning. This transformation is characterized by changes in students' self-perception as learners and the learning environment in higher education, which can lead to improvements in learning outcomes. The changes in students' self-perception as learners involve aspects such as creativity, orientation, self-reflection, self-experience, motivation, and personal growth. Additionally, the creation of a learning environment that promotes transformation in higher education can enhance learning outcomes through the

incorporation of innovative, creative, and technology-based approaches, as well as the establishment of positive learning conditions.

According to Taş et al. (2017), significant changes in the goals, emotions, and needs of individuals have occurred throughout different periods of time, leading to the emergence of intergenerational variations. In the current era, where digital technology has become an integral part of life in various domains, such transformations are particularly evident in the so-called Generation Z. This generation actively and intricately engages with modern technologies. Consequently, it is inevitable that individuals born into this digital world and raised under the influence of such technology differ from their ancestors.

In the article "Net generation or Digital Natives: Is there a distinct new generation entering university?" Jones et al. (2010) refer to the statement by Palfrey and Gasser (2008) that suggests the emergence of a new population comprising individuals born after the integration of digital technologies into social life, which began in the 1980s. Jones et al. (2010) argue that these young individuals, who have grown up with computers and the Internet, are presumed to possess a natural aptitude and advanced proficiency in new technologies. This issue is of great significance as it implies that both educators and educational institutions have a shared responsibility to adapt and meet the anticipated needs of this new generation of students.

As highlighted by Dombrowsky et al. (2018), there is a clear recognition that Generation Z, often referred to as the iGeneration, possesses distinct characteristics that set them apart from previous generations. They are self-motivated individuals driven by a desire for change. It is worth noting that many educational and marketing response systems are still designed with Generation Z and older cohorts in mind. However, it is important to acknowledge that Generation Alpha is emerging as the future generation.

6.3 Generation Alpha

Ziatdinov and Cilliers (2022) emphasize that the rapid evolution of technology has significantly influenced our perception of knowledge as a freely available resource and our ability to apply skills, concepts, and understandings. Technology has played a transformative role in various domains, including education. As we look towards the future, technological advancements will continue to shape teaching and learning

strategies. However, educators will also face new challenges with the emergence of the Alpha Group, the next generation entering higher education. This entrepreneurial generation is characterized by their innovative mindset, progressiveness, and ambition, with a projected 50% of Generation Alphas expected to obtain a bachelor's degree. Given the evolving educational landscape, researchers have been actively investigating the preferred learning styles, perspectives, and educational expectations of Generation Alpha as they prepare to enter university.

Tootell et al. (2014) introduce Generation Alpha as the cohort born at the intersection of Generation Z and the emerging era. This generation will soon populate classrooms and higher education institutions, necessitating tailored instructional methods and learning approaches that cater to their unique skill sets and needs. Notably, Amrit (2020) highlights the work of Mark McCrindle, an Australian social researcher, generational analyst, futurist, and demographer, who coined the term Gen Alpha to refer to individuals born between 2010 and 2024, drawing inspiration from the first letter of the Greek alphabet, Alpha. Just as Generation Z marked the end of the Latin alphabet-based naming convention for generations, the emergence of Generation Alpha paves the way for a new generation.

According to Amrit (2020), Generation Alpha encompasses individuals born between the years 2010 and 2025. Notably, their birth year of 2010 coincides with the launch of significant technological advancements such as the iPad and Instagram, which have become popular brands and social media platforms worldwide. Generation Alpha is born into a global environment where modern technology operates around the clock, every day of the year. Echoing this sentiment, Jha (2020) emphasizes that technology plays a pivotal role in the lives of Generation Alpha. Their activities encompass entertainment, gaming, peer-to-peer communication, and even schooling, especially in the context of the COVID-19 pandemic, where technology has become central to their educational experiences.

According to the generational model proposed by Howe and Strauss (1991), a generational shift occurs approximately every 20 years and exhibits cyclical characteristics. Generation Y, consisting of individuals born in the 1980s and 1990s, earned the moniker of the MTV Generation due to the prevalent influence and significance of this music channel during their formative years. Generation Z, on the other hand, represents the first generation to have technology and social media as integral components of their daily lives.

As is widely recognized, individuals belonging to Generation Alpha, the generation succeeding Generation Z, are already familiar with and soon to become key participants in this highly digitized world. Technology plays a significant role in shaping the evolving world, and its impact on education is undeniable.

Amrit (2020) introduces the term Alpha to denote novelty and a departure from the past rather than a continuation of it. Generation Alpha is recognized as the second true generation of the twenty-first century, with birth years starting from 2010 and beyond, indicating that the majority of these individuals are still in their school years. According to Amrit (2020), Generation Alpha students are exposed to marketing, technology, travel, and the various concerns of their millennial parents from a very young age. Interestingly, the same year of their birth, the term "app" was chosen as the most popular word of the year. McCrindle and Fell (2020) further note that this generation has greater access to technology, knowledge, and external pressures compared to any previous generation. Consequently, they are highly engaged in app-based activities, spend more time on screens, have shorter attention spans, and may lack a cohesive digital literacy and social development.

According to McCrindle and Fell (2020), Generation Alpha stands out from previous generations due to the pervasive influence of technology in their lives. Technology has shaped their reality and permeated every aspect of their daily experiences. From infancy, screens have served as pacifiers, sources of entertainment, and educational tools for Generation Alpha, who are growing up in an era of unprecedented change and rapid technological advancements. They unintentionally participate in a global experiment where screens are placed in front of them as pacifiers, sources of entertainment, and educational aids. Recognizing their strong connection to technology and its advancements, Tootell et al. (2014) refer to Generation Alpha as "Generation Glass, Screenagers, Digital Natives, and the Connected or Wired Generation." Moreover, Ziatdinov and Cilliers (2022) emphasize that being born into a highly digitalized world provides significant advantages to members of this generation in interacting with today's main technological devices, including smartphones, iPads, and laptops. Compared to previous generations, they naturally acquire knowledge and proficiency in utilizing various technologies at a faster and more comprehensive pace. As a result of their constant interaction with electronic devices, they are well-equipped to engage and navigate this postmodern society.

According to Romero (2017), the education of Generation Alpha will be significantly influenced by technological advancements. This generation is characterized by being more tech-savvy, entrepreneurial, and inclined to create their own job opportunities compared to previous generations. McCrindle and Fell (2020) further argue that the pervasive presence of innovation, progressiveness, and advancement in their environment will also shape their career choices and life decisions, setting them apart from previous generations. They are less likely to conform to societal prejudices, biases, and norms. Remarkably, with an estimated one in two members of Generation Alpha expected to obtain a university degree, their formal education is unparalleled in the history of humankind. McCrindle and Fell (2020) also highlight that digital skills, coupled with creativity, curiosity, and adaptability, are likely to be the strengths and core competencies of Generation Alpha. On the other hand, Generation Alpha should strive to enhance their critical thinking and leadership abilities.

As a consequence, according to Ziatdinov and Cilliers (2022), future higher education is likely to incorporate technology-integrated learning programs and opportunities, an increased focus on career engagement and preparation activities, and a reduced emphasis on skill development courses and programs. The shift will be from knowledge transfer to knowledge co-creation, harnessing the Generation Alpha student's unique skill set and their innate ability to embrace and understand technological innovations.

6.4 Transformation of Generations in Digitalization and Work Life

According to Taş et al. (2017), the concept of a generation refers to human societies born within a particular time period, sharing similar circumstances, and experiencing comparable destinies, challenges, and responsibilities. From a sociological perspective, a generation comprises individuals born within specific dates, influenced by similar social, political, and economic events during a particular social era, and sharing common values, beliefs, and behaviors based on their collective responsibilities within these circumstances.

At this point Sernikli (2019) classifies generations as “silent, baby boom, X, Y, Z and Alpha”.

The Silent Generation, as identified by Kyles (2005), encompasses individuals born between the years 1900 and 1945. Keleş (2011) outlines the key characteristics of this generation, which include a focus on deliberation, meaning, and process-oriented thinking, challenges in decision-making, loyalty to authority, readiness to follow directions, a preference for stability and established systems, respect for leaders, adherence to traditional values, and a generation where seniority is closely tied to age.

The Baby Boom Generation, identified by Kyles (2005), refers to individuals born between the years 1946 and 1964. Additionally, Adıgüzel et al. (2014) also refer to this generation as the War Generation. Demirkaya et al. (2015) and Bejtkovský (2016) highlight the main characteristics of this generation, including their advocacy for gender equality, opposition to racial discrimination, environmental sensitivity, loyalty, and a sense of job responsibility or duty. However, they may exhibit a lack of technical proficiency.

Generation X, identified by Kyles (2005), encompasses individuals born between the years 1965 and 1979. Taş et al. (2017) highlight certain characteristics of this generation in the corporate sphere, including high levels of satisfaction, loyalty, motivation, respect for hierarchy, and the ability to stay with the same institution for extended periods. They also possess idealistic traits. However, negative traits associated with this generation include a lack of assertiveness in the professional environment, a preference for individual accomplishments over team success, and a tendency to rely on technology compulsively.

6.4.1 Generation Y and Work Life

Kyles (2005) identifies the members of Generation Y as individuals born between the years 1980 and 1999, also referred to as the millennium generation by Andrea et al. (2016). Additionally, Sernikli (2019) mentions that this generation is known by various names, including Future Generation, Eco Boom, and Digital Generation. According to Adıgüzel et al. (2014) and Andrea et al. (2016), Generation Y, often referred to as the Digital Generation, exhibits specific characteristics such as technology addiction, independence, sociability, entrepreneurship, advanced thinking, quick information acquisition, high adaptability, multitasking, self-confidence, openness to change, a present-oriented mindset, a preference for university education,

and a tendency towards corporate behavior. On the flip side, Göktaş (2016) highlights the negative traits of Generation Y, including easily getting bored at work, frequently switching jobs, not prioritizing work, displaying low loyalty and satisfaction, and exhibiting hostile behavior towards authority.

According to Metin and Kızıldağ (2017), members of Generation Y value responsibility and prestige. They prioritize openness, freedom of thought, and being asked for their ideas. They consider themselves integral team members and aspire to managerial roles. Generation Y employees anticipate promotions early in their careers. Many individuals from Generation Y seek a work environment that offers flexibility, teamwork, and continuous and enjoyable learning.

From the perspective of Adıgüzel et al. (2014), Generation Y employees challenge traditional office regulations and hierarchies. They prefer roles that contribute to the company's growth and are willing to handle significant job pressure if their managers trust them and provide feedback. In this regard, their work styles differ from previous generations. They are not drawn to traditional hierarchical structures based on degrees and positions. Instead, they believe that all employees, regardless of seniority, should be informed of developments, and those with strong ideas should be given opportunities. Sernikli (2019) emphasizes that managers should motivate Generation Y by creating a flexible and social work environment tailored to their needs.

6.4.2 Generation Z and Work Life

According to Sernikli (2019), the generation born after the 2000s is often referred to as Generation Z or the Digital Generation. Metin and Kızıldağ (2017) emphasize that this generation is adept at using social networks and modern communication technologies, actively participating in numerous online communities. Nagy and Kölcsey (2017) note that Generation Z has never experienced a world without the internet, mobile devices, and the World Wide Web. They rely heavily on social media platforms such as Facebook and Twitter for communication and building friendships. Moreover, Kayıkçı and Bozkurt (2018) state that Generation Z embraces technology proficiently and considers it a natural part of their daily lives, rather than being addicted to or overly dependent on it. This generation readily embraces

innovative technologies, including wearable devices, artificial intelligence, mobile communication, and social media, earning them the label of 'digital natives'.

Metin and Kızıldağ (2017) describe Generation Z as the Quiet Generation, highlighting their preference for using communication devices rather than resorting to raising their voices or employing physical force. This generation possesses exceptional multitasking abilities and a high level of integration of motor nerve skills such as hand-eye coordination and auditory processing, distinguishing them as one of the most technologically advanced generations in history. Taş et al. (2017) further point out the positive characteristics of Generation Z, including a focus on individualism, self-expression, and entrepreneurship. However, this generation is also associated with certain negative traits, such as disloyalty, a propensity for giving up easily, egotism, a lack of inclination towards teamwork, and constantly escalating expectations.

According to Sernikli (2019), Generation Z, which is beginning to enter the workforce, highly values company success and productivity due to their ability to maintain focus and avoid distractions. They seek joy and continuous learning in their work environments. This presents a potential positive contribution. Due to their proficiency with technology, this generation represents a valuable human resource for businesses, as they can rapidly enhance their skills. However, it is important to consider that their low sense of belonging and propensity for job-hopping may pose challenges in retaining them within standardized systems. Taş et al. (2017) argue that with the integration of Generation Z, many industry executives anticipate a shift towards increased computerization, reduced paperwork and bureaucracy, flexible work schedules and structures, and the prevalence of teamwork, interim workgroups, and multinational collaborations over traditional hierarchical departments.

6.4.3 Generation Alfa and Work Life

Generation Alpha refers to individuals born after 2010, according to Reis (2018). Bejtkovský (2016) states that Generation Alpha encompasses the children of Generation X, Y, and Z, thereby inheriting certain characteristics shared by previous generations. However, Sernikli (2019) suggests that Generation Alpha will also bring about significant changes in social life and the economy, diverging from their predecessors in various ways. While comprehensive research on Generation Alpha is limited, Bejtkovský (2016) outlines some key features associated with this generation.

- They will constitute the leading entrepreneurial generation ever,
- They will be the most proficient technology users ever, the majority of their purchases will be made online,
- They will have less interpersonal interactions than earlier generations, they will be heavily affected and spoiled by their generation X and generation Y parents,
- They will develop greater independence,
- They will receive a better education.

Furthermore, Sernikli (2019) suggests that Generation Alpha will place a high value on family relationships. Kaynak (2017) emphasizes the importance of tailored and user-friendly approaches in advertising campaigns and job assignments for individuals from the Alpha generation, who will be born and raised in a technologically advanced environment. Reis (2018) predicts that Generation Alpha will spend significant time interacting with robot colleagues or assistants, engaging in learning activities, discussions, and integrating technology into their daily lives. In terms of decision-making and technology, Generation Alpha is expected to lean towards leadership roles and exhibit a desire for independence. The rise of professions such as digital influencers, YouTubers, and bloggers can be anticipated as career choices for this generation.

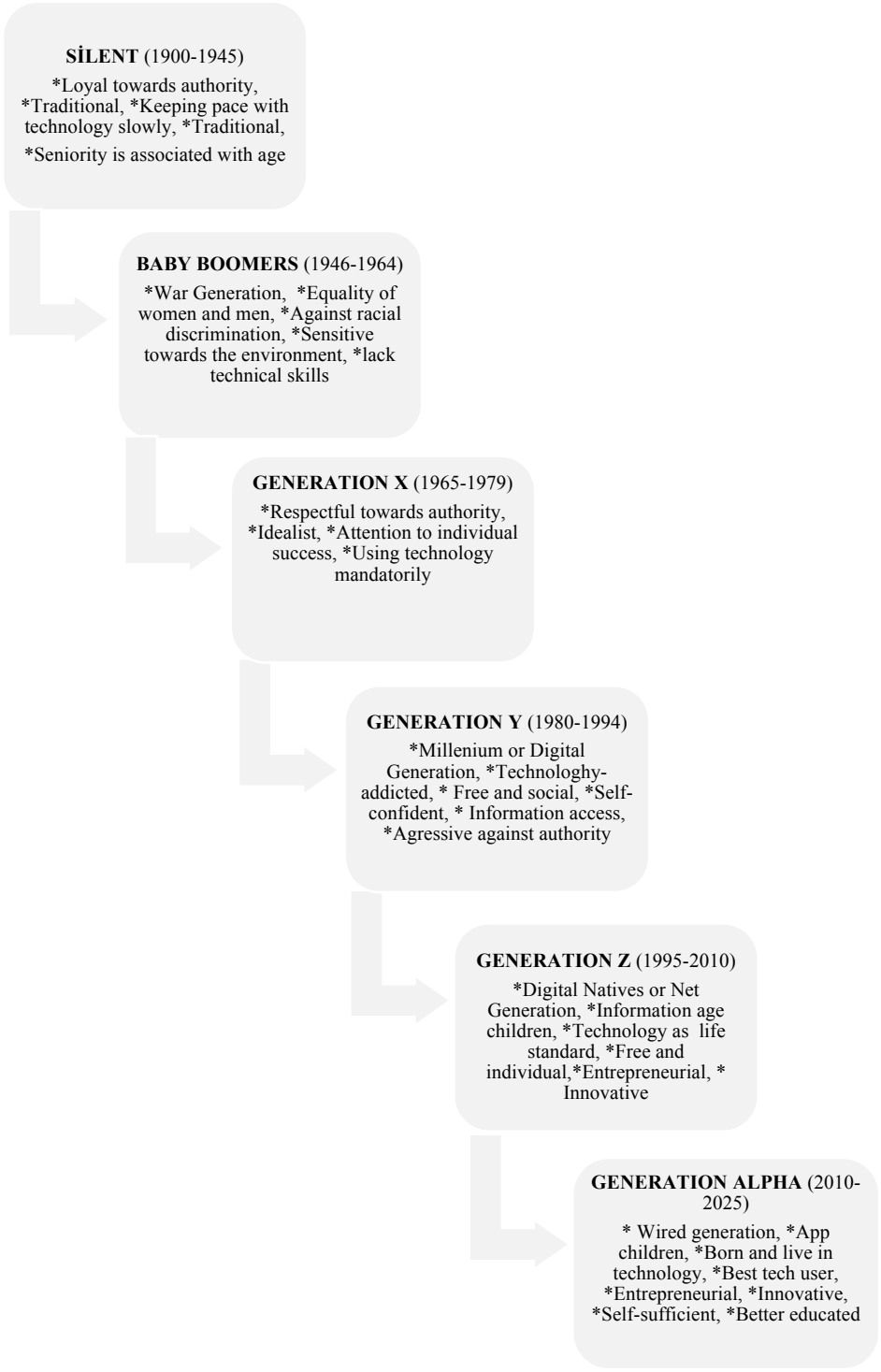

Figure 6.1 History and features of generations

6.5 Reflections from the Past to the Future

In their article titled "Generation Alpha: Marketing or Science" published in Acta Educationis Generalis, Nagy and Kölcsey (2017) discuss the transformative impact of the information age on communication and information-gathering processes. The shift from a world of limited information to one characterized by extensive information availability has necessitated a reevaluation of learning methodologies, particularly in the context of non-formal and informal learning, including lifelong learning. Drawing on the theories of Mannheim (1969) and Prensky (2001), Generations X, Y, and Z have been characterized, although the specific name for the subsequent generation is currently under exploration.

Marc Prensky emphasized the relationship between the information society and technology as a crucial aspect in understanding generational dimensions. By combining Prensky's digital immigrants-digital natives paradigm with the Strauss-Howe model (1991), Székely (2014) provides valuable insights into the characteristics of Generation X, Y, Z, and Alpha.

In Székely's (2014) analysis, Generation X is referred to as digital immigrants or the McDonald's generation. This age group, born in the late 1960s and early 1970s, had early exposure to information technology and the digital world. They witnessed the evolution of computer technology into the information society, and the internet has become an integral part of their lives. Growing up in Western nations, they were influenced by the pervasive presence of electronic media.

Székely (2014) presents Generation Y as digital natives. Born in the 1980s and 1990s, individuals in this age group discovered the internet during their formative years. They possess proficiency in using digital tools and navigating the online world. Generation Y is characterized by their high media consumption and their quick adaptation to technological advancements. They are considered the generation of the information society, having grown up using ICT facilities from a young age. This generation sets global trends and is often at the forefront of mastering new technologies, which has significant implications for the educational landscape. They exhibit a greater sense of comfort and familiarity in the digital environment compared to older generations of digital immigrants.

According to Székely (2014), Generation Z is often referred to as the Facebook generation. Born at or after the turn of the century, they have grown up in the era of

Web 2.0 and have a significant presence on social media platforms. Unlike previous generations, their primary means of communication is social media rather than email. Generation Z not only consumes information but also actively produces and shares content. They are digital natives who have never experienced life without wireless networks, mobile phones, or the internet. A notable cultural distinction is their active production of digital content on platforms like YouTube, Facebook, Twitter, and unauthorized websites. They are adept at multitasking and exhibit improved decision-making speed. Generation Z integrates digital tools and materials into their daily lives, customizing them according to their interests, and they are not limited by geographical boundaries. Their social environment is fundamentally different from earlier generations, resulting in distinctive learning, socialization, and leisure activities. Their information consumption strategies involve multitasking and a cumulative intake that surpasses the traditional limits of an individual's capacity. Additionally, many of them may be unaware of the legal and institutional context of their regular internet activities, such as downloading and file sharing.

Furthermore, Székely (2014) notes that while the alphabet concludes with Z, the generational shift is unlikely to end there. Therefore, the question of what the next generation will be called arises. In the search for a name for the subsequent generation, Australian demographer Mark McCrindle and his team conducted a national survey in 2005, which revealed that the most popular option was Generation Alpha. This term draws parallels to other scientific fields where, after exhausting the Roman alphabet and Arabic numerals, the Greek alphabet was adopted as a naming convention.

In his article '5 Predictions for Generation Alpha,' Schawbel (2014) provides additional insights on the subject. He attempts to anticipate five characteristics that children of Generation Alpha may develop, which bear similarities to those observed in Generation Z.

- They will be the generation with greater entrepreneurism,
- They will be the most technologically advanced generation and will have never known a world without social networking,
- They will mainly purchase online and engage in less human interactions than earlier generations,
- They will be very pampered and affected by their Generation X and Generation Y parents,

- and they will be more independent, better educated, and ready for significant challenges.

In the article 'The Effect of Attitudes by Generations X, Y, Z, Alpha, Beta, Gamma, and Delta on Children' within the book 'Being a Child in a Global World,' Fidan (2022) argues that the demands and value placed on public goods and services by generations X, Y, Z, and Alpha, who coexist in the present era, vary significantly within the growing and expanding demographic segment. This trend is expected to persist, particularly as more than 80 percent of the global population currently resides in urban areas.

Table 6.1 Comparison of recent generations

Perspective	**Gen. X**	**Gen. Y**	**Gen. Z**	**Gen. Alpha**	**Gen. Beta**
Birth Years	1965-1980	1981-1994	1995-2009	2010-2024	2025-2039
Life Paradigm	Relate to me	Life is a cafeteria	Make a difference	Be different	Create difference
View of Authority	Ignore them	Choose them	Work with them	Manage them	Be them
View of Relationships	Central, caring	24/7	Collaboration, resolution	Result-oriented	Robotic
Value System	Media	Shop Around	Open-minded	Influencer	Digital
View of Career	Irritant	Place to serve	Place to solve problems	Place to manage	Boss
View of Technology	Enjoy it	Employ it	Live it	Impossible without it	Part of it
View of Future	Hopeless	Optimistic	Solve it!	Get it!	Live it

Reference: Mohr, K. A., & Mohr, E. S. (2017). Understanding Generation Z students to promote a contemporary learning environment. *Journal on Empowering Teaching Excellence*, *1*(1), 9.

In the article 'Transformation of Human Resources in Digitalization: Y, Z, and Alpha Generations,' Sernikli (2019) explains that the term 'digital' originates from the Latin word 'digitus,' meaning 'finger.' The advancement of digital technologies, such as cyber-physical systems, cloud technologies, smart factories, IoTs, robots, big data, and cybersecurity, amplifies the impact of digitalization. Denner et al. (2018) further define digitalization as the utilization of digital technologies to improve or modify corporate models, human resource management, business processes, and products and services. Moreover, Sernikli (2019) summarizes that the corporate world of today

encompasses four distinct generations: the silent generation, the baby boom generation, the X generation, and the Y generation. The Z generation has already started working as trainees in some businesses, and in the near future, all members of Generation Z will actively participate in the corporate world. Additionally, the 'Alpha generation' will enter corporate life in the future, collaborating with robotic teammates.

Lastly, Generation Beta, consisting of individuals born between 2025 and 2039, is anticipated to follow. Although there are limited exploratory studies about this generation, Venture Pacific (2020), a futurist organization primarily operating in the Asia-Pacific region, suggests an intriguing perspective. They propose that if Alphas were Digital Natives, naturally embracing technology in their lifestyles, Betas are now known as Artificials. While Alphas were able to learn and advance using artificial intelligence technologies, these technologies will play a vital role in the lives of Betas. According to Venture Pacific (2020), Betas will increasingly accept and engage in interactions with artificial intelligence.

This chapter examines the key generations in terms of their general characteristics and differences, particularly regarding their attitudes towards the digital transformation of our era and the major predictions of future changes. The following chapter will delve into the digital evolution of universities, exploring the fundamental factors driving this transformation based on the realities of our age in a comprehensive projection.

CHAPTER 7

7. TRENDS DETERMINING FUTURE IN HIGHER EDUCATION

We are currently living in an era of uncertainty where every industry, the service sector, and even daily life have undergone significant change and development due to the digital revolution. Higher education institutions, or universities, have also undergone a long evolution process in response to these new circumstances, norms, and conditions, driven by the impact of digitalization and evolving expectations of stakeholders. In Chapter 3 of this study, the historical journey of universities is discussed, starting from their initial role as Information Transfer Centers in the first generation (university 1.0) and progressing to become Transfer and Research Centers in the second generation (university 2.0). Subsequently, they transformed into Information Transfer, Research, and Application Centers (University-Industry) in the third generation (university 3.0). The 21st century introduced the fourth generation, University 4.0, characterized by digitalization. However, the forthcoming paradigm is University 5.0, a fully digital university of the future expected to emerge after the 2030s. Therefore, this chapter aims to shed light on the path towards University 5.0, providing insights into the future reality of higher education institutions. It addresses the preparation for a digital university, the rise of hybrid education in the 2020s, the ongoing debate surrounding digital university and its evolution towards University 5.0, the influence of Metaversity. Furthermore, this study will examine the concept of Society 5.0, followed by an analysis of the University of Edinburgh case. Additionally, it will explore examples of Metaversity and Facebook-supported digital campuses. Moreover, a study conducted at the Open University of the United Kingdom, which investigates the potential changes in education over the next decade, will be presented.

Subsequently, a comparative analysis of the structure and costs of traditional universities versus digital universities will be provided, along with a simulation highlighting the pros and cons of each approach. Lastly, the study will delve into the role of digitalization in driving innovation within higher education, considering the opportunities it presents in the new era.

Looking back at history, Jöns (2016) explores the relationship between the evolution of contemporary education and the modifications in universities from the early modern age to the emergence of mass higher education in the 1960s. The course focuses on intellectual and organizational reforms in the 16th and 17th centuries, the introduction of compulsory education in the 18th and 19th centuries, the global expansion of research universities since the 19th century, and the rise of new and expensive techno-sciences as significant fields for international collaboration and competition in the 20th century. This transition from a humanistic to a scientific model of learning, teaching, and research has profoundly transformed schools and universities, explaining why recent globalization processes in education and research are dominated by the natural and technical sciences and their assessment cultures.

In the article 'Redefining the Future of Higher Education in the 21st Century: Educating and Preparing for Today and Tomorrow,' Enwefa and Enwefa (2016) argue that higher education has experienced significant changes in recent decades. Academic institutions worldwide have faced challenges such as increasing student populations, demographic shifts, demands for accountability, advances in technology, and data analytics. Despite these developments, the academic enterprise is still grappling with the consequences and adaptation to these transformative forces.

Enwefa and Enwefa (2016) state that although the contemporary university system remains rooted in the 19th-century model, various forces continue to reshape higher education approaches in the 21st century. Factors driving change in higher education include the digital divide, the learning economy transitioning to learning management systems, digital learning tools, simulations, and budgetary constraints. These pressures have led to the emergence of five key trends in universities for the 21st century: competency-based learning, workforce skills certificates and badges, data-driven university admission processes, real-time technology-driven evaluation, and boot camp academies and short-term training. Universities now search for potential students among those enrolled in free massive open online courses (MOOCs),

enabling them to identify talented candidates who have completed equivalent courses to those in their programs.

According to Aktan (2009), contemporary universities can be classified into several groups, including 'State Higher Education Institutions/State Universities,' 'Non-Profit Universities,' 'For-Profit Universities,' 'Corporate Universities,' 'Transnational Universities,' and 'Virtual Universities.'

Table 7.1 Major actors in delivery of higher education services

Higher Education Institutions	**Main Features**	**Examples**
State Higher Education Institutions / State Universities	✓ Partially or fully founded from the state budget. ✓ Government regulation exists in the selection or appointment of top managers.	State universities operation all around the world.
Non-Profit Universities	✓ The first establishment and expenditures of the university is financed by the foundation. ✓ Income from higher education activities cannot be allocated to other activities. ✓ Foundation founders and the established Board of Trustees are authorized in the appointment of top managers.	This system is most commonly used in the USA. All foundation universities in Turkey can be cited as an example in this regard.
For Profit Universities	✓ All expenditures of the university are financed by companies created for profit. ✓ Income from higher education activities may be allocated to other activities. ✓ Establishing company can be indirectly effective in the appointment of top managers of the university.	Private for profit universities operating in the US, Canada and many others can be displayed as an example.
Corporate Universities	✓ All expenditures of the university are financed by companies created for profit. ✓ Income from higher education activities may be allocated to company's own activities or other activities. ✓ Establishing company can be indirectly effective in the appointment of top managers of the university.	Motorola University, General Motors University, Oracle University and Kellogg University operating in the US can be given as an example.
Transnational Universities	✓ Cross-border universities are widely established by companies aiming profit. All expenditures of the university are financed by companies created for profit. ✓ Cross-border universities can also be established by non-profit organizations. In this case, all expenses of the university are financed by the founding foundation. ✓ Founder Company or Foundation Board of Directors / Trustees is authorized in the appointment of top managers of the university	Apollo Group, Career Education Corporation, Kaplan University, Corinthian Colleges, Laureate International Universities, DeVry, ITT Educational Services, Raffles Education and Manipal are the main actors of global higher education sector.

Virtual Universities	✓ Virtual universities can be established by governments as well as non-profit or for profit companies.	Tec de Monterey in Mexico, College Connection and International University can be given as an example.

Reference: Aktan, C. C. (2009). Yüksek öğretimde değişim: global trendler ve yeni paradigmalar. *Organizasyon ve Yönetim Bilimleri Dergisi*, *1*(2), 39-48.

The article by OBlinGer (2010) explores the future of higher education, particularly in light of the economic downturn and the advancements of the digital age. The author highlights that the challenges facing university education go beyond financial concerns and emphasizes the impact of information technology on societal transformations. The question is raised whether academic institutions should continue to bundle academics, students, classrooms, and courses on a physical campus or if the future will lean towards online or digital institutions. Furthermore, the increasing prevalence of students bringing their own devices and equipment raises further questions about the role of campuses in providing resources.

OBlinGer (2010) also identifies several enduring problems intensified by the digital world. These include issues of accessibility, engagement, graduation rates, flexibility, and participation. Additionally, the need for IT infrastructure, regulatory compliance, and sustainability pose challenges in terms of cost and energy consumption. Measurement, productivity, and accountability are also identified as key difficulties for the future of higher education.

The author suggests that universities must adopt global strategies and leverage information technology to enhance learning productivity and provide affordable education. The aim is to accommodate more students efficiently while maintaining a financially stable model. This requires transforming today's education opportunities into the educational assurance of tomorrow.

In another article by Morris (2018) titled "Designing the future in higher education," the author discusses the need for institutions to address growing public concerns, budget constraints, and changing delivery modalities, demographics, and job requirements. The Georgia Institute of Technology (Ga Tech) serves as an example, as it formed the Commission on Creating the Next in Education (CNE) to envision a technologically advanced research university. The commission recognizes the importance of comprehensive planning, incorporating both traditional models and innovative pedagogical paradigms to ensure student and graduate retention throughout

their lifetimes. The Georgia Tech Commitment to a Lifetime Education embodies this strategic approach.

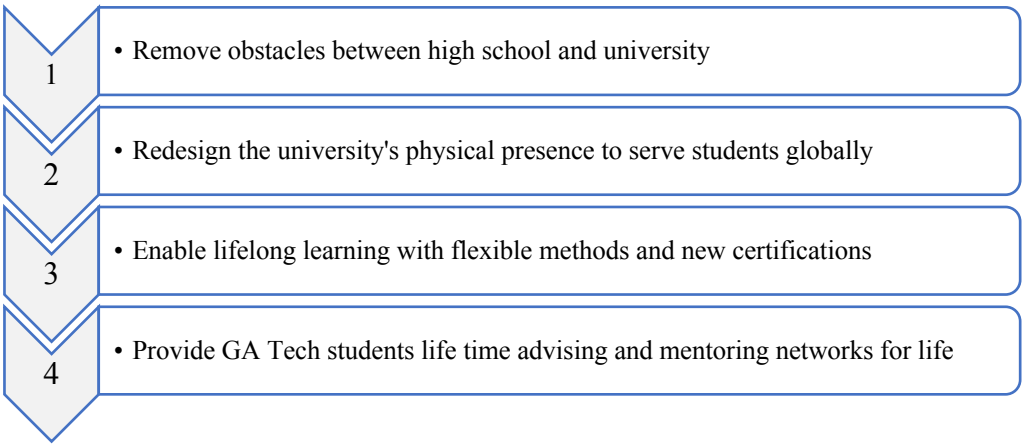

Figure 7.1 Four key actions identified to achieve the shift in focus Reference: Morris, L. V. (2018). Designing the future in higher education. *Innovative Higher Education*, *43*(5), 321-322.

7.1 Preparing for Digital University

According to Harasim (2000), the offering of the first fully online course in 1981 marked the emergence of a new model of education with significant potential to impact the design and delivery of education at all levels. Online learning is often characterized by its learner-centered approach, reduced costs, high retention rates, flexibility, increased enrollment, high interconnectedness between learners and instructors, synergy of media, and pedagogical innovations (Joksimović et al., 2015).

Siemens et al. (2015) argues that higher education cannot remain isolated from the global trend of digitization. Leading universities have been establishing dedicated units and senior management positions to explore innovation processes within academia. To ensure a strong future for digital learning in the academic realm, it is essential to assess the existing knowledge and thoroughly researched areas.

Siemens et al. (2015) also emphasizes the importance of encouraging progress and implementation of digital learning research within society and academic institutions. Key areas requiring investigation include academic staff development, organizational change, innovative practices and institutional models, teaching and learning process efficiency, student experience, performance improvement for all students, as well as state and provincial policies, strategies, and financing mechanisms.

In order to address these needs, interested academics, managers, government officials, and industry representatives are invited to collaborate in developing an organization that advocates for a collaborative and research-based approach to digital learning.

According to Moşteanu (2021), digital communication has become crucial in all social and commercial sectors as we transition from traditional learning to digital e-learning. The Covid-19 pandemic has accelerated the need for digitization, forcing the entire human population to adapt to digital life and abandon outdated practices. While digitization has been ongoing for several years, the pandemic has made it an imperative. Lockdowns have compelled us to operate online and rely on digital networks for communication, payments, and knowledge acquisition, prompting all industries to rapidly adapt to the digital age.

Moşteanu (2020) highlights that recent events in 2020 have underscored the value of technologies developed by scientists in reshaping university education. The shift from traditional teaching and research to digital campuses, facilitated by educational technology (EdTech), has become a prominent trend. In fact, according to Moşteanu (2021), e-learning and e-presence have experienced significant growth due to the socioeconomic realities of the global community. Moving online involves more than just delivering instruction; it is transforming the entire educational environment. Technology continues to reshape every sector, including universities. Furthermore, Moşteanu (2020) argues that online education and digital campuses are no longer a passing fad but have become the new norm. Consequently, transforming the organizational culture and structure of universities and fully implementing the digital campus can contribute to the sustainability of the educational process in an era characterized by technology and socioeconomic unpredictability.

According to Moşteanu (2021), the concept of a digital campus encompasses not only e-learning but also e-presence and e-university governance, incorporating all activities conducted by the university as a corporate entity, in addition to teaching, learning, and research. With the support of e-tools, students engage in various stages of the academic journey, such as application management and registration, counseling, course registration and class timetables, class assignments and access to educational content, thematic centers, networking, socialization, examinations and grading, graduation, and alumni networks. All these activities are conveniently accessible online. The digital campus represents a high-tech environment that enables universities

to adapt to the changing needs of 21st-century society while maintaining the quality of teaching and learning.

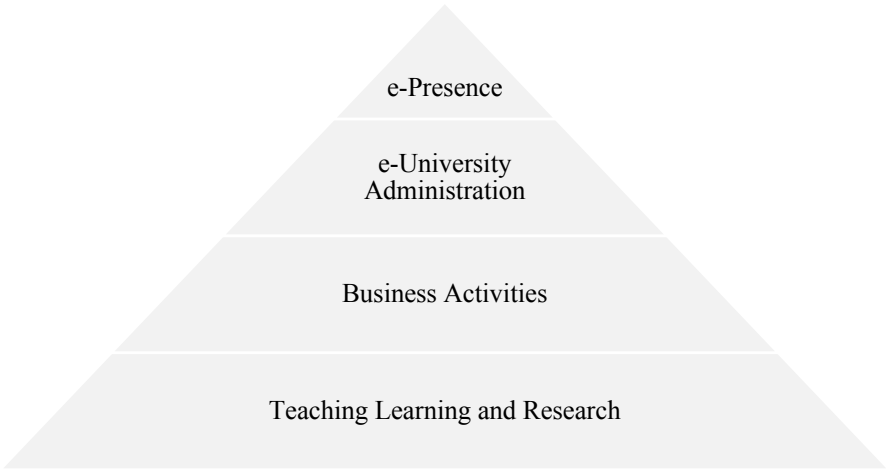

Figure 7.2 Building a digital campus Reference: Moşteanu, N. R. (2021). Digital Campus–a future former investment in education for a sustainable society. In *E3S Web of Conferences* (Vol. 234, p. 00029). EDP Sciences.

A substantial investment in higher education is necessary to transition from formal instruction to e-learning and provide students with the certifications and capabilities required for employability, as emphasized by Moşteanu (2021). The concept of a Digital Campus goes beyond mere technology and online presence; it entails a commitment to adaptability, investments, innovation, creativity, and teamwork. Embracing the Digital Campus model, which represents a technologically advanced approach to higher education, is crucial for promoting the healthy and sustainable growth of the global economy.

Jafari et al. (2021) argue that the traditional notion of education, with its physical locations such as universities, classrooms, and academic staff, is being transformed by the networked world and the information society. The Digital University, built on transformative technology, creates an environment that caters to the needs of its stakeholders, particularly students, academics, and administrators. Through an examination of the progress made by universities and lessons learned in the aftermath of the COVID-19 crisis, the Digital University adapts to the changing landscape of higher education.

In the article "Higher education in the era of the fourth industrial revolution," Gleason (2018) acknowledges that higher education, like society as a whole, is

undergoing profound development. University education is more accessible than ever before in human history, reaching more students in various locations and through diverse methods.

Gleason (2018) further highlights that higher education plays a critical role in facilitating essential societal transformations to adapt to the Fourth Industrial Revolution. However, contemporary university education was designed to meet the needs of earlier industrial revolutions characterized by mass production driven by electricity. These systems are incompatible with the demands of the automation economy.

According to Mazzarol et al. (2003), the Transnational Higher Education (THE) model can be understood through three interconnected waves of cross-border activities. The first wave involves students traveling to a host country for studying, while the second wave encompasses academic alliances and coalitions between universities through dual or joint degree programs. The third wave focuses on establishing branch university campuses in foreign markets and delivering courses digitally through information and communication technologies (ICTs).

Quoting Rossman (1992), "The virtual university, which describes the electronic and online delivery of educational services and activities, is claimed to be the future of higher education." Gleason (2018) adds that Massive Open Online Courses (MOOCs) such as Coursera, EdX, and Udemy have emerged as potential solutions to educational disparities and gained significant attention in the 2000s.

Gallagher and LaBrie (2012) observe that universities like Columbia University, Georgetown University, Johns Hopkins University, the University of North Carolina at Chapel Hill, and the University of Southern California are offering new digital or hybrid graduate degrees. This innovation serves three primary purposes: validating the credibility of digital education in the public's eyes, generating interest from stakeholders in the higher education ecosystem, and indicating that these universities are now competing in student markets, thereby increasing market complexity.

Yaman (2020) notes that Generation Z students have distinct expectations from higher education institutions compared to previous generations (Generation X and Generation Y). However, the prevailing approach in higher education fails to meet these objectives, leading to a debate about the current paradigm. The NMC/CoSN Horizon Report-2017 highlights the crucial role of technology in the future provision

of higher education offerings based on a global survey conducted by the New Media Consortium.

Yaman (2020) also mentions that recent academic conferences and symposia on higher education have focused on various subjects, including international academic cooperation, multinational licensing and graduate programs, formation of multi-partner research centers, market-oriented policy changes, global academic mobility, quality assurance processes and accreditation applications, entrepreneurial university administration models, and e-university and e-learning.

7.2 Rise of Hybrid Education in the 2020s

Underlined in the academic article "The Role of an Entrepreneurial Mindset in Digital Transformation: A Case Study of the Estonian Business School" (Kooskora, 2021), it is emphasized that digitalization and the demand for individuals with digital competencies are prevalent across various sectors, including universities. As both organizations and educational institutions, universities need to undergo digital transformation to support their students in navigating and leading digitalization processes within their own enterprises.

Similar to other sectors, universities' roles in society, the economy, and education delivery are evolving and will continue to do so in the coming decades. The impact of global changes on higher education is even more pronounced compared to other sectors, requiring universities to become more digitally focused learning institutions (Coskun, 2015; Bridgstock & Cunningham, 2016). In this digital age, universities must compete globally for students, academics, and financing. Only those institutions that remain relevant and embrace new digital skills will thrive.

E-learning has gained widespread popularity, and Massive Open Online Courses (MOOCs) have become globally appealing to students (Schuwer et al., 2015). Consequently, many universities are interested in providing and expanding digital education opportunities. While some top universities, such as Cambridge and Oxford, have adopted hybrid education approaches combining digital learning with face-to-face interactions to equip students with relevant skills and real-world problem-solving experiences (Berger & Frey, 2016; Kooskora, 2021).

According to Kooskora (2021), university senior administrators must recognize that institutions failing to implement digital changes will struggle to compete

effectively in the current digital age. Achieving this transformation requires developing a high level of digital awareness, cultivating a digital vision, acquiring necessary digital skills, and fostering an entrepreneurial mindset. Institutions must rethink their operations in the expanding digital age to avoid falling behind the competition.

In the academic article "Digital Transformation in Higher Education: A Case Study on Strategic Plans" (Hakan, 2020), digitalization emerges as a primary focus for both corporations and universities. Digital transformation has become necessary for universities to address the challenges arising from the rapid and diverse changes in their context. In higher education, digitalization encompasses more than technological transformation. Its objective is to broaden the scope, anticipate stakeholders' needs and behaviors, and provide education, research, and social services that align with users' requirements in a competitive environment.

Hakan (2020) highlights the service-oriented objective of digital transformation, which involves creating new educational programs and digitizing existing ones. Various e-learning structures are enhanced with innovative techniques.

Furthermore, Hakan (2020) notes that internet access has increased, coverage has expanded, and the quality of instructional materials has been improved to enhance digital and online education. Videos can be viewed on both mobile and fixed devices, and their importance in lessons has grown (Seaton et al., 2014). Hybrid/blended education has replaced traditional face-to-face education, reflecting the changing landscape of educational delivery (Almaraz et al., 2017).

Carayannis and Morawska-Jancelewicz (2022) emphasize the need for universities to create and define future visions rather than merely reacting to them, particularly in the context of new concepts like Industry 5.0 and Society 5.0 following the COVID-19 experience. Hakan (2020) insists that universities must redefine their roles and behaviors to remain relevant. As online/hybrid teaching and learning strategies adapt to the evolving demands of different generations, several important concerns need to be addressed.

Covid-19 has significantly impacted higher education worldwide, with Marinoni et al. (2020) stating that two-thirds of institutions have shifted from classroom instruction to remote teaching and learning. This transition to online education was not without challenges, including accessibility to technical infrastructure, competencies and pedagogies for digital education, and discipline-specific requirements. However,

it also presents an opportunity for more flexible learning options, blended or hybrid learning, and combining synchronous and asynchronous learning. Additionally, COVID-19 has accelerated digital mobility and collaborative digital learning as alternatives to physical student mobility.

Lastly, Sabzalieva et al. (2021) argue in the article "Thinking Higher and Beyond: Perspectives on the Futures of Higher Education to 2050" that digital and hybrid learning offer improved access, self-paced learning, rapid reskilling and retooling for mature students, as well as greater variety and mobility of certification through micro and digital accreditation.

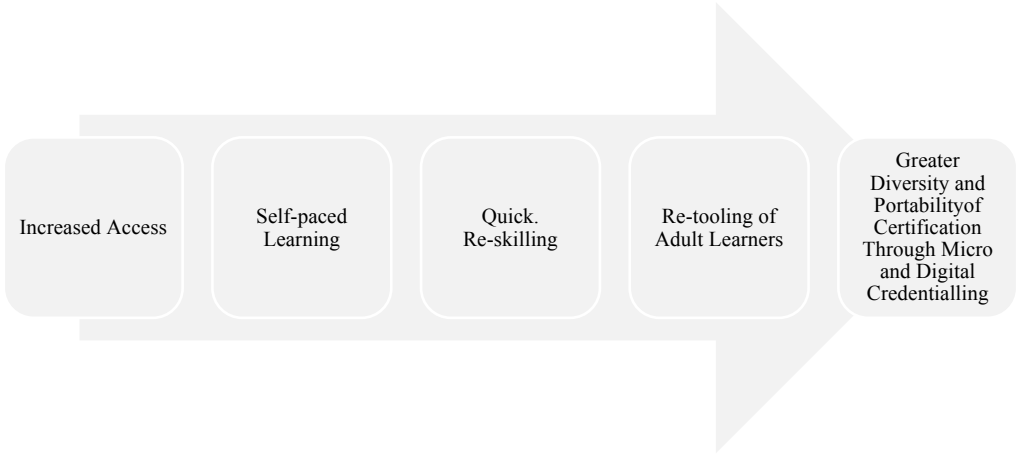

Figure 7.3 Benefits of online and blended learning Reference: Sabzalieva, E., Chacon, E., & Liu, B. L. (2021). Thinking higher and beyond: perspectives on the futures of higher education to 2050.

According to Sabzalieva et al. (2021), the rapid shift to digital education prompted by the pandemic has demonstrated the transformative impact of technology on higher education, and its implications will continue to be significant in the future. The pandemic has also underscored the importance of bridging the digital divide to ensure inclusivity. It is crucial for higher education institutions to advocate for the right to access devices and connectivity, enabling further digitalization to enhance access and improve the overall higher education experience.

Additionally, Sabzalieva et al. (2021) highlight that global access to higher education has witnessed significant growth. Beyond 2050, there remains ample opportunity for the expansion of higher education, particularly in regions like Africa. It is anticipated that half of the world's population will engage in higher education through a combination of face-to-face, hybrid, and digital learning modalities. The

adaptability of digital education can foster engagement among individuals in various communities, such as stay-at-home mothers, rural populations, and employees seeking retraining opportunities.

Lastly, Sabzalieva et al. (2021) conclude that the COVID-19 pandemic has emphasized the significance of interpersonal and social interactions, which higher education institutions can facilitate through both physical and digital spaces. In the future, international students should have the opportunity to choose courses from diverse universities worldwide, enabling them to engage in intellectually stimulating experiences through new forms of student mobility, including transitions between on-campus and digital education.

7.3 Digital University Towards University 5.0

According to Petkovics (2018), advanced innovations in information and communication technologies (ICT) have led to the growth of operational processes and the promotion of products and services. These technologies also offer a model for utilizing information technology that reduces initial IT investment and moderates operational costs. Higher education institutions, as service providers, recognize the advantages of modern ICT and are incorporating them into their corporate strategies. The concept of digital transformation has emerged as a goal for organizations, including universities, as they embrace the newest ICT technologies such as cloud computing, Internet of Things (IoT), big data, blockchain, artificial intelligence (AI), and machine learning (ML) and adapt them to their users' needs and abilities (Faria & Nóvoa, 2017).

From Siemens et al.'s perspective (2015), the advent of the Internet has transformed the mode of knowledge distribution, and higher education is not exempt from this global digitization process. The movement towards digital transformation, often associated with Industry 4.0, has gained momentum, especially with the mandatory lockdowns imposed during the COVID-19 pandemic. Many educational institutions have implemented various digital education systems and tools, highlighting the increased significance of digital technology at all levels of instruction (Korkmaz & Toraman, 2020).

Picciano (2016) outlines the emergence of digital learning technology in five waves spanning from 1993 to the 2020s: starting (1993-1999), integrating into the

mainstream (early 2000s), the concept of massive open online courses (MOOC) (2008-2013), the blending of blended and MOOC technologies (2014-2020), and maturity (2021-2029) with a future extending beyond 2030.

As Moşteanu (2021) suggests, even before the 2020 pandemic crisis, the implementation of educational technologies, artificial intelligence, digital systems, and cybersecurity specializations had witnessed rapid growth. This was reflected in global EdTech investments, which reached $18.66 billion in 2019 and are projected to reach $350 billion by 2025.

Sheail (2018) emphasizes the translocal and transtemporal nature of the digital university, extending the concept beyond physical campus boundaries through strong links across different locations, times and temporalities. A digital university, or University 5.0, can employ academic staff from around the world and provide higher education globally, showcasing its efficiency and effectiveness in the competitive 21st-century market.

Figure7.4 Forms of a digital university

According to McCluskey and Winter (2012), it is crucial to reconsider the concept of higher education in the digital age due to the radical differences between the digital university and the traditional university. The authors highlight three specific areas in which the digital revolution has affected higher education: (a) Online courses have expanded the reach of universities and generated substantial amounts of data that can be aggregated and analyzed to inform decision-making regarding various outcomes, such as student continuity and classroom achievements; (b) Enhanced access to information has transformed the roles of libraries and librarians; and (c) Advanced data management systems, such as Enterprise Resource Planning (ERP), now coordinate a significant amount of university activities and decisions, providing managers with information about all aspects of the institution.

After conducting a study, Khalid et al. (2018) emphasize that universities are increasingly challenged by the effects of a digital world and must strive to compete in terms of student mobility, financing, and global rankings. Only those universities capable of improving their advanced digital abilities will survive. Additionally, Baumöl and Bockshecker (2017) point out that changes in higher education are not solely driven by technological advances but also by societal shifts. As Generation Z and Alpha join universities, additional needs must be met to accommodate their unique learning demands.

7.3.1 The Effect of Metaversity

Hassanzadeh (2022) mentioned that while universities have been offering e-learning services for years, their integration into cyberspace has not been as rapid as that of business enterprises such as banking, IT corporations, and the retail sector. It is important to note that the fundamental aim of universities is distinct from that of other enterprises, making it challenging to compare them in various ways. Furthermore, any modifications to the processes of education, research, scientific innovation, and technology must be compatible with other pertinent processes, necessitating caution when implementing changes in these fields. As a result, alterations in university systems often occur gradually.

According to Hassanzadeh (2022), Metaversity represents an emerging reality aimed at facilitating the successful presence of universities in the metaverse ecosystem. Metaversity interacts with the metaverse environment in three fundamental ways, namely: 1) self-education, discourse growth, and empowerment, 2) participation, utilization, and efficiency, and 3) collaboration, networking, and leadership. By clarifying and implementing these activities, global academic institutions and academic leadership in the metaverse can be developed.

Hassanzadeh (2022) states that the first task involves acquiring accurate knowledge about the metaverse. Creating comprehensive metaverse-related courses, fostering discussions, establishing metaverse chairs, and similar initiatives will assist universities in understanding this new space. Moreover, these efforts will enable practitioners, policymakers, and all citizens to gain metaverse-related knowledge and intellectual competence. The effective execution of subsequent tasks heavily relies on the proper execution of recognition, explanation, and instruction tasks. Encouraging

metaverse dialogue in higher education institutions and providing necessary human resources are crucial steps in this regard.

Furthermore, Hassanzadeh (2022) explains that the second task is actively engaging in the establishment of metaversities and expanding the concept of individual learning, discourse growth, and autonomy; presence, deployment, and efficiency; as well as collaboration, networking, and brand leadership in the Metaverse. The absence of universities in the metaverse may be perceived as negligence or an inability to adapt. Universities should not only acquire space in the Metaverse but also develop the necessary infrastructure and integrate it into the Metaverse. In doing so, metaversities can build the academic metaverse through public trust and collaborative engagement. The concept of a global university has never been more accessible. In addition to providing an activity space, the construction of metaversity in the Metaverse enables broader public access through these institutions. Metaversity should serve as a gateway for individuals to enter and thrive in the metaverse, promoting science, technology, and the metaverse to the greatest extent possible.

Finally, Hassanzadeh (2022) describes the third task of metaversity related to its leadership in this new area. With a large network of students, graduates, workers, and the general public, metaversity has the potential to become a dominant force in the metaverse. The participation and leadership of universities in the metaverse will likely lead to the establishment of a global academic community. Leadership in the metaverse environment will enable public engagement and contribute to the management of knowledge and the digital transformation of society. The meta-generation university will enjoy greater overall support compared to universities of previous generations. The metaverse offers more tools for communicating with the public and providing community-based services

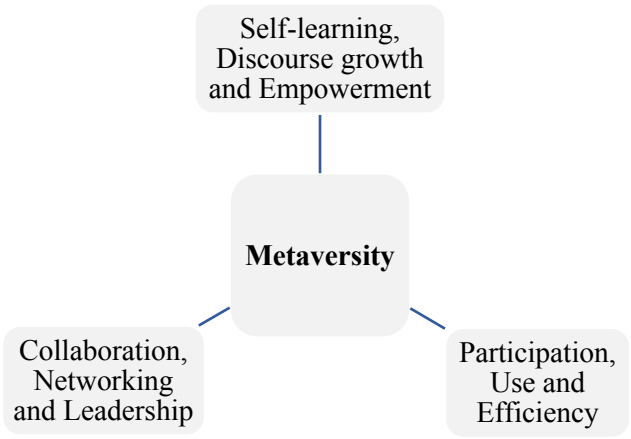

Figure 7.5 Evolving tasks of metaversity Reference: Hassanzadeh, M. (2022). Metaverse, Metaversity, and the Future of Higher Education. *Sciences and Techniques of Information Management*, *8*(2), 7-22.

A project conducted by Duan et al. (2021) introduces the concept of a digital university or University 5.0, which utilizes a blockchain-driven metaverse prototype at The Chinese University of Hong Kong, Shenzhen (CUHKSZ). The researchers have been actively developing the system and conducting user studies for further research. The proposed system aims to provide on-campus students with an interactive metaverse, creating a unified environment where the activities of students in the physical world can influence the virtual world, and vice versa.

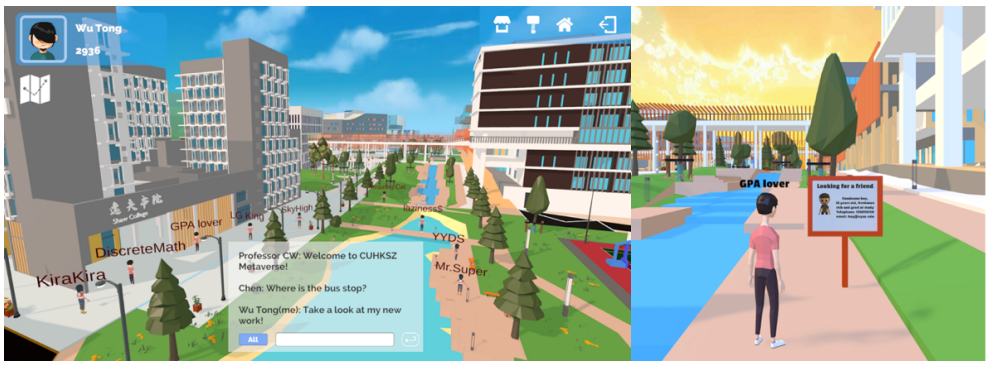

Figure 7.6 A Corner at CUHKS and billboard on campus Reference: Duan, H., Li, J., Fan, S., Lin, Z., Wu, X., & Cai, W. (2021, October). Metaverse for social good: A university campus prototype. In *Proceedings of the 29th ACM Inter. national Conference on Multimedia* (pp. 153-161).

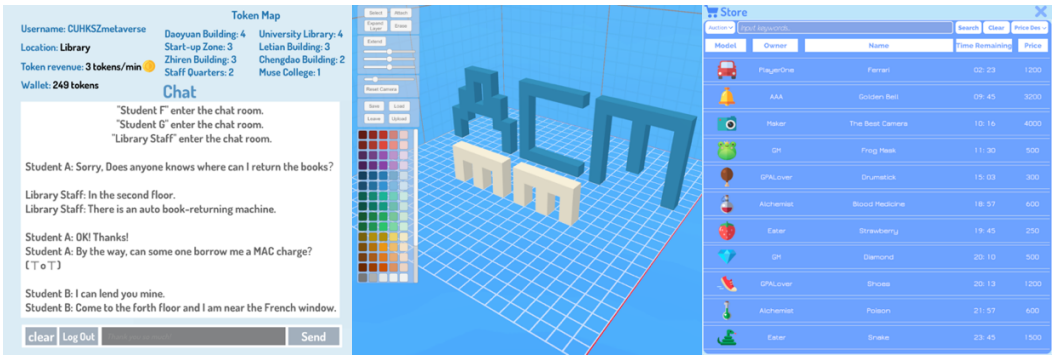

Figure 7.7 Location-based services, editor for content creation and tradeland purchase services Reference: Duan, H., Li, J., Fan, S., Lin, Z., Wu, X., & Cai, W. (2021, October). Metaverse for social good: A university campus prototype. In *Proceedings of the 29th ACM Inter. national Conference on Multimedia* (pp. 153-161).

According to Preston (2021), certain aspects of the metaverse have already made their way into universities. The true revolutionary potential of the metaverse lies in its ability to generate additional profits in university education. Recent studies on digital technology and university education suggest that these innovations may further monetize the student experience and leverage the work of scholars.

Preston (2021) also notes that universities utilize virtual environments such as Second Life and even the block-building game Minecraft. These platforms can enhance lectures and enable remote students to virtually visit campuses. Virtual reality simulations allow medical and architectural students to practice skills that are difficult to experience in the real world.

From Preston's (2021) perspective, the metaverse will enable students to engage in an increasingly cyber-physical university experience where the virtual and real worlds converge. Many students have already had similar experiences, especially during the Covid-19 pandemic, where learning has shifted between online and in-person formats.

As a result, Preston (2021) concludes that the metaverse may lead to the obsolescence of certain traditional forms of higher education. Instead of attending a single physical institution, students may migrate to the cyber-physical realm, where they can learn through virtual experiences provided by various global universities in the metaverse.

7.3.2 Society 5.0 and University 5.0

According to Schwab (2017) and Schwab & Davis (2018), we are currently in the early stages of the Fourth Industrial Revolution, which integrates digital, physical, and biological systems. Mustafa Kamal et al. (2019) emphasize that this revolution will transform our lives, addressing the fundamental needs of every human being on Earth. The projected loss of five million traditional jobs to technology by 2020 is concerning. Although sectors such as construction, health, manufacturing, services, and education will continue to exist, the Fourth Industrial Revolution necessitates improved training and education for the next generation. VR and AR technologies hold the potential to revolutionize interactive learning for students (Adnan et al., 2019). Additionally, Mustafa Kamal et al. (2019) argue that the digital economy will commercialize artificial intelligence technology, which has already become an integral part of our work and leisure activities. In recent years, VR devices have become more affordable, providing more individuals, particularly students, with non-traditional learning opportunities.

Carayannis and Morawska-Jancelewicz (2022) argue that Society 5.0 and Industry 5.0 should not be seen as mere extensions or replacements of the Industry 4.0 paradigm. Instead, Society 5.0 seeks to prioritize the role of human beings in driving innovation, leveraging the advancements brought about by Industry 4.0. The primary objective of Society 5.0 is to enhance the overall quality of life, promote social responsibility, and foster sustainability.

This ambitious vision aligns closely with the goals outlined by the United Nations for Sustainable Development, indicating its significance in shaping the future of societies. Consequently, higher education institutions are expected to adapt to this paradigm shift. Universities are now tasked with generating knowledge in the areas of emerging technologies and social innovation to support the realization of Society 5.0.

The restructuring of higher education institutions to align with Society 5.0 entails a fundamental reevaluation of their curricula, research priorities, and partnerships. The focus should be on equipping students with the necessary skills and knowledge to navigate the complex landscape of emerging technologies and contribute to social progress. Interdisciplinary approaches that integrate technology, social sciences, and humanities are likely to become increasingly important in addressing the multifaceted challenges of Society 5.0.

Moreover, universities are expected to actively engage with industry and other stakeholders to foster innovation and drive societal transformation. Collaborative initiatives that involve academia, government, businesses, and civil society will play a crucial role in creating a synergistic environment conducive to sustainable development.

In summary, the concept of Society 5.0 builds upon the advancements of Industry 4.0 with the goal of placing human well-being at the forefront of technological progress. Higher education institutions must adapt by refocusing their efforts on emerging technologies and social innovation, embracing interdisciplinary approaches, and fostering collaborative partnerships to meet the challenges and opportunities of this transformative era.

Toprak et al. (2020) proposed that Germany's concept of Industry 4.0 has been adopted in Japan as Society 5.0. Society 5.0 is a community that prioritizes the well-being of humans and seeks to address societal challenges in a fair and equitable manner while promoting economic progress. This concept goes beyond the previous classifications of society, such as hunter-gatherer, agrarian, industrial, and informational, as it encompasses a more comprehensive and inclusive approach (Toprak, 2018; Cabinet Office, 2020).

Carayannis et al. (2021) and Carayannis (2021) propose that integrating the principles of Society 5.0 and Industry 5.0 into the policies and procedures of higher education institutions can greatly enhance the benefits of digital transformation for universities and communities. Industry 5.0 can be seen as a response to the need for a revitalized industrial paradigm that prioritizes the human element. This involves restructuring production processes in terms of organization, structure, management, philosophy, knowledge, and culture, with the aim of generating positive outcomes for businesses and the entire innovation ecosystem. Breque et al. (2021) further elaborate on the three key pillars of Industry 5.0, which are human-centricity, sustainability, and resiliency. In order to promote genuine prosperity, industries should consider and incorporate social, societal, and environmental factors into their mission. By embracing these principles, higher education institutions can align their strategies and operations with the needs of a rapidly evolving society, fostering innovation, sustainable practices, and resilient communities.

Fukuyama (2018) introduced the concept of Society 5.0, which is also referred to as a superintelligent society, as a groundbreaking advancement. This concept entails

the seamless integration of virtual and physical realms, allowing for the utilization of artificial intelligence (AI), big data, and robots to collaborate with and support human agents in various tasks. Society 5.0 enables significant progress that was previously achievable solely by human capabilities.

Figure 7.8 Society throughout history Reference: Cabinet Office. (2020). Society 5.0. https://www8.cao.go.jp/cstp/english/society5_0/index. html#container. Toprak, M. (2018). Ekonomilerin yükseliş ve düşüşü. *In book of Türkiye Ekonomisi*, 177-216. Fukuyama, M. (2018). Society 5.0: Aiming for a new human-centered society. *Japan Spotlight*, *27*(5), 47-50.

At this point, Carayannis and Morawska-Jancelewics (2022) propose "the paradigm of a socially and technologically integrated university that welcomes new responsibilities for universities in the innovation ecosystem. In this paradigm, universities are envisioned as prototype sites for social and digital transformations and the creation of capital, which means Super Smart Society.".

Table 7.2 Assumptions in building university for industry 5.0 and/or society 5.0

• "Create proper structures and mechanisms supporting the development and implementation of social/digital innovation"
• "Extend (digital) social innovation to all the missions"
• "Incorporate the societal and sustainability priorities in a systemic way and by this to play an active and leading role in Q2HM"
• "Embrace trans and interdisciplinarity in research and education"
• "Promote cross-sector and multi-actor collaboration"
• "Incentivized utilization of AI wherever it can offer benefits to the economy and society"
• "Strengthen mobility between industry and academia and recognize other than publications outputs and measures"
• "Promote intelligent learning and create new flexible, inclusive, accessible and adaptive learning systems for all generations"
• "Promote new curricula focused on green, digital, quantitative and ethical skills necessary to ensure the effective and appropriate utilization of AI"
• "Digital transformation and AI curricula embed in *Responsible Research and Innovation* approach with the aim to anticipate negative impact of AI"
• "Focus more on social well-being and the quality of life"
• "Deliver tailor-made solutions through social/digital innovation"

Reference: Aktan, C. C. (2009). Yüksek öğretimde değişim: global trendler ve yeni paradigmalar. *Organizasyon ve Yönetim Bilimleri Dergisi*, *1*(2), 39-48.

Research and development, as well as project management, are essential components of knowledge production, as stated by Toprak et al. (2020). In this context, digital networks play a pivotal role in improving efficiency in areas such as education, research, and product development. The conventional model of full-time, single-workplace operations is deemed ineffective and rigid in this landscape. This new paradigm, often called University 4.0 or the digitalized university, has been adopted by prestigious institutions in the United States, the United Kingdom, and Continental Europe. Loveless (2017) further argues that University 4.0 strives for complete digital transformation, encompassing the establishment of a digital campus and emphasizing collaboration and coordination with external stakeholders in research, education, training, and community service. Toprak et al. (2020) also emphasize the extensive utilization of advanced analytics and cloud-based information technology within this framework. They also note that Society 5.0 brings about significant transformations in both economic and social spheres, encompassing concepts such as artificial intelligence applications, big data analysis, cybersecurity, robotics solutions, the Internet of Things, Industry 4.0, virtual reality, and augmented reality.

According to Toprak et al. (2020), Society 5.0 represents a significant convergence of two distinct spaces: cyberspace, which is the realm of the virtual, and physical space, which encompasses the tangible world. In Community 4.0, individuals utilize cloud services in cyberspace to locate and analyze information or data. In Industry 4.0, there is an interconnectedness between people, objects, and systems within the cyber domain. Society 5.0 takes this further by gathering an extensive amount of information from sensors in the physical world and processing it using artificial intelligence in cyberspace. The outcomes of this analysis are then communicated back to individuals in the physical space through various means, such as feedback. The task of collecting and evaluating such vast quantities of data surpasses human capability. For instance, artificial intelligence serves as a highly effective tool for students and educators in fields such as stock market and financial education, medical education, and the application of instructional and learning methods within classroom settings.

The European Commission (2020) outlines its vision for digital education in Europe through the Digital Education Action Plan (2021-2027). This comprehensive plan seeks to enable member countries to seamlessly transition their educational and

training systems into the digital age. A crucial component of this future agenda is the concept of the Digital University, which holds significant importance.

Considering all these factors, in the era of digital transformation, the concept of a digitalized traditional university is evolving into the fully "Digital University." Alternatively known as University 5.0, it differs from traditional digitalized universities and operates fully in the digital realm, aligning with the concept of Super Smart Society 5.0.

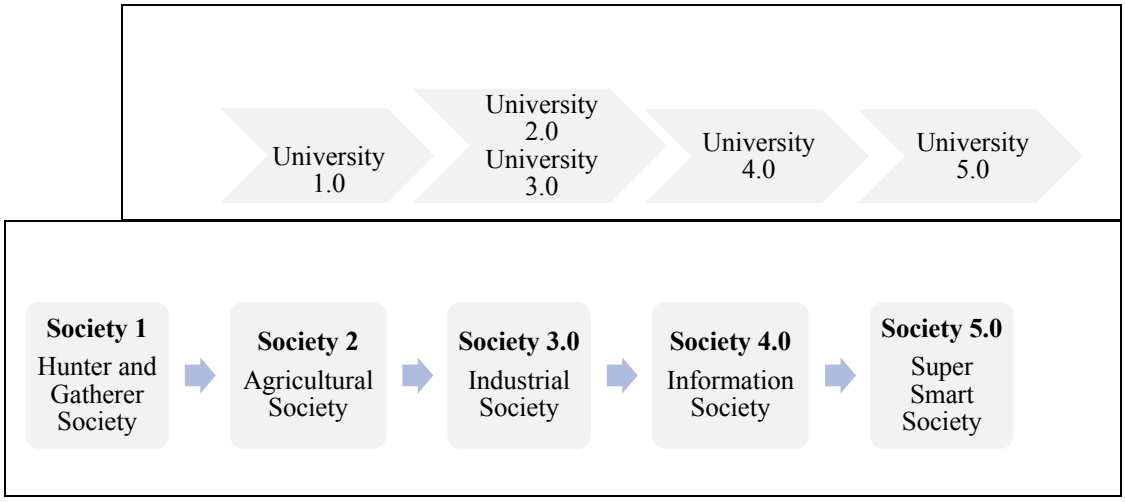

Figure 7.9 University generations during society throughout history Reference: Cabinet Office. (2020). Society 5.0. https://www8.cao.go.jp/cstp/english/society5_0/index. html#container. Toprak, M. (2018). Ekonomilerin yükseliş ve düşüşü. *In book of Türkiye Ekonomisi*, 177-216. Fukuyama, M. (2018). Society 5.0: Aiming for a new human-centered society. *Japan Spotlight*, *27*(5), 47-50.

Finally, there is no doubt that Digital university may successfully realize all the steps of University 1.0, University 2.0, University 3.0, University 4.0 and University 5.0 models. Evidently, in the not too far future new generations will bring the golden era of digital universities as University 5.0.

7.4 The Case of University of Edinburgh

Bayne and Gallagher (2020) argue that many discussions and visions of the future of digital and networked higher education fail to consider the values of universities, students, and academics. Instead, they are often influenced by the

principles and agendas of the ed-tech industry, which prioritize technology-driven change, profit motives, and the instrumentalization of university education.

These discussions on the future of education are heavily shaped by anticipated and actual disruptions in society, the environment, and technology. Consequently, there has been a release of various frameworks and packages aimed at shaping the future of learning. For example, the OECD (2018) has presented a comprehensive learning framework for education until 2030, focusing on transformative competencies to foster innovation, responsibility, and awareness in students. Similarly, the European Commission (2018) has introduced a forward-thinking future of learning package that provides recommendations on lifelong learning, digital education, and the promotion of shared European values.

In the United States, the Deloitte Center for Higher Education Excellence (2018) and the Georgia Tech Centre for 21st Century Universities have collaborated to address perceived deficiencies in public universities. They explore potential solutions such as reduced state funding, inefficiency, integration with the business sector, and responsiveness to the needs of lifelong learners.

Furthermore, the World Economic Forum (2018) envisions a future where education is transformed by technological advancements. They emphasize the importance of a curriculum designed to prepare individuals for the demands of the 21st century.

Overall, these frameworks and initiatives reflect the ongoing discussions and efforts to shape the future of education, taking into account various factors and challenges while aiming to meet the evolving needs of learners and society. (Bayne & Gallagher, 2020).

In the analysis conducted by Bayne and Gallagher (2020), the focus of conversations surrounding the future of higher education predominantly centers on the necessary response of universities to external changes. These discussions are largely influenced by a combination of presumed neoliberalism and technological determinism, both of which are advocated by corporate ed-tech entities. Seldom do these future projections arise from within the higher education institutions themselves or adhere to a set of principles that recognize the broader role of higher education beyond simply producing graduates prepared for employment within a complex political and environmental context.

Bayne and Gallagher (2020) argue that universities need to establish mechanisms for envisioning and articulating their own futures in order to defend futures that align with their ideals as knowledge societies. This is particularly important for digital education, which often tends to perceive itself as driven solely by technical progress and the deterministic, solution-oriented perspectives commonly presented in popular and policy narratives. Their study highlights a values-driven, design-oriented process implemented at the University of Edinburgh, providing a potential strategy for achieving this objective.

In an official capacity, the University of Edinburgh launched the Near Future Teaching initiative with the intention of delineating a forward-thinking perspective on digital education that could influence the institution's strategic direction (Bayne & Gallagher, 2020).

According to Bayne and Gallagher (2020), the University of Edinburgh is home to a diverse and expansive academic community. With an estimated 40,000 students and 15,000 employees, including around 7,000 academic staff members, the university is divided into three primary faculties: Arts, Humanities, and Social Sciences; Medicine and Veterinary Medicine; and Science and Engineering. One notable aspect of the university is its international student body, with approximately half of its students hailing from countries outside of the United Kingdom. This creates a multicultural and globally diverse learning environment. Additionally, the university offers a significant number of distance learning opportunities, with roughly 4,000 students enrolled in online courses, primarily within the College of Medicine and Veterinary Medicine. Furthermore, the University of Edinburgh has developed a wide range of Massive Open Online Courses (MOOCs) that have attracted over 2.5 million participants. This demonstrates the university's commitment to digital education and networked learning, and showcases its strategic direction for the future in this field.

In conclusion, Bayne and Gallagher (2020) identified six aims derived from the Near Future Teaching initiative, along with representative objectives and illustrative actions. These aims are as follows: Community-focused, acknowledging the centrality of the university community in digital education; Post-digital, recognizing the integration of technology into everyday life; Data-fluent, understanding data, data competencies, and the data society; Assessment-oriented, emphasizing assessment and feedback in digital education; Playful and experimental, empowering creative, academic, and student-driven research and development for digital education; and

Boundary-challenging, promoting openness, lifelong learning, and interdisciplinary approaches in digital education. To ensure that the future of digital and networked education serves the interests of both faculty and students, universities must adopt innovative, value-driven approaches to envisioning and constructing it.

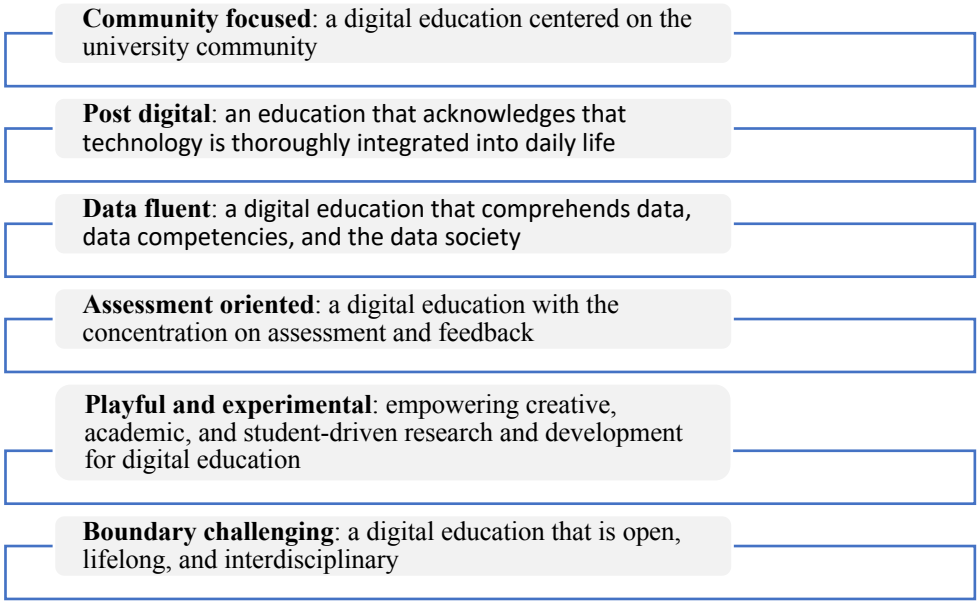

Figure 7.10 The six aims emerging from the near future teaching project Reference: Bayne, S., & Gallagher, M. (2020, May). Anticipating the near future of teaching. In *Proceedings for the Twelfth International Conference on Networked Learning* (pp. 246-253).

7.5 Metaversity and Facebook Supported Digital Campuses

According to Hassanzadeh (2022), the Metaverse, as a constantly expanding virtual world, is bringing about profound changes in all societal institutions. While it presents new challenges to universities and higher education, it also offers unprecedented potential for academic progress and excellence. In response to this emerging reality, the concept of Metaversity has been developed to provide a framework for the effective presence of universities in the metaverse environment.

Indeed, Hassanzadeh (2022) argues that the growth of generations from baby boomers to Generation X, as well as the emergence of Millennials and Generation Z, highlights the increasing significance of generational distinctions. With the advent of the metaverse, a new meta generation is currently taking shape. Babies born after 2020 are already familiar with the metaverse phenomenon from birth, and their experiences

and celebrations increasingly reflect the virtual environment. This generation will exhibit distinct behaviors and characteristics compared to previous generations. By 2050, the first members of this generation will enter their fourth decade of life and actively engage in various aspects of society, including business, management, and family establishment. Universities, along with other institutions that interact with this generation, need to take the necessary measures to address the needs of the meta generation.

As Hassanzadeh (2022) explains, first-generation universities primarily focused on education, while second-generation universities prioritized research. Third-generation universities emphasized entrepreneurial qualities. With significant technological advancements and the emergence of the metaverse, the fourth generation of universities emerged with a focus on community. While a few universities have already taken steps to offer Metaverse courses, the global university system as a whole is experiencing a significant delay compared to businesses, particularly in the entertainment and recreation sectors. This delay may lead to a long-term decline in universities' readiness to interact with the meta generation.

Consequently, Hassanzadeh (2022) emphasizes that the metaversity is a crucial reality in the virtual environment of the metaverse, and the future of higher education relies on the growth and improvement of metaversities. Inevitably, universities need to undergo a virtual transformation.

At this point, it is noteworthy that the social media giant Facebook, known for its investment efforts in the higher education sector through Oculus virtual reality glasses (Mortimer & Tobin, 2021), has already announced its plan to open 10 digital university campuses across the United States as part of its $150 million Meta Immersive Learning Project (Whitford, 2022). This move by Facebook, now rebranded as Meta, aims to bring universities into the metaverse.

According to Whitford (2022), the institutions involved in this initiative include the University of Maryland Global Campus, the University of Kansas School of Nursing, New Mexico State University, South Dakota State University, Florida A&M University, West Virginia University, Southwestern Oregon Community College, California State University Dominguez Hills, and Alabama A&M University. Notably, throughout the Fall semester of 2022-2023, all of these collaborating universities provided online courses.

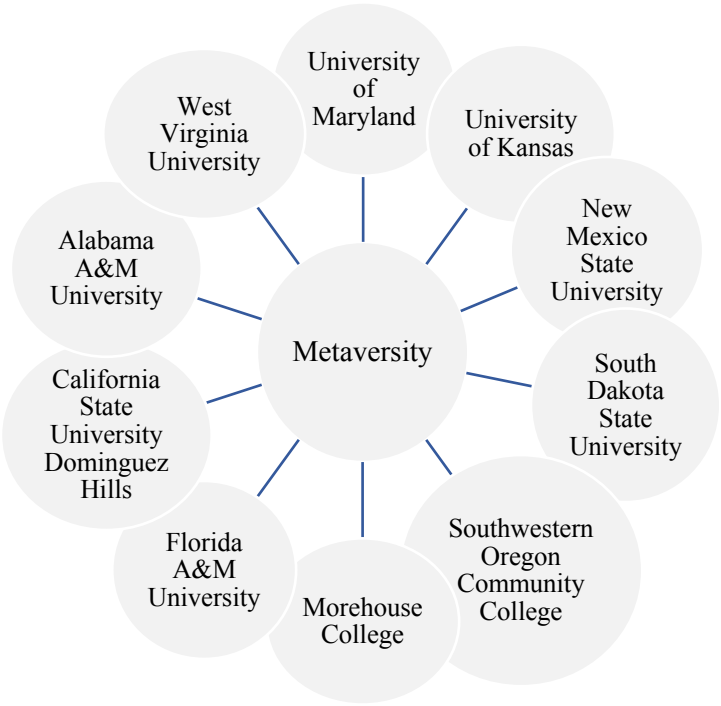

Figure 7.11 10 Digital university campuses across the US Reference: Whitford, E. (2022, September 3). Metaversity is in session as Meta and Iowa's VictoryXR open 10 virtual campuses. Forbes. https://www.forbes.com/sites/emmawhitford/2022/09/03/metaversity-is-in-session-as-meta-and-iowas-victoryxr-open-10-virtual-campuses/?sh=60c015816f25

Whitford (2022) provides an example of the University of Maryland Global Campus, one of the higher education institutions involved in the Metaverse initiative. This institution enrolls over 45,000 undergraduate students entirely in a digital format, without physical classrooms or student living spaces. The digital campus is designed to replicate the atmosphere of a traditional university campus, complete with Georgian-style buildings and a vibrant green lawn. In this innovative Web3 school, students have the opportunity to put on a headset and immerse themselves in the virtual administrative building, where they can interact with an avatar of a financial aid officer who can address their inquiries.

7.6 University Education Next Ten Years: Open University

Kukulska et al. (2020) conducted the Innovating Pedagogy 2020 study as part of the Annual Innovation Report 8 by the Open University, focusing on how education may evolve over the next decade. This study was a collaborative effort between academics from The Open University's Institute of Educational Technology and Dublin City University's National Institute of Digital Learning. The Innovating Pedagogy papers, now in their 8th edition, aim to provide insights for educators, policymakers, academics, and anyone interested in understanding potential changes in education in the coming years.

In their study, Kukulska et al. (2020) present a comprehensive list of emerging educational concepts, terminologies, hypotheses, and activities and narrow it down to ten key approaches that have the potential to significantly impact educational practice. They propose these ten sketches of contemporary approaches as potential agents of change in education. The list is arranged in approximate order of importance and timeline for widespread adoption.

1- **Artificial intelligence in education:** It is essential for academics, learning scientists, and other stakeholders to engage with the topic of artificial intelligence to drive the development of AI-powered systems and effective teaching and learning methodologies that leverage AI capabilities (Kukulska et al., 2020).

2- **Posthumanist perspectives:** Implementing posthumanist methodologies in education raises important questions about what students can learn by encountering the blurring boundaries between humans and technology. The goal is to envision beneficial connections between humans, the environment, animals, and technology (Kukulska et al., 2020).

3- **Learning through open data:** Engaging with open data enables students to interact with real-world phenomena, promoting data literacy, transparency, and evidence-based action (Kukulska et al., 2020).

4- **Engaging with data ethics:** This topic is an essential component of designing successful learning cultures in the digital age, as discussed by Kukulska et al. (2020). Institutions need to address the ethical considerations associated with data usage to ensure a responsible and informed approach to learning in the digital era.

5- **Social justice pedagogy:** Social justice pedagogy emphasizes the importance of involving students in curriculum development rather than imposing a predetermined curriculum. It also requires a critical examination of how educational materials and media reflect the experiences of sub-cultures, marginalized groups, and underrepresented communities, as highlighted by Kukulska et al. (2020).
6- **e-sports:** e-sports, or electronic sports, refer to competitive video games that are broadcasted over the Internet and played by individuals or teams. e-sports have gained global popularity and also offer educational opportunities. The integration of virtual reality technology can further enhance the immersive and engaging experience of e-sports, as suggested by Kukulska et al. (2020).
7- **Learning from animations:** Animations can be powerful tools for demonstrating complex concepts and real-world phenomena. Research indicates that well-designed animations, with strong instructional strategies and student control, can be more effective than static images in enhancing learning experiences, as discussed by Kukulska et al. (2020).
8- **Multisensory learning:** The next generation of education, including health, wellness, travel services, and training, is expected to incorporate multisensory experiences. With advancements in technology-supported education and a growing focus on learners with special needs, multisensory approaches are gaining prominence. However, it is important to consider the individual needs and preferences of students when implementing multisensory education, as highlighted by Kukulska et al. (2020).
9- **Offline networked learning:** While networked learning through digital platforms is widely accepted, there are situations where internet access may be limited or not feasible. Offline networked learning, facilitated by low-cost devices like Raspberry Pis, provides an alternative for users in such circumstances. This approach enables dialogue, collaboration, resource sharing, visualization, and integration, enhancing the learning process and outcomes, as discussed by Kukulska et al. (2020).
10- **Online laboratories:** In certain situations where physical laboratories are not accessible or appropriate, online laboratories offer a viable alternative. Virtual laboratories provide interactive environments for designing and conducting simulated scientific investigations. Although they may lack certain sensory

elements of physical labs, virtual labs have become commonplace in higher education for science and engineering fields, as highlighted by Kukulska et al. (2020).

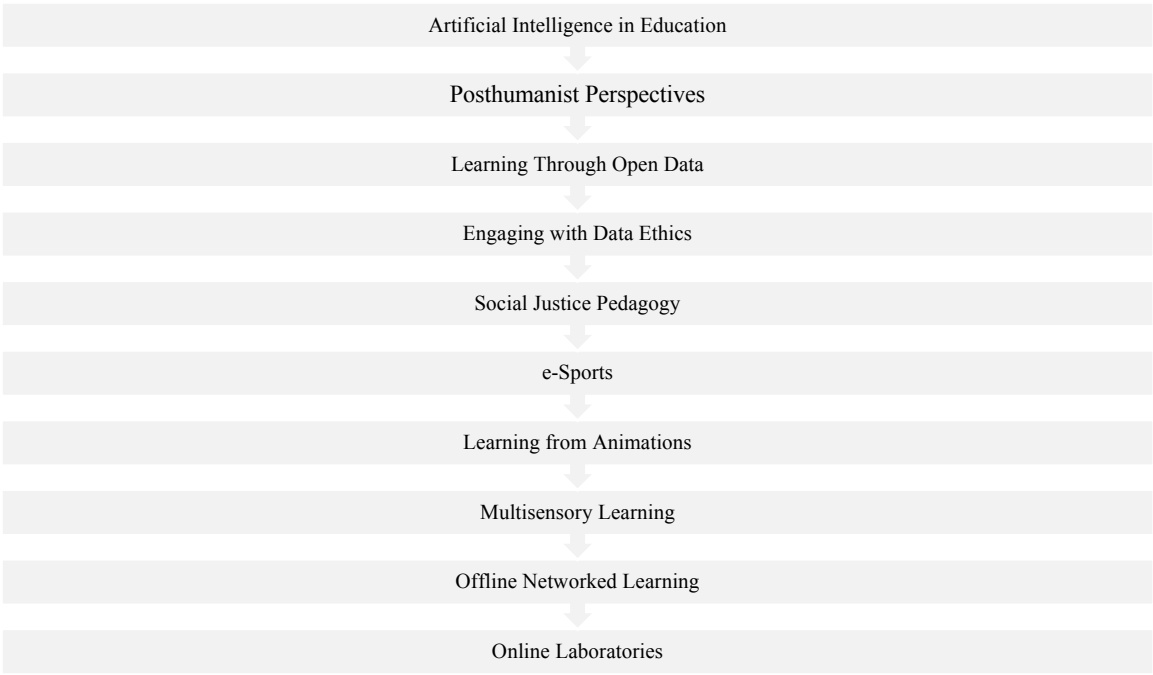

Figure 7.12 Ten sketches of new pedagogies that might transform education
Reference: Kukulska-Hulme, A., Beirne, E., Conole, G., Costello, E., Coughlan, T., Ferguson, R., FitzGerald, E., Gaved, M., Herodotou, C., Holmes, W., Mac Lochlain, C., Nic Giolla Mhichíl, M., Rienties, B., Sargent, J., Scanlon, E., Sharples, M. & Whitelock, D. (2020). *Innovating Pedagogy 2020: Open University Innovation Report 8*. The Open University. Retrieved June 27, 2022 from https://www.learntechlib.org/p/213818/.

7.7 Comparative Cost Analysis: Traditional vs Digital University

A Traditional and a Digital university structure and cost analysis simulations are compared and contrasted depending on the parameters below:

A mid-size (10.000 students) University composed by:

- 4 Faculties and 20 Departments
- 130 Full-time and Part-time Academic Staff
- 50 Administrative Staff

Simulation below is designed for the Structure and Cost Analysis of a Traditional University*:

Table 7.3 A traditional university model

A- Academic	**B- Administrative**
✓ Full-time Staff Salaries ✓ Full-time Staff Additional Course Fee ✓ Part-time Staff Fee ✓ Publication and Project Support Expenses ✓ Scientific Project Research Expenses	✓ Personnel ✓ Rent ✓ Pre-requisite Labs for the Launch of New Departments ✓ Physical Place (Campus) ✓ Launch of New Faculties ✓ Launch of New Departments ✓ Advertising and Publicity
C- Administrative Administration	**D- Investment**
✓ Salaries ✓ Executive Compensations	✓ Additional Physical Space ✓ Labs
E- Economic Investments	**F- Other**
✓ Technology ✓ Software ✓ Hardware ✓ Library	✓ Shuttle ✓ Security ✓ Technical ✓ Heating ✓ Catering ✓ Vehicle ✓ Related

- Monthly Cost: 15.000.000 TL
- Annual Cost: 180.000.000 TL

To collect the required data, in depth interviews were conducted with University Rectors, who were requested to be confidential.

Simulation below is designed for the Structure and Cost Analysis of a Digital University:

Table 7.4 A digital university model

A- Academic	**B- Administrative**
✓ Full-time Staff Salaries (*) ✓ Full-time Staff Additional Course Fee ✓ Part-time Staff Fee ✓ Publication and Project Support Expenses ✓ Scientific Project Research Expenses	✓ Personnel ✓ Rent (**) ✓ Advertising and Publicity ✓ Digital Space (Campus)
C- Academic Administration	**D- Investment**
✓ Salaries(*) ✓ Executive Compensations	✓ Additional Bandwidth ✓ Labs (***)
E- Economic Investments	**F- Other**
✓ Technology ✓ Infrastructure (***) ✓ Software ✓ Hardware ✓ Library (***)	✓ Technical ✓ Security(**) ✓ Heating (**) ✓ Catering (**) ✓ Vehicle (**) ✓ Related

(*) Academic administration is consisted by full-time academic staff.
(**) Only for Administration or Rectorate building.
(***) Digital

Table 7.5 A digital university cost structure

A- Academic Costs (TL)	
Full-time and Administrative Staff	18.720.000
Part-time Staff	23.950.080
Academic Activities *	7.200.000
	49.870.080
B- Administrative Costs (TL)	
Administrative Personnel	26.965.200
Other**	45.120.000
	72.085.200
Total (TL)	**121.955.280**

* Publication and Project Support Expenses, Scientific Project Research Expenses.
** Investment, Economic Investments, and Other related operational costs.

- Monthly Cost: 10.162.940 TL
- Annual Cost: 121.955.280 TL

Table 7.6 Annual cost difference between a traditional and a digital university

Annual Cost for a Traditional University (TL)	**180.000.000**
Annual Cost for a Digital University (TL)	**121.955.280**
Annual Cost Advantage of a Digital University (TL)	**58.044.720**
Annual Cost Advantage Ratio of a Digital University (TL)	**32%**

As Traditional and Digital University Models are compared, the latter financially is 32% more advantageous than that of former in terms of annual cost.

Both models are comparable in terms of the number of faculties and departments, which also results in similar numbers of full-time and part-time academic staff required for the academic curricula. However, the numbers of administrative staff differ between the two models due to their distinct human resource requirements. For instance, a digital university employs digital examination executives and more IT experts, while a traditional university requires more security and maintenance personnel.

A digital university enjoys significant cost advantages over a traditional university as it does not require physical spaces such as campuses, physical labs, and student services like shuttles, catering, and security, among others. Additionally, tuition fees at digital universities are generally lower compared to traditional universities.

Furthermore, a digital university holds certain advantages over a traditional university in terms of meeting the attitudes and expectations of new generations. It typically offers lower tuition fees and provides academic staff that educates students from all around the world, offering a significant opportunity to pursue higher education in a "translocal and transtemporal" (Sheail, 2018) nature. A digital university sees the entire world as a global target and market, leveraging the growing digital opportunities. However, a traditional university still holds certain advantages over a digital university, especially when it comes to students lacking prerequisite tools such as hardware, software, and internet infrastructure.

As a result, considering the changes brought about by Covid-19, which have disrupted traditional norms, values, and modes of delivery in the higher education sector, it is highly anticipated that the hybrid model will replace the traditional model in the near future, followed by the emergence of digital universities, particularly after the 2030s. This reflects the reality of constant change and development in our world.

7.8 Drivers of Digitalization in Higher Education

Today, digitization plays a crucial role in driving innovation in the education sector. According to UNESCO's Global Education Monitoring (GEM) report (2019), there are approximately 1.5 billion students worldwide, including over 200 million university students, with an estimated cost of nearly 5 trillion US dollars. Consequently, technology is vital for educational innovation. As mentioned by Gillpatrick (2020), new information and communication technologies (ICT), such as the printing press, computers, digital media, and the internet, have had a significant impact on instructional methods. However, the rapid pace of technological advancements has increased the rate of change in education, leading schools to undergo profound transformations at all levels in a globalized world. Newman (2017) outlines that the internet is just one of several transformative technologies that have the potential to reshape various aspects of our lives. These technologies include artificial intelligence (AI), virtual reality (VR), augmented reality (AR), personalized learning, gamification, the Internet of Things (IoT), and redesigned learning spaces, among other emerging technologies. Each of these innovations possesses the ability to significantly impact and change how we interact, learn, and engage with the world

around us. By incorporating these advancements into our daily lives, we can expect to witness profound transformations in various fields and sectors.

According to Times Higher Education (2022), universities need to not only change their pedagogy but also their infrastructure and culture, as digital and hybrid delivery has become mainstream in the higher education system. A study conducted by Dignan et al. (2021) on universities in the United Kingdom reveals that the implementation and utilization of technology are essential for acquiring and retaining students, academic staff, and employees while remaining relevant in a digitalized world. In this new era, top universities will not only undergo digital transformation but also demonstrate digital resilience. This means building digital infrastructure that can not only adapt and react to disruptions but also capitalize on new conditions. Universities that can offer a seamless transition between in-person and digital experiences, for example, will be able to maintain service continuity during disruptions while meeting the increased demand for digital or hybrid education experiences.

From the perspective of Dignan et al. (2021), further technological advancements in the workplace, such as the adoption of automation, machine learning, and artificial intelligence (AI), are accelerating the loss of skills. This has led to a societal shift toward lifelong learning, where individuals engage in education and training programs more frequently throughout their careers to stay relevant. Consequently, higher education institutions are compelled to reassess traditional business structures, enrollment and recruitment techniques, student services, and degree programs, among others.

Therefore, Dignan et al. (2021) conclude that the university sector is undergoing a significant transformation overall. As a result, university executives should establish and implement digitalization plans driven not only by budgetary or cost-cutting concerns but also by considerations of digital resilience, student well-being and achievement, hybrid experiences, and lifelong learning.

Referring to the impact of digital transformation and the need for innovative business models in higher education institutions, Rof et al. (2020) state that 'the digital transformation of a university entails a shift from a paper-based to a digitally-based infrastructure. This revolution is not only about equipment but also involves a transformation of all organizational activities, necessitating a comprehensive reconsideration of the management approach. The digital revolution affects all aspects, including education, learning, and everything in between.'

According to Rof et al. (2020), digital transformation is seen as beneficial and essential, presenting an opportunity to modernize universities and better meet the digital requirements and demands of students. The digital revolution will undoubtedly disrupt the higher education sector, and university administrators must drive innovative business models to position their institutions as significant actors in the future.

At this point, Gillpatrick (2020) states that digital transformation companies predict major shifts in the demand and supply characteristics of the economic delivery method for higher education. The rapid adoption of emerging digital technologies, the creation of novel educational delivery systems and economic models, and, perhaps most significantly from an innovation standpoint, the evolving educational demands of a new generation of students who have grown up with these technologies are the three main drivers of change for higher education.

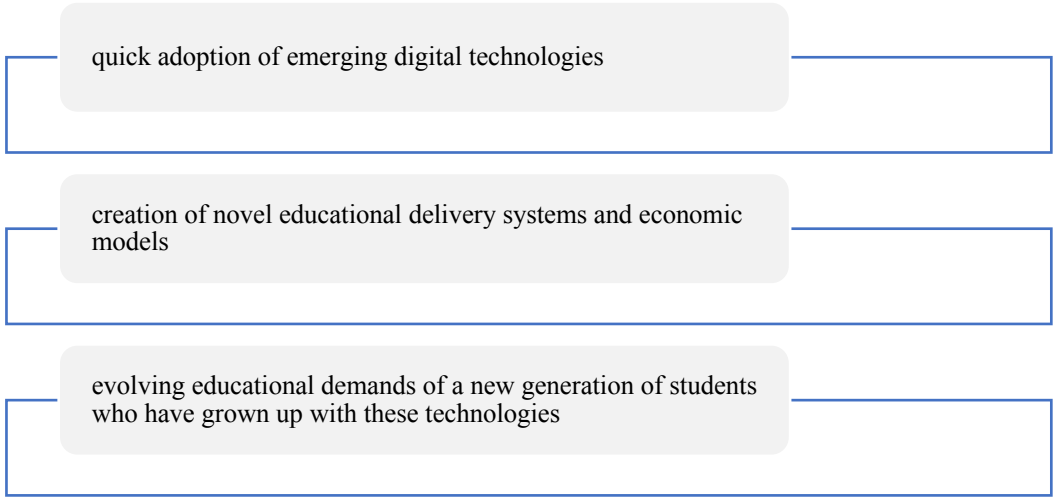

Figure 7.13 Three main drivers of alteration for higher education Reference: Gillpatrick, T. (2020). Innovation and the digital transformation of education. *Sınırsız Eğitim ve Araştırma Dergisi*, *5*(3), 194-201.

According to Gillpatrick (2020), students' educational decisions will be influenced by their experiences with Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), gamification, and customization. As a result, universities need to proactively develop services and experiences that meet student expectations. This will require new delivery strategies and reorganization of educational structures and organizations. In fact, some experts even predict "sweeping partnerships between a

few elite universities and large technology companies, like Google and Amazon," (Walsh, 2020) as the way forward for digital higher education.

A report by the World Economic Forum (2018) highlights the potential $100 trillion impact of digital technologies. Zang and Hon (2020) describe this digital transformation of society as having significant effects across various sectors, including public services, education, health, transport, agriculture, manufacturing, energy, and the future of labor. They argue that as computing becomes more pervasive, artificial intelligence becomes more widespread, and digital transformation becomes standardized, society will increasingly depend on data and technology. This dependency will extend to educational methodologies at universities as well.

From Gillpatrick's (2020) perspective, as the economics of education change, an increasing proportion of enrollments are moving away from classroom engagement towards digital education. While the benefit of a campus-based education currently includes degree certification, educational experience, and educational content, the perceived value of a traditional campus atmosphere is likely to decrease as more students opt for remote learning. This may lead many potential students to seek lower-priced alternatives, often in geographically remote areas, where digital connectivity, content, and degree reputation are comparable or even superior. This shift will impact student attitudes, create new behavioral expectations, and generate winners and losers among universities. Those who can create educational material and methods to attract the new generation of students will have the opportunity to sell their services in a broader and more global market.

Finally, Gillpatrick (2020) mentions that digital technology facilitates global collaboration, content integration, and program integration to a greater extent. Rather than creating content for a few hundred students on a traditional campus, universities now have significant options to produce and deliver content globally. This paves the way for the emergence of the 'Digital University' in the 21st century, driving innovation in higher education through digitalization.

In this chapter, the concept of the digital university was examined from various perspectives, including its evolution, the rise of hybrid education in the 2020s, current approaches, and the University 5.0 paradigm. The chapter also included examples of current universities embracing this new understanding, supported by a comparison of traditional versus digital university structures and cost analysis simulations, along with

their pros and cons. Finally, an analysis of innovation in higher education due to digitalization concluded this section. The following chapter will address the results and implications of the survey conducted in this thesis.

CHAPTER 8

8. A SURVEY FOR DIGITAL UNIVERSITY

As the Research Methodology, Quantitative Research Method is used since the target population is located in geographically dispersed areas all around Türkiye.

According to recent studies, the digitalization and unlimited interactive communication prevalent in the 21st-century world have revolutionized various aspects of our lives. Digital technologies have been instrumental in transforming the global economy, and the effects of digital disruption can be observed across all sectors, including higher education. Universities, like other institutions, are not immune to these changes, and it is becoming increasingly crucial for them to effectively implement and utilize digital technologies in order to attract the right students and staff, foster growth, enable remote delivery, and ultimately adapt to survive in this rapidly evolving landscape. This paradigm shift is often referred to as digital transformation in the higher education sector. Furthermore, it is highly likely that this transformation will continue to progress, especially in response to the demands and expectations of the Z generation and the upcoming Alpha generation. Consequently, the future of higher education is projected to be characterized by a hybrid approach, encompassing both traditional face-to-face instruction and digital learning modalities. This hybrid, or formal+digital, higher education model is anticipated to shape the educational landscape in the near future.

For all these reasons the survey questionnaire was constructed on the basis of these four dimensions: *Signification of digitalization*, *Importance Given to Higher Education*, *Understanding Generation Z's Perspective on Embracing Digital Technologies* and *Importance Given to Digital Education*.

The study has taken “Employers/Managers”, “Academics” and “formal University Students” as a population frame.

As the name of the thesis is “Future in Higher Education: Digital University” and the research question of this study is “**Will Digital Universities shape the future of Higher Education? ”**; an online survey was conducted between the dates 19th and 25th January 2023 towards 2017 people. A designed questionnaire composed by 42 questions divided into four groups as mentioned above was sent and received a return from a sample of 346 people consisted by 106 university students, 83 academics and 157 employers /managers via convenience sampling to reach the accurate data in a time constraint as the units are easiest to access.

The selection of sampling units primarily included Employers and Managers from the service and manufacturing sectors. These individuals were chosen due to their roles as representatives of the business world and their need for qualified and talented human resources, both currently employed and continuing their education at universities. Additionally, academics were included in the sampling process as they play an important role in shaping the next generation of human resources to meet the needs of the business world and society. Finally, university students were included in the sampling as the workforce of the future. It is worth noting that formal university students were specifically selected to ensure the impartial evaluation of the results. This decision was made because the four dimensions of the survey are indicative of the digitized future of higher education. The aim is to test:

Hypothesis 1: There is a difference among gender groups regarding digitalization importance.

Hypothesis 2: There is a difference among education groups regarding digitalization importance.

Hypothesis 3: There is a difference among social status groups regarding digitalization importance.

Hypothesis 4: There is a difference among gender groups regarding digital education importance.

Hypothesis 5: There is a difference among education groups regarding digital education importance.

Hypothesis 6: There is a difference among social status groups regarding digital education' importance.

Hypothesis 7: There is a correlation between significance of digitalization and digital education importance.

Hypothesis 8: There is a correlation between higher education importance and digital education importance.

Table 8.1 Survey questionnaire

Questions Related to Digitalization	**Strongly disagree**	**Somewhat disagree**	**Neither agree nor disagree**	**Somewhat agree**	**Strongly agree**	**Weighted Averages**
1- I think that digitalization is one of the most important realities in the 21st Century	2,3	2	6,4	34,4	54,9	4,38
2- I believe that digitalization is a part of my daily life	1,2	1,7	6,1	40,8	50,3	4,37
3- I think that digitalization is just a technological issue	2,6	4,9	15,9	46,5	30,1	3,97
4- I think that digitalization is a socio-cultural phenomenon	9,5	30,9	16,8	26,6	16,2	3,09
5- I think that digitalization provides unlimited interactive communication	2	8,4	13,6	48	28	3,92
6- I believe that digital transformation will change traditional perspectives	2	3,2	11	52,6	31,2	4,08
7- I believe that digitalization makes our lives more efficient	2,3	3,8	18,2	43,4	32,4	4
8- I am currently making extensive use of digital technologies	1,2	3,5	12,7	47,4	35,3	4,12
9- Using digital technologies, my life is more comfortable	1,2	4,3	11	46,8	36,7	4,14
10- I think that digital efficiency increases employment opportunities	4,3	11,3	22	35	27,5	3,7
Signification of digitalization					**TOTAL**	**3,9751**
Questions Related to Higher Education	**Strongly disagree**	**Somewhat disagree**	**Neither agree nor disagree**	**Somewhat agree**	**Strongly agree**	**Weighted Averages**
1- I think that technological developments positively support the quality of higher education	1,2	7,8	14,2	46	30,9	3,98
2- I think that earning an undergraduate degree is important for my career	1,7	6,4	11,8	38,7	41,3	4,12
3- I think that university education will remain useful and relevant for a lifetime	2,6	10,7	16,2	38,7	31,8	3,86
4- I believe that universities are aligned with the needs and expectations of working life	7,5	20,2	24	29,8	18,5	3,32
5- I think that digital impact highly effects universities in our age	2	5,5	15,3	48,8	28,3	3,96
6- I believe the Universities should shape their education strategies according to the realities of the digitalization age	1,2	4	10,4	46	38,4	4,16
7- I believe that the value proposition for universities is changing in the digitalization era	0,9	5,2	17,9	48,3	27,7	3,97
8- I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace	1,7	6,9	15,3	49,1	26,9	3,92
9- I believe that Universities should fulfill the needs and expectations of new generation students	1,2	2,9	7,2	46	42,8	4,26
10- Universities should develop traditional education methodologies with the opportunities of the digital age	1,4	3,2	8,7	44,2	42,5	4,23
Importance Given to Higher Education					**TOTAL**	**3,9783**

Questions Related to Generation Z (people born between 1995 and 2010) and Alpha (people born in 2010 and after)	**Strongly disagree**	**Somewhat disagree**	**Neither agree nor disagree**	**Somewhat agree**	**Strongly agree**	**Weighted Averages**
1- I think that Z and Alpha are more prone to digitalization than the previous generations	1,4	3,5	8,1	35,3	51,7	4,32
2- I think that Generation Alpha is more prone to technology than Generation Z	2,6	8,4	19,1	32,7	37,3	3,94
3- I think that technology and digitalization are indispensable for the Generation Z	0,9	3,8	9,8	39	46,5	4,27
4- I think that Generation Z has a different view of higher education	2	5,2	13,6	43,1	36,1	4,06
5- I think that Generation Z uses social media effectively	1,7	3,8	10,1	37	47,4	4,25
6- I think that Generation Z uses digital communication tools effectively	1,4	5,2	10,4	39	43,9	4,19
7- I think the Generation Z is an important factor for the arrival of online and hybrid methodologies in the universities	2	8,1	15,6	43,1	31,2	3,93
8- I think that Generation Z prefer online higher education	1,7	8,4	22,3	40,5	27,2	3,83
9- I think that Generation Z prefer hybrid (online/traditional) higher education	2,6	5,8	18,2	48,3	25,1	3,88
10- Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha	2,6	4,3	20,2	41,3	31,5	3,95
Understanding Generation Z's Perspective on Embracing Digital Technologies					**TOTAL**	**4,06**
Questions Related to Digital and Hybrid Education	**Strongly disagree**	**Somewhat disagree**	**Neither agree nor disagree**	**Somewhat agree**	**Strongly agree**	**Weighted Averages**
1- I think that digital education transfers the traditional classroom environment in digital environment	6,6	14,2	18,5	36,4	24,3	3,58
2- I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future	2,3	6,1	19,7	44,2	27,7	3,89
3- I think following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly	2,9	4,9	17,1	46,5	28,6	3,93
4- I believe that university education will turn to a completely digital education model after 2030	5,5	13,9	24,9	30,6	25,1	3,56
5- I think that the digital education model will completely replace the traditional university formal education model after 2030	5,5	15,9	23,4	33,8	21,4	3,5
6- I think that digital education is an effective complement to the traditional university formal education model	2,3	4	13,9	50,3	29,5	4,01
7- I think that universities can only provide digital education in the field of social sciences after 2030	3,2	19,9	21,4	31,2	24,3	3,53
8- I think that universities can provide hybrid education in the field of social sciences after 2030	2,3	6,1	17,9	50,6	23,1	3,86
9- I think universities can only provide digital education in the field of medicine and engineering after 2030	18,8	22,5	17,3	22,5	18,8	3
10- I think universities can only provide hybrid education in the field of medicine and engineering after 2030	10,1	10,7	24,6	33,8	20,8	3,45
11- I believe employers will only demand certificates of competence rather than university degrees after 2030	5,8	15,9	23,4	34,4	20,5	3,48
12- I believe that there will be no need for the classical formal education university model after 2030	8,1	22	23,1	26,9	19,9	3,29
Importance Given to Digital Education					**TOTAL**	**3,58**

Regarding the results of the survey questionnaire, the total weighted averages of all four question groups, as well as their dimensions, were agreed upon by the respondents. At this point, the agreement for questions related to digital and hybrid education, and their dimension of importance given to digital education, is moderately lower than that of the other three question groups and their related dimensions. However, the agreement for questions related to Generation Z (people born between 1995 and 2010) and Alpha (people born in 2010 and after), and their dimension of understanding Generation Z's perspective on embracing digital technologies, is moderately higher than that of the remaining two question groups and their related dimensions. Given these circumstances, one can conclude that the significance of digitalization is a reality of our era, and the importance given to higher education remains a continuous fact in the higher education system. Notably, there is a clear and irresistible trend towards digital transformation in the higher education system, particularly in understanding Generation Z's perspective on embracing digital technologies. Finally, the importance given to digital education is expected to be gradually assimilated over time, and the trends for the future are positively revealed.

Table 8.2 Summary of survey questionnaire results

Question Groups	**Dimensions**	**Total Weighted Averages**
Questions Related to Digitalization	Signification of digitalization	3,9751
Questions Related to Higher Education	Importance Given to Higher Education	3,9783
Questions Related to Generation Z (people born between 1995 and 2010) and Alpha (people born in 2010 and after)	Understanding Generation Z's Perspective on Embracing Digital Technologies	4,06
Questions Related to Digital and Hybrid Education	Importance Given to Digital Education	3,58

Table 8.3 Selected cross tabulations

		I believe that universities are aligned with the needs and expectations of working life					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Age	17-22	3,4%	10,3%	31,0%	27,6%	27,6%	100,0%
	23-27	5,9%	13,2%	23,5%	30,9%	26,5%	100,0%
	28-35	12,0%	16,0%	26,0%	28,0%	18,0%	100,0%
	36-45	8,1%	17,4%	16,3%	38,4%	19,8%	100,0%
	45+	7,1%	31,0%	27,4%	23,9%	10,6%	100,0%
Total		7,5%	20,2%	24,0%	29,8%	18,5%	100,0%

		I think that digitalization is just a technological issue					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	6,6%	13,2%	24,5%	33,0%	22,6%	100,0%
	Academic	16,9%	49,4%	13,3%	13,3%	7,2%	100,0%
	Employer/Manager	7,6%	33,1%	13,4%	29,3%	16,6%	100,0%
Total		9,5%	30,9%	16,8%	26,6%	16,2%	100,0%

		I think that Generation Z prefer digital higher education					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	2,8%	6,6%	13,2%	42,5%	34,9%	100,0%
	Academic	2,4%	16,9%	33,7%	33,7%	13,3%	100,0%
	Employer/Manager	,6%	5,1%	22,3%	42,7%	29,3%	100,0%
Total		1,7%	8,4%	22,3%	40,5%	27,2%	100,0%

		I think that Generation Z prefer hybrid (digital/traditional) higher education					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	2,8%	5,7%	14,2%	46,2%	31,1%	100,0%
	Academic	2,4%	4,8%	19,3%	55,4%	18,1%	100,0%
	Employer/Manager	2,5%	6,4%	20,4%	45,9%	24,8%	100,0%
Total		2,6%	5,8%	18,2%	48,3%	25,1%	100,0%

		I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Age	17-22		6,9%	27,6%	51,7%	13,8%	100,0%
	23-27	4,4%	4,4%	10,3%	44,1%	36,8%	100,0%
	28-35	4,0%	8,0%	18,0%	44,0%	26,0%	100,0%
	36-45	2,3%	9,3%	14,0%	45,3%	29,1%	100,0%
	45+	,9%	3,5%	28,3%	41,6%	25,7%	100,0%
Total		2,3%	6,1%	19,7%	44,2%	27,7%	100,0%

		I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Age	17-22			17,2%	72,4%	10,3%	100,0%
	23-27	2,9%	8,8%	14,7%	32,4%	41,2%	100,0%
	28-35	2,0%	10,0%	18,0%	40,0%	30,0%	100,0%
	36-45	2,3%	7,0%	11,6%	45,3%	33,7%	100,0%
	45+	1,8%	9,7%	17,7%	41,6%	29,2%	100,0%
Total		2,0%	8,1%	15,6%	43,1%	31,2%	100,0%

		Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	5,7%	2,8%	23,6%	35,8%	32,1%	100,0%
	Academic	1,2%	7,2%	24,1%	43,4%	24,1%	100,0%
	Employer/Manager	1,3%	3,8%	15,9%	43,9%	35,0%	100,0%
Total		2,6%	4,3%	20,2%	41,3%	31,5%	100,0%

		I think that digital education transfers the traditional classroom environment in digital environment					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	5,7%	6,6%	17,9%	35,8%	34,0%	100,0%
	Academic	12,0%	25,3%	18,1%	31,3%	13,3%	100,0%
	Employer/Manager	4,5%	13,4%	19,1%	39,5%	23,6%	100,0%
Total		6,6%	14,2%	18,5%	36,4%	24,3%	100,0%

		I think that Generation Alpha is more prone to technology than Generation Z					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Gender	Male	3,9%	6,1%	20,6%	38,9%	30,6%	100,0%
	Female	1,2%	10,8%	17,5%	25,9%	44,6%	100,0%
Total		2,6%	8,4%	19,1%	32,7%	37,3%	100,0%

		I think that technology and digitalization are indispensable for the Generation Z					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Gender	Male	1,1%	3,3%	10,6%	44,4%	40,6%	100,0%
	Female	,6%	4,2%	9,0%	33,1%	53,0%	100,0%
Total		,9%	3,8%	9,8%	39,0%	46,5%	100,0%

		I think that Generation Z prefer digital higher education					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Age	17-22		10,3%	17,2%	55,2%	17,2%	100,0%
	23-27	2,9%	5,9%	10,3%	39,7%	41,2%	100,0%
	28-35	2,0%	6,0%	22,0%	38,0%	32,0%	100,0%
	36-45	1,2%	9,3%	20,9%	39,5%	29,1%	100,0%
	45+	1,8%	9,7%	31,9%	38,9%	17,7%	100,0%
Total		1,7%	8,4%	22,3%	40,5%	27,2%	100,0%

		I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	3,8%	4,7%	15,1%	46,2%	30,2%	100,0%
	Academic	2,4%	7,2%	26,5%	43,4%	20,5%	100,0%
	Employer/Manager	1,3%	6,4%	19,1%	43,3%	29,9%	100,0%
Total		2,3%	6,1%	19,7%	44,2%	27,7%	100,0%

		I think that the digital education model will completely replace the traditional university formal education model after 2030					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	3,8%	8,5%	21,7%	39,6%	26,4%	100,0%
	Academic	13,3%	26,5%	26,5%	24,1%	9,6%	100,0%
	Employer/Manager	2,5%	15,3%	22,9%	35,0%	24,2%	100,0%
Total		5,5%	15,9%	23,4%	33,8%	21,4%	100,0%

		I think that universities can provide hybrid education in the field of social sciences after 2030					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	2,8%	4,7%	18,9%	42,5%	31,1%	100,0%
	Academic	3,6%	12,0%	13,3%	56,6%	14,5%	100,0%
	Employer/Manager	1,3%	3,8%	19,7%	52,9%	22,3%	100,0%
Total		2,3%	6,1%	17,9%	50,6%	23,1%	100,0%

		I think universities can only provide digital education in the field of medicine and engineering after 2030					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	8,5%	13,2%	17,0%	34,9%	26,4%	100,0%
	Academic	39,8%	28,9%	19,3%	7,2%	4,8%	100,0%
	Employer/Manager	14,6%	25,5%	16,6%	22,3%	21,0%	100,0%
Total		18,8%	22,5%	17,3%	22,5%	18,8%	100,0%

		I believe that there will be no need for the classical formal education university model after 2030					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	2,8%	11,3%	26,4%	34,0%	25,5%	100,0%
	Academic	20,5%	30,1%	22,9%	18,1%	8,4%	100,0%
	Employer/Manager	5,1%	24,8%	21,0%	26,8%	22,3%	100,0%
Total		8,1%	22,0%	23,1%	26,9%	19,9%	100,0%

		I believe that university education will turn to a completely digital education model after 2030					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	University Student	5,7%	10,4%	17,0%	35,8%	31,1%	100,0%
	Academic	9,6%	22,9%	34,9%	16,9%	15,7%	100,0%
	Employer/Manager	3,2%	11,5%	24,8%	34,4%	26,1%	100,0%
Total		5,5%	13,9%	24,9%	30,6%	25,1%	100,0%

		I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Age	17-22		3,4%	31,0%	48,3%	17,2%	100,0%
	23-27	5,9%	5,9%	14,7%	41,2%	32,4%	100,0%
	28-35	4,0%	8,0%	18,0%	42,0%	28,0%	100,0%
	36-45	1,2%	3,5%	15,1%	48,8%	31,4%	100,0%
	45+	2,7%	4,4%	15,9%	49,6%	27,4%	100,0%
Total		2,9%	4,9%	17,1%	46,5%	28,6%	100,0%

		I think that digitalization is one of the most important realities in the 21st Century					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Sector	Academic	2,6%	2,1%	9,5%	36,0%	49,7%	100,0%
	Services sector	,9%	2,6%	1,7%	29,9%	65,0%	100,0%
	Manufacturing sector	5,0%		5,0%	40,0%	50,0%	100,0%
Total		2,3%	2,0%	6,4%	34,4%	54,9%	100,0%

		I think that digitalization provides unlimited interactive communication					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Sector	Academic	2,1%	10,1%	15,3%	47,6%	24,9%	100,0%
	Services sector	,9%	8,5%	12,8%	49,6%	28,2%	100,0%
	Manufacturing sector	5,0%		7,5%	45,0%	42,5%	100,0%
Total		2,0%	8,4%	13,6%	48,0%	28,0%	100,0%

		I think that digital efficiency increases employment opportunities					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Sector	Academic	4,8%	11,1%	20,6%	37,0%	26,5%	100,0%
	Services sector	4,3%	13,7%	25,6%	31,6%	24,8%	100,0%
	Manufacturing sector	2,5%	5,0%	17,5%	35,0%	40,0%	100,0%
Total		4,3%	11,3%	22,0%	35,0%	27,5%	100,0%

		I think that digital impact highly effects universities in our age					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Sector	Academic	2,1%	6,3%	15,9%	46,6%	29,1%	100,0%
	Services sector	2,6%	5,1%	17,1%	52,1%	23,1%	100,0%
	Manufacturing sector		2,5%	7,5%	50,0%	40,0%	100,0%
Total		2,0%	5,5%	15,3%	48,8%	28,3%	100,0%

		I think that digitalization is one of the most important realities in the 21st Century					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Education	College student	4,7%	2,8%	15,1%	36,8%	40,6%	100,0%

	Secondary school	33,3%	33,3%		33,3%		100,0%
	High school	3,3%	3,3%	10,0%	33,3%	50,0%	100,0%
	Two-year degree			16,7%	16,7%	66,7%	100,0%
	Undergraduate degree		1,1%		34,1%	64,8%	100,0%
	Master's degree	2,7%	2,7%		29,7%	64,9%	100,0%
	Doctorate			2,6%	35,5%	61,8%	100,0%
Total		2,3%	2,0%	6,4%	34,4%	54,9%	100,0%

		I think universities can only provide digital education in the field of medicine and engineering after 2030					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Sector	Academic	22,2%	20,1%	18,0%	22,8%	16,9%	100,0%
	Services sector	18,8%	28,2%	16,2%	20,5%	16,2%	100,0%
	Manufacturing sector	2,5%	17,5%	17,5%	27,5%	35,0%	100,0%
Total		18,8%	22,5%	17,3%	22,5%	18,8%	100,0%

		I think that digitalization is one of the most important realities in the 21st Century					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
How long have you been working?	1-5 years		7,4%	3,7%	40,7%	48,1%	100,0%
	6-10 years	3,1%	3,1%	3,1%	35,9%	54,7%	100,0%
	10 years+	,7%		2,0%	30,9%	66,4%	100,0%
Total		1,3%	1,7%	2,5%	33,3%	61,3%	100,0%

8.1 Survey Findings

Within the scope of the research Likert scale questions consisting of 4 parts were used, whereby descriptive statistics of demographic characteristics were applied.

In the first step, normality tests were applied in order to analyze the relationship between the scales containing questions about Digitalization, Higher Education, Generation Z / Alpha generation and Digital / Hybrid Education and the questions in the personal information form.

Parametric tests were used for scales as show normal distribution. The descriptive statistical analysis of the demographic characteristics of the participants is given in Table

8.4.**Table 8.4** Descriptive statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	180	52,0	52,0	52,0
	Female	166	48,0	48,0	100,0
Age	17-22	29	8,4	8,4	8,4
	23-27	68	19,7	19,7	28,0
	28-35	50	14,5	14,5	42,5
	36-45	86	24,9	24,9	67,3
	45+	113	32,7	32,7	100,0
Position	University student	106	30,6	30,6	30,6
	Academic	83	24,0	24,0	54,6
	Employer/Manager	157	45,4	45,4	100,0
Sector	Academic	189	54,6	54,6	54,6
	Services sector	117	33,8	33,8	88,4
	Manufacturing sector	40	11,6	11,6	100,0
Education	University student	106	30,6	30,6	30,6
	Secondary school	3	0,9	0,9	31,5
	High school	30	8,7	8,7	40,2
	Two-year degree	6	1,7	1,7	41,9
	Undergraduate degree	88	25,4	25,4	67,3
	Master's degree	37	10,7	10,7	78,0
	Doctorate	76	22,0	22,0	100,0
How long have you been working?	1-5 years	27	7,8	11,3	11,3
	6-10 years	64	18,5	26,7	37,9
	10 years+	149	43,1	62,1	100,0
	Total	240	69,4	100,0	
	Missing System	106	30,6		
Total		346	100,0		

As long as Table 1 is examined, 52% of the participants are male and 48% are female. Age range of the participants are described as, 8.4% 17-22, %19.7 23-27, 14.5% 28-35, 24.9% 36-45 and 32.7% over 45.

Positions of the participants are described as, 45.4% employers/managers, 30.6% university students and 24% academics. Sectors of the participants are described as, 54.6% in academia, 33.8% in the service sector and 11.6% in the production sector. Education levels of the participants are described as 0.9% secondary school 8.7% high school, 30.6% university students, 1.7% associate degree 25.4% undergraduate degree, 10.7% master's degree, and 22% doctorate. Concerning work experience of the participants, 7.8% of them work for1-5 years, 18.5% for 6-10 years, 43.1% 10 years or more, whereas 30.6% of the participants do not work. The distribution of the participants according to the city they live in is given in Table 8.4.

Table 8.5 Distribution of place of residence

		Frequency	Percent	Valid Percent	Cumulative Percent
Which city do you live in?	Adana	6	1,7	1,7	1,7
	Adıyaman	2	0,6	0,6	2,3
	Afyonkarahisar	2	0,6	0,6	2,9
	Ağrı	2	0,6	0,6	3,5
	Aksaray	1	0,3	0,3	3,8
	Ankara	36	10,4	10,4	14,2
	Antalya	9	2,6	2,6	16,8
	Ardahan	1	0,3	0,3	17,1
	Aydın	1	0,3	0,3	17,3
	Balıkesir	3	0,9	0,9	18,2
	Batman	2	0,6	0,6	18,8
	Burdur	1	0,3	0,3	19,1
	Bursa	11	3,2	3,2	22,3
	Denizli	1	0,3	0,3	22,5
	Diyarbakır	1	0,3	0,3	22,8
	Düzce	1	0,3	0,3	23,1
	Edirne	3	0,9	0,9	24,0
	Elazığ	1	0,3	0,3	24,3
	Erzincan	1	0,3	0,3	24,6
	Erzurum	1	0,3	0,3	24,9
	Eskişehir	2	0,6	0,6	25,4
	Gaziantep	5	1,4	1,4	26,9
	Gazimağusa	1	0,3	0,3	27,2
	Giresun	1	0,3	0,3	27,5
	Girne	1	0,3	0,3	27,7
	Hatay	2	0,6	0,6	28,3
	Isparta	4	1,2	1,2	29,5
	İstanbul	176	50,9	50,9	80,3
	İzmir	29	8,4	8,4	88,7
	Kars	1	0,3	0,3	89,0
	Kayseri	5	1,4	1,4	90,5
	Kırklareli	1	0,3	0,3	90,8
	Kocaeli	3	0,9	0,9	91,6
	Konya	4	1,2	1,2	92,8
	Malatya	2	0,6	0,6	93,4
	Manisa	3	0,9	0,9	94,2
	Mersin	2	0,6	0,6	94,8
	Muğla	1	0,3	0,3	95,1
	Niğde	2	0,6	0,6	95,7
	Ordu	1	0,3	0,3	96,0
	Osmaniye	1	0,3	0,3	96,2
	Sakarya	1	0,3	0,3	96,5
	Samsun	2	0,6	0,6	97,1
	Şanlıurfa	2	0,6	0,6	97,7
	Tekirdağ	3	0,9	0,9	98,6
	Trabzon	2	0,6	0,6	99,1
	Van	2	0,6	0,6	99,7
	Yalova	1	0,3	0,3	100,0
	Total	346	100,0	100,0	

There are participants from 48 cities in total. In general, 50.9% of the participants live in Istanbul and 10.4% of them live in Ankara.

8.2 Results of Survey

As a result of the studies and surveys, in the light of the data analyzed through the SPSS program; As the numerical data show normal distribution, parametric tests were applied.

The research, which consists of a total of 8 hypotheses, was carried out with 346 participants from 48 cities from Turkey and the TRNC. These participants were listed as university students, academics and employers/managers.

Table 8.6 Cronbach's Alpha test table data applied to data

	Cronbach's Alpha	Cronbach's Alpha based on standardized items	Number of items
Applied to All Data	,832	,958	47
Signification of Digitalization	,882	,897	10
Importance given to Higher Education	,894	,899	10
Understanding Generation Z's perspective on embracing Digital Technologies	,913	,915	10
Importance given to Digital Education	,934	,934	12

According to the results of the Cronbach's Alpha reliability test applied to the demographic data of the participants, as well as the data on Signification of Digitalization, Importance given to Higher Education, Understanding Generation Z's perspective on embracing Digital Technologies, and Importance given to Digital Education, it was found that the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.832, >0.70).

The Cronbach's Alpha test results for the scale related to Signification of Digitalization indicated that the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.882, >0.70).

The Cronbach's Alpha test results for the scale related to Importance given to Higher Education revealed that the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.894, >0.70).

According to the Cronbach's Alpha test results for the scale related to Understanding Generation Z's perspective on embracing Digital Technologies , the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.913, >0.70).

The Cronbach's Alpha test results for the scale related to Importance given to Digital Education indicated that the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.934, >0.70).

During the data analysis, a new composite variable was created by calculating the average scores of the scale items, and the statistical tests were conducted using the weighted data.

Normal distribution of Likert-type scale scores is not a common assumption; therefore, skewness, kurtosis, and Shapiro-Wilk tests were conducted. If the data fell within the range of +1.5 to -1.5 (Tabachnick & Fidell, 2013), +1.0 to -1.0 (Hair et al., 2014), or +2.0 to -2.0 (George and Mallery 2010), it was considered to be approximately normally distributed.

Table 8.7 Normal distribution tests

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Digitalization Scale Averages	,093	346	,000	,935	346	,000

a. Lilliefors Significance Correction

The averages of the digitalization scale scores were taken and the normal distribution test was performed with the gender variable. It was determined that the test result did not show a normal distribution as expected (P<.05 , P= ,000). However, since the normal distribution in Likert-type scale scores is not a generally observed condition, skewness and kurtosis values were checked (skewness= -,968 , kurtosis= 2,720) and because a value between -2 +2 was observed, it was assumed that the data showed a normal distribution based on the source cited above.

Table 8.8 Independent groups T-Test table

Groups	N	X	Ss	sd	t	P
Male	105	3,9390	,07325	211	,823	
Female	108	4,0241	,07284			,411

Hypothesis 1: There is a difference among gender groups regarding digitalization importance.

As a result of the independent groups t test conducted for the Hypothesis 1, it was determined that there was no significant difference between the averages of importance given to gender and digitalization (p> .05 , p= ,411). In this case, the Hypothesis 1 is rejected and not accepted as valid.

However, this situation can also be considered as the constant emphasis on digitalization, regardless of gender.

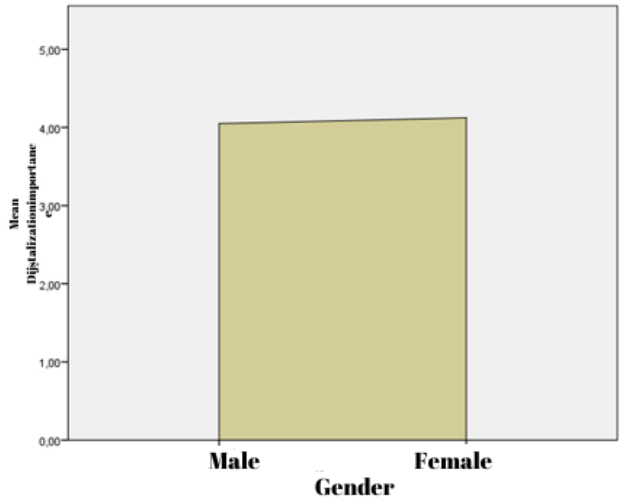

Figure 8.1 Average score of signification of digitalization by gender

Table 8.9 One-Way ANOVA Test for education with the signification of digitalization

ANOVA

Digitalization

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6,626	6	1,104	2,579	,019
Within Groups	145,160	339	,428		
Total	151,786	345			

Hypothesis 2: There is a difference among education groups regarding digitalization importance.

According to the One-Way Anova test result for the Hypothesis 2, it was determined that there is a significant difference between the signification of digitalization based on different education levels.(p<.05 p= ,019 , F(6, 339) = 2,579).

Bonferroni test was conducted as a Post-Hoc test to determine the distinctions between different groups. According to this test result; the signification of digitalization by secondary school graduates is lower than those participants with other education levels. (P<.05)

Effect Size=Partial Eta Squared = $x = \frac{6,626}{151,786}$ = 0.43

The education level variable explains 43% of the variance in the signification of digitalization.

Since the normal distribution test has the same main variable and the same results as the Table 8.6, even though the normal distribution test table was not written, it was tested that the test variables were normally distributed and it was accepted that the normal distribution was due to the reasons stated in the Table 8.6.

In this case, the Hypothesis 2 is accepted and seen as valid.

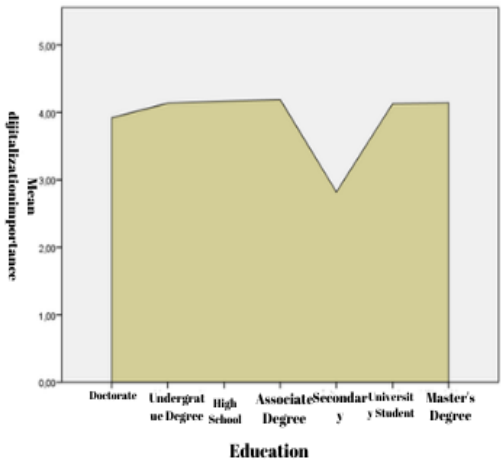

Figure 8.2 Signification of digitalization by education levels

Table 8.10 One-Way Anova Test on the signification of digitalization with social status

ANOVA

Digitalization

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		7,677	2	3,838	10,926	,000
	Linear Term	Unweighted	,004	1	,004	,013	,910
		Weighted	,045	1	,045	,128	,720
		Deviation	7,632	1	7,632	21,723	,000
Within Groups			482,008	1372	,351		
Total			489,685	1374			

Hypothesis 3: There is a difference among social status groups regarding signification of digitalization.

As a result of the One-way Anova Test conducted for the Hypothesis 3, it has been determined that there is a significant difference between the status of participants and the importance they attach to digitalization (p<.05 p=,000).

Bonferroni test was conducted as a Post-Hoc test to determine the distinctions between different groups. According to this test result; Academics give less importance to digitalization than senior managers. (P<.05)

Effect Size=Partial Eta Square = x= 7,677/489,685 = 0.015

The social status variable explains 15% of the variance in the signification of digitalization.

Since the normal distribution test has the same main variable and the same results as the Table 8.6, even though the normal distribution test table was not written, it was tested that the test variables were normally distributed and it was accepted that the normal distribution was due to the reasons in the Table 8.6.

In this case, the Hypothesis 3 is accepted and seen as valid.

Figure 8.3 Signification of digitalization according to social status

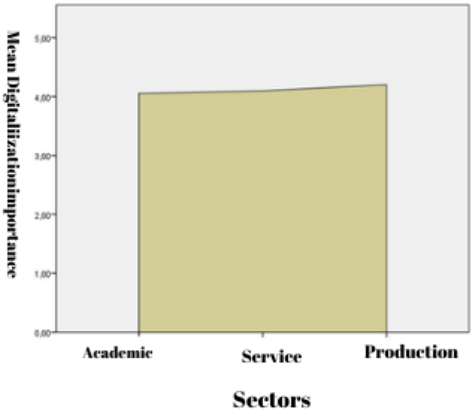

Figure 8.4 Signification of digitalization by sector

Table 8.11 Importance given to digital education normal distribution test table

Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
digitaleducation	,064	1375	,000

a. Lilliefors Significance Correction

The mean scores of the Importance Given to Digital Education scale were taken, the data was weighted, and a normal distribution test was performed with the gender variable. It was determined that the test result did not show a normal distribution as expected. (P<.05 , P= .000). However, since the normal distribution in Likert-type scale scores is not a generally observed condition, skewness and kurtosis values were checked (skewness= -,858 , kurtosis= 2.030), and because a value between -2 +2 was

observed, it was assumed that the data showed a normal distribution based on the source cited above.

Table 8.12 Gender and importance given to digital education independent groups T-Test

Group Statistics

	GENDER	N	Mean	Std. Deviation	Std. Error Mean
Digital Education	MALE	392	3,9177	,76165	,03847
	FEMALE	416	4,0512	,77475	,03797

Table 8.13 Independent groups T-test continuation table

t	2,469
p	,014

Hypothesis 4: There is a difference among gender groups regarding digital education importance.

According to the results of the independent groups t-test for the Hypothesis 4, there is a significant difference between the gender variable and the means of importance given to digital education. ($p<.05$ $p= .014$, $t= 2,469$).

In this case, the Hypothesis 4 is accepted and seen as valid.

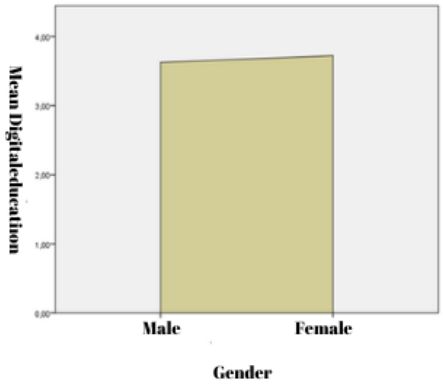

Figure 8.5 Importance given to digital education by gender

Table 8.14 Levels of education and importance given to digital education One-Way Anova Test

ANOVA

digital education

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		74,186	6	12,364	20,695	,000
	Linear Term	Unweighted	,944	1	,944	1,580	,209
		Weighted	50,162	1	50,162	83,959	,000
		Deviation	24,024	5	4,805	8,042	,000
Within Groups			737,259	1234	,597		
Total			811,444	1240			

Hypothesis 5: There is a difference among education groups regarding digital education importance.

According to the results of the One Way Anova Test conducted for the Hypothesis 5; It has been determined that there is a significant difference between the education level of participants and the importance they attach to digital education (p<.05 p=.000).

Bonferroni test was conducted as a Post-Hoc test to determine between which groups the difference was. According to this test result; The importance given to digital education by secondary school graduates is lower than those of participants with other education levels. (P<.05)

Effect Size=Partial Eta Square = x= 74,186/811,444 = 0.091

The education level variable explains 91% of the variance in the importance given to digital education.

Since the normal distribution test has the same main variable and the same results as the Table 8.10, even though the normal distribution test table was not written, it was tested that the test variables were normally distributed and it was accepted that the normal distribution was due to the reasons stated in the Table 8.10.

In this case, the Hypothesis 5 is accepted and seen as valid.

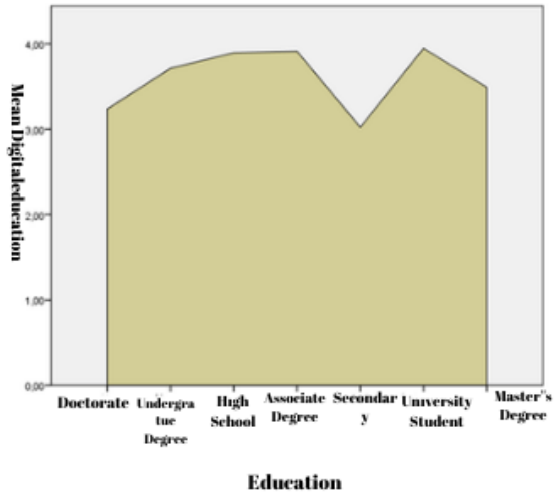

Figure 8.6 Importance given to digital education by education levels

Table 8.15 Social status and Importance given to digital education one-way Anova test

ANOVA

digital education

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		61,528	2	30,764	50,787	,000
	Linear Term	Unweighted	6,665	1	6,665	11,004	,001
		Weighted	3,872	1	3,872	6,392	,012
		Deviation	57,656	1	57,656	95,182	,000
Within Groups			749,916	1238	,606		
Total			811,444	1240			

Hypothesis 6: There is a difference among social status groups regarding digital education importance.

According to the One-Way Anova Test Result for the Hypothesis 6; it was determined that there is a significant difference between the Education Levels of the participants and the importance they attach to digital education. (p<.05, p=.000).

Bonferroni test was conducted as a Post-Hoc test to determine between which groups the difference existed. According to this test result; Academics give importance to digital education less than employers and students (p<.05, p= ,000).

Effect Size=Partial Eta Square = x= 61,528/811,444 = 0.075

The social status variable explains 75% of the variance in the importance given to digital education.

Since the normal distribution test has the same main variable and the same results as the Table 8.10, even though the normal distribution test table was not written, it was tested that the test variables were normally distributed and it was accepted that the normal distribution was due to the reasons stated in the Table 8.10.

In this case, the Hypothesis 6 is accepted and seen as valid.

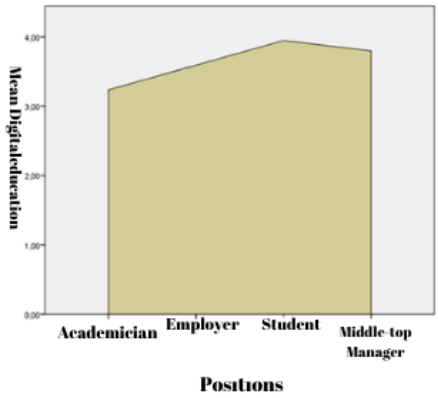

Figure 8.7 Importance given to digital education by social status

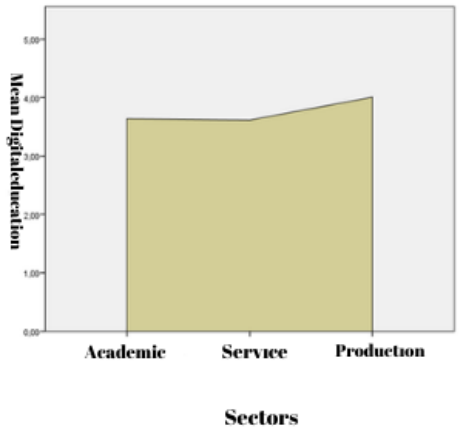

Figure 8.8 Importance given to digital education by sector

Table 8.16 Significance of digitalization and digital education importance normal distribution tests

Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
Digital Education	,064	1375	,000
Digital Importance	,074	1375	,000

a. Lilliefors Significance Correction

The averages of the signification of digitalization and the importance given to university education scale scores were taken and a normal distribution test was performed. It was determined that the test result did not show a normal distribution as expected. (P<.05 , P= .000). However, since the normal distribution in Likert-type scale scores is not a generally observed situation, skewness and kurtosis values were checked (skewness= -,868 , kurtosis= 2.376), and because a value between -2 +2 was observed, it was assumed that the data showed a normal distribution based on the source cited above.

Table 8.17 Importance given to digital education and signification of digitalization Pearson Correlation Analysis

Correlations

		Digitalization	Digital Education
Digital	Pearson Correlation	1	,699**
	Sig. (2-tailed)		,000
	N	1375	1375
Digjitaledu	Pearson Correlation	,699**	1
	Sig. (2-tailed)	,000	
	N	1375	1375

**. Correlation is significant at the 0.01 level (2-tailed).

Hypothesis 7: There is a correlation between significance of digitalization and digital education importance.

According to the results of the Pearson Correlation Test conducted for the Hypothesis 7, it was determined that there was a positive and highly significant relationship between the signification of digitalization and the importance scores given to digital education (r=.699 , p<.05, p= .000).

In this case, the Hypothesis 7 is accepted and seen as valid.

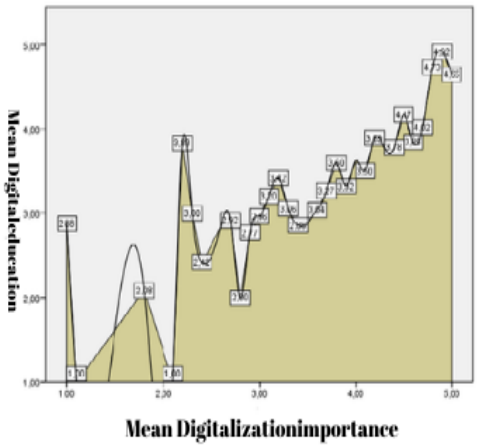

Figure 8.9 Signification of digitalization and the importance given to digital education

Table 8.18 Higher education importance and digital education importance normal distribution tests

Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
Digital Education	,064	1375	,000
Higher Education	,086	1375	,000

a. Lilliefors Significance Correction

The averages of the signification of digitalization and the importance given to university education scale scores were taken and a normal distribution test was performed. It was determined that the test result did not show a normal distribution as expected. (P<.05 , P= .000). However, since the normal distribution in Likert-type scale scores is not a generally observed situation, skewness and kurtosis values were checked (skewness= -,768 , kurtosis= 1,356), and because a value between -2 +2 was observed, it was assumed that the data showed a normal distribution based on the source cited above.

Table 8.19 Importance given to digital education and importance given to higher education Pearson Correlation Analysis

Correlations

		Digital Education	Higher Education
Digital Education	Pearson Correlation	1	,615**
	Sig. (2-tailed)		,000
	N	1242	1242
Higher Education	Pearson Correlation	,615**	1
	Sig. (2-tailed)	,000	
	N	1242	1242

**. *Correlation is significant at the 0.01 level (2-tailed).*

Hypothesis 8: There is a correlation between higher education importance and digital education importance.

According to the results of the Pearson Correlation test conducted for the Hypothesis 8; it was determined that there is a positive and highly significant relationship between the importance scores given to digital education and the importance given to higher education (r= .615 , p< .05, p= ,000).

In this case, the Hypothesis 8 is accepted and seen as valid.

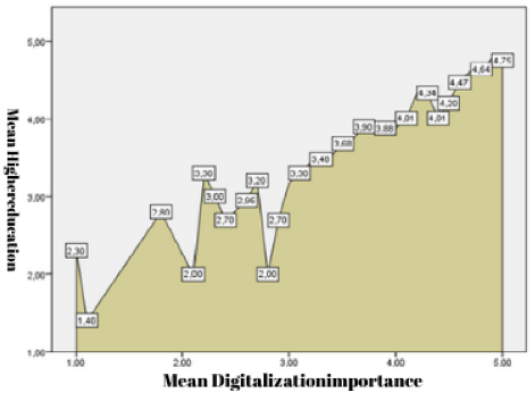

Figure 8.10 Importance given to digital education and importance given to higher education

To conclude, Cronbach's Alpha Reliability analysis was conducted for each sub-category and the overall data, revealing the reliability of the test data. The average scores obtained from the 5-point Likert Scale, which assessed the importance given to Digital Education, the importance given to Higher Education, and the significance of digitalization were categorized into three separate headings. The data were weighted, and the relevant hypothesis tests were applied to the sub-categories. Based on the test

results, it was found that 7 out of 8 hypotheses were accepted as valid, while one hypothesis was rejected.

Regarding the tests conducted with the gender variable in the collected data, it was predicted that there would be no significant difference in the significance of digitalization based on gender. The results confirmed that digitalization is equally important for both male and female participants. However, the tests also revealed a significant difference between the gender variable and the importance given to digital education. Therefore, while the significance of digitalization does not differ according to gender, there is a difference in the importance attached to digital education.

Concerning the tests conducted with the education level variable in the collected data, it was found that there was a significant difference in the mean scores of the significance of digitalization and the importance given to digital education based on education level. The results indicated that secondary school graduates assigned lower importance to digital education and digitalization compared to participants with other education levels, such as high school, university students, associate degree holders, undergraduate degree holders, master's degree holders, and doctorate holders.

Regarding the tests performed with the social status variable in the collected data, it was observed that there are differences in the significance of digitalization and the importance given to digital education. Specifically, the significance of digitalization among academic participants was found to be lower than that of senior managers, while the level of importance given to digital education by academics was lower compared to employers and students.

Based on the data obtained, two different test results were obtained regarding the average scores of the importance given to digital education. These test results revealed a linear and significant relationship between the importance given to digital education by participants and the importance they attributed to digitalization. Furthermore, a linear and significant relationship was found between the importance given to digital education and the importance given to university education.

8.2.1 Cluster Analysis

The clustering quality was assessed based on gender, age, position, sector, education level, and years in the workforce. The obtained clustering quality result was 0.28, which falls into the poor range. As depicted in the graph below, the low clustering

quality indicates the absence of significant clusters. In other words, the lack of significant differences between our subscales and demographic breakdowns hinders cluster analysis. Considering the importance of digitalization and digital education with six demographic inputs, the poor cluster quality suggests that there are no substantial distinctions among them, further supporting our hypotheses.

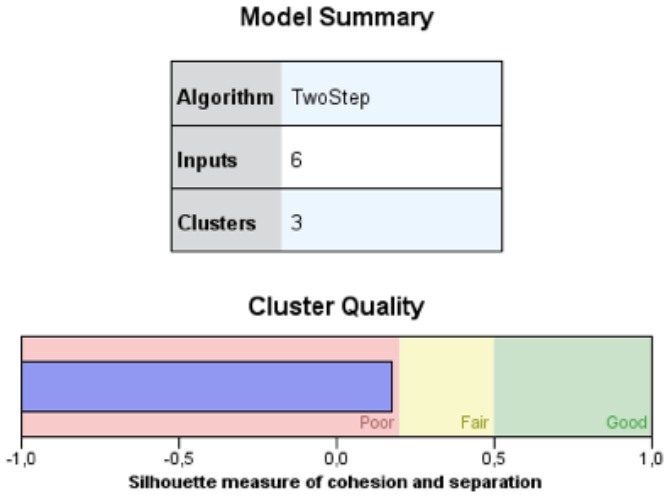

Figure 8.11 Cluster quality

8.2.2 Exploratory and Confirmatory Factor Analysis

Table 8.20 X-Scale Exploratory Factor Analysis results

		Eigenvalue	Explained Variance	Factor Loading
Dimension1		5.369	59.653	
X1	I think that digitalization is one of the most important realities in the 21st Century			.79
X2	I believe that digitalization is a part of my daily life			.83
X3	I think that digitalization is just a technological issue			.69
X5	I think that digitalization provides unlimited interactive communication			.74
X6	I believe that digital transformation will change traditional perspectives			.75
X7	I believe that digitalization makes our lives more efficient			.82
X8	I am currently making extensive use of digital technologies			.82
X9	Using digital technologies my life is more comfortable			.85
X10	I think that digital efficiency increases employment opportunities			.64
Total			59.653	

KMO: .91; Bartletts: .0000

To determine the factor structure of the X Scale, an Exploratory Factor Analysis was conducted (refer to Table 8.18). The factorability of the dataset was examined using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity (BTS). The KMO value should approach 1 (Field, 2005). A value between 0.7 and 0.8 is

considered good, between 0.8 and 0.9 very good, and above 0.9 excellent (Kaiser, 1974; Çokluk et al., 2012). Significance in Bartlett's test indicates the suitability for factor analysis (Çolakoğlu & Büyükekşi, 2014). Based on these results, it was determined that the dataset used in this study was suitable for factor analysis. The analysis ensured a common variance of each item at 0.50, a factor load of 0.45, and a difference of over 0.10 between the factor loads of both factors (Tabachnick & Fidel, 2013). Moreover, an Exploratory Factor Analysis that explains 40%-60% of the variance is considered sufficient (Çokluk et al., 2012). Table 8.19 presents the results, revealing a one-factor structure with factor loads ranging from 0.64 to 0.85, and a single factor explaining 59.653% of the total variance.

Table 8.21 X-scale confirmatory factor analysis results

Models	CFI	GFI	AGFI	IFI	TLI	NFI	RMSEA	*χ2*	*χ2 /df*	*df*
Model 1	.97	.95	.91	.97	.96	.96	.079	79.328	3.173	15

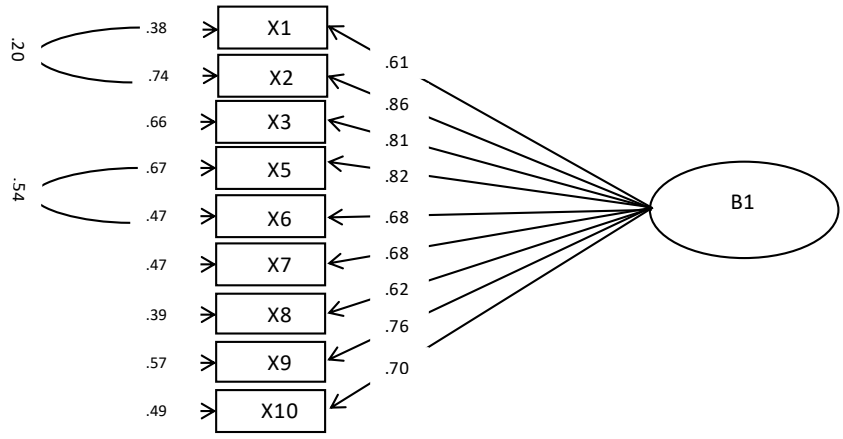

Figure 8.12 X-scale confirmatory factor analysis

Confirmatory factor analysis was performed to assess the construct validity of the X Scale. Goodness of fit indices such as χ2 /degree of freedom (df), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI) were examined. A χ2/df ratio of 3 or less, an RMSEA value less than 0.08, and a CFI value higher than 0.90 are considered indicative of a good fit. (Hoe, 2008). A GFI value higher than 0.90 and

an AGFI value higher than 0.85 represent an acceptable goodness of fit (Schermelleh-Engel et al., 2003).

The results of the second confirmatory factor analysis showed acceptable fit indices: [$\chi 2(15, N= 346) =79.328$, $\chi 2 /df =3.173$, RMSEA= 0.079, CFI = 0.97, GFI = 0.95, AGFI = 0.91].

Table 8.22 Y-scale exploratory factor analysis results

		Eigenvalue	Explained Variance	Factor Loading
Dimension1		5.285	52.849	
Y2	I think that earning an undergraduate degree is important for my career			.62
Y3	I think that university education will remain useful and relevant for a lifetime			.86
Y4	I believe that universities are aligned with the needs and expectations of working life			.90
Y5	I think that digital impact highly effects universities in our age			.69
Dimension2		1.313	13.132	
Y6	I believe tha Universities should shape their education strategies according to the realities of the digitalization age			.74
Y7	I believe that the value proposition for universities is changing in the digitalization era			.63
Y8	I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace			.84
Y9	I believe that Universities should fulfil the needs and expectations of new generation students			.83
Y10	Universities should develop traditional education methodologies with the opportunities of the digital age			.85
Total			65.981	

KMO: .88; Bartletts: .0000

To determine the factor structure of the Y Scale, an Exploratory Factor Analysis was conducted (refer to Table 8.20). The factorability of the data set was assessed using the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity (BTS). The KMO value should ideally approach 1 (Field, 2005). A value between 0.7 and 0.8 is considered good, between 0.8 and 0.9 very good, and above 0.9 excellent (Kaiser, 1974; Çokluk et al., 2012). Significance in the Bartlett's test indicates suitability for factor analysis (Çolakoğlu & Büyükekşi, 2014). Based on these values, it was determined that the data set used in this study was suitable for

factor analysis. During the analysis, attention was given to ensuring that each item had a common variance of 0.50, a factor loading of 0.45, and a difference of at least 0.10 between factor loadings for both factors (Tabachnick & Fidel, 2013). Additionally, Exploratory Factor Analysis considers 40%-60% variance explained as a sufficient level (Çokluk et al., 2012). Upon examining Table 8.21, a two-factor structure was identified as a result of the Exploratory Factor Analysis. The factor loadings of the items ranged from 0.62 to 0.90, and a single factor accounted for 65.981% of the total variance.

Table 8.23 Y-scale confirmatory factor analysis results

Models	CFI	GFI	AGFI	IFI	TLI	NFI	RMSEA	*χ2*	*χ2 /df*	*df*
Model 1	.97	.96	.92	.97	.96	.96	.075	62.083	2.956	24

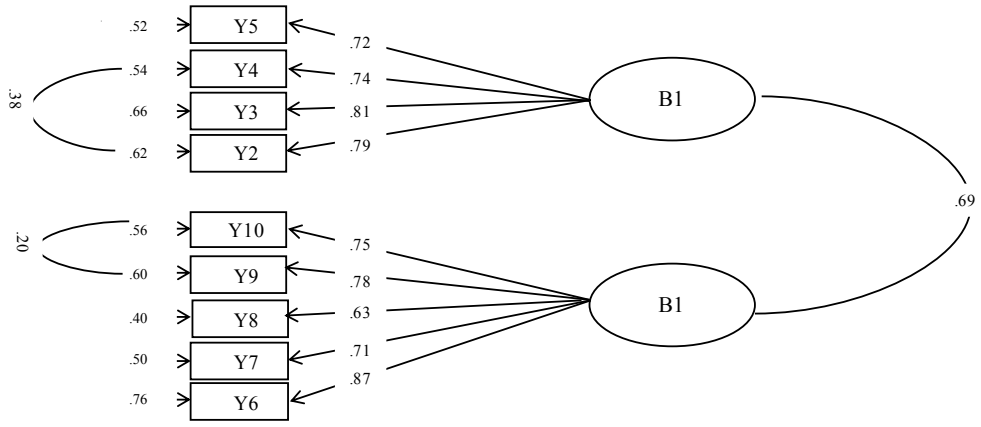

Figure 8.13 Y-scale confirmatory factor analysis results

Confirmatory factor analysis was performed to assess the construct validity of the Y Scale. In confirmatory factor analysis, goodness of fit indices such as χ2 /degree of freedom (df), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI) were examined. A χ2/df ratio of 3 or less, an RMSEA value below 0.08, and a CFI value above 0.90 are considered indicators of a good fit (Hoe, 2008). A GFI value above 0.90 and an AGFI value above 0.85 represent an acceptable level of goodness of fit (Schermelleh-Engel et al., 2003).

According to the results of the second confirmatory factor analysis conducted, the fit indices were found to be at an acceptable level [$\chi 2(24, N=346) = 62.083$, $\chi 2/df = 2.956$, RMSEA = 0.075, CFI = 0.97, GFI = 0.96, AGFI = 0.92]

Table 8.24 Z-scale exploratory factor analysis results

		Eigenvalue	Explained Variance	Factor Loading
Dimension1		5.701	57.007	
Z1	I think that Z and Alpha are more prone to digitalization than the previous generations			.79
Z2	I think that Generation Alpha is more prone to technology than Generation Z			.83
Z3	I think that technology and digitalization are indispensable for the Generation Z			.69
Z4	I think that Generation Z has a different view of higher education			.74
Z5	I think that Generation Z uses social media effectively			.75
Z6	I think that Generation Z uses digital communication tools effectively			.82
Z7	I think that Generation Z is an important factor for the arrival of online and hybrid methodologies in the universities			.82
Z8	I think that Generation Z prefer online higher education			.85
Z9	I think that Generation Z prefer hybrid (online/traditional) higher education			.64
Z10	Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha			.79
Total			57.007	

KMO:.88; Bartletts: .0000

To determine the factor structure of the Z Scale, an Exploratory Factor Analysis was conducted (refer to Table 8.22). The factorability of the data set was assessed using the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity (BTS). The KMO value should ideally approach 1 (Field, 2005). A value between 0.7 and 0.8 is considered good, between 0.8 and 0.9 very good, and above 0.9 excellent (Kaiser, 1974; Çokluk et al., 2012). Significance in the Bartlett's test indicates suitability for factor analysis (Çolakoğlu & Büyükekşi, 2014). Based on these values, it was determined that the data set used in this study was suitable for factor analysis. During the analysis, attention was given to ensuring that each item had a common variance of 0.50, a factor loading of 0.45, and a difference of at least 0.10 between factor loadings for both factors (Tabachnick & Fidel, 2013). Additionally, Exploratory Factor Analysis considers 40%-60% variance explained as a sufficient

level (Çokluk et al., 2012). Upon examining Table 8.23, a one-factor structure was identified as a result of the Exploratory Factor Analysis. The factor loadings of the items ranged from 0.64 to 0.83, and a single factor accounted for 57.007% of the total variance.

Table 8.25 Z-scale confirmatory factor analysis results

Models	CFI	GFI	AGFI	IFI	TLI	NFI	RMSEA	*χ2*	*χ2 /df*	*df*
Model 1	.95	.93	.88	.95	.93	.94	.094	122.175	4.072	32

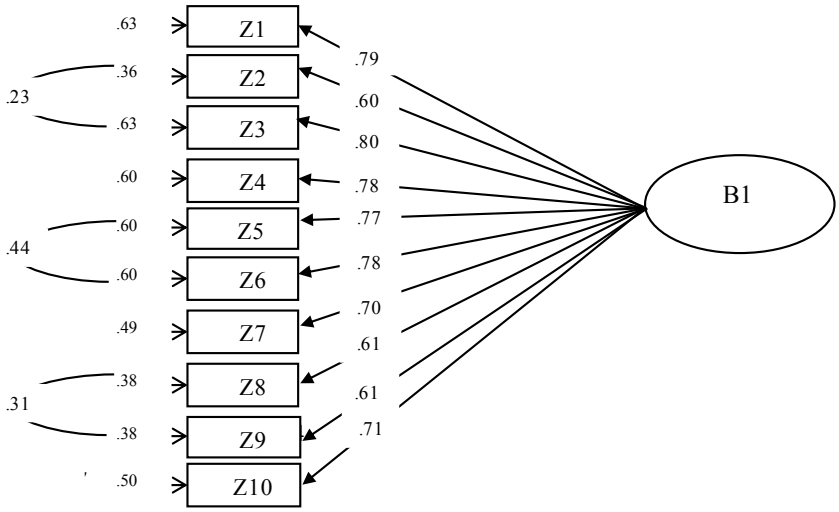

Figure 8.14 Z-scale confirmatory factor analysis results

Confirmatory factor analysis was performed to assess the construct validity of the Z Scale. In confirmatory factor analysis, goodness of fit indices such as χ2 /degree of freedom (df), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI) were examined. A χ2/df ratio of 3 or less, an RMSEA value below 0.08, and a CFI value above 0.90 are considered indicators of a good fit (Hoe, 2008). A GFI value above 0.90 and an AGFI value above 0.85 represent an acceptable level of goodness of fit (Schermelleh-Engel et al., 2003).

According to the results of the second confirmatory factor analysis, it was found that the fit indices were at an acceptable level [χ2(32, N=346) = 122.175, χ2/df = 4.072, RMSEA = 0.094, CFI = 0.95, GFI = 0.93, AGFI = 0.88].

Table 8.26 O-scale exploratory factor analysis results

		Eigenvalue	Explained Variance	Factor Loading
Dimension1		4.771	58.701	
O1	I think that digital education transfers the traditional classroom environment in digital environment			.55
O2	I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future			.69
O3	I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly			.88
O6	I think that digital education is an effective complement to the traditional university formal education model			.74
O8	I think that universities can provide hybrid education in the field of social sciences after 2030			.63
Dimension2		1.168	9.730	
O4	I believe that university education will turn to a completely digital education model after 2030			.70
O5	I think that the digital education model will completely replace the traditional university formal education model after 2030			.77
O7	I think that universities can only provide digital education in the field of social sciences after 2030			.67
O9	I think universities can only provide digital education in the field of medicine and engineering after 2030			.96
010	I think universities can only provide hybrid education in the field of medicine and engineering after 2030			.66

KMO: .93; Bartletts: .0000

To determine the factor structure of the Z Scale, an Exploratory Factor Analysis was conducted (refer to Table 8.24). The factorability of the dataset was assessed using the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity (BTS) tests. The factorability of the data set was assessed using the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity (BTS). The KMO value should ideally approach 1 (Field, 2005). A value between 0.7 and 0.8 is considered good, between 0.8 and 0.9 very good, and above 0.9 excellent (Kaiser, 1974; Çokluk et al., 2012). Significance in the Bartlett's test indicates suitability for factor analysis (Çolakoğlu & Büyükekşi, 2014). Based on these values, it was determined that the data set used in this study was suitable for factor analysis. During the analysis, attention was given to ensuring that each item had a common variance of 0.50, a factor loading of 0.45, and a difference of at least 0.10 between factor loadings

for both factors (Tabachnick & Fidel, 2013). Additionally, Exploratory Factor Analysis considers 40%-60% variance explained as a sufficient level (Çokluk et al., 2012). Upon examining Table 8.25, a two-factor structure emerged from the Exploratory Factor Analysis. The factor loadings ranged from 0.55 to 0.96, and the two factors accounted for 68.432% of the total variance.

Table 8.27 O-scale confirmatory factor analysis results

Models	CFI	GFI	AGFI	IFI	TLI	NFI	RMSEA	*χ2*	*χ2 /df*	*df*
Model 1	.97	.94	.90	.97	.95	.95	.078	146.489	3.117	32

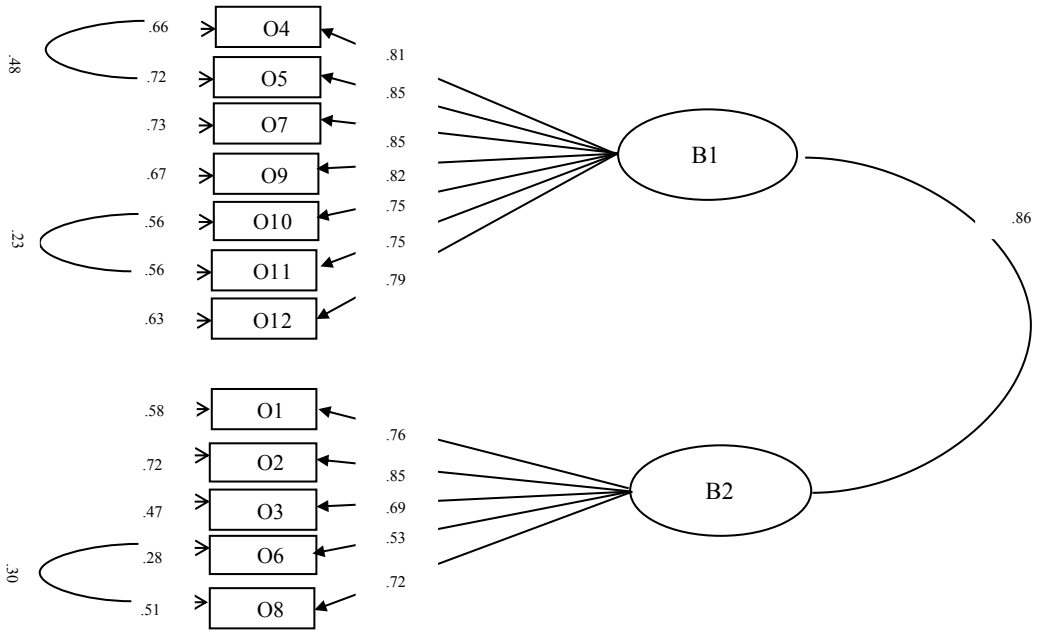

Figure 8.15 O-scale confirmatory factor analysis results

Confirmatory factor analysis was conducted to assess the construct validity of the O Scale. Goodness-of-fit indices such as χ2/df, RMSEA, CFI, GFI, and AGFI were examined. A χ2/df ratio of 3 or less, RMSEA value less than 0.08, and CFI value higher than 0.90 indicate a good fit (Hoe, 2008). A GFI value higher than 0.90 and AGFI value higher than 0.85 represent acceptable goodness of fit (Schermelleh-Engel et al., 2003).

According to the results of the second confirmatory factor analysis, it was found that the fit indices were at an acceptable level [$\chi 2(32, N=346) = 146.489$, $\chi 2/df = 3.117$, RMSEA = 0.078, CFI = 0.97, GFI = 0.94, AGFI = 0.90].

In conclusion, both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted on the X, Y, Z, and O scales to assess their validity and reliability. During the EFA process, the common factor loads, common variance of items, and total explained variance of the scales were examined based on relevant literature.

It was determined that all the scales utilized in the study exhibited consistency with the values reported in the relevant literature (Tabachnick & Fidel, 2013). Additionally, the Confirmatory Factor Analysis conducted on the respective scales involved an examination of commonly used fit indices such as CFI, GFI, AGFI, IFI, TLI, NFI, and RMSEA.

Factor analysis was performed on all variables included in the X, Y, Z, and O scales. However, due to the influence of the Y1 variable, which is exclusively present in the Y scale, on the goodness of fit in the confirmatory factor analysis, the Y1 variable was excluded to obtain an accurate measure of goodness of fit. Consequently, acceptable goodness-of-fit values were achieved for all scales in our study, aligning with previous research findings (Schermelleh-Engel et al., 2003; Hoe, 2008).

CHAPTER 9

9. CONCLUSION

Over time, universities that embrace the digital age and anticipate evolution will attract students who value time and place flexibility for their future career advancements or new professions after graduation. Therefore, the research proposal of this study is focused on the question, 'Will Digital Universities shape the future of Higher Education?'

It is evident that the trend towards digital transformation in higher education has gained significant momentum, particularly during the Covid-19 period in the last 20 years. It is expected that the traditional university system will gradually evolve into a digital university system in the near future. Traditional prestigious universities will continue to exist, while digital universities will emerge. The process of this transition will occur step by step, as witnessed by the adoption of hybrid education by universities after the Covid-19 period. Furthermore, digital technologies such as virtual reality, augmented reality, blockchain, Web 3.0, and the preliminary steps of the metaverse are rapidly advancing. The higher education system will assimilate these developments in the 21st century. Digitalization is a reality of the Industry 4.0 era, and universities have been increasingly digitalized in alignment with the University 4.0 concept. Looking ahead, the anticipated fifth-generation University 5.0, especially as a digital university, will likely proliferate by the 2030s.

Universities hold a significant role for humanity throughout their journey from the University 1.0 of the Medieval Age to the University 5.0 of the digital world. These higher education institutions have nurtured different generations that have contributed to the sustainable development and prosperity of society. In this era of innovation and

digital transformation, Generation Z and their successors in Generation Alpha are paving the way for the hybrid education of digitalized universities as an initial step. Subsequently, virtual education in digital universities is expected to take place after the 2030s, as indicated by the findings of this study.

The first-generation University 1.0 emerged as information transfer centers in the 11th Century. This was followed by the second-generation University 2.0, which evolved into information transfer and research centers in the 19th Century. The University 3.0 generation emerged in the 1970s as information transfer, research, and application centers, fostering university-industry collaboration. The fourth-generation University 4.0 flourished as a digitalized university in the 2000s, driven by technological and social innovations during the age of digital transformation. This thesis aims to provide insights into the future fifth-generation University 5.0, particularly its projected rise by the 2030s as a digital university targeting a global market and delivering education activities in a translocal and transtemporal manner.

Using a survey on digitalization and perceptions of digital universities, the results provided support for a linear and significant relationship between the importance attributed to digital education by respondents and the importance they placed on digitalization. Additionally, there was a linear and significant relationship between the importance given to digital education and the importance given to university education. Based on the survey results from 346 respondents, it was observed that academics assigned less importance to digital education compared to employers and students, indicating a certain level of caution within the academic community regarding digital education. Interestingly, while gender did not differ significantly in terms of digitalization, female respondents attached more importance to digital education. On the other hand, respondents with a secondary school education level demonstrated the least importance given to both digitalization and digital education.

Under these circumstances, it can be argued that until 2030, universities will increasingly adopt a hybrid model of education in response to market demand, which will be implemented at different levels in various disciplines such as medicine, engineering, social sciences, and others. After 2030, traditional universities are expected to incorporate a blended learning model, while digital higher education institutions are likely to experience inevitable growth. In fact, with the rapid pace of

digital transformation, digital education may eventually replace traditional universities entirely after 2050.

9.1 Implications

The ongoing digital transformation is set to bring about significant advancements in the higher education ecosystem, particularly through the integration of Artificial Intelligence (AI) and 5G wireless technology. Firstly, it can be argued that AI will not only enhance the efficiency and effectiveness of management operations within higher education institutions, but also provide invaluable assistance to academics and students in the educational process, thereby enhancing academic output. Secondly, the advent of 5G technology will facilitate the active utilization of digital age innovations such as Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0, and the Metaverse. These elements of the digital storm will introduce novel and captivating learning experiences for students, enabling more personalized and adaptive learning approaches in the 21st century. Undoubtedly, both AI and 5G technology will enhance access to education, offering greater flexibility, mobility, and convenience in the globalized education market.

The post-2030 period will necessitate a greater presence of academicians with digital expertise, as they will play a crucial role in developing qualified and skilled human resources in the digital age. Consequently, academics must embrace the advantages of digitalized educational opportunities, while acknowledging that the digital transformation era will primarily impact educational methodologies, while the fundamental pillars of higher education - namely, academic content and faculty expertise - will remain unchanged in the University 5.0 period and beyond. Intriguingly, the World Economic Forum predicts that over half of the future jobs in 2030 will require proficiency in digital technology (Marr, 2023). This observation underscores the growing demand from employers for proficient graduates who can effectively leverage digital applications and platforms to solve problems and generate value. Undoubtedly, lifelong learning will retain its importance amidst the constant change and development in this new era. However, digital universities of the University 5.0 generation will effectively and globally cater to this demand.

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APPENDICES

A-1 Frequency Tables

Position * I think that digitalization is one of the most important realities in the 21st Century Crosstabulation

% within Position

		I think that digitalization is one of the most important realities in the 21st Century					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	College student	4,7%	2,8%	15,1%	36,8%	40,6%	100,0 %
	Academic		1,2%	2,4%	34,9%	61,4%	100,0 %
	Employer/Manager	1,9%	1,9%	2,5%	32,5%	61,1%	100,0 %
Total		2,3%	2,0%	6,4%	34,4%	54,9%	100,0 %

Position * I believe that digitalization is a part of my daily life Crosstabulation

% within Position

		I believe that digitalization is a part of my daily life					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	College student	2,8%	3,8%	11,3%	43,4%	38,7%	100,0 %
	Academic		1,2%	3,6%	36,1%	59,0%	100,0 %
	Employer/Manager	,6%	,6%	3,8%	41,4%	53,5%	100,0 %
Total		1,2%	1,7%	6,1%	40,8%	50,3%	100,0 %

Position * I think that digitalization is a socio-cultural phenomenon Crosstabulation

% within Position

		I think that digitalization is a socio-cultural phenomenon					
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Position	College student	1,9%	3,8%	17,9%	44,3%	32,1%	100,0 %
	Academic	1,2%	7,2%	13,3%	51,8%	26,5%	100,0 %
	Employer/Manager	3,8%	4,5%	15,9%	45,2%	30,6%	100,0 %
Total		2,6%	4,9%	15,9%	46,5%	30,1%	100,0 %

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	180	52,0	52,0	52,0
	Female	166	48,0	48,0	100,0
	Total	346	100,0	100,0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17-22	29	8,4	8,4	8,4
	23-27	68	19,7	19,7	28,0
	28-35	50	14,5	14,5	42,5
	36-45	86	24,9	24,9	67,3
	45+	113	32,7	32,7	100,0
	Total	346	100,0	100,0	

Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	College student	106	30,6	30,6	30,6
	Academic	83	24,0	24,0	54,6
	Employer/Manager	157	45,4	45,4	100,0
	Total	346	100,0	100,0	

Sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Academic	189	54,6	54,6	54,6
	Services sector	117	33,8	33,8	88,4
	Manufacturing sector	40	11,6	11,6	100,0
	Total	346	100,0	100,0	

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	College student	106	30,6	30,6	30,6
	Secondary school	3	,9	,9	31,5
	High school	30	8,7	8,7	40,2
	Two-year degree	6	1,7	1,7	41,9
	Undergraduate degree	88	25,4	25,4	67,3
	Master's degree	37	10,7	10,7	78,0
	Doctorate	76	22,0	22,0	100,0
	Total	346	100,0	100,0	

How long have you been working?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	27	7,8	11,3	11,3
	6-10 years	64	18,5	26,7	37,9
	10 years+	149	43,1	62,1	100,0

	Total	240	69,4	100,0	
Missing	System	106	30,6		
Total		346	100,0		

Which city do you live in?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Adana	6	1,7	1,7	1,7
	Adıyaman	2	,6	,6	2,3
	Afyonkarahisar	2	,6	,6	2,9
	Ağrı	2	,6	,6	3,5
	Aksaray	1	,3	,3	3,8
	Ankara	36	10,4	10,4	14,2
	Antalya	9	2,6	2,6	16,8
	Ardahan	1	,3	,3	17,1
	Aydın	1	,3	,3	17,3
	Balıkesir	3	,9	,9	18,2
	Batman	2	,6	,6	18,8
	Burdur	1	,3	,3	19,1
	Bursa	11	3,2	3,2	22,3
	Denizli	1	,3	,3	22,5
	Diyarbakır	1	,3	,3	22,8
	Düzce	1	,3	,3	23,1
	Edirne	3	,9	,9	24,0
	Elazığ	1	,3	,3	24,3
	Erzincan	1	,3	,3	24,6
	Erzurum	1	,3	,3	24,9
	Eskişehir	2	,6	,6	25,4
	Gaziantep	5	1,4	1,4	26,9
	Gazimağusa	1	,3	,3	27,2
	Giresun	1	,3	,3	27,5
	Girne	1	,3	,3	27,7
	Hatay	2	,6	,6	28,3
	Isparta	4	1,2	1,2	29,5
	İstanbul	176	50,9	50,9	80,3
	İzmir	29	8,4	8,4	88,7
	Kars	1	,3	,3	89,0
	Kayseri	5	1,4	1,4	90,5
	Kırklareli	1	,3	,3	90,8
	Kocaeli	3	,9	,9	91,6
	Konya	4	1,2	1,2	92,8
	Malatya	2	,6	,6	93,4
	Manisa	3	,9	,9	94,2
	Mersin	2	,6	,6	94,8
	Muğla	1	,3	,3	95,1
	Niğde	2	,6	,6	95,7
	Ordu	1	,3	,3	96,0
	Osmaniye	1	,3	,3	96,2
	Sakarya	1	,3	,3	96,5
	Samsun	2	,6	,6	97,1
	Şanlıurfa	2	,6	,6	97,7
	Tekirdağ	3	,9	,9	98,6
	Trabzon	2	,6	,6	99,1
	Van	2	,6	,6	99,7
	Yalova	1	,3	,3	100,0
	Total	346	100,0	100,0	

I think that digitalization is one of the most important realities in the 21st Century

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	2,3	2,3	2,3
	Somewhat disagree	7	2,0	2,0	4,3
	Neither agree nor disagree	22	6,4	6,4	10,7
	Somewhat agree	119	34,4	34,4	45,1
	Strongly agree	190	54,9	54,9	100,0
	Total	346	100,0	100,0	

I believe that digitalization is a part of my daily life

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	1,2	1,2	1,2
	Somewhat disagree	6	1,7	1,7	2,9
	Neither agree nor disagree	21	6,1	6,1	9,0
	Somewhat agree	141	40,8	40,8	49,7
	Strongly agree	174	50,3	50,3	100,0
	Total	346	100,0	100,0	

I think that digitalization is a socio-cultural phenomenon

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	2,6	2,6	2,6
	Somewhat disagree	17	4,9	4,9	7,5
	Neither agree nor disagree	55	15,9	15,9	23,4
	Somewhat agree	161	46,5	46,5	69,9
	Strongly agree	104	30,1	30,1	100,0
	Total	346	100,0	100,0	

I think that digitalization is just a technological issue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	33	9,5	9,5	9,5
	Somewhat disagree	107	30,9	30,9	40,5
	Neither agree nor disagree	58	16,8	16,8	57,2
	Somewhat agree	92	26,6	26,6	83,8
	Strongly agree	56	16,2	16,2	100,0
	Total	346	100,0	100,0	

I think that digitalization provides unlimited interactive communication

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	2,0	2,0	2,0
	Somewhat disagree	29	8,4	8,4	10,4
	Neither agree nor disagree	47	13,6	13,6	24,0
	Somewhat agree	166	48,0	48,0	72,0
	Strongly agree	97	28,0	28,0	100,0
	Total	346	100,0	100,0	

I believe that digital transformation will change traditional perspectives

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	2,0	2,0	2,0
	Somewhat disagree	11	3,2	3,2	5,2
	Neither agree nor disagree	38	11,0	11,0	16,2
	Somewhat agree	182	52,6	52,6	68,8
	Strongly agree	108	31,2	31,2	100,0
	Total	346	100,0	100,0	

I believe that digitalization makes our lives more efficient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	2,3	2,3	2,3
	Somewhat disagree	13	3,8	3,8	6,1
	Neither agree nor disagree	63	18,2	18,2	24,3
	Somewhat agree	150	43,4	43,4	67,6
	Strongly agree	112	32,4	32,4	100,0
	Total	346	100,0	100,0	

I am currently making extensive use of digital technologies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	1,2	1,2	1,2
	Somewhat disagree	12	3,5	3,5	4,6
	Neither agree nor disagree	44	12,7	12,7	17,3
	Somewhat agree	164	47,4	47,4	64,7
	Strongly agree	122	35,3	35,3	100,0
	Total	346	100,0	100,0	

Using digital technologies my life is more comfortable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	1,2	1,2	1,2
	Somewhat disagree	15	4,3	4,3	5,5
	Neither agree nor disagree	38	11,0	11,0	16,5
	Somewhat agree	162	46,8	46,8	63,3
	Strongly agree	127	36,7	36,7	100,0
	Total	346	100,0	100,0	

I think that digital efficiency increases employment opportunities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	15	4,3	4,3	4,3
	Somewhat disagree	39	11,3	11,3	15,6
	Neither agree nor disagree	76	22,0	22,0	37,6
	Somewhat agree	121	35,0	35,0	72,5
	Strongly agree	95	27,5	27,5	100,0
	Total	346	100,0	100,0	

I think that technological developments positively support the quality of higher education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	1,2	1,2	1,2
	Somewhat disagree	27	7,8	7,8	9,0
	Neither agree nor disagree	49	14,2	14,2	23,1
	Somewhat agree	159	46,0	46,0	69,1
	Strongly agree	107	30,9	30,9	100,0
	Total	346	100,0	100,0	

I think that earning an undergraduate degree is important for my career

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	1,7	1,7	1,7
	Somewhat disagree	22	6,4	6,4	8,1
	Neither agree nor disagree	41	11,8	11,8	19,9
	Somewhat agree	134	38,7	38,7	58,7
	Strongly agree	143	41,3	41,3	100,0
	Total	346	100,0	100,0	

I think that university education will remain useful and relevant for a lifetime

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	2,6	2,6	2,6
	Somewhat disagree	37	10,7	10,7	13,3
	Neither agree nor disagree	56	16,2	16,2	29,5
	Somewhat agree	134	38,7	38,7	68,2
	Strongly agree	110	31,8	31,8	100,0
	Total	346	100,0	100,0	

I believe that universities are aligned with the needs and expectations of working life

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	26	7,5	7,5	7,5
	Somewhat disagree	70	20,2	20,2	27,7
	Neither agree nor disagree	83	24,0	24,0	51,7
	Somewhat agree	103	29,8	29,8	81,5
	Strongly agree	64	18,5	18,5	100,0
	Total	346	100,0	100,0	

I think that digital impact highly effects universities in our age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	2,0	2,0	2,0
	Somewhat disagree	19	5,5	5,5	7,5
	Neither agree nor disagree	53	15,3	15,3	22,8
	Somewhat agree	169	48,8	48,8	71,7
	Strongly agree	98	28,3	28,3	100,0
	Total	346	100,0	100,0	

I believe the Universities should shape their education strategies according to the realities of the digitalization age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	1,2	1,2	1,2
	Somewhat disagree	14	4,0	4,0	5,2
	Neither agree nor disagree	36	10,4	10,4	15,6
	Somewhat agree	159	46,0	46,0	61,6
	Strongly agree	133	38,4	38,4	100,0
	Total	346	100,0	100,0	

I believe that the value proposition for universities is changing in the digitalization era

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	,9	,9	,9
	Somewhat disagree	18	5,2	5,2	6,1
	Neither agree nor disagree	62	17,9	17,9	24,0
	Somewhat agree	167	48,3	48,3	72,3
	Strongly agree	96	27,7	27,7	100,0
	Total	346	100,0	100,0	

I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	1,7	1,7	1,7
	Somewhat disagree	24	6,9	6,9	8,7
	Neither agree nor disagree	53	15,3	15,3	24,0
	Somewhat agree	170	49,1	49,1	73,1
	Strongly agree	93	26,9	26,9	100,0
	Total	346	100,0	100,0	

I believe that Universities should fulfil the needs and expectations of new generation students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	1,2	1,2	1,2
	Somewhat disagree	10	2,9	2,9	4,0
	Neither agree nor disagree	25	7,2	7,2	11,3
	Somewhat agree	159	46,0	46,0	57,2
	Strongly agree	148	42,8	42,8	100,0
	Total	346	100,0	100,0	

Universities should develop traditional education methodologies with the opportunities of the digital age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	1,4	1,4	1,4
	Somewhat disagree	11	3,2	3,2	4,6
	Neither agree nor disagree	30	8,7	8,7	13,3
	Somewhat agree	153	44,2	44,2	57,5
	Strongly agree	147	42,5	42,5	100,0
	Total	346	100,0	100,0	

I think that Z and Alpha are more prone to digitalization than the previous generations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	1,4	1,4	1,4
	Somewhat disagree	12	3,5	3,5	4,9
	Neither agree nor disagree	28	8,1	8,1	13,0
	Somewhat agree	122	35,3	35,3	48,3
	Strongly agree	179	51,7	51,7	100,0
	Total	346	100,0	100,0	

I think that Generation Alpha is more prone to technology than Generation Z

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	2,6	2,6	2,6
	Somewhat disagree	29	8,4	8,4	11,0
	Neither agree nor disagree	66	19,1	19,1	30,1
	Somewhat agree	113	32,7	32,7	62,7
	Strongly agree	129	37,3	37,3	100,0
	Total	346	100,0	100,0	

I think that technology and digitalization are indispensable for the Generation Z

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	,9	,9	,9
	Somewhat disagree	13	3,8	3,8	4,6
	Neither agree nor disagree	34	9,8	9,8	14,5
	Somewhat agree	135	39,0	39,0	53,5
	Strongly agree	161	46,5	46,5	100,0
	Total	346	100,0	100,0	

I think that Generation Z has a different view of higher education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	2,0	2,0	2,0
	Somewhat disagree	18	5,2	5,2	7,2
	Neither agree nor disagree	47	13,6	13,6	20,8
	Somewhat agree	149	43,1	43,1	63,9
	Strongly agree	125	36,1	36,1	100,0
	Total	346	100,0	100,0	

I think that Generation Z uses social media effectively

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	1,7	1,7	1,7
	Somewhat disagree	13	3,8	3,8	5,5
	Neither agree nor disagree	35	10,1	10,1	15,6
	Somewhat agree	128	37,0	37,0	52,6
	Strongly agree	164	47,4	47,4	100,0
	Total	346	100,0	100,0	

I think that Generation Z uses digital communication tools effectively

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	1,4	1,4	1,4
	Somewhat disagree	18	5,2	5,2	6,6
	Neither agree nor disagree	36	10,4	10,4	17,1
	Somewhat agree	135	39,0	39,0	56,1
	Strongly agree	152	43,9	43,9	100,0
	Total	346	100,0	100,0	

I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	2,0	2,0	2,0
	Somewhat disagree	28	8,1	8,1	10,1
	Neither agree nor disagree	54	15,6	15,6	25,7
	Somewhat agree	149	43,1	43,1	68,8
	Strongly agree	108	31,2	31,2	100,0
	Total	346	100,0	100,0	

I think that Generation Z prefer digital higher education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	1,7	1,7	1,7
	Somewhat disagree	29	8,4	8,4	10,1
	Neither agree nor disagree	77	22,3	22,3	32,4
	Somewhat agree	140	40,5	40,5	72,8
	Strongly agree	94	27,2	27,2	100,0
	Total	346	100,0	100,0	

I think that Generation Z prefer hybrid (digital/traditional) higher education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	2,6	2,6	2,6
	Somewhat disagree	20	5,8	5,8	8,4
	Neither agree nor disagree	63	18,2	18,2	26,6
	Somewhat agree	167	48,3	48,3	74,9
	Strongly agree	87	25,1	25,1	100,0
	Total	346	100,0	100,0	

Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	2,6	2,6	2,6
	Somewhat disagree	15	4,3	4,3	6,9
	Neither agree nor disagree	70	20,2	20,2	27,2
	Somewhat agree	143	41,3	41,3	68,5
	Strongly agree	109	31,5	31,5	100,0
	Total	346	100,0	100,0	

I think that digital education transfers the traditional classroom environment in digital environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	23	6,6	6,6	6,6
	Somewhat disagree	49	14,2	14,2	20,8
	Neither agree nor disagree	64	18,5	18,5	39,3
	Somewhat agree	126	36,4	36,4	75,7
	Strongly agree	84	24,3	24,3	100,0
	Total	346	100,0	100,0	

I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	2,3	2,3	2,3
	Somewhat disagree	21	6,1	6,1	8,4
	Neither agree nor disagree	68	19,7	19,7	28,0
	Somewhat agree	153	44,2	44,2	72,3
	Strongly agree	96	27,7	27,7	100,0
	Total	346	100,0	100,0	

I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	2,9	2,9	2,9
	Somewhat disagree	17	4,9	4,9	7,8
	Neither agree nor disagree	59	17,1	17,1	24,9
	Somewhat agree	161	46,5	46,5	71,4
	Strongly agree	99	28,6	28,6	100,0
	Total	346	100,0	100,0	

I believe that university education will turn to a completely digital education model after 2030

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	19	5,5	5,5	5,5
	Somewhat disagree	48	13,9	13,9	19,4
	Neither agree nor disagree	86	24,9	24,9	44,2
	Somewhat agree	106	30,6	30,6	74,9
	Strongly agree	87	25,1	25,1	100,0
	Total	346	100,0	100,0	

I think that the digital education model will completely replace the traditional university formal education model after 2030

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	19	5,5	5,5	5,5
	Somewhat disagree	55	15,9	15,9	21,4
	Neither agree nor disagree	81	23,4	23,4	44,8
	Somewhat agree	117	33,8	33,8	78,6
	Strongly agree	74	21,4	21,4	100,0
	Total	346	100,0	100,0	

I think that digital education is an effective complement to the traditional university formal education model

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	2,3	2,3	2,3
	Somewhat disagree	14	4,0	4,0	6,4
	Neither agree nor disagree	48	13,9	13,9	20,2
	Somewhat agree	174	50,3	50,3	70,5
	Strongly agree	102	29,5	29,5	100,0
	Total	346	100,0	100,0	

I think that universities can only provide digital education in the field of social sciences after 2030

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	11	3,2	3,2	3,2
	Somewhat disagree	69	19,9	19,9	23,1
	Neither agree nor disagree	74	21,4	21,4	44,5
	Somewhat agree	108	31,2	31,2	75,7
	Strongly agree	84	24,3	24,3	100,0
	Total	346	100,0	100,0	

I think that universities can provide hybrid education in the field of social sciences after 2030

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	2,3	2,3	2,3
	Somewhat disagree	21	6,1	6,1	8,4
	Neither agree nor disagree	62	17,9	17,9	26,3
	Somewhat agree	175	50,6	50,6	76,9
	Strongly agree	80	23,1	23,1	100,0
	Total	346	100,0	100,0	

I think universities can only provide digital education in the field of medicine and engineering after 2030

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	65	18,8	18,8	18,8
	Somewhat disagree	78	22,5	22,5	41,3
	Neither agree nor disagree	60	17,3	17,3	58,7
	Somewhat agree	78	22,5	22,5	81,2
	Strongly agree	65	18,8	18,8	100,0
	Total	346	100,0	100,0	

I think universities can only provide hybrid education in the field of medicine and engineering after 2030

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	35	10,1	10,1	10,1
	Somewhat disagree	37	10,7	10,7	20,8
	Neither agree nor disagree	85	24,6	24,6	45,4
	Somewhat agree	117	33,8	33,8	79,2
	Strongly agree	72	20,8	20,8	100,0
	Total	346	100,0	100,0	

I believe employers will only demand certificates of competence rather than university degrees after 2030

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	20	5,8	5,8	5,8
	Somewhat disagree	55	15,9	15,9	21,7
	Neither agree nor disagree	81	23,4	23,4	45,1
	Somewhat agree	119	34,4	34,4	79,5
	Strongly agree	71	20,5	20,5	100,0
	Total	346	100,0	100,0	

I believe that there will be no need for the classical formal education university model after 2030

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	28	8,1	8,1	8,1
	Somewhat disagree	76	22,0	22,0	30,1
	Neither agree nor disagree	80	23,1	23,1	53,2
	Somewhat agree	93	26,9	26,9	80,1
	Strongly agree	69	19,9	19,9	100,0
	Total	346	100,0	100,0	

A-2 Crosstabulation (Position)

Position * I think that digitalization is one of the most important realities in the 21st Century Crosstabulation

% within Position

		I think that digitalization is one of the most important realities in the 21st Century					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	4,7%	2,8%	15,1%	36,8%	40,6%	100,0%
	Academic		1,2%	2,4%	34,9%	61,4%	100,0%
	Employer/Manager	1,9%	1,9%	2,5%	32,5%	61,1%	100,0%
Total		2,3%	2,0%	6,4%	34,4%	54,9%	100,0%

Position * I believe that digitalization is a part of my daily life Crosstabulation

% within Position

		I believe that digitalization is a part of my daily life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	3,8%	11,3%	43,4%	38,7%	100,0%
	Academic		1,2%	3,6%	36,1%	59,0%	100,0%
	Employer/Manager	,6%	,6%	3,8%	41,4%	53,5%	100,0%
Total		1,2%	1,7%	6,1%	40,8%	50,3%	100,0%

Position * I think that digitalization is a socio-cultural phenomenon Crosstabulation

% within Position

		I think that digitalization is a socio-cultural phenomenon					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	3,8%	17,9%	44,3%	32,1%	100,0%
	Academic	1,2%	7,2%	13,3%	51,8%	26,5%	100,0%
	Employer/Manager	3,8%	4,5%	15,9%	45,2%	30,6%	100,0%
Total		2,6%	4,9%	15,9%	46,5%	30,1%	100,0%

Position * I think that digitalization is just a technological issue Crosstabulation

% within Position

		I think that digitalization is just a technological issue					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	6,6%	13,2%	24,5%	33,0%	22,6%	100,0%
	Academic	16,9%	49,4%	13,3%	13,3%	7,2%	100,0%
	Employer/Manager	7,6%	33,1%	13,4%	29,3%	16,6%	100,0%
Total		9,5%	30,9%	16,8%	26,6%	16,2%	100,0%

Position * I think that digitalization provides unlimited interactive communication Crosstabulation

% within Position

		I think that digitalization provides unlimited interactive communication					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	7,5%	16,0%	45,3%	28,3%	100,0%
	Academic	1,2%	13,3%	14,5%	50,6%	20,5%	100,0%
	Employer/Manager	1,9%	6,4%	11,5%	48,4%	31,8%	100,0%
Total		2,0%	8,4%	13,6%	48,0%	28,0%	100,0%

Position * I believe that digital transformation will change traditional perspectives Crosstabulation

% within Position

		I believe that digital transformation will change traditional perspectives					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	3,8%	1,9%	14,2%	51,9%	28,3%	100,0%
	Academic		1,2%	13,3%	56,6%	28,9%	100,0%
	Employer/Manager	1,9%	5,1%	7,6%	51,0%	34,4%	100,0%
Total		2,0%	3,2%	11,0%	52,6%	31,2%	100,0%

Position * I believe that digitalization makes our lives more efficient Crosstabulation

% within Position

		I believe that digitalization makes our lives more efficient					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	3,8%	3,8%	17,9%	43,4%	31,1%	100,0%
	Academic	1,2%	8,4%	20,5%	38,6%	31,3%	100,0%
	Employer/Manager	1,9%	1,3%	17,2%	45,9%	33,8%	100,0%
Total		2,3%	3,8%	18,2%	43,4%	32,4%	100,0%

Position * I am currently making extensive use of digital technologies Crosstabulation

% within Position

		I am currently making extensive use of digital technologies					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	3,8%	19,8%	39,6%	34,0%	100,0%
	Academic		2,4%	9,6%	56,6%	31,3%	100,0%
	Employer/Manager	,6%	3,8%	9,6%	47,8%	38,2%	100,0%
Total		1,2%	3,5%	12,7%	47,4%	35,3%	100,0%

Position * Using digital technologies my life is more comfortable Crosstabulation

% within Position

		Using digital technologies my life is more comfortable					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	4,7%	10,4%	45,3%	36,8%	100,0%
	Academic		7,2%	9,6%	54,2%	28,9%	100,0%
	Employer/Manager	,6%	2,5%	12,1%	43,9%	40,8%	100,0%
Total		1,2%	4,3%	11,0%	46,8%	36,7%	100,0%

Position * I think that digital efficiency increases employment opportunities Crosstabulation

% within Position

		I think that digital efficiency increases employment opportunities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	7,5%	17,9%	40,6%	31,1%	100,0%
	Academic	7,2%	15,7%	24,1%	32,5%	20,5%	100,0%
	Employer/Manager	3,8%	11,5%	23,6%	32,5%	28,7%	100,0%
Total		4,3%	11,3%	22,0%	35,0%	27,5%	100,0%

Position * I think that technological developments positively support the quality of higher education Crosstabulation

% within Position

		I think that technological developments positively support the quality of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	8,5%	17,9%	42,5%	29,2%	100,0%
	Academic		9,6%	9,6%	49,4%	31,3%	100,0%
	Employer/Manager	1,3%	6,4%	14,0%	46,5%	31,8%	100,0%
Total		1,2%	7,8%	14,2%	46,0%	30,9%	100,0%

Position * I think that earning an undergraduate degree is important for my career Crosstabulation

% within Position

		I think that earning an undergraduate degree is important for my career					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	6,6%	20,8%	34,0%	36,8%	100,0%
	Academic	1,2%	7,2%	3,6%	34,9%	53,0%	100,0%
	Employer/Manager	1,9%	5,7%	10,2%	43,9%	38,2%	100,0%
Total		1,7%	6,4%	11,8%	38,7%	41,3%	100,0%

Position * I think that university education will remain useful and relevant for a lifetime Crosstabulation

% within Position

		I think that university education will remain useful and relevant for a lifetime					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	10,4%	17,9%	42,5%	26,4%	100,0%
	Academic	3,6%	9,6%	13,3%	34,9%	38,6%	100,0%
	Employer/Manager	1,9%	11,5%	16,6%	38,2%	31,8%	100,0%
Total		2,6%	10,7%	16,2%	38,7%	31,8%	100,0%

Position * I believe that universities are aligned with the needs and expectations of working life Crosstabulation

% within Position

		I believe that universities are aligned with the needs and expectations of working life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	5,7%	10,4%	24,5%	33,0%	26,4%	100,0%
	Academic	8,4%	30,1%	24,1%	26,5%	10,8%	100,0%
	Employer/Manager	8,3%	21,7%	23,6%	29,3%	17,2%	100,0%
Total		7,5%	20,2%	24,0%	29,8%	18,5%	100,0%

Position * I think that digital impact highly effects universities in our age Crosstabulation

% within Position

		I think that digital impact highly effects universities in our age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	3,8%	18,9%	45,3%	29,2%	100,0%
	Academic	1,2%	9,6%	12,0%	48,2%	28,9%	100,0%
	Employer/Manager	1,9%	4,5%	14,6%	51,6%	27,4%	100,0%
Total		2,0%	5,5%	15,3%	48,8%	28,3%	100,0%

Position * I believe that Universities should shape their education strategies according to the realities of the digitalization age Crosstabulation

% within Position

		I believe that Universities should shape their education strategies according to the realities of the digitalization age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	5,7%	15,1%	44,3%	32,1%	100,0%
	Academic		2,4%	4,8%	51,8%	41,0%	100,0%
	Employer/Manager	,6%	3,8%	10,2%	43,9%	41,4%	100,0%
Total		1,2%	4,0%	10,4%	46,0%	38,4%	100,0%

Position * I believe that the value proposition for universities is changing in the digitalization era Crosstabulation

% within Position

		I believe that the value proposition for universities is changing in the digitalization era					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	

Position	College student	,9%	6,6%	17,0%	43,4%	32,1%	100,0%
	Academic		7,2%	22,9%	45,8%	24,1%	100,0%
	Employer/Manager	1,3%	3,2%	15,9%	52,9%	26,8%	100,0%
Total		,9%	5,2%	17,9%	48,3%	27,7%	100,0%

Position * I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace Crosstabulation

% within Position

		I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	9,4%	18,9%	37,7%	32,1%	100,0%
	Academic	1,2%	10,8%	9,6%	49,4%	28,9%	100,0%
	Employer/Manager	1,9%	3,2%	15,9%	56,7%	22,3%	100,0%
Total		1,7%	6,9%	15,3%	49,1%	26,9%	100,0%

Position * I believe that Universities should fulfil the needs and expectations of new generation students Crosstabulation

% within Position

		I believe that Universities should fulfil the needs and expectations of new generation students					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	4,7%	13,2%	38,7%	40,6%	100,0%
	Academic		3,6%	4,8%	47,0%	44,6%	100,0%
	Employer/Manager	,6%	1,3%	4,5%	50,3%	43,3%	100,0%
Total		1,2%	2,9%	7,2%	46,0%	42,8%	100,0%

Position * Universities should develop traditional education methodologies with the opportunities of the digital age Crosstabulation

% within Position

		Universities should develop traditional education methodologies with the opportunities of the digital age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	5,7%	14,2%	43,4%	34,0%	100,0%
	Academic		1,2%	4,8%	43,4%	50,6%	100,0%
	Employer/Manager	1,3%	2,5%	7,0%	45,2%	43,9%	100,0%
Total		1,4%	3,2%	8,7%	44,2%	42,5%	100,0%

Position * I think that Z and Alpha are more prone to digitalization than the previous generations Crosstabulation

% within Position

		I think that Z and Alpha are more prone to digitalization than the previous generations					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	5,7%	12,3%	34,9%	45,3%	100,0%
	Academic	1,2%	2,4%	2,4%	37,3%	56,6%	100,0%
	Employer/Manager	1,3%	2,5%	8,3%	34,4%	53,5%	100,0%
Total		1,4%	3,5%	8,1%	35,3%	51,7%	100,0%

Position * I think that Generation Alpha is more prone to technology than Generation Z Crosstabulation

% within Position

		I think that Generation Alpha is more prone to technology than Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	10,4%	19,8%	29,2%	37,7%	100,0%
	Academic	2,4%	4,8%	25,3%	36,1%	31,3%	100,0%
	Employer/Manager	2,5%	8,9%	15,3%	33,1%	40,1%	100,0%
Total		2,6%	8,4%	19,1%	32,7%	37,3%	100,0%

Position * I think that technology and digitalization are indispensable for the Generation Z Crosstabulation

% within Position

		I think that technology and digitalization are indispensable for the Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	3,8%	15,1%	34,0%	45,3%	100,0%
	Academic		2,4%	8,4%	45,8%	43,4%	100,0%
	Employer/Manager	,6%	4,5%	7,0%	38,9%	49,0%	100,0%
Total		,9%	3,8%	9,8%	39,0%	46,5%	100,0%

Position * I think that Generation Z has a different view of higher education Crosstabulation

% within Position

		I think that Generation Z has a different view of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	4,7%	12,3%	41,5%	39,6%	100,0%
	Academic	1,2%	4,8%	18,1%	43,4%	32,5%	100,0%
	Employer/Manager	2,5%	5,7%	12,1%	43,9%	35,7%	100,0%
Total		2,0%	5,2%	13,6%	43,1%	36,1%	100,0%

Position * I think that Generation Z uses social media effectively Crosstabulation

% within Position

		I think that Generation Z uses social media effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	3,8%	12,3%	37,7%	44,3%	100,0%
	Academic		3,6%	9,6%	48,2%	38,6%	100,0%
	Employer/Manager	2,5%	3,8%	8,9%	30,6%	54,1%	100,0%
Total		1,7%	3,8%	10,1%	37,0%	47,4%	100,0%

Position * I think that Generation Z uses digital communication tools effectively Crosstabulation

% within Position

		I think that Generation Z uses digital communication tools effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	5,7%	10,4%	36,8%	44,3%	100,0%
	Academic		7,2%	8,4%	50,6%	33,7%	100,0%
	Employer/Manager	1,3%	3,8%	11,5%	34,4%	49,0%	100,0%
Total		1,4%	5,2%	10,4%	39,0%	43,9%	100,0%

Position * I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities Crosstabulation

% within Position

		I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	4,7%	17,0%	44,3%	32,1%	100,0%
	Academic	3,6%	16,9%	19,3%	36,1%	24,1%	100,0%
	Employer/Manager	1,3%	5,7%	12,7%	45,9%	34,4%	100,0%
Total		2,0%	8,1%	15,6%	43,1%	31,2%	100,0%

Position * I think that Generation Z prefer digital higher education Crosstabulation

% within Position

		I think that Generation Z prefer digital higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	6,6%	13,2%	42,5%	34,9%	100,0%
	Academic	2,4%	16,9%	33,7%	33,7%	13,3%	100,0%
	Employer/Manager	,6%	5,1%	22,3%	42,7%	29,3%	100,0%
Total		1,7%	8,4%	22,3%	40,5%	27,2%	100,0%

Position * I think that Generation Z prefer hybrid (digital/traditional) higher education Crosstabulation

% within Position

		I think that Generation Z prefer hybrid (digital/traditional) higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	5,7%	14,2%	46,2%	31,1%	100,0%
	Academic	2,4%	4,8%	19,3%	55,4%	18,1%	100,0%
	Employer/Manager	2,5%	6,4%	20,4%	45,9%	24,8%	100,0%
Total		2,6%	5,8%	18,2%	48,3%	25,1%	100,0%

Position * Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha Crosstabulation

% within Position

		Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	5,7%	2,8%	23,6%	35,8%	32,1%	100,0%
	Academic	1,2%	7,2%	24,1%	43,4%	24,1%	100,0%
	Employer/Manager	1,3%	3,8%	15,9%	43,9%	35,0%	100,0%
Total		2,6%	4,3%	20,2%	41,3%	31,5%	100,0%

Position * I think that digitaleducation transfers the traditional classroom environment in digital environment Crosstabulation

% within Position

		I think that digitaleducation transfers the traditional classroom environment in digital environment					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	5,7%	6,6%	17,9%	35,8%	34,0%	100,0%
	Academic	12,0%	25,3%	18,1%	31,3%	13,3%	100,0%
	Employer/Manager	4,5%	13,4%	19,1%	39,5%	23,6%	100,0%
Total		6,6%	14,2%	18,5%	36,4%	24,3%	100,0%

Position * I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future Crosstabulation

% within Position

		I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	3,8%	4,7%	15,1%	46,2%	30,2%	100,0%
	Academic	2,4%	7,2%	26,5%	43,4%	20,5%	100,0%
	Employer/Manager	1,3%	6,4%	19,1%	43,3%	29,9%	100,0%
Total		2,3%	6,1%	19,7%	44,2%	27,7%	100,0%

Position * I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly Crosstabulation

% within Position

		I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	4,7%	4,7%	19,8%	43,4%	27,4%	100,0%
	Academic	2,4%	4,8%	14,5%	49,4%	28,9%	100,0%
	Employer/Manager	1,9%	5,1%	16,6%	47,1%	29,3%	100,0%
Total		2,9%	4,9%	17,1%	46,5%	28,6%	100,0%

Position * I believe that university education will turn to a completely digital education model after 2030 Crosstabulation

% within Position

		I believe that university education will turn to a completely digital education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	5,7%	10,4%	17,0%	35,8%	31,1%	100,0%
	Academic	9,6%	22,9%	34,9%	16,9%	15,7%	100,0%
	Employer/Manager	3,2%	11,5%	24,8%	34,4%	26,1%	100,0%
Total		5,5%	13,9%	24,9%	30,6%	25,1%	100,0%

Position * I think that the digital education model will completely replace the traditional university formal education model after 2030 Crosstabulation

% within Position

		I think that the digital education model will completely replace the traditional university formal education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	3,8%	8,5%	21,7%	39,6%	26,4%	100,0%
	Academic	13,3%	26,5%	26,5%	24,1%	9,6%	100,0%
	Employer/Manager	2,5%	15,3%	22,9%	35,0%	24,2%	100,0%
Total		5,5%	15,9%	23,4%	33,8%	21,4%	100,0%

Position * I think that digital education is an effective complement to the traditional university formal education model Crosstabulation

% within Position

		I think that digital education is an effective complement to the traditional university formal education model					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	3,8%	17,9%	45,3%	31,1%	100,0%
	Academic	2,4%	4,8%	8,4%	54,2%	30,1%	100,0%
	Employer/Manager	2,5%	3,8%	14,0%	51,6%	28,0%	100,0%
Total		2,3%	4,0%	13,9%	50,3%	29,5%	100,0%

Position * I think that universities can only provide digital education in the field of social sciences after 2030 Crosstabulation

% within Position

		I think that universities can only provide digital education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	10,4%	21,7%	36,8%	29,2%	100,0%
	Academic	7,2%	34,9%	20,5%	24,1%	13,3%	100,0%
	Employer/Manager	1,9%	18,5%	21,7%	31,2%	26,8%	100,0%
Total		3,2%	19,9%	21,4%	31,2%	24,3%	100,0%

Position * I think that universities can provide hybrid education in the field of social sciences after 2030 Crosstabulation

% within Position

		I think that universities can provide hybrid education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	4,7%	18,9%	42,5%	31,1%	100,0%
	Academic	3,6%	12,0%	13,3%	56,6%	14,5%	100,0%
	Employer/Manager	1,3%	3,8%	19,7%	52,9%	22,3%	100,0%
Total		2,3%	6,1%	17,9%	50,6%	23,1%	100,0%

Position * I think universities can only provide digital education in the field of medicine and engineering after 2030 Crosstabulation

% within Position

		I think universities can only provide digital education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	8,5%	13,2%	17,0%	34,9%	26,4%	100,0%
	Academic	39,8%	28,9%	19,3%	7,2%	4,8%	100,0%
	Employer/Manager	14,6%	25,5%	16,6%	22,3%	21,0%	100,0%
Total		18,8%	22,5%	17,3%	22,5%	18,8%	100,0%

Position * I think universities can only provide hybrid education in the field of medicine and engineering after 2030 Crosstabulation

% within Position

		I think universities can only provide hybrid education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	7,5%	7,5%	23,6%	32,1%	29,2%	100,0%
	Academic	16,9%	18,1%	21,7%	32,5%	10,8%	100,0%
	Employer/Manager	8,3%	8,9%	26,8%	35,7%	20,4%	100,0%
Total		10,1%	10,7%	24,6%	33,8%	20,8%	100,0%

Position * I believe employers will only demand certificates of competence rather than university degrees after 2030 Crosstabulation

% within Position

		I believe employers will only demand certificates of competence rather than university degrees after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	1,9%	8,5%	25,5%	37,7%	26,4%	100,0%
	Academic	13,3%	21,7%	28,9%	22,9%	13,3%	100,0%
	Employer/Manager	4,5%	17,8%	19,1%	38,2%	20,4%	100,0%
Total		5,8%	15,9%	23,4%	34,4%	20,5%	100,0%

Position * I believe that there will be no need for the classical formal education university model after 2030 Crosstabulation

% within Position

		I believe that there will be no need for the classical formal education university model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Position	College student	2,8%	11,3%	26,4%	34,0%	25,5%	100,0%
	Academic	20,5%	30,1%	22,9%	18,1%	8,4%	100,0%
	Employer/Manager	5,1%	24,8%	21,0%	26,8%	22,3%	100,0%
Total		8,1%	22,0%	23,1%	26,9%	19,9%	100,0%

A-3 Crosstabulation (Gender)

Gender * Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha Crosstabulation

% within Gender

		Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	3,3%	3,9%	20,0%	45,0%	27,8%	100,0%
	Female	1,8%	4,8%	20,5%	37,3%	35,5%	100,0%
Total		2,6%	4,3%	20,2%	41,3%	31,5%	100,0%

Gender * I think that digitaleducation transfers the traditional classroom environment in digital environment Crosstabulation

% within Gender

		I think that digitaleducation transfers the traditional classroom environment in digital environment					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	6,7%	15,0%	18,9%	38,9%	20,6%	100,0%
	Female	6,6%	13,3%	18,1%	33,7%	28,3%	100,0%
Total		6,6%	14,2%	18,5%	36,4%	24,3%	100,0%

Gender * I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future Crosstabulation

% within Gender

		I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	2,8%	6,1%	18,9%	46,7%	25,6%	100,0%
	Female	1,8%	6,0%	20,5%	41,6%	30,1%	100,0%
Total		2,3%	6,1%	19,7%	44,2%	27,7%	100,0%

Gender * I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly Crosstabulation

% within Gender

		I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	2,2%	6,7%	15,0%	49,4%	26,7%	100,0%
	Female	3,6%	3,0%	19,3%	43,4%	30,7%	100,0%
Total		2,9%	4,9%	17,1%	46,5%	28,6%	100,0%

Gender * I believe that university education will turn to a completely digital education model after 2030 Crosstabulation

% within Gender

		I believe that university education will turn to a completely digital education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	5,6%	12,2%	25,6%	32,8%	23,9%	100,0%
	Female	5,4%	15,7%	24,1%	28,3%	26,5%	100,0%
Total		5,5%	13,9%	24,9%	30,6%	25,1%	100,0%

Gender * I think that the digital education model will completely replace the traditional university formal education model after 2030 Crosstabulation

% within Gender

		I think that the digital education model will completely replace the traditional university formal education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	5,6%	15,6%	22,2%	38,9%	17,8%	100,0%
	Female	5,4%	16,3%	24,7%	28,3%	25,3%	100,0%
Total		5,5%	15,9%	23,4%	33,8%	21,4%	100,0%

Gender * I think that digital education is an effective complement to the traditional university formal education model Crosstabulation

% within Gender

		I think that digital education is an effective complement to the traditional university formal education model					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	2,8%	4,4%	14,4%	52,2%	26,1%	100,0%
	Female	1,8%	3,6%	13,3%	48,2%	33,1%	100,0%
Total		2,3%	4,0%	13,9%	50,3%	29,5%	100,0%

Gender * I think that universities can only provide digital education in the field of social sciences after 2030 Crosstabulation

% within Gender

		I think that universities can only provide digital education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	3,3%	21,1%	21,1%	32,2%	22,2%	100,0%
	Female	3,0%	18,7%	21,7%	30,1%	26,5%	100,0%
Total		3,2%	19,9%	21,4%	31,2%	24,3%	100,0%

Gender * I think that universities can provide hybrid education in the field of social sciences after 2030 Crosstabulation

% within Gender

		I think that universities can provide hybrid education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	2,8%	6,1%	18,9%	51,7%	20,6%	100,0%
	Female	1,8%	6,0%	16,9%	49,4%	25,9%	100,0%
Total		2,3%	6,1%	17,9%	50,6%	23,1%	100,0%

Gender * I think universities can only provide digital education in the field of medicine and engineering after 2030 Crosstabulation

% within Gender

		I think universities can only provide digital education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	21,1%	18,3%	21,7%	23,3%	15,6%	100,0%
	Female	16,3%	27,1%	12,7%	21,7%	22,3%	100,0%
Total		18,8%	22,5%	17,3%	22,5%	18,8%	100,0%

Gender * I think universities can only provide hybrid education in the field of medicine and engineering after 2030 Crosstabulation

% within Gender

		I think universities can only provide hybrid education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	10,6%	10,6%	23,9%	36,7%	18,3%	100,0%

	Female	9,6%	10,8%	25,3%	30,7%	23,5%	100,0%
Total		10,1%	10,7%	24,6%	33,8%	20,8%	100,0%

Gender * I believe employers will only demand certificates of competence rather than university degrees after 2030 Crosstabulation

% within Gender

		I believe employers will only demand certificates of competence rather than university degrees after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	5,6%	13,3%	23,9%	38,3%	18,9%	100,0%
	Female	6,0%	18,7%	22,9%	30,1%	22,3%	100,0%
Total		5,8%	15,9%	23,4%	34,4%	20,5%	100,0%

Gender * I believe that there will be no need for the classical formal education university model after 2030 Crosstabulation

% within Gender

		I believe that there will be no need for the classical formal education university model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Gender	Male	8,9%	22,2%	23,3%	28,3%	17,2%	100,0%
	Female	7,2%	21,7%	22,9%	25,3%	22,9%	100,0%
Total		8,1%	22,0%	23,1%	26,9%	19,9%	100,0%

A-4 Crosstabulation (Age)

Age * I think that digitalization is one of the most important realities in the 21st Century Crosstabulation

% within Age

		I think that digitalization is one of the most important realities in the 21st Century					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%		20,7%	41,4%	34,5%	100,0%
	23-27	4,4%	2,9%	13,2%	32,4%	47,1%	100,0%
	28-35	6,0%	8,0%	2,0%	38,0%	46,0%	100,0%
	36-45		1,2%	2,3%	39,5%	57,0%	100,0%
	45+	,9%		3,5%	28,3%	67,3%	100,0%
Total		2,3%	2,0%	6,4%	34,4%	54,9%	100,0%

Age * I believe that digitalization is a part of my daily life Crosstabulation

% within Age

		I believe that digitalization is a part of my daily life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	3,4%	17,2%	44,8%	31,0%	100,0%
	23-27	1,5%	2,9%	8,8%	41,2%	45,6%	100,0%
	28-35	4,0%	2,0%	6,0%	48,0%	40,0%	100,0%
	36-45		2,3%	3,5%	33,7%	60,5%	100,0%
	45+			3,5%	41,6%	54,9%	100,0%
Total		1,2%	1,7%	6,1%	40,8%	50,3%	100,0%

Age * I think that digitalization is a socio-cultural phenomenon Crosstabulation

% within Age

		I think that digitalization is a socio-cultural phenomenon					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%		17,2%	48,3%	31,0%	100,0%
	23-27		4,4%	19,1%	42,6%	33,8%	100,0%
	28-35	6,0%	8,0%	10,0%	40,0%	36,0%	100,0%
	36-45	1,2%	7,0%	19,8%	41,9%	30,2%	100,0%
	45+	3,5%	3,5%	13,3%	54,9%	24,8%	100,0%
Total		2,6%	4,9%	15,9%	46,5%	30,1%	100,0%

Age * I think that digitalization is just a technological issue Crosstabulation

% within Age

		I think that digitalization is just a technological issue					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	6,9%	13,8%	27,6%	34,5%	17,2%	100,0%
	23-27	5,9%	14,7%	23,5%	30,9%	25,0%	100,0%
	28-35	10,0%	26,0%	20,0%	30,0%	14,0%	100,0%
	36-45	8,1%	38,4%	12,8%	22,1%	18,6%	100,0%
	45+	13,3%	41,6%	11,5%	23,9%	9,7%	100,0%
Total		9,5%	30,9%	16,8%	26,6%	16,2%	100,0%

Age * I think that digitalization provides unlimited interactive communication Crosstabulation

% within Age

		I think that digitalization provides unlimited interactive communication					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	10,3%	13,8%	51,7%	20,7%	100,0%
	23-27	1,5%	7,4%	16,2%	42,6%	32,4%	100,0%
	28-35	4,0%	4,0%	14,0%	50,0%	28,0%	100,0%
	36-45	2,3%	9,3%	10,5%	46,5%	31,4%	100,0%
	45+	,9%	9,7%	14,2%	50,4%	24,8%	100,0%
Total		2,0%	8,4%	13,6%	48,0%	28,0%	100,0%

Age * I believe that digital transformation will change traditional perspectives Crosstabulation

% within Age

		I believe that digital transformation will change traditional perspectives					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%		6,9%	72,4%	17,2%	100,0%
	23-27	1,5%	2,9%	16,2%	47,1%	32,4%	100,0%
	28-35	6,0%	4,0%	18,0%	30,0%	42,0%	100,0%
	36-45	1,2%	4,7%	7,0%	57,0%	30,2%	100,0%
	45+	,9%	2,7%	8,8%	57,5%	30,1%	100,0%
Total		2,0%	3,2%	11,0%	52,6%	31,2%	100,0%

Age * I believe that digitalization makes our lives more efficient Crosstabulation

% within Age

		I believe that digitalization makes our lives more efficient					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	6,9%	3,4%	17,2%	48,3%	24,1%	100,0%
	23-27	1,5%	4,4%	19,1%	41,2%	33,8%	100,0%
	28-35	4,0%		16,0%	40,0%	40,0%	100,0%
	36-45	2,3%	4,7%	17,4%	46,5%	29,1%	100,0%
	45+	,9%	4,4%	19,5%	42,5%	32,7%	100,0%
Total		2,3%	3,8%	18,2%	43,4%	32,4%	100,0%

Age * I am currently making extensive use of digital technologies Crosstabulation

% within Age

		I am currently making extensive use of digital technologies					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%		24,1%	48,3%	24,1%	100,0%
	23-27	1,5%	7,4%	16,2%	36,8%	38,2%	100,0%
	28-35	2,0%	4,0%	10,0%	44,0%	40,0%	100,0%
	36-45	1,2%	1,2%	14,0%	46,5%	37,2%	100,0%
	45+		3,5%	8,0%	55,8%	32,7%	100,0%
Total		1,2%	3,5%	12,7%	47,4%	35,3%	100,0%

Age * Using digital technologies my life is more comfortable Crosstabulation

% within Age

		Using digital technologies my life is more comfortable					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	3,4%	13,8%	55,2%	24,1%	100,0%
	23-27	1,5%	7,4%	5,9%	42,6%	42,6%	100,0%
	28-35	2,0%	4,0%	10,0%	42,0%	42,0%	100,0%
	36-45	1,2%	3,5%	12,8%	40,7%	41,9%	100,0%

	45+		3,5%	12,4%	54,0%	30,1%	100,0%
Total		1,2%	4,3%	11,0%	46,8%	36,7%	100,0%

Age * I think that digital efficiency increases employment opportunities Crosstabulation

% within Age

		I think that digital efficiency increases employment opportunities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	3,4%	20,7%	48,3%	24,1%	100,0%
	23-27	1,5%	10,3%	14,7%	39,7%	33,8%	100,0%
	28-35	4,0%	8,0%	24,0%	28,0%	36,0%	100,0%
	36-45	4,7%	9,3%	19,8%	34,9%	31,4%	100,0%
	45+	6,2%	16,8%	27,4%	31,9%	17,7%	100,0%
Total		4,3%	11,3%	22,0%	35,0%	27,5%	100,0%

Age * I think that technological developments positively support the quality of higher education Crosstabulation

% within Age

		I think that technological developments positively support the quality of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	3,4%	20,7%	51,7%	20,7%	100,0%
	23-27		11,8%	16,2%	38,2%	33,8%	100,0%
	28-35	2,0%	6,0%	12,0%	48,0%	32,0%	100,0%
	36-45	2,3%	9,3%	10,5%	43,0%	34,9%	100,0%
	45+		6,2%	15,0%	50,4%	28,3%	100,0%
Total		1,2%	7,8%	14,2%	46,0%	30,9%	100,0%

Age * I think that earning an undergraduate degree is important for my career Crosstabulation

% within Age

		I think that earning an undergraduate degree is important for my career					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	3,4%	34,5%	31,0%	27,6%	100,0%
	23-27	1,5%	8,8%	13,2%	33,8%	42,6%	100,0%
	28-35	2,0%	10,0%	12,0%	40,0%	36,0%	100,0%
	36-45	2,3%	5,8%	10,5%	36,0%	45,3%	100,0%
	45+	,9%	4,4%	6,2%	45,1%	43,4%	100,0%
Total		1,7%	6,4%	11,8%	38,7%	41,3%	100,0%

Age * I think that university education will remain useful and relevant for a lifetime Crosstabulation

% within Age

		I think that university education will remain useful and relevant for a lifetime					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		10,3%	20,7%	51,7%	17,2%	100,0%
	23-27	4,4%	13,2%	19,1%	32,4%	30,9%	100,0%
	28-35		12,0%	24,0%	40,0%	24,0%	100,0%
	36-45	2,3%	9,3%	12,8%	43,0%	32,6%	100,0%
	45+	3,5%	9,7%	12,4%	35,4%	38,9%	100,0%
Total		2,6%	10,7%	16,2%	38,7%	31,8%	100,0%

Age * I believe that universities are aligned with the needs and expectations of working life Crosstabulation

% within Age

		I believe that universities are aligned with the needs and expectations of working life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	10,3%	31,0%	27,6%	27,6%	100,0%
	23-27	5,9%	13,2%	23,5%	30,9%	26,5%	100,0%
	28-35	12,0%	16,0%	26,0%	28,0%	18,0%	100,0%
	36-45	8,1%	17,4%	16,3%	38,4%	19,8%	100,0%
	45+	7,1%	31,0%	27,4%	23,9%	10,6%	100,0%
Total		7,5%	20,2%	24,0%	29,8%	18,5%	100,0%

Age * I think that digital impact highly effects universities in our age Crosstabulation

% within Age

		I think that digital impact highly effects universities in our age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		3,4%	24,1%	48,3%	24,1%	100,0%
	23-27	4,4%	4,4%	16,2%	42,6%	32,4%	100,0%
	28-35	2,0%	6,0%	20,0%	48,0%	24,0%	100,0%
	36-45	2,3%	8,1%	8,1%	50,0%	31,4%	100,0%
	45+	,9%	4,4%	15,9%	52,2%	26,5%	100,0%
Total		2,0%	5,5%	15,3%	48,8%	28,3%	100,0%

Age * I believe that Universities should shape their education strategies according to the realities of the digitalization age Crosstabulation

% within Age

		I believe that Universities should shape their education strategies according to the realities of the digitalization age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		10,3%	17,2%	51,7%	20,7%	100,0%
	23-27	4,4%	5,9%	11,8%	41,2%	36,8%	100,0%
	28-35		2,0%	18,0%	42,0%	38,0%	100,0%
	36-45	1,2%	2,3%	11,6%	45,3%	39,5%	100,0%
	45+		3,5%	3,5%	49,6%	43,4%	100,0%
Total		1,2%	4,0%	10,4%	46,0%	38,4%	100,0%

Age * I believe that the value proposition for universities is changing in the digitalization era Crosstabulation

% within Age

		I believe that the value proposition for universities is changing in the digitalization era					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		6,9%	27,6%	48,3%	17,2%	100,0%
	23-27	1,5%	5,9%	11,8%	42,6%	38,2%	100,0%
	28-35		4,0%	24,0%	44,0%	28,0%	100,0%
	36-45	2,3%	4,7%	17,4%	51,2%	24,4%	100,0%
	45+		5,3%	16,8%	51,3%	26,5%	100,0%
Total		,9%	5,2%	17,9%	48,3%	27,7%	100,0%

Age * I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace Crosstabulation

% within Age

		I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		10,3%	24,1%	44,8%	20,7%	100,0%

	23-27	1,5%	10,3%	16,2%	33,8%	38,2%	100,0%
	28-35	2,0%	6,0%	14,0%	56,0%	22,0%	100,0%
	36-45	2,3%	8,1%	16,3%	48,8%	24,4%	100,0%
	45+	1,8%	3,5%	12,4%	56,6%	25,7%	100,0%
Total		1,7%	6,9%	15,3%	49,1%	26,9%	100,0%

Age * I believe that Universities should fulfil the needs and expectations of new generation students Crosstabulation

% within Age

		I believe that Universities should fulfil the needs and expectations of new generation students					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		3,4%	17,2%	51,7%	27,6%	100,0%
	23-27	4,4%	5,9%	8,8%	33,8%	47,1%	100,0%
	28-35			10,0%	52,0%	38,0%	100,0%
	36-45	1,2%	5,8%	7,0%	46,5%	39,5%	100,0%
	45+			2,7%	48,7%	48,7%	100,0%
Total		1,2%	2,9%	7,2%	46,0%	42,8%	100,0%

Age * Universities should develop traditional education methodologies with the opportunities of the digital age Crosstabulation

% within Age

		Universities should develop traditional education methodologies with the opportunities of the digital age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		3,4%	24,1%	51,7%	20,7%	100,0%
	23-27	2,9%	8,8%	7,4%	41,2%	39,7%	100,0%
	28-35	2,0%	4,0%	12,0%	42,0%	40,0%	100,0%
	36-45	1,2%	1,2%	8,1%	46,5%	43,0%	100,0%
	45+	,9%	,9%	4,4%	43,4%	50,4%	100,0%
Total		1,4%	3,2%	8,7%	44,2%	42,5%	100,0%

Age * I think that Z and Alpha are more prone to digitalization than the previous generations Crosstabulation

% within Age

		I think that Z and Alpha are more prone to digitalization than the previous generations					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	3,4%	13,8%	48,3%	31,0%	100,0%
	23-27	1,5%	8,8%	10,3%	29,4%	50,0%	100,0%
	28-35	2,0%	2,0%	12,0%	40,0%	44,0%	100,0%
	36-45	2,3%	2,3%	5,8%	33,7%	55,8%	100,0%
	45+		1,8%	5,3%	34,5%	58,4%	100,0%
Total		1,4%	3,5%	8,1%	35,3%	51,7%	100,0%

Age * I think that Generation Alpha is more prone to technology than Generation Z Crosstabulation

% within Age

		I think that Generation Alpha is more prone to technology than Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		10,3%	20,7%	31,0%	37,9%	100,0%
	23-27	2,9%	13,2%	17,6%	26,5%	39,7%	100,0%
	28-35	4,0%	4,0%	24,0%	38,0%	30,0%	100,0%
	36-45	3,5%	11,6%	16,3%	29,1%	39,5%	100,0%
	45+	1,8%	4,4%	19,5%	37,2%	37,2%	100,0%
Total		2,6%	8,4%	19,1%	32,7%	37,3%	100,0%

Age * I think that technology and digitalization are indispensable for the Generation Z Crosstabulation

% within Age

		I think that technology and digitalization are indispensable for the Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		3,4%	24,1%	51,7%	20,7%	100,0%
	23-27	2,9%	4,4%	11,8%	27,9%	52,9%	100,0%
	28-35		6,0%	10,0%	36,0%	48,0%	100,0%
	36-45	1,2%	3,5%	5,8%	38,4%	51,2%	100,0%
	45+		2,7%	8,0%	44,2%	45,1%	100,0%
Total		,9%	3,8%	9,8%	39,0%	46,5%	100,0%

Age * I think that Generation Z has a different view of higher education Crosstabulation

% within Age

		I think that Generation Z has a different view of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22			20,7%	51,7%	27,6%	100,0%
	23-27	2,9%	7,4%	7,4%	38,2%	44,1%	100,0%
	28-35	4,0%	10,0%	12,0%	42,0%	32,0%	100,0%
	36-45	3,5%	4,7%	11,6%	46,5%	33,7%	100,0%
	45+		3,5%	17,7%	41,6%	37,2%	100,0%
Total		2,0%	5,2%	13,6%	43,1%	36,1%	100,0%

Age * I think that Generation Z uses social media effectively Crosstabulation

% within Age

		I think that Generation Z uses social media effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22			17,2%	51,7%	31,0%	100,0%
	23-27	2,9%	5,9%	10,3%	32,4%	48,5%	100,0%
	28-35	2,0%	6,0%	12,0%	28,0%	52,0%	100,0%
	36-45	2,3%	3,5%	8,1%	36,0%	50,0%	100,0%
	45+	,9%	2,7%	8,8%	40,7%	46,9%	100,0%
Total		1,7%	3,8%	10,1%	37,0%	47,4%	100,0%

Age * I think that Generation Z uses digital communication tools effectively Crosstabulation

% within Age

		I think that Generation Z uses digital communication tools effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	6,9%	10,3%	51,7%	27,6%	100,0%
	23-27	2,9%	4,4%	10,3%	32,4%	50,0%	100,0%
	28-35		4,0%	14,0%	34,0%	48,0%	100,0%
	36-45	2,3%	8,1%	8,1%	37,2%	44,2%	100,0%
	45+		3,5%	10,6%	43,4%	42,5%	100,0%
Total		1,4%	5,2%	10,4%	39,0%	43,9%	100,0%

Age * I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities Crosstabulation

% within Age

		I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22			17,2%	72,4%	10,3%	100,0%
	23-27	2,9%	8,8%	14,7%	32,4%	41,2%	100,0%
	28-35	2,0%	10,0%	18,0%	40,0%	30,0%	100,0%
	36-45	2,3%	7,0%	11,6%	45,3%	33,7%	100,0%
	45+	1,8%	9,7%	17,7%	41,6%	29,2%	100,0%

Total		2,0%	8,1%	15,6%	43,1%	31,2%	100,0%

Age * I think that Generation Z prefer digital higher education Crosstabulation

% within Age

		I think that Generation Z prefer digital higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		10,3%	17,2%	55,2%	17,2%	100,0%
	23-27	2,9%	5,9%	10,3%	39,7%	41,2%	100,0%
	28-35	2,0%	6,0%	22,0%	38,0%	32,0%	100,0%
	36-45	1,2%	9,3%	20,9%	39,5%	29,1%	100,0%
	45+	1,8%	9,7%	31,9%	38,9%	17,7%	100,0%
Total		1,7%	8,4%	22,3%	40,5%	27,2%	100,0%

Age * I think that Generation Z prefer hybrid (digital/traditional) higher education Crosstabulation

% within Age

		I think that Generation Z prefer hybrid (digital/traditional) higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%		20,7%	58,6%	17,2%	100,0%
	23-27	2,9%	7,4%	10,3%	42,6%	36,8%	100,0%
	28-35	2,0%	4,0%	26,0%	40,0%	28,0%	100,0%
	36-45	2,3%	7,0%	17,4%	46,5%	26,7%	100,0%
	45+	2,7%	6,2%	19,5%	54,0%	17,7%	100,0%
Total		2,6%	5,8%	18,2%	48,3%	25,1%	100,0%

Age * Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha Crosstabulation

% within Age

		Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	6,9%	3,4%	20,7%	44,8%	24,1%	100,0%
	23-27	4,4%	2,9%	26,5%	30,9%	35,3%	100,0%
	28-35	4,0%		28,0%	46,0%	22,0%	100,0%
	36-45	1,2%	12,8%	12,8%	39,5%	33,7%	100,0%
	45+	,9%	,9%	18,6%	46,0%	33,6%	100,0%
Total		2,6%	4,3%	20,2%	41,3%	31,5%	100,0%

Age * I think that digitaleducation transfers the traditional classroom environment in digital environment Crosstabulation

% within Age

		I think that digitaleducation transfers the traditional classroom environment in digital environment					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	6,9%	6,9%	17,2%	48,3%	20,7%	100,0%
	23-27	4,4%	7,4%	17,6%	30,9%	39,7%	100,0%
	28-35	10,0%	16,0%	16,0%	34,0%	24,0%	100,0%
	36-45	10,5%	11,6%	11,6%	41,9%	24,4%	100,0%
	45+	3,5%	21,2%	25,7%	33,6%	15,9%	100,0%
Total		6,6%	14,2%	18,5%	36,4%	24,3%	100,0%

Age * I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future Crosstabulation

% within Age

		I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		6,9%	27,6%	51,7%	13,8%	100,0%
	23-27	4,4%	4,4%	10,3%	44,1%	36,8%	100,0%
	28-35	4,0%	8,0%	18,0%	44,0%	26,0%	100,0%
	36-45	2,3%	9,3%	14,0%	45,3%	29,1%	100,0%
	45+	,9%	3,5%	28,3%	41,6%	25,7%	100,0%
Total		2,3%	6,1%	19,7%	44,2%	27,7%	100,0%

Age * I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly Crosstabulation

% within Age

		I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		3,4%	31,0%	48,3%	17,2%	100,0%
	23-27	5,9%	5,9%	14,7%	41,2%	32,4%	100,0%
	28-35	4,0%	8,0%	18,0%	42,0%	28,0%	100,0%
	36-45	1,2%	3,5%	15,1%	48,8%	31,4%	100,0%
	45+	2,7%	4,4%	15,9%	49,6%	27,4%	100,0%
Total		2,9%	4,9%	17,1%	46,5%	28,6%	100,0%

Age * I believe that university education will turn to a completely digital education model after 2030 Crosstabulation

% within Age

		I believe that university education will turn to a completely digital education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	10,3%	6,9%	20,7%	41,4%	20,7%	100,0%
	23-27	4,4%	13,2%	16,2%	33,8%	32,4%	100,0%
	28-35	6,0%	16,0%	20,0%	30,0%	28,0%	100,0%
	36-45	4,7%	12,8%	19,8%	31,4%	31,4%	100,0%
	45+	5,3%	15,9%	37,2%	25,7%	15,9%	100,0%
Total		5,5%	13,9%	24,9%	30,6%	25,1%	100,0%

Age * I think that the digital education model will completely replace the traditional university formal education model after 2030 Crosstabulation

% within Age

		I think that the digital education model will completely replace the traditional university formal education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	3,4%	6,9%	24,1%	41,4%	24,1%	100,0%
	23-27	4,4%	10,3%	20,6%	38,2%	26,5%	100,0%
	28-35	4,0%	18,0%	28,0%	28,0%	22,0%	100,0%
	36-45	7,0%	12,8%	19,8%	37,2%	23,3%	100,0%
	45+	6,2%	23,0%	25,7%	29,2%	15,9%	100,0%
Total		5,5%	15,9%	23,4%	33,8%	21,4%	100,0%

Age * I think that digital education is an effective complement to the traditional university formal education model Crosstabulation

% within Age

		I think that digital education is an effective complement to the traditional university formal education model					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22			20,7%	58,6%	20,7%	100,0%
	23-27	2,9%	5,9%	16,2%	38,2%	36,8%	100,0%
	28-35	2,0%		18,0%	56,0%	24,0%	100,0%
	36-45	3,5%	4,7%	12,8%	53,5%	25,6%	100,0%
	45+	1,8%	5,3%	9,7%	50,4%	32,7%	100,0%
Total		2,3%	4,0%	13,9%	50,3%	29,5%	100,0%

Age * I think that universities can only provide digital education in the field of social sciences after 2030 Crosstabulation

% within Age

		I think that universities can only provide digital education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		6,9%	17,2%	55,2%	20,7%	100,0%
	23-27	2,9%	14,7%	20,6%	27,9%	33,8%	100,0%
	28-35	4,0%	14,0%	20,0%	36,0%	26,0%	100,0%
	36-45	5,8%	19,8%	18,6%	31,4%	24,4%	100,0%
	45+	1,8%	29,2%	25,7%	24,8%	18,6%	100,0%
Total		3,2%	19,9%	21,4%	31,2%	24,3%	100,0%

Age * I think that universities can provide hybrid education in the field of social sciences after 2030 Crosstabulation

% within Age

		I think that universities can provide hybrid education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		3,4%	27,6%	37,9%	31,0%	100,0%
	23-27	4,4%	5,9%	17,6%	42,6%	29,4%	100,0%
	28-35	2,0%	6,0%	12,0%	52,0%	28,0%	100,0%
	36-45	3,5%	5,8%	19,8%	48,8%	22,1%	100,0%
	45+	,9%	7,1%	16,8%	59,3%	15,9%	100,0%
Total		2,3%	6,1%	17,9%	50,6%	23,1%	100,0%

Age * I think universities can only provide digital education in the field of medicine and engineering after 2030 Crosstabulation

% within Age

		I think universities can only provide digital education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	6,9%	6,9%	17,2%	48,3%	20,7%	100,0%
	23-27	10,3%	19,1%	13,2%	30,9%	26,5%	100,0%
	28-35	22,0%	12,0%	14,0%	26,0%	26,0%	100,0%
	36-45	19,8%	23,3%	18,6%	19,8%	18,6%	100,0%
	45+	24,8%	32,7%	20,4%	11,5%	10,6%	100,0%
Total		18,8%	22,5%	17,3%	22,5%	18,8%	100,0%

Age * I think universities can only provide hybrid education in the field of medicine and engineering after 2030 Crosstabulation

% within Age

		I think universities can only provide hybrid education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22	10,3%	3,4%	27,6%	41,4%	17,2%	100,0%
	23-27	8,8%	10,3%	22,1%	25,0%	33,8%	100,0%

	28-35	8,0%	12,0%	22,0%	38,0%	20,0%	100,0%
	36-45	12,8%	15,1%	25,6%	27,9%	18,6%	100,0%
	45+	9,7%	8,8%	25,7%	39,8%	15,9%	100,0%
Total		10,1%	10,7%	24,6%	33,8%	20,8%	100,0%

Age * I believe employers will only demand certificates of competence rather than university degrees after 2030 Crosstabulation

% within Age

		I believe employers will only demand certificates of competence rather than university degrees after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		13,8%	34,5%	37,9%	13,8%	100,0%
	23-27	4,4%	7,4%	22,1%	38,2%	27,9%	100,0%
	28-35	6,0%	22,0%	14,0%	34,0%	24,0%	100,0%
	36-45	11,6%	12,8%	18,6%	37,2%	19,8%	100,0%
	45+	3,5%	21,2%	29,2%	29,2%	16,8%	100,0%
Total		5,8%	15,9%	23,4%	34,4%	20,5%	100,0%

Age * I believe that there will be no need for the classical formal education university model after 2030 Crosstabulation

% within Age

		I believe that there will be no need for the classical formal education university model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Age	17-22		6,9%	34,5%	44,8%	13,8%	100,0%
	23-27	4,4%	14,7%	23,5%	29,4%	27,9%	100,0%
	28-35	8,0%	18,0%	16,0%	34,0%	24,0%	100,0%
	36-45	12,8%	20,9%	17,4%	26,7%	22,1%	100,0%
	45+	8,8%	32,7%	27,4%	17,7%	13,3%	100,0%
Total		8,1%	22,0%	23,1%	26,9%	19,9%	100,0%

A-5 Crosstabulation (Sector)

Sector * I think that digitalization is one of the most important realities in the 21st Century Crosstabulation

% within Sector

		I think that digitalization is one of the most important realities in the 21st Century					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,6%	2,1%	9,5%	36,0%	49,7%	100,0%
	Services sector	,9%	2,6%	1,7%	29,9%	65,0%	100,0%
	Manufacturing sector	5,0%		5,0%	40,0%	50,0%	100,0%
Total		2,3%	2,0%	6,4%	34,4%	54,9%	100,0%

Sector * I believe that digitalization is a part of my daily life Crosstabulation

% within Sector

		I believe that digitalization is a part of my daily life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	2,6%	7,9%	40,2%	47,6%	100,0%
	Services sector	,9%	,9%	2,6%	41,0%	54,7%	100,0%
	Manufacturing sector			7,5%	42,5%	50,0%	100,0%
Total		1,2%	1,7%	6,1%	40,8%	50,3%	100,0%

Sector * I think that digitalization is a socio-cultural phenomenon Crosstabulation

% within Sector

		I think that digitalization is a socio-cultural phenomenon					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	5,3%	15,9%	47,6%	29,6%	100,0%
	Services sector	4,3%	5,1%	17,1%	44,4%	29,1%	100,0%
	Manufacturing sector	2,5%	2,5%	12,5%	47,5%	35,0%	100,0%
Total		2,6%	4,9%	15,9%	46,5%	30,1%	100,0%

Sector * I think that digitalization is just a technological issue Crosstabulation

% within Sector

		I think that digitalization is just a technological issue					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	11,1%	29,1%	19,6%	24,3%	15,9%	100,0%
	Services sector	8,5%	35,0%	8,5%	30,8%	17,1%	100,0%
	Manufacturing sector	5,0%	27,5%	27,5%	25,0%	15,0%	100,0%
Total		9,5%	30,9%	16,8%	26,6%	16,2%	100,0%

Sector * I think that digitalization provides unlimited interactive communication Crosstabulation

% within Sector

		I think that digitalization provides unlimited interactive communication					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,1%	10,1%	15,3%	47,6%	24,9%	100,0%
	Services sector	,9%	8,5%	12,8%	49,6%	28,2%	100,0%

	Manufacturing sector	5,0%		7,5%	45,0%	42,5%	100,0%
Total		2,0%	8,4%	13,6%	48,0%	28,0%	100,0%

Sector * I believe that digital transformation will change traditional perspectives Crosstabulation

% within Sector

		I believe that digital transformation will change traditional perspectives					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,1%	1,6%	13,8%	54,0%	28,6%	100,0%
	Services sector	1,7%	4,3%	8,5%	51,3%	34,2%	100,0%
	Manufacturing sector	2,5%	7,5%	5,0%	50,0%	35,0%	100,0%
Total		2,0%	3,2%	11,0%	52,6%	31,2%	100,0%

Sector * I believe that digitalization makes our lives more efficient Crosstabulation

% within Sector

		I believe that digitalization makes our lives more efficient					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,6%	5,8%	19,0%	41,3%	31,2%	100,0%
	Services sector	1,7%	,9%	17,9%	48,7%	30,8%	100,0%
	Manufacturing sector	2,5%	2,5%	15,0%	37,5%	42,5%	100,0%
Total		2,3%	3,8%	18,2%	43,4%	32,4%	100,0%

Sector * I am currently making extensive use of digital technologies Crosstabulation

% within Sector

		I am currently making extensive use of digital technologies					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	3,2%	15,3%	47,1%	32,8%	100,0%
	Services sector	,9%	4,3%	9,4%	47,9%	37,6%	100,0%
	Manufacturing sector		2,5%	10,0%	47,5%	40,0%	100,0%
Total		1,2%	3,5%	12,7%	47,4%	35,3%	100,0%

Sector * Using digital technologies my life is more comfortable Crosstabulation

% within Sector

		Using digital technologies my life is more comfortable					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	5,8%	10,1%	49,2%	33,3%	100,0%
	Services sector	,9%	3,4%	12,8%	43,6%	39,3%	100,0%
	Manufacturing sector			10,0%	45,0%	45,0%	100,0%
Total		1,2%	4,3%	11,0%	46,8%	36,7%	100,0%

Sector * I think that digital efficiency increases employment opportunities Crosstabulation

% within Sector

		I think that digital efficiency increases employment opportunities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	4,8%	11,1%	20,6%	37,0%	26,5%	100,0%
	Services sector	4,3%	13,7%	25,6%	31,6%	24,8%	100,0%
	Manufacturing sector	2,5%	5,0%	17,5%	35,0%	40,0%	100,0%

Total		4,3%	11,3%	22,0%	35,0%	27,5%	100,0%

Sector * I think that technological developments positively support the quality of higher education Crosstabulation

% within Sector

		I think that technological developments positively support the quality of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,1%	9,0%	14,3%	45,5%	30,2%	100,0%
	Services sector	,9%	8,5%	15,4%	45,3%	29,9%	100,0%
	Manufacturing sector	2,5%		10,0%	50,0%	37,5%	100,0%
Total		1,2%	7,8%	14,2%	46,0%	30,9%	100,0%

Sector * I think that earning an undergraduate degree is important for my career Crosstabulation

% within Sector

		I think that earning an undergraduate degree is important for my career					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	6,9%	13,2%	34,4%	43,9%	100,0%
	Services sector	2,6%	6,8%	10,3%	41,9%	38,5%	100,0%
	Manufacturing sector		2,5%	10,0%	50,0%	37,5%	100,0%
Total		1,7%	6,4%	11,8%	38,7%	41,3%	100,0%

Sector * I think that university education will remain useful and relevant for a lifetime Crosstabulation

% within Sector

		I think that university education will remain useful and relevant for a lifetime					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	3,2%	10,1%	15,9%	39,2%	31,7%	100,0%
	Services sector	2,6%	12,0%	18,8%	36,8%	29,9%	100,0%
	Manufacturing sector		10,0%	10,0%	42,5%	37,5%	100,0%
Total		2,6%	10,7%	16,2%	38,7%	31,8%	100,0%

Sector * I believe that universities are aligned with the needs and expectations of working life Crosstabulation

% within Sector

		I believe that universities are aligned with the needs and expectations of working life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	6,9%	19,0%	24,3%	30,2%	19,6%	100,0%
	Services sector	10,3%	25,6%	24,8%	27,4%	12,0%	100,0%
	Manufacturing sector	2,5%	10,0%	20,0%	35,0%	32,5%	100,0%
Total		7,5%	20,2%	24,0%	29,8%	18,5%	100,0%

Sector * I think that digital impact highly effects universities in our age Crosstabulation

% within Sector

		I think that digital impact highly effects universities in our age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,1%	6,3%	15,9%	46,6%	29,1%	100,0%
	Services sector	2,6%	5,1%	17,1%	52,1%	23,1%	100,0%
	Manufacturing sector		2,5%	7,5%	50,0%	40,0%	100,0%
Total		2,0%	5,5%	15,3%	48,8%	28,3%	100,0%

Sector * I believe that Universities should shape their education strategies according to the realities of the digitalization age Crosstabulation
% within Sector

		I believe that Universities should shape their education strategies according to the realities of the digitalization age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	4,2%	10,6%	47,6%	36,0%	100,0%
	Services sector	,9%	5,1%	9,4%	44,4%	40,2%	100,0%
	Manufacturing sector			12,5%	42,5%	45,0%	100,0%
Total		1,2%	4,0%	10,4%	46,0%	38,4%	100,0%

Sector * I believe that the value proposition for universities is changing in the digitalization era Crosstabulation
% within Sector

		I believe that the value proposition for universities is changing in the digitalization era					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	,5%	6,9%	19,6%	44,4%	28,6%	100,0%
	Services sector	1,7%	3,4%	18,8%	51,3%	24,8%	100,0%
	Manufacturing sector		2,5%	7,5%	57,5%	32,5%	100,0%
Total		,9%	5,2%	17,9%	48,3%	27,7%	100,0%

Sector * I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace Crosstabulation
% within Sector

		I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	10,1%	14,8%	42,9%	30,7%	100,0%
	Services sector	1,7%	2,6%	16,2%	58,1%	21,4%	100,0%
	Manufacturing sector	2,5%	5,0%	15,0%	52,5%	25,0%	100,0%
Total		1,7%	6,9%	15,3%	49,1%	26,9%	100,0%

Sector * I believe that Universities should fulfil the needs and expectations of new generation students Crosstabulation
% within Sector

		I believe that Universities should fulfil the needs and expectations of new generation students					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	4,2%	9,5%	42,3%	42,3%	100,0%
	Services sector	,9%	1,7%	4,3%	49,6%	43,6%	100,0%
	Manufacturing sector			5,0%	52,5%	42,5%	100,0%
Total		1,2%	2,9%	7,2%	46,0%	42,8%	100,0%

Sector * Universities should develop traditional education methodologies with the opportunities of the digital age Crosstabulation
% within Sector

		Universities should develop traditional education methodologies with the opportunities of the digital age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	3,7%	10,1%	43,4%	41,3%	100,0%
	Services sector	1,7%	2,6%	8,5%	45,3%	41,9%	100,0%
	Manufacturing sector		2,5%	2,5%	45,0%	50,0%	100,0%
Total		1,4%	3,2%	8,7%	44,2%	42,5%	100,0%

Sector * I think that Z and Alpha are more prone to digitalization than the previous generations Crosstabulation

% within Sector

		I think that Z and Alpha are more prone to digitalization than the previous generations					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	4,2%	7,9%	36,0%	50,3%	100,0%
	Services sector	1,7%	1,7%	7,7%	34,2%	54,7%	100,0%
	Manufacturing sector		5,0%	10,0%	35,0%	50,0%	100,0%
Total		1,4%	3,5%	8,1%	35,3%	51,7%	100,0%

Sector * I think that Generation Alpha is more prone to technology than Generation Z Crosstabulation

% within Sector

		I think that Generation Alpha is more prone to technology than Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,6%	7,9%	22,2%	32,3%	34,9%	100,0%
	Services sector	2,6%	7,7%	17,1%	35,0%	37,6%	100,0%
	Manufacturing sector	2,5%	12,5%	10,0%	27,5%	47,5%	100,0%
Total		2,6%	8,4%	19,1%	32,7%	37,3%	100,0%

Sector * I think that technology and digitalization are indispensable for the Generation Z Crosstabulation

% within Sector

		I think that technology and digitalization are indispensable for the Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,1%	3,2%	12,2%	39,2%	44,4%	100,0%
	Services sector	,9%	5,1%	8,5%	35,9%	49,6%	100,0%
	Manufacturing sector		2,5%	2,5%	47,5%	47,5%	100,0%
Total		,9%	3,8%	9,8%	39,0%	46,5%	100,0%

Sector * I think that Generation Z has a different view of higher education Crosstabulation

% within Sector

		I think that Generation Z has a different view of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	4,8%	14,8%	42,3%	36,5%	100,0%
	Services sector	1,7%	6,8%	12,8%	42,7%	35,9%	100,0%
	Manufacturing sector	5,0%	2,5%	10,0%	47,5%	35,0%	100,0%
Total		2,0%	5,2%	13,6%	43,1%	36,1%	100,0%

Sector * I think that Generation Z uses social media effectively Crosstabulation

% within Sector

		I think that Generation Z uses social media effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,1%	3,7%	11,1%	42,3%	41,8%	100,0%
	Services sector	2,6%	4,3%	12,0%	27,4%	53,8%	100,0%
	Manufacturing sector	2,5%	2,5%		40,0%	55,0%	100,0%
Total		1,7%	3,8%	10,1%	37,0%	47,4%	100,0%

Sector * I think that Generation Z uses digital communication tools effectively Crosstabulation

% within Sector

		I think that Generation Z uses digital communication tools effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	1,6%	6,3%	9,5%	42,9%	39,7%	100,0%
	Services sector	1,7%	3,4%	13,7%	33,3%	47,9%	100,0%
	Manufacturing sector		5,0%	5,0%	37,5%	52,5%	100,0%
Total		1,4%	5,2%	10,4%	39,0%	43,9%	100,0%

Sector * I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities Crosstabulation

% within Sector

		I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,6%	10,1%	18,0%	40,7%	28,6%	100,0%
	Services sector	1,7%	6,0%	14,5%	47,0%	30,8%	100,0%
	Manufacturing sector		5,0%	7,5%	42,5%	45,0%	100,0%
Total		2,0%	8,1%	15,6%	43,1%	31,2%	100,0%

Sector * I think that Generation Z prefer digital higher education Crosstabulation

% within Sector

		I think that Generation Z prefer digital higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,6%	11,1%	22,2%	38,6%	25,4%	100,0%
	Services sector	,9%	5,1%	23,9%	43,6%	26,5%	100,0%
	Manufacturing sector		5,0%	17,5%	40,0%	37,5%	100,0%
Total		1,7%	8,4%	22,3%	40,5%	27,2%	100,0%

Sector * I think that Generation Z prefer hybrid (digital/traditional) higher education Crosstabulation

% within Sector

		I think that Generation Z prefer hybrid (digital/traditional) higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,6%	5,3%	16,4%	50,3%	25,4%	100,0%
	Services sector	1,7%	6,0%	23,1%	47,0%	22,2%	100,0%
	Manufacturing sector	5,0%	7,5%	12,5%	42,5%	32,5%	100,0%
Total		2,6%	5,8%	18,2%	48,3%	25,1%	100,0%

Sector * Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha Crosstabulation

% within Sector

		Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	3,7%	4,8%	23,8%	39,2%	28,6%	100,0%
	Services sector	,9%	4,3%	19,7%	42,7%	32,5%	100,0%
	Manufacturing sector	2,5%	2,5%	5,0%	47,5%	42,5%	100,0%
Total		2,6%	4,3%	20,2%	41,3%	31,5%	100,0%

Sector * I think that digitaleducation transfers the traditional classroom environment in digital environment Crosstabulation

% within Sector

		I think that digitaleducation transfers the traditional classroom environment in digital environment					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	8,5%	14,8%	18,0%	33,9%	24,9%	100,0%
	Services sector	5,1%	12,8%	19,7%	40,2%	22,2%	100,0%
	Manufacturing sector	2,5%	15,0%	17,5%	37,5%	27,5%	100,0%
Total		6,6%	14,2%	18,5%	36,4%	24,3%	100,0%

Sector * I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future Crosstabulation

% within Sector

		I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	3,2%	5,8%	20,1%	45,0%	25,9%	100,0%
	Services sector	1,7%	7,7%	17,1%	45,3%	28,2%	100,0%
	Manufacturing sector		2,5%	25,0%	37,5%	35,0%	100,0%
Total		2,3%	6,1%	19,7%	44,2%	27,7%	100,0%

Sector * I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly Crosstabulation

% within Sector

		I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	3,7%	4,8%	17,5%	46,0%	28,0%	100,0%
	Services sector	1,7%	4,3%	16,2%	51,3%	26,5%	100,0%
	Manufacturing sector	2,5%	7,5%	17,5%	35,0%	37,5%	100,0%
Total		2,9%	4,9%	17,1%	46,5%	28,6%	100,0%

Sector * I believe that university education will turn to a completely digital education model after 2030 Crosstabulation

% within Sector

		I believe that university education will turn to a completely digital education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	7,4%	15,9%	24,9%	27,5%	24,3%	100,0%
	Services sector	3,4%	13,7%	27,4%	33,3%	22,2%	100,0%
	Manufacturing sector	2,5%	5,0%	17,5%	37,5%	37,5%	100,0%
Total		5,5%	13,9%	24,9%	30,6%	25,1%	100,0%

Sector * I think that the digital education model will completely replace the traditional university formal education model after 2030 Crosstabulation

% within Sector

		I think that the digital education model will completely replace the traditional university formal education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	7,9%	16,4%	23,8%	32,8%	19,0%	100,0%
	Services sector	3,4%	17,9%	23,9%	31,6%	23,1%	100,0%
	Manufacturing sector		7,5%	20,0%	45,0%	27,5%	100,0%
Total		5,5%	15,9%	23,4%	33,8%	21,4%	100,0%

Sector * I think that digital education is an effective complement to the traditional university formal education model Crosstabulation
% within Sector

		I think that digital education is an effective complement to the traditional university formal education model					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	2,1%	4,2%	13,8%	49,2%	30,7%	100,0%
	Services sector	3,4%	5,1%	14,5%	51,3%	25,6%	100,0%
	Manufacturing sector			12,5%	52,5%	35,0%	100,0%
Total		2,3%	4,0%	13,9%	50,3%	29,5%	100,0%

Sector * I think that universities can only provide digital education in the field of social sciences after 2030 Crosstabulation
% within Sector

		I think that universities can only provide digital education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	4,2%	21,2%	21,2%	31,2%	22,2%	100,0%
	Services sector	2,6%	23,1%	22,2%	27,4%	24,8%	100,0%
	Manufacturing sector		5,0%	20,0%	42,5%	32,5%	100,0%
Total		3,2%	19,9%	21,4%	31,2%	24,3%	100,0%

Sector * I think that universities can provide hybrid education in the field of social sciences after 2030 Crosstabulation
% within Sector

		I think that universities can provide hybrid education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	3,2%	7,9%	16,4%	48,7%	23,8%	100,0%
	Services sector	1,7%	4,3%	20,5%	52,1%	21,4%	100,0%
	Manufacturing sector		2,5%	17,5%	55,0%	25,0%	100,0%
Total		2,3%	6,1%	17,9%	50,6%	23,1%	100,0%

Sector * I think universities can only provide digital education in the field of medicine and engineering after 2030 Crosstabulation
% within Sector

		I think universities can only provide digital education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	22,2%	20,1%	18,0%	22,8%	16,9%	100,0%
	Services sector	18,8%	28,2%	16,2%	20,5%	16,2%	100,0%
	Manufacturing sector	2,5%	17,5%	17,5%	27,5%	35,0%	100,0%
Total		18,8%	22,5%	17,3%	22,5%	18,8%	100,0%

Sector * I think universities can only provide hybrid education in the field of medicine and engineering after 2030 Crosstabulation
% within Sector

		I think universities can only provide hybrid education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	11,6%	12,2%	22,8%	32,3%	21,2%	100,0%
	Services sector	10,3%	10,3%	23,9%	37,6%	17,9%	100,0%
	Manufacturing sector	2,5%	5,0%	35,0%	30,0%	27,5%	100,0%
Total		10,1%	10,7%	24,6%	33,8%	20,8%	100,0%

Sector * I believe employers will only demand certificates of competence rather than university degrees after 2030 Crosstabulation

% within Sector

		I believe employers will only demand certificates of competence rather than university degrees after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	6,9%	14,3%	27,0%	31,2%	20,6%	100,0%
	Services sector	5,1%	23,1%	19,7%	32,5%	19,7%	100,0%
	Manufacturing sector	2,5%	2,5%	17,5%	55,0%	22,5%	100,0%
Total		5,8%	15,9%	23,4%	34,4%	20,5%	100,0%

Sector * I believe that there will be no need for the classical formal education university model after 2030 Crosstabulation

% within Sector

		I believe that there will be no need for the classical formal education university model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Sector	Academic	10,6%	19,6%	24,9%	27,0%	18,0%	100,0%
	Services sector	6,8%	29,1%	17,9%	26,5%	19,7%	100,0%
	Manufacturing sector		12,5%	30,0%	27,5%	30,0%	100,0%
Total		8,1%	22,0%	23,1%	26,9%	19,9%	100,0%

A-6 Crosstabulation (Education)

Education * I think that digitalization is one of the most important realities in the 21st Century Crosstabulation

% within Education

		I think that digitalization is one of the most important realities in the 21st Century					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	4,7%	2,8%	15,1%	36,8%	40,6%	100,0%
	Secondary school	33,3%	33,3%		33,3%		100,0%
	High school	3,3%	3,3%	10,0%	33,3%	50,0%	100,0%
	Two-year degree			16,7%	16,7%	66,7%	100,0%
	Undergraduate degree		1,1%		34,1%	64,8%	100,0%
	Master's degree	2,7%	2,7%		29,7%	64,9%	100,0%
	Doctorate			2,6%	35,5%	61,8%	100,0%
Total		2,3%	2,0%	6,4%	34,4%	54,9%	100,0%

Education * I believe that digitalization is a part of my daily life Crosstabulation

% within Education

		I believe that digitalization is a part of my daily life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	3,8%	11,3%	43,4%	38,7%	100,0%
	Secondary school			33,3%	66,7%		100,0%
	High school			10,0%	36,7%	53,3%	100,0%
	Two-year degree			16,7%	33,3%	50,0%	100,0%
	Undergraduate degree		1,1%	1,1%	40,9%	56,8%	100,0%
	Master's degree	2,7%			45,9%	51,4%	100,0%
	Doctorate		1,3%	3,9%	35,5%	59,2%	100,0%
Total		1,2%	1,7%	6,1%	40,8%	50,3%	100,0%

Education * I think that digitalization is a socio-cultural phenomenon Crosstabulation

% within Education

		I think that digitalization is a socio-cultural phenomenon					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	3,8%	17,9%	44,3%	32,1%	100,0%
	Secondary school	33,3%		33,3%		33,3%	100,0%
	High school	3,3%	3,3%	33,3%	36,7%	23,3%	100,0%
	Two-year degree		16,7%	33,3%	16,7%	33,3%	100,0%
	Undergraduate degree	3,4%	5,7%	9,1%	47,7%	34,1%	100,0%
	Master's degree	2,7%	2,7%	13,5%	54,1%	27,0%	100,0%
	Doctorate	1,3%	6,6%	13,2%	52,6%	26,3%	100,0%
Total		2,6%	4,9%	15,9%	46,5%	30,1%	100,0%

Education * I think that digitalization is just a technological issue Crosstabulation

% within Education

		I think that digitalization is just a technological issue					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	6,6%	13,2%	24,5%	33,0%	22,6%	100,0%
	Secondary school	33,3%		33,3%	33,3%		100,0%
	High school	3,3%	20,0%	10,0%	43,3%	23,3%	100,0%
	Two-year degree		33,3%		33,3%	33,3%	100,0%
	Undergraduate degree	9,1%	37,5%	14,8%	23,9%	14,8%	100,0%
	Master's degree	10,8%	37,8%	13,5%	24,3%	13,5%	100,0%
	Doctorate	15,8%	50,0%	13,2%	14,5%	6,6%	100,0%
Total		9,5%	30,9%	16,8%	26,6%	16,2%	100,0%

Education * I think that digitalization provides unlimited interactive communication Crosstabulation

% within Education

		I think that digitalization provides unlimited interactive communication					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	7,5%	16,0%	45,3%	28,3%	100,0%
	Secondary school	33,3%		33,3%	33,3%		100,0%
	High school			10,0%	56,7%	33,3%	100,0%
	Two-year degree		16,7%		66,7%	16,7%	100,0%
	Undergraduate degree	2,3%	6,8%	12,5%	45,5%	33,0%	100,0%
	Master's degree		10,8%	2,7%	45,9%	40,5%	100,0%
	Doctorate	1,3%	13,2%	18,4%	51,3%	15,8%	100,0%
Total		2,0%	8,4%	13,6%	48,0%	28,0%	100,0%

Education * I believe that digital transformation will change traditional perspectives Crosstabulation

% within Education

		I believe that digital transformation will change traditional perspectives					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	3,8%	1,9%	14,2%	51,9%	28,3%	100,0%
	Secondary school	33,3%		33,3%		33,3%	100,0%
	High school		3,3%	10,0%	53,3%	33,3%	100,0%
	Two-year degree	16,7%			50,0%	33,3%	100,0%
	Undergraduate degree	1,1%	8,0%	6,8%	50,0%	34,1%	100,0%
	Master's degree			8,1%	51,4%	40,5%	100,0%
	Doctorate		1,3%	13,2%	59,2%	26,3%	100,0%
Total		2,0%	3,2%	11,0%	52,6%	31,2%	100,0%

Education * I believe that digitalization makes our lives more efficient Crosstabulation

% within Education

		I believe that digitalization makes our lives more efficient					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	3,8%	3,8%	17,9%	43,4%	31,1%	100,0%
	Secondary school	33,3%		66,7%			100,0%
	High school		3,3%	16,7%	50,0%	30,0%	100,0%

	Two-year degree				66,7%	33,3%	100,0%
	Undergraduate degree	2,3%	1,1%	15,9%	44,3%	36,4%	100,0%
	Master's degree			18,9%	43,2%	37,8%	100,0%
	Doctorate	1,3%	9,2%	21,1%	39,5%	28,9%	100,0%
Total		2,3%	3,8%	18,2%	43,4%	32,4%	100,0%

Education * I am currently making extensive use of digital technologies Crosstabulation

% within Education

		I am currently making extensive use of digital technologies					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	3,8%	19,8%	39,6%	34,0%	100,0%
	Secondary school		66,7%	33,3%			100,0%
	High school		3,3%	10,0%	50,0%	36,7%	100,0%
	Two-year degree			16,7%	50,0%	33,3%	100,0%
	Undergraduate degree	1,1%	2,3%	10,2%	48,9%	37,5%	100,0%
	Master's degree		2,7%	5,4%	54,1%	37,8%	100,0%
	Doctorate		2,6%	9,2%	53,9%	34,2%	100,0%
Total		1,2%	3,5%	12,7%	47,4%	35,3%	100,0%

Education * Using digital technologies my life is more comfortable Crosstabulation

% within Education

		Using digital technologies my life is more comfortable					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	4,7%	10,4%	45,3%	36,8%	100,0%
	Secondary school		33,3%	33,3%	33,3%		100,0%
	High school			20,0%	36,7%	43,3%	100,0%
	Two-year degree			16,7%	50,0%	33,3%	100,0%
	Undergraduate degree	1,1%	1,1%	9,1%	47,7%	40,9%	100,0%
	Master's degree		8,1%	8,1%	35,1%	48,6%	100,0%
	Doctorate		6,6%	10,5%	57,9%	25,0%	100,0%
Total		1,2%	4,3%	11,0%	46,8%	36,7%	100,0%

Education * I think that digital efficiency increases employment opportunities Crosstabulation

% within Education

		I think that digital efficiency increases employment opportunities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	7,5%	17,9%	40,6%	31,1%	100,0%
	Secondary school		33,3%	66,7%			100,0%
	High school	3,3%	10,0%	16,7%	33,3%	36,7%	100,0%
	Two-year degree			16,7%	33,3%	50,0%	100,0%
	Undergraduate degree	3,4%	10,2%	21,6%	36,4%	28,4%	100,0%
	Master's degree	2,7%	18,9%	24,3%	24,3%	29,7%	100,0%
	Doctorate	9,2%	14,5%	27,6%	32,9%	15,8%	100,0%
Total		4,3%	11,3%	22,0%	35,0%	27,5%	100,0%

Education * I think that technological developments positively support the quality of higher education Crosstabulation

% within Education

		I think that technological developments positively support the quality of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	8,5%	17,9%	42,5%	29,2%	100,0%
	Secondary school		33,3%	66,7%			100,0%
	High school		6,7%	3,3%	56,7%	33,3%	100,0%
	Two-year degree		16,7%		66,7%	16,7%	100,0%
	Undergraduate degree	2,3%	4,5%	14,8%	48,9%	29,5%	100,0%
	Master's degree		5,4%	13,5%	32,4%	48,6%	100,0%
	Doctorate		10,5%	11,8%	50,0%	27,6%	100,0%
Total		1,2%	7,8%	14,2%	46,0%	30,9%	100,0%

Education * I think that earning an undergraduate degree is important for my career Crosstabulation

% within Education

		I think that earning an undergraduate degree is important for my career					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	6,6%	20,8%	34,0%	36,8%	100,0%
	Secondary school		33,3%	33,3%	33,3%		100,0%
	High school		6,7%	13,3%	46,7%	33,3%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	2,3%	4,5%	8,0%	48,9%	36,4%	100,0%
	Master's degree	2,7%	5,4%	8,1%	21,6%	62,2%	100,0%
	Doctorate	1,3%	6,6%	3,9%	38,2%	50,0%	100,0%
Total		1,7%	6,4%	11,8%	38,7%	41,3%	100,0%

Education * I think that university education will remain useful and relevant for a lifetime Crosstabulation

% within Education

		I think that university education will remain useful and relevant for a lifetime					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	10,4%	17,9%	42,5%	26,4%	100,0%
	Secondary school		33,3%	66,7%			100,0%
	High school		20,0%	16,7%	30,0%	33,3%	100,0%
	Two-year degree		16,7%		66,7%	16,7%	100,0%
	Undergraduate degree	3,4%	8,0%	10,2%	45,5%	33,0%	100,0%
	Master's degree		5,4%	35,1%	24,3%	35,1%	100,0%
	Doctorate	3,9%	11,8%	10,5%	35,5%	38,2%	100,0%
Total		2,6%	10,7%	16,2%	38,7%	31,8%	100,0%

Education * I believe that universities are aligned with the needs and expectations of working life Crosstabulation

% within Education

		I believe that universities are aligned with the needs and expectations of working life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	5,7%	10,4%	24,5%	33,0%	26,4%	100,0%
	Secondary school	33,3%		66,7%			100,0%
	High school	3,3%	20,0%	23,3%	33,3%	20,0%	100,0%

	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	6,8%	26,1%	19,3%	30,7%	17,0%	100,0%
	Master's degree	16,2%	16,2%	29,7%	18,9%	18,9%	100,0%
	Doctorate	7,9%	30,3%	25,0%	27,6%	9,2%	100,0%
Total		7,5%	20,2%	24,0%	29,8%	18,5%	100,0%

Education * I think that digital impact highly effects universities in our age Crosstabulation

% within Education

		I think that digital impact highly effects universities in our age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	3,8%	18,9%	45,3%	29,2%	100,0%
	Secondary school		33,3%	66,7%			100,0%
	High school			13,3%	56,7%	30,0%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	2,3%	5,7%	12,5%	54,5%	25,0%	100,0%
	Master's degree	2,7%	2,7%	13,5%	48,6%	32,4%	100,0%
	Doctorate	1,3%	9,2%	13,2%	46,1%	30,3%	100,0%
Total		2,0%	5,5%	15,3%	48,8%	28,3%	100,0%

Education * I believe that Universities should shape their education strategies according to the realities of the digitalization age Crosstabulation

% within Education

		I believe that Universities should shape their education strategies according to the realities of the digitalization age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	5,7%	15,1%	44,3%	32,1%	100,0%
	Secondary school		33,3%	66,7%			100,0%
	High school			16,7%	50,0%	33,3%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	1,1%	2,3%	8,0%	46,6%	42,0%	100,0%
	Master's degree		5,4%	2,7%	37,8%	54,1%	100,0%
	Doctorate		2,6%	5,3%	51,3%	40,8%	100,0%
Total		1,2%	4,0%	10,4%	46,0%	38,4%	100,0%

Education * I believe that the value proposition for universities is changing in the digitalization era Crosstabulation

% within Education

		I believe that the value proposition for universities is changing in the digitalization era					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	,9%	6,6%	17,0%	43,4%	32,1%	100,0%
	Secondary school			66,7%	33,3%		100,0%
	High school			23,3%	50,0%	26,7%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	2,3%	3,4%	12,5%	54,5%	27,3%	100,0%
	Master's degree		2,7%	16,2%	51,4%	29,7%	100,0%
	Doctorate		7,9%	22,4%	46,1%	23,7%	100,0%
Total		,9%	5,2%	17,9%	48,3%	27,7%	100,0%

Education * I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace Crosstabulation

% within Education

		I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	9,4%	18,9%	37,7%	32,1%	100,0%
	Secondary school			33,3%	66,7%		100,0%
	High school			20,0%	50,0%	30,0%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	3,4%	3,4%	14,8%	58,0%	20,5%	100,0%
	Master's degree		8,1%	16,2%	51,4%	24,3%	100,0%
	Doctorate	1,3%	9,2%	7,9%	52,6%	28,9%	100,0%
Total		1,7%	6,9%	15,3%	49,1%	26,9%	100,0%

Education * I believe that Universities should fulfil the needs and expectations of new generation students Crosstabulation

% within Education

		I believe that Universities should fulfil the needs and expectations of new generation students					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	4,7%	13,2%	38,7%	40,6%	100,0%
	Secondary school			66,7%	33,3%		100,0%
	High school			6,7%	50,0%	43,3%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	1,1%	1,1%	2,3%	50,0%	45,5%	100,0%
	Master's degree		2,7%	2,7%	45,9%	48,6%	100,0%
	Doctorate		2,6%	3,9%	50,0%	43,4%	100,0%
Total		1,2%	2,9%	7,2%	46,0%	42,8%	100,0%

Education * Universities should develop traditional education methodologies with the opportunities of the digital age Crosstabulation

% within Education

		Universities should develop traditional education methodologies with the opportunities of the digital age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	5,7%	14,2%	43,4%	34,0%	100,0%
	Secondary school		33,3%	66,7%			100,0%
	High school			13,3%	53,3%	33,3%	100,0%
	Two-year degree		16,7%		66,7%	16,7%	100,0%
	Undergraduate degree	2,3%		5,7%	44,3%	47,7%	100,0%
	Master's degree		5,4%		32,4%	62,2%	100,0%
	Doctorate		1,3%	5,3%	47,4%	46,1%	100,0%
Total		1,4%	3,2%	8,7%	44,2%	42,5%	100,0%

Education * I think that Z and Alpha are more prone to digitalization than the previous generations Crosstabulation

% within Education

		I think that Z and Alpha are more prone to digitalization than the previous generations					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	5,7%	12,3%	34,9%	45,3%	100,0%
	Secondary school		33,3%	33,3%	33,3%		100,0%
	High school			6,7%	40,0%	53,3%	100,0%

	Two-year degree		16,7%	16,7%	33,3%	33,3%	100,0%
	Undergraduate degree	2,3%	1,1%	6,8%	35,2%	54,5%	100,0%
	Master's degree	2,7%	2,7%	8,1%	24,3%	62,2%	100,0%
	Doctorate		2,6%	2,6%	39,5%	55,3%	100,0%
Total		1,4%	3,5%	8,1%	35,3%	51,7%	100,0%

Education * I think that Generation Alpha is more prone to technology than Generation Z Crosstabulation

% within Education

		I think that Generation Alpha is more prone to technology than Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	10,4%	19,8%	29,2%	37,7%	100,0%
	Secondary school		33,3%	33,3%	33,3%		100,0%
	High school		10,0%	16,7%	33,3%	40,0%	100,0%
	Two-year degree		16,7%	33,3%	16,7%	33,3%	100,0%
	Undergraduate degree	4,5%	9,1%	13,6%	34,1%	38,6%	100,0%
	Master's degree	2,7%	2,7%	16,2%	35,1%	43,2%	100,0%
	Doctorate	1,3%	5,3%	25,0%	35,5%	32,9%	100,0%
Total		2,6%	8,4%	19,1%	32,7%	37,3%	100,0%

Education * I think that technology and digitalization are indispensable for the Generation Z Crosstabulation

% within Education

		I think that technology and digitalization are indispensable for the Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	3,8%	15,1%	34,0%	45,3%	100,0%
	Secondary school		33,3%		33,3%	33,3%	100,0%
	High school				46,7%	53,3%	100,0%
	Two-year degree		16,7%	16,7%	33,3%	33,3%	100,0%
	Undergraduate degree	1,1%	3,4%	4,5%	38,6%	52,3%	100,0%
	Master's degree		8,1%	13,5%	32,4%	45,9%	100,0%
	Doctorate		1,3%	10,5%	47,4%	40,8%	100,0%
Total		,9%	3,8%	9,8%	39,0%	46,5%	100,0%

Education * I think that Generation Z has a different view of higher education Crosstabulation

% within Education

		I think that Generation Z has a different view of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	4,7%	12,3%	41,5%	39,6%	100,0%
	Secondary school	33,3%		33,3%	33,3%		100,0%
	High school		3,3%	10,0%	53,3%	33,3%	100,0%
	Two-year degree		16,7%	33,3%	16,7%	33,3%	100,0%
	Undergraduate degree	3,4%	5,7%	6,8%	45,5%	38,6%	100,0%
	Master's degree	2,7%	8,1%	13,5%	40,5%	35,1%	100,0%
	Doctorate		3,9%	22,4%	42,1%	31,6%	100,0%
Total		2,0%	5,2%	13,6%	43,1%	36,1%	100,0%

Education * I think that Generation Z uses social media effectively Crosstabulation

% within Education

		I think that Generation Z uses social media effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	3,8%	12,3%	37,7%	44,3%	100,0%
	Secondary school	33,3%	33,3%		33,3%		100,0%
	High school			6,7%	40,0%	53,3%	100,0%
	Two-year degree		16,7%	16,7%	16,7%	50,0%	100,0%
	Undergraduate degree	2,3%	3,4%	9,1%	26,1%	59,1%	100,0%
	Master's degree		2,7%	10,8%	40,5%	45,9%	100,0%
	Doctorate	1,3%	3,9%	9,2%	47,4%	38,2%	100,0%
Total		1,7%	3,8%	10,1%	37,0%	47,4%	100,0%

Education * I think that Generation Z uses digital communication tools effectively Crosstabulation

% within Education

		I think that Generation Z uses digital communication tools effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	5,7%	10,4%	36,8%	44,3%	100,0%
	Secondary school		33,3%	33,3%	33,3%		100,0%
	High school			6,7%	43,3%	50,0%	100,0%
	Two-year degree		16,7%	16,7%	33,3%	33,3%	100,0%
	Undergraduate degree	2,3%	3,4%	11,4%	27,3%	55,7%	100,0%
	Master's degree		5,4%	10,8%	48,6%	35,1%	100,0%
	Doctorate		6,6%	9,2%	50,0%	34,2%	100,0%
Total		1,4%	5,2%	10,4%	39,0%	43,9%	100,0%

Education * I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities Crosstabulation

% within Education

		I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	4,7%	17,0%	44,3%	32,1%	100,0%
	Secondary school		33,3%	33,3%	33,3%		100,0%
	High school		3,3%	3,3%	46,7%	46,7%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	1,1%	3,4%	13,6%	44,3%	37,5%	100,0%
	Master's degree	2,7%	16,2%	8,1%	43,2%	29,7%	100,0%
	Doctorate	3,9%	14,5%	23,7%	38,2%	19,7%	100,0%
Total		2,0%	8,1%	15,6%	43,1%	31,2%	100,0%

Education * I think that Generation Z prefer digital higher education Crosstabulation

% within Education

		I think that Generation Z prefer digital higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	6,6%	13,2%	42,5%	34,9%	100,0%
	Secondary school			33,3%	66,7%		100,0%
	High school		3,3%	13,3%	50,0%	33,3%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%

	Undergraduate degree	1,1%	4,5%	23,9%	39,8%	30,7%	100,0%
	Master's degree		13,5%	21,6%	32,4%	32,4%	100,0%
	Doctorate	2,6%	14,5%	36,8%	36,8%	9,2%	100,0%
Total		1,7%	8,4%	22,3%	40,5%	27,2%	100,0%

Education * I think that Generation Z prefer hybrid (digital/traditional) higher education Crosstabulation

% within Education

		I think that Generation Z prefer hybrid (digital/traditional) higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	5,7%	14,2%	46,2%	31,1%	100,0%
	Secondary school	33,3%			33,3%	33,3%	100,0%
	High school		6,7%	23,3%	43,3%	26,7%	100,0%
	Two-year degree		16,7%	16,7%	33,3%	33,3%	100,0%
	Undergraduate degree	3,4%	5,7%	22,7%	44,3%	23,9%	100,0%
	Master's degree		2,7%	18,9%	54,1%	24,3%	100,0%
	Doctorate	2,6%	6,6%	17,1%	56,6%	17,1%	100,0%
Total		2,6%	5,8%	18,2%	48,3%	25,1%	100,0%

Education * Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha Crosstabulation

% within Education

		Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	5,7%	2,8%	23,6%	35,8%	32,1%	100,0%
	Secondary school	33,3%		66,7%			100,0%
	High school		3,3%	20,0%	40,0%	36,7%	100,0%
	Two-year degree		16,7%	16,7%	33,3%	33,3%	100,0%
	Undergraduate degree	1,1%	4,5%	11,4%	48,9%	34,1%	100,0%
	Master's degree		2,7%	18,9%	40,5%	37,8%	100,0%
	Doctorate	1,3%	6,6%	25,0%	43,4%	23,7%	100,0%
Total		2,6%	4,3%	20,2%	41,3%	31,5%	100,0%

Education * I think that digitaleducation transfers the traditional classroom environment in digital environment Crosstabulation

% within Education

		I think that digitaleducation transfers the traditional classroom environment in digital environment					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	5,7%	6,6%	17,9%	35,8%	34,0%	100,0%
	Secondary school		66,7%		33,3%		100,0%
	High school	3,3%	10,0%	10,0%	46,7%	30,0%	100,0%
	Two-year degree		16,7%		50,0%	33,3%	100,0%
	Undergraduate degree	5,7%	12,5%	20,5%	37,5%	23,9%	100,0%
	Master's degree	10,8%	16,2%	24,3%	29,7%	18,9%	100,0%
	Doctorate	9,2%	25,0%	19,7%	34,2%	11,8%	100,0%
Total		6,6%	14,2%	18,5%	36,4%	24,3%	100,0%

Education * I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future Crosstabulation

% within Education

		I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	3,8%	4,7%	15,1%	46,2%	30,2%	100,0%
	Secondary school		33,3%	66,7%			100,0%
	High school		3,3%	23,3%	40,0%	33,3%	100,0%
	Two-year degree		16,7%		50,0%	33,3%	100,0%
	Undergraduate degree	2,3%	6,8%	14,8%	44,3%	31,8%	100,0%
	Master's degree	2,7%	5,4%	24,3%	43,2%	24,3%	100,0%
	Doctorate	1,3%	6,6%	27,6%	44,7%	19,7%	100,0%
Total		2,3%	6,1%	19,7%	44,2%	27,7%	100,0%

Education * I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly Crosstabulation

% within Education

		I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	4,7%	4,7%	19,8%	43,4%	27,4%	100,0%
	Secondary school				100,0%		100,0%
	High school			23,3%	43,3%	33,3%	100,0%
	Two-year degree		16,7%	16,7%	33,3%	33,3%	100,0%
	Undergraduate degree	1,1%	5,7%	17,0%	46,6%	29,5%	100,0%
	Master's degree	5,4%	8,1%	16,2%	35,1%	35,1%	100,0%
	Doctorate	2,6%	3,9%	11,8%	56,6%	25,0%	100,0%
Total		2,9%	4,9%	17,1%	46,5%	28,6%	100,0%

Education * I believe that university education will turn to a completely digital education model after 2030 Crosstabulation

% within Education

		I believe that university education will turn to a completely digital education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	5,7%	10,4%	17,0%	35,8%	31,1%	100,0%
	Secondary school	33,3%	33,3%	33,3%			100,0%
	High school			20,0%	46,7%	33,3%	100,0%
	Two-year degree		16,7%	16,7%	33,3%	33,3%	100,0%
	Undergraduate degree	2,3%	13,6%	23,9%	36,4%	23,9%	100,0%
	Master's degree	8,1%	18,9%	27,0%	16,2%	29,7%	100,0%
	Doctorate	9,2%	21,1%	38,2%	18,4%	13,2%	100,0%
Total		5,5%	13,9%	24,9%	30,6%	25,1%	100,0%

Education * I think that the digital education model will completely replace the traditional university formal education model after 2030 Crosstabulation

% within Education

		I think that the digital education model will completely replace the traditional university formal education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	3,8%	8,5%	21,7%	39,6%	26,4%	100,0%
	Secondary school		66,7%	33,3%			100,0%
	High school		6,7%	26,7%	33,3%	33,3%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	2,3%	13,6%	20,5%	39,8%	23,9%	100,0%
	Master's degree	8,1%	21,6%	27,0%	21,6%	21,6%	100,0%
	Doctorate	13,2%	27,6%	26,3%	25,0%	7,9%	100,0%
Total		5,5%	15,9%	23,4%	33,8%	21,4%	100,0%

Education * I think that digital education is an effective complement to the traditional university formal education model Crosstabulation

% within Education

		I think that digital education is an effective complement to the traditional university formal education model					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	3,8%	17,9%	45,3%	31,1%	100,0%
	Secondary school			33,3%	66,7%		100,0%
	High school		3,3%	26,7%	36,7%	33,3%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	3,4%	4,5%	8,0%	56,8%	27,3%	100,0%
	Master's degree	2,7%		13,5%	51,4%	32,4%	100,0%
	Doctorate	2,6%	5,3%	9,2%	53,9%	28,9%	100,0%
Total		2,3%	4,0%	13,9%	50,3%	29,5%	100,0%

Education * I think that universities can only provide digital education in the field of social sciences after 2030 Crosstabulation

% within Education

		I think that universities can only provide digital education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	10,4%	21,7%	36,8%	29,2%	100,0%
	Secondary school		33,3%			66,7%	100,0%
	High school		13,3%	30,0%	30,0%	26,7%	100,0%
	Two-year degree		16,7%	16,7%	33,3%	33,3%	100,0%
	Undergraduate degree	2,3%	17,0%	21,6%	34,1%	25,0%	100,0%
	Master's degree	5,4%	24,3%	18,9%	27,0%	24,3%	100,0%
	Doctorate	6,6%	36,8%	19,7%	23,7%	13,2%	100,0%
Total		3,2%	19,9%	21,4%	31,2%	24,3%	100,0%

Education * I think that universities can provide hybrid education in the field of social sciences after 2030 Crosstabulation

% within Education

		I think that universities can provide hybrid education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	4,7%	18,9%	42,5%	31,1%	100,0%
	Secondary school		33,3%	33,3%	33,3%		100,0%
	High school		3,3%	26,7%	40,0%	30,0%	100,0%

	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	1,1%	2,3%	19,3%	55,7%	21,6%	100,0%
	Master's degree	2,7%	10,8%	13,5%	54,1%	18,9%	100,0%
	Doctorate	3,9%	9,2%	13,2%	59,2%	14,5%	100,0%
Total		2,3%	6,1%	17,9%	50,6%	23,1%	100,0%

Education * I think universities can only provide digital education in the field of medicine and engineering after 2030 Crosstabulation

% within Education

		I think universities can only provide digital education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	8,5%	13,2%	17,0%	34,9%	26,4%	100,0%
	Secondary school			66,7%		33,3%	100,0%
	High school	10,0%	13,3%	26,7%	23,3%	26,7%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	13,6%	33,0%	11,4%	21,6%	20,5%	100,0%
	Master's degree	27,0%	21,6%	16,2%	18,9%	16,2%	100,0%
	Doctorate	40,8%	28,9%	19,7%	6,6%	3,9%	100,0%
Total		18,8%	22,5%	17,3%	22,5%	18,8%	100,0%

Education * I think universities can only provide hybrid education in the field of medicine and engineering after 2030 Crosstabulation

% within Education

		I think universities can only provide hybrid education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	7,5%	7,5%	23,6%	32,1%	29,2%	100,0%
	Secondary school	33,3%	33,3%	33,3%			100,0%
	High school	10,0%	6,7%	26,7%	33,3%	23,3%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	9,1%	9,1%	22,7%	37,5%	21,6%	100,0%
	Master's degree	8,1%	10,8%	37,8%	24,3%	18,9%	100,0%
	Doctorate	15,8%	17,1%	21,1%	36,8%	9,2%	100,0%
Total		10,1%	10,7%	24,6%	33,8%	20,8%	100,0%

Education * I believe employers will only demand certificates of competence rather than university degrees after 2030 Crosstabulation

% within Education

		I believe employers will only demand certificates of competence rather than university degrees after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	1,9%	8,5%	25,5%	37,7%	26,4%	100,0%
	Secondary school	33,3%		66,7%			100,0%
	High school	6,7%	10,0%	16,7%	43,3%	23,3%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	3,4%	22,7%	15,9%	35,2%	22,7%	100,0%
	Master's degree	8,1%	21,6%	24,3%	29,7%	16,2%	100,0%
	Doctorate	11,8%	18,4%	30,3%	27,6%	11,8%	100,0%
Total		5,8%	15,9%	23,4%	34,4%	20,5%	100,0%

Education * I believe that there will be no need for the classical formal education university model after 2030 Crosstabulation

% within Education

		I believe that there will be no need for the classical formal education university model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
Education	College student	2,8%	11,3%	26,4%	34,0%	25,5%	100,0%
	Secondary school		33,3%		33,3%	33,3%	100,0%
	High school	6,7%	20,0%	16,7%	33,3%	23,3%	100,0%
	Two-year degree		16,7%	16,7%	50,0%	16,7%	100,0%
	Undergraduate degree	4,5%	25,0%	19,3%	27,3%	23,9%	100,0%
	Master's degree	8,1%	29,7%	27,0%	18,9%	16,2%	100,0%
	Doctorate	21,1%	30,3%	25,0%	15,8%	7,9%	100,0%
Total		8,1%	22,0%	23,1%	26,9%	19,9%	100,0%

A-7 Crosstabulation (Work Experience)

How long have you been working? * I think that digitalization is one of the most important realities in the 21st Century Crosstabulation

% within How long have you been working?

		I think that digitalization is one of the most important realities in the 21st Century					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		7,4%	3,7%	40,7%	48,1%	100,0%
	6-10 years	3,1%	3,1%	3,1%	35,9%	54,7%	100,0%
	10 years+	,7%		2,0%	30,9%	66,4%	100,0%
Total		1,3%	1,7%	2,5%	33,3%	61,3%	100,0%

How long have you been working? * I believe that digitalization is a part of my daily life Crosstabulation

% within How long have you been working?

		I believe that digitalization is a part of my daily life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	7,4%	37,0%	51,9%	100,0%
	6-10 years	1,6%		4,7%	42,2%	51,6%	100,0%
	10 years+		,7%	2,7%	38,9%	57,7%	100,0%
Total		,4%	,8%	3,8%	39,6%	55,4%	100,0%

How long have you been working? * I think that digitalization is a socio-cultural phenomenon Crosstabulation

% within How long have you been working?

		I think that digitalization is a socio-cultural phenomenon					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	7,4%	3,7%	14,8%	40,7%	33,3%	100,0%
	6-10 years	3,1%	6,3%	12,5%	46,9%	31,3%	100,0%
	10 years+	2,0%	5,4%	16,1%	49,0%	27,5%	100,0%
Total		2,9%	5,4%	15,0%	47,5%	29,2%	100,0%

How long have you been working? * I think that digitalization is just a technological issue Crosstabulation

% within How long have you been working?

		I think that digitalization is just a technological issue					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	3,7%	40,7%	18,5%	18,5%	18,5%	100,0%
	6-10 years	14,1%	29,7%	15,6%	23,4%	17,2%	100,0%
	10 years+	10,7%	42,3%	11,4%	24,8%	10,7%	100,0%
Total		10,8%	38,8%	13,3%	23,8%	13,3%	100,0%

How long have you been working? * I think that digitalization provides unlimited interactive communication Crosstabulation

% within How long have you been working?

		I think that digitalization provides unlimited interactive communication					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	3,7%	14,8%	11,1%	48,1%	22,2%	100,0%
	6-10 years	3,1%	7,8%	10,9%	42,2%	35,9%	100,0%
	10 years+	,7%	8,1%	13,4%	52,3%	25,5%	100,0%
Total		1,7%	8,8%	12,5%	49,2%	27,9%	100,0%

How long have you been working? * I believe that digital transformation will change traditional perspectives Crosstabulation

% within How long have you been working?

		I believe that digital transformation will change traditional perspectives					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	22,2%	40,7%	33,3%	100,0%
	6-10 years	3,1%	4,7%	9,4%	43,8%	39,1%	100,0%
	10 years+	,7%	3,4%	7,4%	59,1%	29,5%	100,0%
Total		1,3%	3,8%	9,6%	52,9%	32,5%	100,0%

How long have you been working? * I believe that digitalization makes our lives more efficient Crosstabulation

% within How long have you been working?

		I believe that digitalization makes our lives more efficient					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	7,4%		14,8%	40,7%	37,0%	100,0%
	6-10 years	1,6%	3,1%	20,3%	39,1%	35,9%	100,0%
	10 years+	,7%	4,7%	18,1%	45,6%	30,9%	100,0%
Total		1,7%	3,8%	18,3%	43,3%	32,9%	100,0%

How long have you been working? * I am currently making extensive use of digital technologies Crosstabulation

% within How long have you been working?

		I am currently making extensive use of digital technologies					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	3,7%	3,7%	11,1%	55,6%	25,9%	100,0%
	6-10 years		4,7%	10,9%	46,9%	37,5%	100,0%
	10 years+		2,7%	8,7%	51,7%	36,9%	100,0%
Total		,4%	3,3%	9,6%	50,8%	35,8%	100,0%

How long have you been working? * Using digital technologies my life is more comfortable Crosstabulation

% within How long have you been working?

		Using digital technologies my life is more comfortable					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	3,7%	7,4%	7,4%	48,1%	33,3%	100,0%
	6-10 years		4,7%	10,9%	34,4%	50,0%	100,0%
	10 years+		3,4%	12,1%	53,0%	31,5%	100,0%

Total		,4%	4,2%	11,3%	47,5%	36,7%	100,0%

How long have you been working? * I think that digital efficiency increases employment opportunities Crosstabulation

% within How long have you been working?

		I think that digital efficiency increases employment opportunities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	3,7%	7,4%	18,5%	33,3%	37,0%	100,0%
	6-10 years	3,1%	6,3%	20,3%	39,1%	31,3%	100,0%
	10 years+	6,0%	16,8%	26,2%	29,5%	21,5%	100,0%
Total		5,0%	12,9%	23,8%	32,5%	25,8%	100,0%

How long have you been working? * I think that technological developments positively support the quality of higher education Crosstabulation

% within How long have you been working?

		I think that technological developments positively support the quality of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years			11,1%	55,6%	33,3%	100,0%
	6-10 years	3,1%	14,1%	7,8%	42,2%	32,8%	100,0%
	10 years+		6,0%	14,8%	48,3%	30,9%	100,0%
Total		,8%	7,5%	12,5%	47,5%	31,7%	100,0%

How long have you been working? * I think that earning an undergraduate degree is important for my career Crosstabulation

% within How long have you been working?

		I think that earning an undergraduate degree is important for my career					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years			7,4%	55,6%	37,0%	100,0%
	6-10 years	4,7%	12,5%	10,9%	32,8%	39,1%	100,0%
	10 years+	,7%	4,7%	6,7%	41,6%	46,3%	100,0%
Total		1,7%	6,3%	7,9%	40,8%	43,3%	100,0%

How long have you been working? * I think that university education will remain useful and relevant for a lifetime Crosstabulation

% within How long have you been working?

		I think that university education will remain useful and relevant for a lifetime					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		7,4%	18,5%	51,9%	22,2%	100,0%
	6-10 years	3,1%	17,2%	21,9%	21,9%	35,9%	100,0%
	10 years+	2,7%	8,7%	12,1%	40,9%	35,6%	100,0%
Total		2,5%	10,8%	15,4%	37,1%	34,2%	100,0%

How long have you been working? * I believe that universities are aligned with the needs and expectations of working life Crosstabulation

% within How long have you been working?

		I believe that universities are aligned with the needs and expectations of working life					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	3,7%	33,3%	18,5%	33,3%	11,1%	100,0%
	6-10 years	12,5%	23,4%	17,2%	26,6%	20,3%	100,0%
	10 years+	7,4%	23,5%	27,5%	28,2%	13,4%	100,0%
Total		8,3%	24,6%	23,8%	28,3%	15,0%	100,0%

How long have you been working? * I think that digital impact highly effects universities in our age Crosstabulation

% within How long have you been working?

		I think that digital impact highly effects universities in our age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		11,1%	7,4%	59,3%	22,2%	100,0%
	6-10 years	4,7%	7,8%	15,6%	42,2%	29,7%	100,0%
	10 years+	,7%	4,7%	14,1%	52,3%	28,2%	100,0%
Total		1,7%	6,3%	13,8%	50,4%	27,9%	100,0%

How long have you been working? * I believe that Universities should shape their education strategies according to the realities of the digitalization age Crosstabulation

% within How long have you been working?

		I believe that Universities should shape their education strategies according to the realities of the digitalization age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	11,1%	48,1%	37,0%	100,0%
	6-10 years	1,6%	3,1%	14,1%	37,5%	43,8%	100,0%
	10 years+		3,4%	5,4%	50,3%	40,9%	100,0%
Total		,4%	3,3%	8,3%	46,7%	41,3%	100,0%

How long have you been working? * I believe that the value proposition for universities is changing in the digitalization era Crosstabulation

% within How long have you been working?

		I believe that the value proposition for universities is changing in the digitalization era					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years			7,4%	66,7%	25,9%	100,0%
	6-10 years	1,6%	7,8%	26,6%	39,1%	25,0%	100,0%
	10 years+	,7%	4,0%	16,8%	52,3%	26,2%	100,0%
Total		,8%	4,6%	18,3%	50,4%	25,8%	100,0%

How long have you been working? * I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace Crosstabulation

% within How long have you been working?

		I think that today universities are now being forced to deliver learning in new ways and operate in a global marketplace					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	14,8%	66,7%	14,8%	100,0%
	6-10 years	3,1%	7,8%	17,2%	45,3%	26,6%	100,0%
	10 years+	1,3%	5,4%	12,1%	55,7%	25,5%	100,0%
Total		1,7%	5,8%	13,8%	54,2%	24,6%	100,0%

How long have you been working? * I believe that Universities should fulfil the needs and expectations of new generation students Crosstabulation

% within How long have you been working?

		I believe that Universities should fulfil the needs and expectations of new generation students					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	3,7%	40,7%	51,9%	100,0%
	6-10 years	1,6%	1,6%	6,3%	53,1%	37,5%	100,0%
	10 years+		2,0%	4,0%	49,0%	45,0%	100,0%
Total		,4%	2,1%	4,6%	49,2%	43,8%	100,0%

How long have you been working? * Universities should develop traditional education methodologies with the opportunities of the digital age Crosstabulation

% within How long have you been working?

		Universities should develop traditional education methodologies with the opportunities of the digital age					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	3,7%	3,7%	7,4%	40,7%	44,4%	100,0%
	6-10 years	1,6%	4,7%	7,8%	37,5%	48,4%	100,0%
	10 years+		,7%	5,4%	48,3%	45,6%	100,0%
Total		,8%	2,1%	6,3%	44,6%	46,3%	100,0%

How long have you been working? * I think that Z and Alpha are more prone to digitalization than the previous generations Crosstabulation

% within How long have you been working?

		I think that Z and Alpha are more prone to digitalization than the previous generations					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	7,4%	48,1%	40,7%	100,0%
	6-10 years	3,1%	4,7%	6,3%	31,3%	54,7%	100,0%
	10 years+	,7%	1,3%	6,0%	34,9%	57,0%	100,0%
Total		1,3%	2,5%	6,3%	35,4%	54,6%	100,0%

How long have you been working? * I think that Generation Alpha is more prone to technology than Generation Z Crosstabulation

% within How long have you been working?

		I think that Generation Alpha is more prone to technology than Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		7,4%	22,2%	44,4%	25,9%	100,0%
	6-10 years	4,7%	12,5%	14,1%	34,4%	34,4%	100,0%
	10 years+	2,0%	5,4%	20,1%	32,2%	40,3%	100,0%
Total		2,5%	7,5%	18,8%	34,2%	37,1%	100,0%

How long have you been working? * I think that technology and digitalization are indispensable for the Generation Z Crosstabulation

% within How long have you been working?

		I think that technology and digitalization are indispensable for the Generation Z					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years			3,7%	59,3%	37,0%	100,0%
	6-10 years	1,6%	7,8%	3,1%	35,9%	51,6%	100,0%
	10 years+		2,7%	10,1%	40,3%	47,0%	100,0%
Total		,4%	3,8%	7,5%	41,3%	47,1%	100,0%

How long have you been working? * I think that Generation Z has a different view of higher education Crosstabulation

% within How long have you been working?

		I think that Generation Z has a different view of higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	7,4%	55,6%	33,3%	100,0%
	6-10 years	6,3%	10,9%	9,4%	43,8%	29,7%	100,0%
	10 years+	,7%	3,4%	17,4%	41,6%	36,9%	100,0%
Total		2,1%	5,4%	14,2%	43,8%	34,6%	100,0%

How long have you been working? * I think that Generation Z uses social media effectively Crosstabulation

% within How long have you been working?

		I think that Generation Z uses social media effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years			14,8%	37,0%	48,1%	100,0%
	6-10 years	3,1%	9,4%	4,7%	29,7%	53,1%	100,0%
	10 years+	1,3%	2,0%	10,1%	39,6%	47,0%	100,0%
Total		1,7%	3,8%	9,2%	36,7%	48,8%	100,0%

How long have you been working? * I think that Generation Z uses digital communication tools effectively Crosstabulation

% within How long have you been working?

		I think that Generation Z uses digital communication tools effectively					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	7,4%	40,7%	48,1%	100,0%

	6-10 years	1,6%	7,8%	6,3%	39,1%	45,3%	100,0%
	10 years+	,7%	4,0%	12,8%	40,3%	42,3%	100,0%
Total		,8%	5,0%	10,4%	40,0%	43,8%	100,0%

How long have you been working? * I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities Crosstabulation

% within How long have you been working?

		I think that Generation Z is an important factor for the arrival of digital and hybrid methodologies in the universities					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		7,4%	22,2%	44,4%	25,9%	100,0%
	6-10 years	3,1%	14,1%	4,7%	45,3%	32,8%	100,0%
	10 years+	2,0%	8,1%	18,1%	40,9%	30,9%	100,0%
Total		2,1%	9,6%	15,0%	42,5%	30,8%	100,0%

How long have you been working? * I think that Generation Z prefer digital higher education Crosstabulation

% within How long have you been working?

		I think that Generation Z prefer digital higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		11,1%	22,2%	40,7%	25,9%	100,0%
	6-10 years	1,6%	10,9%	17,2%	43,8%	26,6%	100,0%
	10 years+	1,3%	8,1%	30,9%	37,6%	22,1%	100,0%
Total		1,3%	9,2%	26,3%	39,6%	23,8%	100,0%

How long have you been working? * I think that Generation Z prefer hybrid (digital/traditional) higher education Crosstabulation

% within How long have you been working?

		I think that Generation Z prefer hybrid (digital/traditional) higher education					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	22,2%	55,6%	18,5%	100,0%
	6-10 years	4,7%	7,8%	20,3%	37,5%	29,7%	100,0%
	10 years+	2,0%	5,4%	19,5%	53,0%	20,1%	100,0%
Total		2,5%	5,8%	20,0%	49,2%	22,5%	100,0%

How long have you been working? * Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha Crosstabulation

% within How long have you been working?

		Future in higher education (after 2030) will be structured depending on the attitude and expectations of Generation Alpha					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		7,4%	22,2%	40,7%	29,6%	100,0%
	6-10 years	4,7%	6,3%	20,3%	43,8%	25,0%	100,0%
	10 years+		4,0%	17,4%	44,3%	34,2%	100,0%
Total		1,3%	5,0%	18,8%	43,8%	31,3%	100,0%

How long have you been working? * I think that digitaleducation transfers the traditional classroom environment in digital environment Crosstabulation

% within How long have you been working?

		I think that digitaleducation transfers the traditional classroom environment in digital environment					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	7,4%	11,1%	25,9%	48,1%	7,4%	100,0%
	6-10 years	7,8%	20,3%	10,9%	35,9%	25,0%	100,0%
	10 years+	6,7%	17,4%	20,8%	34,9%	20,1%	100,0%
Total		7,1%	17,5%	18,8%	36,7%	20,0%	100,0%

How long have you been working? * I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future Crosstabulation

% within How long have you been working?

		I think the concepts of Virtual Reality (VR), Augmented Reality (AR), Blockchain, Web 3.0 and Metaverse will transform physical education classroom place of today into the digital education space of the future					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	3,7%	7,4%	33,3%	40,7%	14,8%	100,0%
	6-10 years	3,1%	10,9%	14,1%	40,6%	31,3%	100,0%
	10 years+	,7%	4,7%	22,8%	45,0%	26,8%	100,0%
Total		1,7%	6,7%	21,7%	43,3%	26,7%	100,0%

How long have you been working? * I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly Crosstabulation

% within How long have you been working?

		I think that following Covid-19 pandemic period, hybrid university education will increase until 2030 rapidly					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	25,9%	48,1%	22,2%	100,0%
	6-10 years	4,7%	9,4%	15,6%	40,6%	29,7%	100,0%
	10 years+	1,3%	3,4%	14,1%	51,0%	30,2%	100,0%
Total		2,1%	5,0%	15,8%	47,9%	29,2%	100,0%

How long have you been working? * I believe that university education will turn to a completely digital education model after 2030 Crosstabulation

% within How long have you been working?

		I believe that university education will turn to a completely digital education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	11,1%	11,1%	25,9%	37,0%	14,8%	100,0%
	6-10 years	6,3%	14,1%	20,3%	31,3%	28,1%	100,0%
	10 years+	4,0%	16,8%	32,2%	25,5%	21,5%	100,0%
Total		5,4%	15,4%	28,3%	28,3%	22,5%	100,0%

How long have you been working? * I think that the digital education model will completely replace the traditional university formal education model after 2030 Crosstabulation

% within How long have you been working?

		I think that the digital education model will completely replace the traditional university formal education model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	11,1%	3,7%	40,7%	29,6%	14,8%	100,0%
	6-10 years	3,1%	20,3%	20,3%	34,4%	21,9%	100,0%
	10 years+	6,7%	21,5%	22,8%	30,2%	18,8%	100,0%
Total		6,3%	19,2%	24,2%	31,3%	19,2%	100,0%

How long have you been working? * I think that digital education is an effective complement to the traditional university formal education model Crosstabulation

% within How long have you been working?

		I think that digital education is an effective complement to the traditional university formal education model					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years			22,2%	40,7%	37,0%	100,0%
	6-10 years	3,1%	6,3%	15,6%	48,4%	26,6%	100,0%
	10 years+	2,7%	4,0%	8,7%	56,4%	28,2%	100,0%
Total		2,5%	4,2%	12,1%	52,5%	28,8%	100,0%

How long have you been working? * I think that universities can only provide digital education in the field of social sciences after 2030 Crosstabulation

% within How long have you been working?

		I think that universities can only provide digital education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	3,7%	18,5%	25,9%	29,6%	22,2%	100,0%
	6-10 years	6,3%	21,9%	12,5%	29,7%	29,7%	100,0%
	10 years+	2,7%	26,2%	24,2%	28,2%	18,8%	100,0%
Total		3,8%	24,2%	21,3%	28,8%	22,1%	100,0%

How long have you been working? * I think that universities can provide hybrid education in the field of social sciences after 2030 Crosstabulation

% within How long have you been working?

		I think that universities can provide hybrid education in the field of social sciences after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years		3,7%	14,8%	70,4%	11,1%	100,0%
	6-10 years	3,1%	9,4%	14,1%	50,0%	23,4%	100,0%
	10 years+	2,0%	6,0%	19,5%	53,0%	19,5%	100,0%
Total		2,1%	6,7%	17,5%	54,2%	19,6%	100,0%

How long have you been working? * I think universities can only provide digital education in the field of medicine and engineering after 2030 Crosstabulation

% within How long have you been working?

		I think universities can only provide digital education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	25,9%	22,2%	18,5%	25,9%	7,4%	100,0%
	6-10 years	18,8%	25,0%	17,2%	18,8%	20,3%	100,0%
	10 years+	24,8%	28,2%	17,4%	14,8%	14,8%	100,0%
Total		23,3%	26,7%	17,5%	17,1%	15,4%	100,0%

How long have you been working? * I think universities can only provide hybrid education in the field of medicine and engineering after 2030 Crosstabulation

% within How long have you been working?

		I think universities can only provide hybrid education in the field of medicine and engineering after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	14,8%	11,1%	25,9%	37,0%	11,1%	100,0%
	6-10 years	10,9%	12,5%	28,1%	25,0%	23,4%	100,0%
	10 years+	10,7%	12,1%	23,5%	38,3%	15,4%	100,0%
Total		11,3%	12,1%	25,0%	34,6%	17,1%	100,0%

How long have you been working? * I believe employers will only demand certificates of competence rather than university degrees after 2030 Crosstabulation

% within How long have you been working?

		I believe employers will only demand certificates of competence rather than university degrees after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	11,1%	25,9%	18,5%	37,0%	7,4%	100,0%
	6-10 years	6,3%	17,2%	18,8%	35,9%	21,9%	100,0%
	10 years+	7,4%	18,8%	24,8%	30,9%	18,1%	100,0%
Total		7,5%	19,2%	22,5%	32,9%	17,9%	100,0%

How long have you been working? * I believe that there will be no need for the classical formal education university model after 2030 Crosstabulation

% within How long have you been working?

		I believe that there will be no need for the classical formal education university model after 2030					Total
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	
How long have you been working?	1-5 years	11,1%	18,5%	25,9%	33,3%	11,1%	100,0%
	6-10 years	9,4%	18,8%	21,9%	28,1%	21,9%	100,0%
	10 years+	10,7%	31,5%	20,8%	20,1%	16,8%	100,0%
Total		10,4%	26,7%	21,7%	23,8%	17,5%	100,0%

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