

Emerging technologies and immersive learning

How edgy technologies fused with experiential learning modalities can prepare adaptive leaders for evolving ecosystems

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Foreword

Traditionally, the white paper format has been embraced by those in the know to communicate fresh or emerging ideas, to distil expert opinions into a digestible format, and to put new ideas and solutions on the table. In academia, white papers are a useful bridge between formal journal articles and the sort of conversation-starters we like to interrogate in the classroom.

For the life-long learners and the curious at heart, the white paper is a punchy, to-the-point partner on a never-ending journey of exploration. For the busy executive, manager, and leader, the white paper is a convenient, easy-to-read, and authoritative tool that captures the essence of an argument and opens the door to future debate. After all, deliberation and disagreement are critical elements to effective education and personal mastery. Without exposure to new perspectives and opinions, no leader can even hope to keep abreast of fast-moving shifts and trends. Therefore, the white paper stirs the pot, puts uncomfortable – or just interesting – topics on the table, and entices readers' interest.

Given its convenient and accessible format, and relevant subject matter, the white paper has become an integral part of Henley Business School Africa's annual research output. Like an informative chat with an old friend or colleague, the white paper affords Henley's faculty and professional associates the opportunity to share a snapshot of exciting areas of study as well as to flag, debate, and make sense of unfolding trends. In turn, the business leader receives a front-row seat to new thinking and emerging solutions to current and sticky problems. These insights ensure that today's leaders can make better, faster, and more agile decisions to steer their organisations forward.

In Africa, where leaders from all spheres are buffeted by a range of often interconnected social, economic, and environmental concerns, the sheer volume of issues on the table can be particularly overwhelming. Our white papers attempt to shine a spotlight on what we deem to be key considerations impacting leadership and business on our continent, with the aim of equipping those in the broader Henley Business School Africa family with the will and the way to build a better Africa.

Jon Foster-Pedley

Dean: Henley Business School Africa

'Henley Africa white papers prod and probe innovations worth noting, interrogate complex issues, and discuss ways in which to solve them. They encourage dialogue, impact, and impact-driven research.'



White paper

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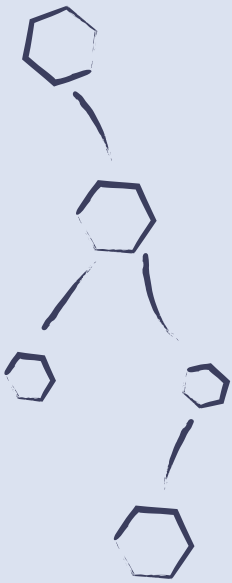
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Thank you to the visionaries, the open-minded, the experiential, the iconoclasts, and the dissatisfied for always changing the question and how it is answered. Thank you to the colleagues, clients, and partners who have pushed the boundaries and from whom I continue to learn, as together we unlock the power of transcendent immersive experiences.

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I tip my hat to all the thoughtful technologists out there who are creating the tools that augment humanity in previously unimagined ways. I am grateful to be able to experiment with what you have built and create an echo chamber of possibilities in my part of the world.

To my wife, Linda van der Colff, the original provocateur who always strives to make things better. Thank you for your incredible partnership and support over 20 years.



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Disclaimer

Aligned with our mission, 'we build the people who build the businesses that build Africa', we facilitate open, multi-perspective conversations and the generation of thought leadership pieces, such as this white paper. However, the views expressed in this white paper are held by the author and not necessarily held by Henley Business School Africa.

Abstract

While technology has been changing the nature of work and the lives of workers since the advent of the 18th-century First Industrial Revolution, and the subsequent Second, Third and Fourth Industrial Revolutions of the 19th, 20th and 21st centuries, never has the extent of the change unleashed on the world been quite as rapid as it is today. While knowledge workers were previously assumed to be invulnerable to technological change, as noted by Prof. Steven Mintz from the University of Texas in 2023, this is no longer the case. A new generation of disruptive technologies, including spatial computing, such as extended reality and generative artificial intelligence models like ChatGPT, are changing the landscape.

Business schools, amongst other shape-shifting institutions in society, need to instil in students as organisational leaders the next skills and expertise they will require in a race that pits people, education, and organisations against an endless tide of technological innovation. This white paper explores the nature and potential of immersive learning, delving into some of its earlier non-technological roots and asking how business schools can leverage edgy technologies, such as virtual reality and generative artificial intelligence, by entwining them with immersive learning models to prepare adaptive leaders to face a fast-changing world with the confidence and resources to lead and succeed.

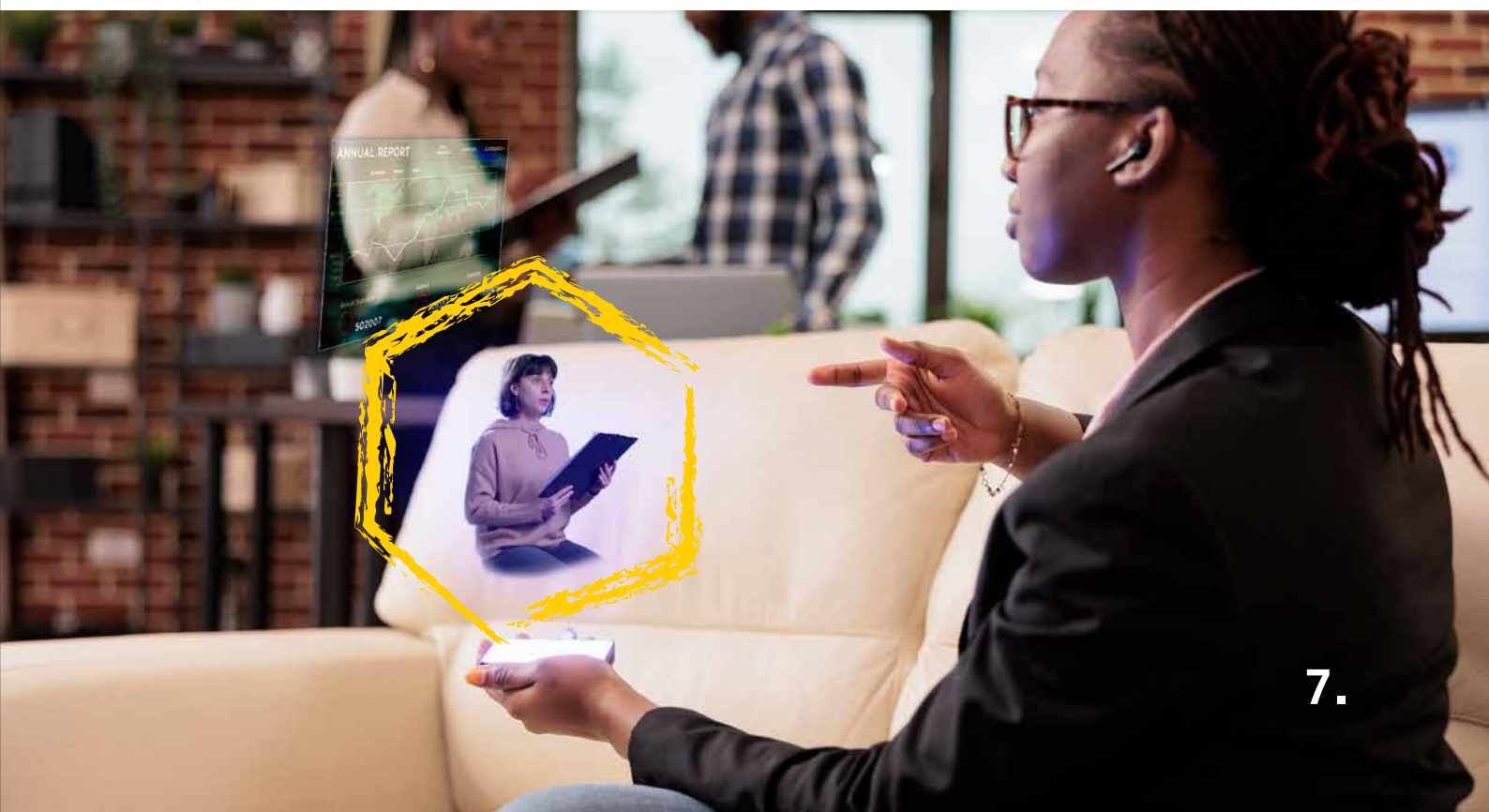
Getting to grips with the acronyms

- *Virtual reality (VR)* is a state of complete immersion in a virtual world. This is achieved by using VR devices to shut out the real world (Gupton and Kiger, 2020).
- *Augmented reality (AR)* refers to a composite experience that merges the real world with superimposed digital elements (Claassen, 2022).
- *Mixed reality (MR)* is achieved when VR and AR are combined with real-world elements (Claassen, 2022).
- *Extended reality (XR)* is a term used to embrace all the technologies that can enhance human senses, such as VR, AR, and MR (Gupton and Kiger, 2020).
- *Immersive technology* refers to a range of technologies, which can be used on an immersive platform that can include VR, AR, and MR, as well as virtual learning and immersive VR (Ummihusna and Zairul, 2022).
- *The metaverse* is popularly understood to describe a three-dimensional virtual world that exists independently of the physical world, and in which VR and MR can come together using a browser or a VR headset (Ma, 2022).
- *Web 3.0* is the term for the decentralised, democratic future of the internet that draws in emerging digital platforms and ownership models, such as non-fungible tokens, cryptocurrencies, and blockchain (Claassen, 2022).
- *Generative artificial intelligence (AI)* is a blanket term used to describe algorithms (e.g., those driving human-like natural language tools, such as ChatGPT) that 'can be used to create new content, including audio, code, images, text, simulations, and videos. Recent breakthroughs in the field have the potential to drastically change the way we approach content creation' (McKinsey and Company, 2023).

Introduction

This white paper explores how the strategic adoption and inclusion in business school curricula of generative artificial intelligence (AI), Web 3.0 technologies, and the emerging and disruptive technologies collectively known as extended reality (XR) – comprising augmented reality (AR), virtual reality (VR), and mixed reality (MR) – can position forward-looking business schools to partner effectively with their clients to prepare adaptive leaders for evolving business ecosystems. This transition requires *adaptive leadership*, which encompasses a leadership approach that emphasises the ability to navigate and lead effectively in complex and rapidly changing environments. It also suggests the capacity to recognise and respond to emerging challenges, to mobilise individuals and organisations towards adaptive solutions, and to promote learning and growth within organisations (Heifetz et al., 2009). Over time, organisations will often have developed established ways of conduct that may not be that easy to change. However, by adding edgy, emerging technologies to a body of diverse and effective physical, classroom-orientated immersive learning experiences, a whole pantheon of powerful new immersive learning experiences can constellate.

Immersive and experiential learning allows for the development of a range of capabilities that equip leaders for now and for the future.



The importance of immersive learning in leadership development

Business schools play a central role in dynamic business ecosystems by cultivating talent and creating the knowledge and skills individuals require to optimise their positions as leaders in business environments. As ecosystem nodes or neutral platforms where theory and practice converge, business schools should act as catalysts for innovation, entrepreneurship, and the development of adaptive leadership capabilities. Business schools work with individuals and organisations responsible for shaping the future of the business world by equipping them to navigate complex challenges, drive economic growth, and foster sustainable practices.

Right now, the companies and leaders looking to business schools for skills development, knowledge creation, and talent cultivation are asking new questions based on a shifting set of challenges in a rapidly changing world. The most important of these questions are outlined below.



Also refer to page 17:

Question 1: How can business schools help to prepare us for the next Black Swan event?



1. How can business schools help to prepare us for the next Black Swan event?

This comes in the wake of the global COVID-19 pandemic and supply chain shocks caused by events, such as the Russian invasion of Ukraine. Coined by Taleb (2007), a Black Swan event is a highly unexpected and rare event that has a severe impact and is often inappropriately rationalised in hindsight. This emerging question implies the need for a development approach that creates leaders who are not only resilient, but 'anti-fragile' (Taleb, 2007), which gives them the ability to thrive and gain strength amidst volatility. The concept links clearly with adaptive leadership.

2. How can business schools help us navigate the blistering speed of technological change?

Digital technology and data fluency have become a central component of the leadership roles at all levels of an organisation, regardless of their functional or professional background. Business schools need to guide transformative initiatives to help their corporate clients and students to maintain competitiveness in the current market, while having the vision and foresight to explore new market opportunities.



3. How can business schools help knowledge workers make sense of and prepare for a generative AI future?

With the advent of generative AI models, managers and leaders face an even more existential threat. As Rutter and Mintz (2023) explained: 'Robots and automation did, in fact, displace millions of members of the industrial working class. Computerization eliminated large swathes of middle management jobs.' There is a very real chance that generative AI developed through large language models like ChatGPT will fundamentally change the future of work for knowledge workers, leaders, and managers.

4. How should business schools adapt their pedagogies to remain relevant to business students?

Learning behaviour is evolving rapidly, hence the growing need for bite-sized learning and microlearning (Soh, 2017). These dynamic learning formats are vital due to shifting learning preferences and the overwhelming amount of information available. Attention spans are shorter and learners expect interactive, practical education through engagement, entertainment, and immediate application of knowledge. They desire measurable progress and autonomy in their learning journeys, while receiving expert guidance.

Immersive learning in the physical and virtual planes has been proven to enhance the acquisition of knowledge and new ideas, and to provide interactive, stimulating, and engaging learning experiences. In essence, the utilisation of immersive technology for experiential learning can expedite the development of adaptive leadership behaviours.

The threat now is to the very knowledge workers who many assumed were invulnerable to technological change. If we fail to instill within our students the advanced skills and expertise that they need in today's rapidly shifting competitive landscape, they too will be losers in the unending contest between technological innovation and education.

(Rutter and Mintz, 2023)

Immersive learning: expanding definitions and evolving practices

What does it entail?



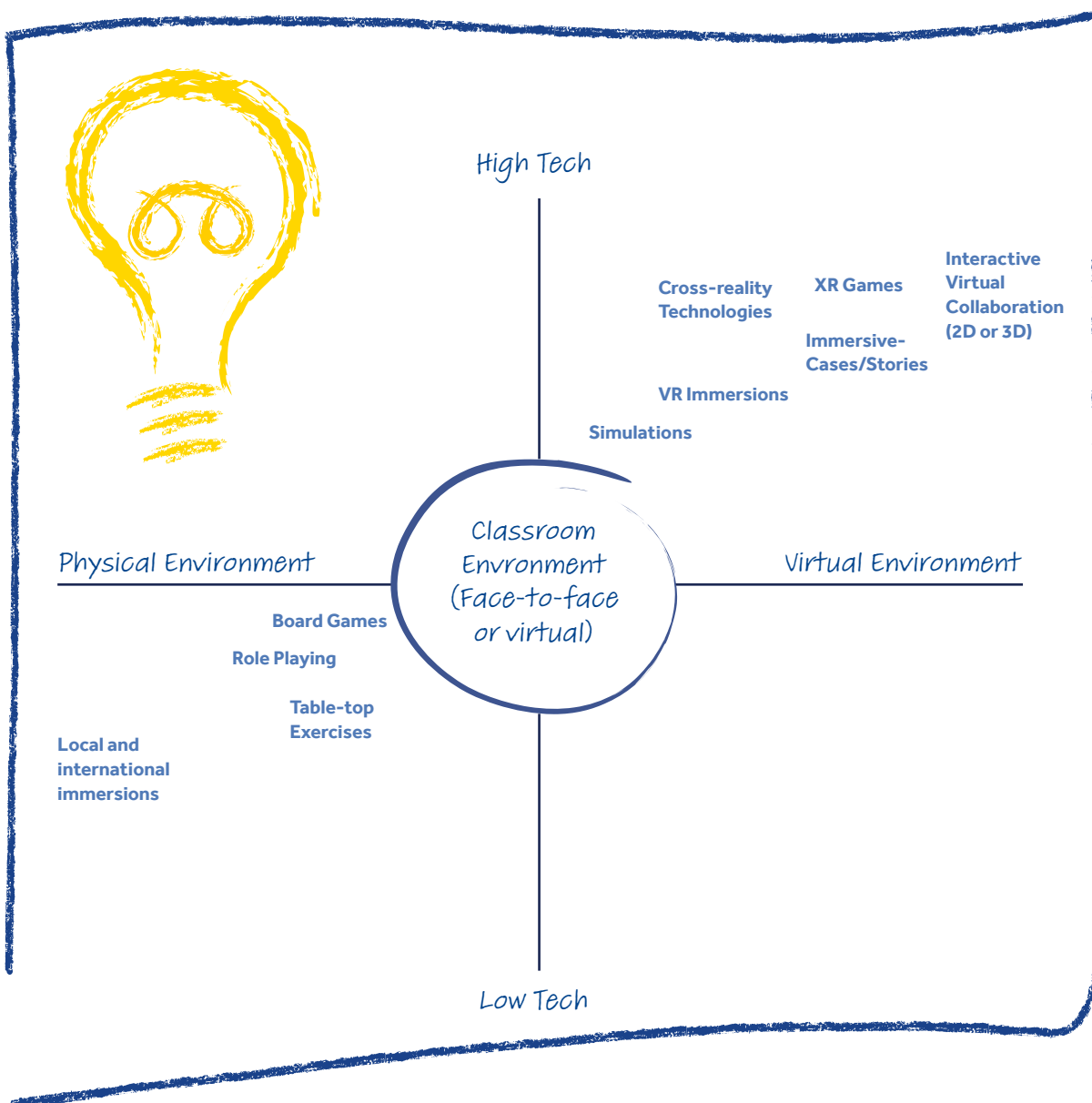
Immersive learning encompasses a diverse range of formats – including physical, classroom, and virtual environments, or a combination of these – that provide learners with rich and interactive educational experiences. Irrespective of its format or setting, the following remains true: 'Immersion is an experience where one is intensely absorbed into something and is inclined to forget the surrounding temporarily' (Yuen et al., 2013).

The aim of creating or designing an immersive experience is to envelop the individual in an auditory, visual, and informative engagement, which exposes them to a world, an environment, a place, a culture, or a philosophy from which they can learn and transform (Sunderland et al., 2020).

Immersive learning in practice – modes of delivery

Experiential learning in the form of international immersions is favoured by MBA programmes as a way to embed and support theory through the act of doing. The notion that students learn from exposure to real-world situations and practical problem-solving has been the essence of experiential learning across doing, reflecting, and drawing conclusions, as well as applying those takeaways to different situations (Guerra-Tamez, 2023). Through new technology tools, such as VR, further immersive learning options open up to educators and students alike (see Figure 1).

Figure 1: Immersive learning modes



Source: Adapted from Backus et al. (2010); Papageorgiou and Kokshagina (2022)

Physical environment immersions

Since the late-1990s, MBA programmes from leading international business schools have included an intensive in-country experience of one to two weeks during which students are exposed to different cultures and business practices, while interacting with business leaders, academics, entrepreneurs, and fellow students from other parts of the world. These immersions hinge on gaining experiences from activities designed to support active learning – from active networking to exposure to different markets and ways of doing business (Rubin, 2019). While MBA students from the United States (US) might opt for emerging markets (e.g., South Africa and Brazil) alongside high-tech achievers (e.g., Israel) as learning destinations, South African students could opt to visit other African countries (e.g., Kenya and Nigeria) or emerging powerhouses (e.g., China and India). Factors, such as the internationalisation of business, coupled with the desire by business schools to ensure relevance and value in a competitive landscape, prove a driving force for in-country immersions.

In addition to the MBA immersions on offer, an international immersion can form part of an Executive Development Programme at Henley Business School Africa. For leaders of regional and multinational companies, the focus is frequently on the development of more global mindsets and cultural intelligence, as well as the exploration of diverse business practices in specific sectors. For instance, local immersions at Henley Business School Africa can take the form of a day spent exploring a particular space and meeting with people who allow students to learn more about their customers and the challenges they face, the challenges and opportunities for entrepreneurs and small businesses in a particular community, or how the history and politics shape the lived reality of people in a given environment. These immersive learning experiences are woven into a programme to support its formal learning outcomes.

Classroom environment immersions

Immersive learning strategies can include several options – from game-based learning and simulations, board games, and 'game-based learning to interactive stories and alternate reality games' (Backus et al., 2010). Many of these experiences can take place in a classroom environment, linked to different programme modules, and include varying degrees of technological enablement and support. Classroom environments can also be described as face-to-face or virtual environments hosted by technologies, such as Zoom or Microsoft Teams.

Virtual environment immersions

Breakthroughs in technologies, such as VR, AR, and MR, make it possible to deploy technologically enabled immersive learning experiences in a way that is scalable (Wang et al., 2021: 539). When it comes to technology-enabled immersive learning, the key lies not merely in the presence of technology or VR, but rather in the participants' cognitive states, which truly make the learning experience immersive (Scoresby and Shelton, 2011). The sense of presence or 'being there' is central, and five core elements work together to achieve a so-called 'presence' (Slater and Wilbur, 1997), namely:

- *Reality* (the illusion of)/vividness;
- *Inclusiveness* (absorbing attention away from the real world);
- *Surrounding* (all-encompassing);
- *Extensiveness* (wide-ranging); and
- *Proprioceptive matching* (alignment between how a user's body position and movement align with the optical VR experience).

Interactive virtual collaboration and immersive cases

Virtual environment immersions include the likes of *interactive virtual collaboration*, which is made possible through social VR applications or metaverses, such as Engage VR, Spatial, and Horizon Workrooms. These applications enable participants to interact as an avatar from either a mobile app, web interface, or an immersive VR device, such as a Meta Quest 2 or HTC Vive. Horizon Workrooms facilitate collaborative meetings in VR with features including a virtual whiteboard and sticky notes, spatial audio, presentation sharing, and working in smaller breakout groups. These features support collaborative activities, such as brainstorming, problem-solving, and collective design.

Meanwhile, *immersive cases* – a concept developed by Henley Business School Africa – links an immersive VR film or experience with a series of short case studies to facilitate discussions about a subject or topic in class. For example, the Henley Business School Africa team recently created a VR experience about the 688km Container Corridor operated by Transnet SOC, the South African rail, port, and pipeline firm. The VR experience follows a container from South Africa's strategic Durban Port to City Deep Container Port in Johannesburg, the country's economic hub. This powerful immersive experience allows viewers to experience the full journey from the perspective of the different Transnet team members who interact with the container and to observe the challenges they encounter. The VR film and its accompanying case studies offer a rich learning experience in subject areas, such as strategy, supply chain, internal collaboration, and customer service. Very few Transnet employees or people outside the Transnet business would have the opportunity to gain such a holistic, integrated, and cross-functional experience. In VR, this end-to-end journey becomes possible and impactful.

Whether being engaged on a physical, classroom or virtual plane, it is clear that psychological absorption and mental engagement are crucial to secure a meaningful immersive learning experience, as they foster the feeling of being truly present in a virtual simulation setting – even if the interaction takes place in XR through AR, VR, or MR (Morgado et al., 2022).





Real-world applications of virtual reality-enabled immersive learning

As immersive technologies evolve, new applications will continue to emerge and acceptance for the immersive uses of VR technology education and other fields will deepen as attitudes become more conducive (Reynard, 2017) and as concrete evidence emerges of its effectiveness. In 2021, professional services firm PwC rolled out a learning programme for new managers across 12 US regions. The programme, which was created to address inclusive leadership, allowed delegates to attend using classroom, online, or VR learning. Following the delivery of the learning programme, PwC conducted a survey to assess the impact, which revealed that by using VR, it was possible to upskill employees faster. According to the PwC (2022) assessment, VR learners can be trained *four times faster* than those receiving in-person instruction – findings showed that VR learners' *confidence levels of the skills they learnt increased by 275%*, while their *emotional connection to the content was 3.75 times stronger*. This outcome is significant, given the cost associated with in-person training (PwC, 2022).

The PwC experience does not stand in isolation. During a 2017 TEDx Talk, Michael Bodekaer Jensen, a multidisciplinary academic, innovator, and entrepreneur, referenced a psychological study that involved 160 Stanford University in the US as well as the Technical University of Denmark. The participants were split into two groups: one to be taught using traditional methods and the other using VR simulations. Both groups were given the same time for learning and all students were tested prior to the learning intervention and after the experiment to gauge the impact of the learning experience. The results revealed a *76% increase in learning effectiveness* when using virtual methods, and a *101% increase* when VR applications were married with coaching and mentoring that were teacher-led (TEDx Talks, 2015).



As educators spend more time understanding and incorporating VR tools in the learning experience, a wealth of opportunities will doubtlessly emerge. While Bodekaer Jensen's focus was on the application of VR in science education, Cristobal Rodolfo Guerra-Tamez from the Universidad de Monterrey in Mexico approached the impact of immersion from an art and design perspective. Like his Danish counterpart, he emphasised the positive impacts of VR-enabled learning, noting that VR experiences 'create a sense of presence and connection to the task at hand', which enhances engagement (Guerra-Tamez, 2023: 4).

Increased levels of engagement, curiosity, emotional connection, speed of learning, and confidence are just some of the benefits of VR-enabled learning observed by researchers, academics, and business school commentators. These benefits are enhanced by the immersive nature of simulated VR environments, which envelop students in the experience, ensuring deeper retention and a longer impact (Govindarajan, 2022).

VR in the school classroom

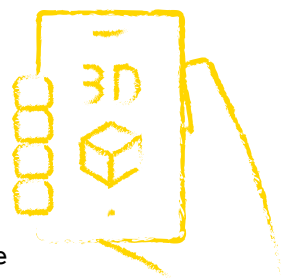
In the *United Kingdom*, Sevenoaks School in the county of Kent utilizes VR in classrooms to teach subjects as diverse as philosophy, history, and art. The director of Innovation at the school, Graeme Lawrie, explained:

The educational applications of immersive technology are endless, from teaching everything about ancient Egypt, to exploring the undersea world in geography, learning a modern language or walking through the human brain. For students, this is by far the most engaging and enjoyable way to learn. It is important for them to engage with this technology and understand how it is used as it will form such a big part of the future. (Education Business, n.d.)

3D avatars, hybrid programmes, and virtual experiences

In *Italy*, Polimi Graduate School of Management followed a similar course, working with an educational technology start-up called Fadpro to facilitate virtual experiences at companies, and what Henley Business School Africa terms 'immersions', to enable students to experience business scenarios in various countries worldwide without having to travel, saving time and money (Murray, 2022).

In *France*, ESSCA School of Management requires its International Business masters' students to create an avatar in the 3D virtual world Second Life and observe 'how other avatars behave. Each student then identifies a potential commercial opportunity for a luxury brand in the metaverse, such as selling digital goods, and creates a virtual prototype' (Murray, 2022).





Advantages of immersive learning

Reflecting on the questions being asked of business schools concerning the shifting circumstances facing their key stakeholders, this section explores how VR-enabled immersive learning can effectively tackle each question.

Question 1: How can business schools help to prepare us for the next Black Swan event?

One of the superpowers of XR is that it allows students to experience scenarios that are often hard, too dangerous, impossible or too resource-intensive to simulate in the classroom (Kavanaugh et al., 2017). The Transnet VR film mentioned earlier in this paper is one such example. In 12 minutes, a student experiences Durban Port from a helicopter, viewing container vessels arriving and being loaded and unloaded. The student virtually sits next to a tugboat master navigating a vessel out to sea, stands on a ship-to-shore crane as it moves containers, and observes straddle carriers being maintained, all while freight rail trains make their way from Durban to Johannesburg. There is no other way to have this depth of experience without harnessing VR, which explains why the immersion has been received with such overwhelming positivity by a broad audience, including clients and students. Through this sort of exposure

to experiences in which participants can be virtually present, the catalogue of experiences a leader draws on in a relatively short space of time will help to equip them to respond to challenges of all shapes and sizes.

If business schools are being asked to develop anti-fragile, adaptive leaders, then being able to expose students to a full back catalogue of Black Swan events – viewed from many and varied perspectives – might go a long way towards achieving this objective.

In a 2021 podcast, Mark Zuckerberg shared: 'I want it so that people have access to the full back catalogue of things in the world at their fingertips at any point. So just like Spotify gave you access to the full back catalogue of music' (Heath and Olson, 2021).



Refer back to page 8:

Question 1: How can business schools help to prepare us for the next Black Swan event?





Question 2: How can business schools help us navigate the blistering speed of technological change?

VR makes it possible to visualise the invisible. Therefore, 'through the use of VR we can provide users with the possibility for visualizing invisible phenomena, which proved to make the learning content more readily comprehensible for students' (Slavova and Mu, 2018, cited in Holly et al., 2021: 117). This ability becomes even more important when considering how digital technology is often so shrouded in jargon that it becomes intangible and quite abstract, regardless of whether one is discussing present uses or future possibilities. However, once a student experiences VR, the conversation around technology shifts from uncertainties to possibilities; thereby elevating the potential of the individual.

Consequently, including immersive technology-enabled experiences combines two key points of impact for business schools:

- *First, the technology allows students to engage in the conversation with a sense of possibility and excitement; and*
- *Second, visualising how different digital technologies interlink, and are developed and deployed in different contexts – from data and data science to blockchain and cryptocurrencies – enables students to master the knowledge and skills needed to lead digital transformation in their functional and leadership domains.*

Question 3:

How can business schools help knowledge workers make sense of and prepare for a generative AI future?

Technology entrepreneur Reid Hoffman cautioned that educators must come to terms with the first instances of generative AI flooding the market. He argued that it is important to appreciate and more completely understand how these technologies are rapidly shaping how people work at the micro and individual level. At the meta-organisational level, it is imperative that business schools work with clients and partners to forward projects and develop a range of scenarios that could prepare people for the future impact of these generative technologies (Hoffman with GPT-4, 2023). The Chat 4 permutation of ChatGPT is already exponentially more capable than Chat 3.5. In no time, Chat 6, 7, or even 10 will become available, and what might these ever-more capable younger siblings bring forth?

The impact and reach of new versions of Chat 4 and AI cannot be known for certain. Therefore, business schools need to prepare their students' minds so they can meet the challenges that lie ahead with mental acuity, resourcefulness, and a sense of possibility (Chamorro-Premuzic, 2023).

According to organisational psychologist Tomas Chamorro-Premuzic (2023), there are three skills that will be in high demand when it comes to engaging with AI, each of which requires behaviours well suited for development through immersive learning. *Table 1 lists the behaviours that are intrinsically associated with, and developed through, immersive learning modalities. Particularly important is the fact that they are not easily replicated, predictable, optimal or even possible for AI.*

If we want to retain an edge over machines, it is advisable that we avoid acting like one. Unless we do this we may find that the real threat is not so much AI automation, but our tendency to automate ourselves, or to turn into automata. (Chamorro-Premuzic, 2023)

Table 1: In-demand skills for an artificial intelligence world

Skills in demand in relation to AI	Behaviours the skill requires
Know what questions to ask (also becoming known as prompt engineering)	Curiosity, creativity, and critical thinking
Cultivate specialist insights and skills not in AI training data	Exploration, experimentation, and discovery
Leverage AI-generated insights to help make decisions and take appropriate actions	Judgement, communication, and leadership

Source: Adapted from Chamorro-Premuzic (2023)

Question 4: How should business schools adapt their pedagogies to remain relevant to business students?



To VR-enabled immersive learning programme designers, it may be tempting to let the pedagogy that underpins effective virtual learning take second place to the many new and often exciting modes of delivery available to educators in the immersive learning space. However, these theoretical underpinnings are no less important. In fact, they may become increasingly significant as more, varied high-tech tools find their way into the learning space, demanding more attention from students and, possibly, adding to their levels of cognitive stress.

The 'science of instruction' must still underline the design goals behind any learning intervention. We must recognise that 'hands-on activities by themselves cannot foster meaningful learning, but cognitively guided active processing can do so' (Mulders et al., 2020: 210). If a teaching approach begins with the desired learning outcome and then critically evaluates the inclusion of VR features in line with these needs, it will be possible to hold true to the pedagogic design goals (Fowler, 2015).

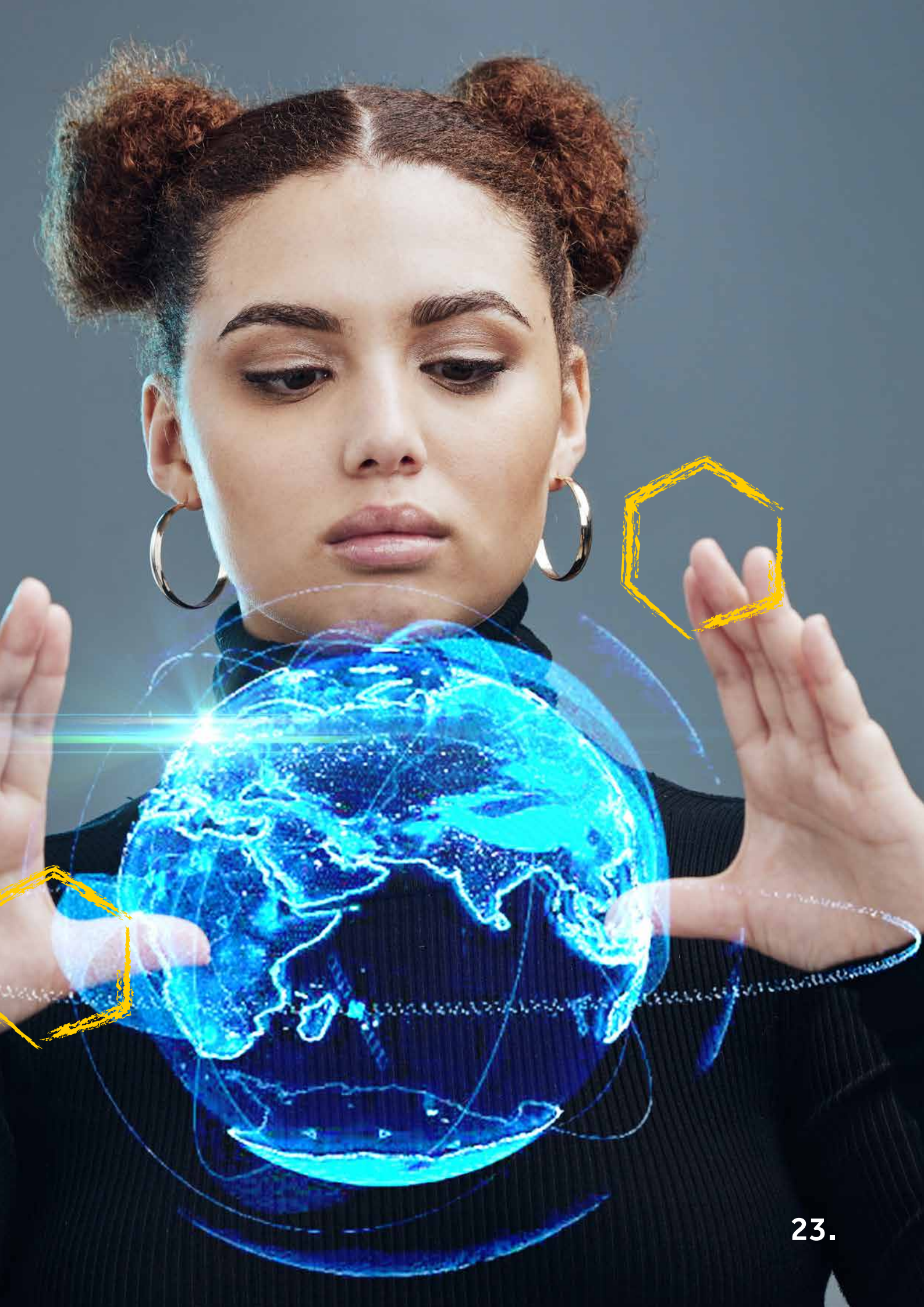
In essence, what is needed from the pedagogy is to ensure that the learning intention always takes precedence over the technology.

Educational psychologist Dr Richard Mayer (2014), in recognition of the potential for cognitive overload amid the level of available extraneous material, suggested several multimedia learning design methods to reduce cognitive load. These design methods are based on the assumption that human beings take in more information when they learn across mediums (e.g., audio, images, and text), rather than relying on the written word alone. Recommendations include:

- **Segmentation:** Allows users to choose when they receive new information so that learners can proceed at their own pace. This will prevent learners from feeling overwhelmed by cognitive stress and subsequent distress, academic burnout, and higher dropout rates (Emersen et al., 2023).
- **Pre-work:** Assists delegates in building a level of understanding about the subject matter, from terms to key concepts, prior to the commencement of the learning intervention.
- **Coherence:** Removes any superfluous information from the learning process (De Back et al., 2021).
- **Generative processing:** This includes using activities that deepen understanding and motivation (De Back et al., 2021) by, for instance, engaging learners in a conversational and personalised tone of voice (Harvard University, 2014).

The skills defined by Chamorro-Premuzic (2023) in Table 1 also provide food for thought for learning in general, and immersive learning in particular, as these are skills that can be included and amplified through a range of immersive learning experiences.





Virtual reality-enabled immersive learning challenges: from logistics to privacy

Unfortunately, learning in a virtual world also poses challenges, such as:

- Issues related to *cost and bandwidth* (Murray, 2022).
- The *physical response* that some individuals experience when using headsets – a feeling of motion sickness is not uncommon (Murray, 2022).
- The *upskill of faculty members* to better navigate a digital world, as these tools increasingly become part of their teaching repertoire (Murray, 2022), which represents a steep learning curve for both educators and institutions.
- On a personal level, *privacy* will continue to warrant attention as VL continues to develop. In 2021, Stanford University launched its first class taught completely in the virtual world. Afterwards, Prof. Jeremy Bailenson and doctoral student Ms Cyan DeVeaux explained that they overcame student concerns around privacy by negotiating with Facebook to allow students to set up a fake account to protect their personal information and privacy while using university-owned Oculus headsets (Kornfein, 2021). Similar privacy concerns were encountered by EGADE Business School in Mexico in 2021, when piloting a full-wall, multi-screen immersive room. The school's

director, Teresa Almaguer, explained that the immersive room allowed for 'vivid experiences of learning and closeness' and an enhanced immersive experience for students and lecturers alike, but with sensor technology feeding back student emotions and expressions to lecturers in real time, students needed to give legal permission to take part (EFMD, 2021).

- On an *operational level, logistical challenges* need to be managed or planned for on a contingency basis. For example, how best to distribute and collect VR headsets, how best to onboard learners to use VR technology effectively to get the most out of the interaction, and the requirement for efficient and fast internet connections (Stern et al., 2021).
- The *cost of investing in the latest headsets and technologies* might explain why VR has gained more traction among business schools and corporate training divisions than a typical high school classroom.

Thoughts on the future of emerging technology and immersive learning

While considering the evolution of immersive learning facilitated by emerging technologies, it would be appropriate to pierce the veil of time and see what tomorrow may hold. Technology in general, and immersive technologies in particular, continue to develop apace. As a result, we may see some of the following technologies make their way into technologically enabled immersive experience in the near future:

- While it is already possible to create *digital twins* of existing spaces, it will become easier to bring high-fidelity digital models into class that can introduce whole new categories of applied learning. This would include the ability and skill to work with data inputs and outputs produced by digital twins linked, for example, to the internet of things. It will also be possible to experiment with digital twins as part of company- and industry-specific innovation and strategy processes (Dzyuba, 2023).
- Furthermore, one might explore the creation of *company, industry or country metaverses* that facilitate the participation and interaction of humans and different kinds of artefacts in very organic and insightful ways.
- Devices, such as the Meta Quest 2, Meta Quest Pro, and HTC Vive XR Elite, already produce exceptional visual fidelity, but are not yet at the point of '*real-life realism*'. In devices where sensors read facial expressions and project these into a virtual environment, avatars look more realistic and convey more nuanced human responses in virtual interpersonal situations.
- *Haptic technology*, which replaces the sense of touch for users, is currently the recipient of significant investment and is estimated to reach a market value of US\$23.8 billion by 2030 (Dzyuba, 2023). The sense of presence, of really occupying a different space, is already one of VR's superpowers and with improvements in haptic technology, the impact for a visual and sensory experience can be truly remarkable (Dzyuba, 2023).
- Web 3.0 technologies, such as non-fungible tokens (more commonly known as NFTs), blockchain, and smart contracts, are already facilitating the transaction and proof of ownership of digital assets, and can safeguard digital identities. In turn, these qualities allow for *interoperability* or the ability to move around the internet with one's digital identity and assets intact.



Today, we can still define what is immersive and relatively easily differentiate whether the immersive experience is real. In the upcoming few years, the quality of immersive experiences is bound to go beyond what we have experienced so far, becoming more sensorial, hyper-realistic and practically indistinguishable from real-life interaction.

(Dzyuba, 2023)

As advanced 5G networks become more prevalent, we can even imagine ourselves 'visiting' another place as a hologram of ourselves or having a hologram of another transported in our space. Who knows? ChatGPT 8 might even build the VR worlds in which adaptive leadership learning experiences for students are facilitated in 2028.

It is for this reason that the space below is purposely left open to accommodate the emergence of the next technology, which becomes pertinent to this white paper – a platform, application or solutions that could well be just days, weeks or months away from bursting onto the scene. When it does, just insert below.

Emerging technology



Artificial intelligence



Biometrics



Internet of things



Augmented/
Virtual reality



Blockchain



Natural language processing



Robotics



Quantum computing



Cyber security

Conclusion

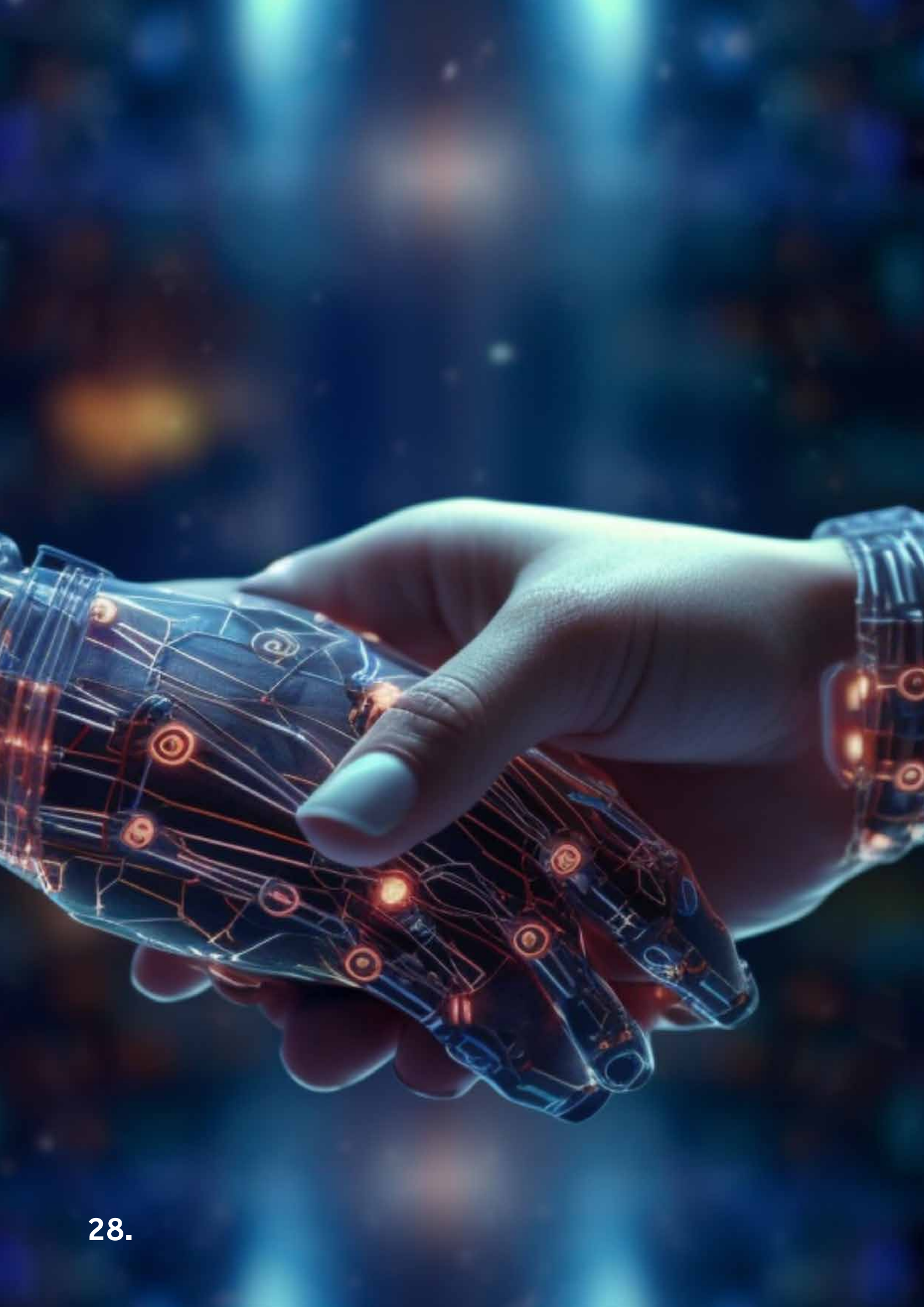
The objective of this white paper was to explore how the strategic adoption and inclusion of emerging and disruptive technologies in business school curricula can position forward-looking business schools to prepare adaptive leaders for evolving business ecosystems. Climate change, demographic shifts, population ageing (paradoxically with a very youthful African population), urbanisation, the rise of digital technologies, and growing inequity – these are just some of the megatrends impacting economic, social, and environmental outcomes in our time and shaping our future (United Nations, 2020). Facing these trends and how they shape business ecosystems constructively and energetically will require adaptive leaders; organisations resourced with the right talent, knowledge, and skills; and business schools that partner effectively to create these capabilities.

The current challenge facing business schools is to prepare students and leaders to effectively use new tools to help them move beyond their limitations. To ensure impact and effectiveness, business schools need to utilise pedagogies that promote experiential and immersive learning to demonstrate to students how best to harness the potential of these new technologies (Rutter and Mintz, 2023).

Currently, the cost of creating VR content, coupled with the outlay needed for immersive headsets and technologies, is high. However, in time, these costs are highly likely to come down and the use of technology with multiple groups will offset the initial financial outlay (Willard, 2022).



The ability to tap into student engagement data – through measuring eye tracking, facial expressions, and head movements – promises a future in which impact can be tracked and learning interventions adapted according to individual needs (Willard, 2022). In the not-too-distant future, emerging technologies will not only augment our humanity, but remind us that the very things that set us apart as humans – empathy, creativity, curiosity, experimentation, and leadership – will be the skills that cement our competitive edge.





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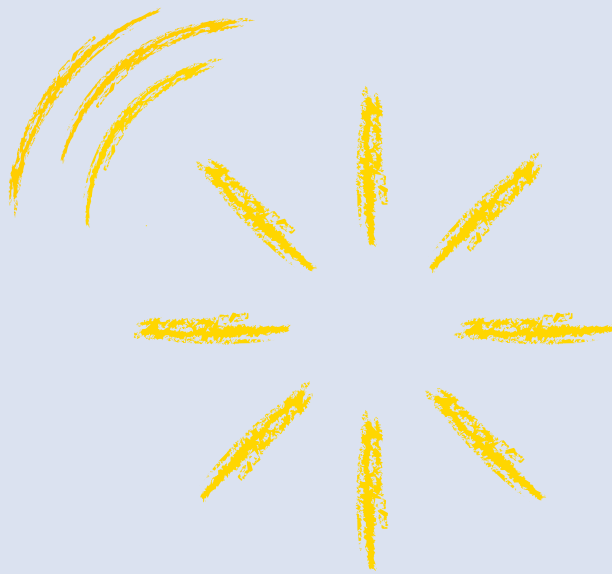
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Emerging technologies and immersive learning



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