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Review Article

The Application Status, Development and Future of Meta-cosmic Technology in Higher Education Under the Background of Digitization

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Abstract

Metaverse technology, integrating VR, AR, AI, and blockchain, is revolutionizing higher education through applications like virtual campuses and professional skill training. This study explores its potential despite challenges such as equipment costs and privacy concerns. This research employs strategic solutions to address these issues and enhances personalized learning, practical training, and global education cooperation. The findings suggest that future research should focus on technological advancements, educational impact assessment, policy formulation, and deeper educational practices to fully leverage metaverse technology's benefits.

Keywords

Meta-Universe Technology, Higher Education, Virtual Reality, Digital Education, Personalized Learning, Technical Challenges, Educational Model Change

1. Foreword

1.1. Brief the Background of the Digital Age

The digital age is an era characterized by the rapid development of information and communication technology, especially the popularization of the Internet and mobile communication technology. The characteristics of this era include seven points: First, the popularization and progress of information technology: computers, smart phones and other smart devices become part of daily life and work, and the development of cloud computing and big data technology makes storage [1], Processing and analyzing large amounts of data becomes easier and more efficient. Second, the increase of network connectivity: the widespread availability of the high-speed Internet gives people access to information and services anytime and anywhere, and the development of the Internet of Things (IoT) technology has further strengthened the connectivity between devices, systems, and people. Third, the rise of the digital economy: the rapid development of emerging businesses such as e-commerce, digital payment and online marketing has changed business models and consumption behaviors. Fourth, the influence of social media: social networking platforms such as Facebook, Twitter and Weibo have become the main channels for people to communicate and share information and opinions, and have also

had a profound impact on society, politics and culture [2]. Fifth, the spread of digital education and distance work: the increasing use of online education platforms and telecommuting tools has become particularly important in particular circumstances, such as during a global health crisis. Sixth, privacy and security issues: With the generation and use of large amounts of data, data privacy and network security have become important issues. Seventh, artificial intelligence and machine learning: The development of a range of advanced technologies is changing industries, from manufacturing to services to health care and education.

The digital age has brought great opportunities, but also raised a series of challenges, such as how to protect personal privacy, how to ensure information security, how to deal with the digital divide, etc., which are the key issues that the current society needs to face and solve.

1.2. Space Technology and Its Potential Applications in Higher Education

Metasmos is a composite technology that integrates virtual reality (VR), augmented reality (AR), artificial intelligence (AI), blockchain and social media, aiming to create an immersive, continuous online, 3D virtual space in which users interact with others, experience and create content. In the field of higher education, the potential applications of meta-universe technology mainly include: first, virtual classrooms and campus: through VR and AR technology, students and teachers meet and interact in a simulated 3D environment, providing a teaching experience close to reality. This environment can simulate real laboratories, lecture halls, and even a complete campus. The second is practice and simulation training: in the fields of engineering, medicine, art and so on, the meta-universe provides a highly simulated simulation environment for students to conduct practical training, such as surgical simulation, engineering design, etc. Third, collaboration and team work: It provides a platform where students and teachers work together to complete projects and research wherever they are. Fourth, personalized learning experience: combined with AI technology, meta-universe provides students with personalized learning paths and experience [3], Adjust the teaching content and difficulty according to their learning habits and progress. Fifth, cross-cultural exchanges and international cooperation: the meta-universe breaks geographical restrictions and promotes exchanges and cooperation between students and teachers of different countries and cultural backgrounds. Sixth, expand the access of educational resources: through the universe, students can visit educational resources around the world, such as visiting virtual museums and listening to lectures by international experts. Seventh, enhance learning motivation and participation: an immersive learning environment can enhance students learning motivation and participation, especially in the teaching of complex or abstract concepts.

The application of metatechnology in higher education has the potential to dramatically change teaching methods and learning experiences to become more interactive, flexible and personalized. However, this wide range of applications also needs to address the challenges of complex technical, ethical, and equal access to educational resources.

1.3. The Main Research Questions, Objectives and Structures

What is the current application of the universe technology in higher education? Explore the specific application cases of the current universe technology in teaching, learning and campus management. Second, how do these technologies affect the quality of education and the learning experience? Analyze the impact of meta-universe technology on educational content delivery, student engagement, and learning effectiveness. Third, under the digital background, what is the development trend and future potential of metatechnology? To predict the development trend of technology and explore its future application potential in the field of higher education. Fourth, what challenges need to be solved in the field of higher education when facing the application of metaverse technology? Identify barriers and challenges in technology implementation, such as: technology infrastructure, funding, ethical and privacy issues.

The purpose of the research is to evaluate the current situation: to comprehensively evaluate the application status of meta-universe technology in higher education, and to understand its impact and effect. The second is potential and trend analysis: analyze the future potential development and trends of these technologies. Third, the solution: to face the challenges, put forward feasible solutions and suggestions.

The structure level of the paper, The first is to brief the research background, the main research problems and the structure of the paper; Second, an overview of metachoic technology, Define metacological technology and its key components, To analyze the digital background, Discuss how digital trends affect higher education and technology development; Moreover, the application status quo analysis, Discuss the specific application cases of universe technology in higher education and carry out impact assessment, Analyze the impact of these technologies on educational quality and learning experience; Then comes an analysis of future trends and potential, Explore future technology trends and potential application scenarios, And the challenges and solutions faced; Finally, by summarizing the study findings, Provide for future research directions. The overall structure aims to comprehensively and deeply explore the application of meta-universe technology in higher education, including its advantages, challenges and future development direction, so as to provide a clear and systematic research perspective for readers and subsequent researchers.

2. Overview of Metacverse Technology

2.1. The Meta-Universe and Its Key Technologies (Such as VR, AR, AI, etc.)

The universe is an integrated, virtual shared space composed of physical reality and a digital virtual world interwoven and connected mainly through the Internet. The concept originated from science fiction, but it gradually became possible as the technology progressed. The core features of the meta-universe include continuity (always online and evolving), real-time (providing instant interaction and experience), unlimited (scalable, free of physical space constraints), user-generated content (content that allows users to create and manage virtual worlds), and high interactivity and immersion. The realization of the metauniverse relies on a number of key technologies:

One is virtual reality (VR): providing an immersive experience that makes users feel like they are in a completely virtual environment. Through a head-mounted display (HMD) and handheld controller, VR simulates the users visual, auditory and even tactile experience in three-dimensional space. The second is augmented reality (AR): stacking virtual information in the real world [4], Unlike VR, AR technology overrides computer-generated images into real-world views through devices such as smartphones, tablets or special glasses. Third, artificial intelligence (AI): it provides intelligent decision-making and interaction for the meta-universe. AI is used for natural language processing, virtual assistant, personalized experience, content recommendation, etc., to make the interaction of the meta-universe more rich and intelligent. Fourth, blockchain and cryptocurrencies: ensuring the security and ownership of digital assets, and transactions in the universe. Blockchain provides a decentralized, transparent, and secure way to manage and trade virtual goods and services. Fifth, 3D modeling and simulation technology: used to create and maintain virtual environments and objects in the meta-universe, the technology allows for an accurate and detailed representation of the real world or build a new virtual world. Sixth, network technology and cloud computing: support the transmission and processing of large amounts of data to ensure real-time interaction and continuous online in the meta-universe.

Through the integration of the above set of technologies, the metaspace can provide a new digital space in which users can communicate, entertain, work and learn.

2.2. The Development Process of Meta-Universe Technology

The development process of metasmos technology is a history from the early science fiction concept to the realization of modern technology. This process is mainly divided into several key stages in the following table, such as Table 1.

Table 1. Development history of Metacverse Technology.

The stage	Phase (time) background	Background brief
stage Ⅰ	The 20th century: Science fiction literature (1984/1992)	In 1984, William Gibson first introduced the concept of "Cyber Space" (Cyberspace) in his novel The Neurorover, describing a virtual reality connected through a computer network. In 1992, Neil Stephenson used the word "the universe" (Metaverse) in his novel "Avalanche" [5], Describes a large-scale online environment constructed by virtual reality technology.
stage Ⅱ	1990s and early 2000s: Early virtual worlds and games	Multiple early virtual worlds and online games, such as Second Life (Second Life), provide a platform for users to create and explore virtual space, although with many technical limitations [6].
phase III	The 2010s: Development of virtual reality (VR) and augmented reality (AR) technologies	Witnessing significant advances in VR and AR technologies, such as the launch of Oculus Rift, HTC Vive, and Google Glass, a range of technologies that provide the hardware foundation for higher quality and immersive virtual environments.
Phase IV	Artificial intelligence (AI) and blockchain Technology fusion	With the development of AI and blockchain technology, the universe began to integrate more complex functions, such as AI-driven interactions, cryptocurrencies, and NFT (non-homogenized tokens) in virtual worlds.
The fifth stage	Technology fusion and metacosmic concepts The popularity of	With the maturity of technology and large technology companies, such as: Facebook (renamed Meta), Microsoft, Google and apple to the universe investment and research, the concept of the universe gradually to the mainstream, these companies not only in hardware (such as VR / AR equipment), also in the software, platform development and cloud computing technology, to support more rich and highly interactive virtual experience.

The stage	Phase (time) background	Background brief
The sixth stage	Towards the future of development	The universe is in a stage of rapid development, with various new technologies and applications emerging, such as applications in education, entertainment, social networking and business. In the future, with the further development and improvement of technology, it is expected that the metasome will become more popular and may become an important part of Peoples Daily life and work.

In general, the development of metatechnology is an interdisciplinary and gradual process, involving the integration and innovation of many technological fields, from hardware to software, from networks to artificial intelligence.

3. Digital Background Analysis

3.1. The Impact of the Current Digital Trends on Higher Education

The current digital trend has had a profound impact on higher education, which is mainly reflected in the following aspects:

One is the rise of online and hybrid learning: digitization enables online and hybrid learning, and students receive courses through online platforms. The popularity of this approach, especially during the global health crisis, reinforces the importance and feasibility of distance learning.

The second is the change of teaching methods: the introduction of digital tools and resources (such as interactive software, online courses, virtual laboratories, etc.) has changed the traditional teaching and learning methods. Teachers use multimedia and interactive technology to improve students participation and learning effect.

The third is personalized and adaptive learning: the application of AI and data analysis enables students to customize personalized learning paths according to students learning progress and style. This adaptive learning method can help to improve learning efficiency when dealing with students different learning needs.

Fourth, the expansion and acquisition of resources: digitization makes higher education resources (such as lectures, research materials, expert explanations, etc.) more accessible, breaking the limitations of geographical and physical resources, and students and teachers can easily access educational resources and research materials around the world.

Fifth, new ways of academic research: digital technologies, such as big data analysis and cloud computing, provide new tools and methods for academic research, accelerate the research process and improve the accuracy and scope of research. At the same time, researchers can more easily cooperate with and share discoveries through online platforms.

Sixth, the efficiency of administrative management: higher education institutions through the introduction of digital management systems (such as student information systems, online registration and management platforms, etc.), improve the efficiency and transparency of administrative work.

Despite the benefits of digitization, there are some challenges in the future, such as the digital divide, network security and data privacy, and quality assurance of online learning. In general, the digital trend has greatly promoted the modernization and globalization of higher education, but it also requires the education system to adapt to the new technologies and methods as soon as possible, and to think about solving the various challenges it brings.

3.2. Digital Background Promotes the Development and Application of Meta-Cosmic Technology

In the context of digital age, the development and application of metauniverse technology has been significantly promoted, mainly in the following aspects: First, the progress of high-speed Internet and computing technology: the popularization of high-speed broadband and wireless network provides necessary network infrastructure for metauniverse, enabling large-scale and high-speed data transmission; the development of cloud computing and edge computing provides powerful data processing capability, and supports the real-time rendering and operation of complex environment and interaction in metauniverse. The second is the popularity of smart devices and sensing technologies: the popularity of smart phones, wearable devices and various sensors provides convenient access methods and rich user interaction means for the metacom. This series of devices can collect and process user data and provide a more personalized and immersive metasome experience. Third, the maturity of virtual reality (VR) and augmented reality (AR) technologies: the progress of VR and AR technologies directly promotes the improvement of visual and sensory experience of the meacuniverse, which provides users with an immersive virtual environment and is a key part of the metacom experience. Fourth, the application of artificial intelligence: on the one hand, the application of AI technology in the meta-universe (such as natural language processing, machine learning, virtual assistant, etc.) provides intelligent support for user interaction, on the other hand, it is also in the meta-universeCapacity creation, environmental simulation and personalized experience play an important

role. Fifth, digital economy and new business models: the application of technologies such as digital currency, block-chain and NFT in the meta-universe provides the basis for the transaction of virtual goods and services. In addition, these technologies also help to ensure the security of trans-actions and the ownership of users assets. Sixth, the digital transformation of society and culture: With the popularity of social media and digital content consumption, people are increasingly accustomed to socialize and entertainment in digital space, laying the foundation for social interaction and cultural experience in the meta-universe. Seventh, the digi-talization of education and training: in the field of education and training, digitalization has promoted the development of distance learning and virtual training, providing the practical basis and demand background for the exploration of the meta-universe in the application of education.

In the context of digitalization, the development of network technology, the popularization of hardware, the application of AI, the rise of digital economy and the change of society and culture [7], Jointly promote the development and application of metasmos technology. These factors not only provide technical support for the meta-universe, but also create a demand and market environment for its wide application.

4. The Application Status of the Metaverse in Higher Education

4.1. Application Examples of the Current Meta-Universe Technology in Higher Education

At present, the application of the universe technology in higher education is still in its initial stage, but there have been some innovative examples. The following table Table 2 are several representative application cases:

Table 2. Application cases (examples) of the universe technology in the field of higher education.

Case number	Case name and brief description	Brief description of specific application
Case 1	Virtual Campus and Classroom: Some higher education institutions have set up virtual campuses on the universe platform	By using VR technology, students explore, learn, and socialize in a fully simulated campus environment. Virtual classrooms allow students and teachers to interact in an immersive 3D environment, providing a new form of distance learning and learning.
Case 2	Professional skills training: In the fields of medi-cine, engineering and art, metacross technology is used for simulation training of professional skills	Medical students perform the surgical exercises in a virtual envi-ronment [8], Engineering students test their designs in a virtual lab. This training approach provides a low-risk and cost-effective prac-tical learning environment.
Case 3	Collaboration and project work: The universe platform promotes collaboration among students	For those geographically dispersed teams, students work together in a virtual space to complete course projects and research work. This collaborative approach breaks through the traditional physical and geographical limitations and increases the flexibility of team work.
Case 4	Cultural exchanges and international cooperation: It provides a sharing platform for students from different cultures and countries to promote the expansion of international vision and cultural exchanges	Students participating in international conferences, seminars, and cultural activities in the virtual space enhances the experience of global education.
Case 5	Innovating teaching methods and expanding ed-ucational resources: Meta verse technology ena-bles teachers to adopt more innovative and inter-active teaching methods in the teaching process	History is taught through virtual scenarios of historical events, and geography is taught through virtual travel around the world; in the meta-verse, students access richer and more diverse educational resources such as virtual libraries, museum visits, and expert lec-tures.

These examples of applications presented in the table above Table 2 show that it has great potential in higher education to provide a richer, interactive and personalized learning expe-rience. However, the widespread implementation of these applications also faces challenges in technology, funding, acceptability, and educational quality assurance. With the further development and improvement of technology, these challenges will be gradually solved, and the application of metasology technology in higher education will be further expanded and deepened.

4.2. The Impact of Current Application on Teaching and Learning

Meta universe technology application in higher education has a significant impact on teaching and learning, specific can be discussed from the following aspects: first, enhance the learning experience: the universe provides an immersive learning environment, enables the students to more vivid and intuitive understanding of complex concepts and theories, this kind of interactivity and immersion can increase the students interest in learning and motivation. Second, promote collaboration and communication: Through the universe platform, students and teachers communicate and cooperate beyond geographical restrictions, which is particularly conducive to distance education, international project cooperation and cross-cultural communication. Third, provide personalized and adaptive learning: In combination with artificial intelligence technology, the meta-universe provides personalized learning paths and resources according to students learning progress and style, which helps to meet the specific needs of different students. Fourth, improve practice and simulation training: Meta-universe technology is particularly suitable for areas that require high practice, such as medicine, engineering and art, and through simulation training, students gain valuable practical experience in a safe and low-cost environment. Fifth, expand access to educational resources: Students access a wider range of educational resources through the universe, such as virtual museums, international lectures and online libraries, which help expand their knowledge and horizons. Sixth, teaching methods Changes: Teachers use the meta-universe platform to adopt more innovative teaching methods, such as improving the teaching effect through gamified learning, scenario simulation and virtual experiments [9]. Seventh, improvements in evaluation and feedback: The meta-cosmic environment collects data on students performance during the learning process, provides more accurate and real-time evaluation and feedback, and helps students and teachers adjust their learning and teaching strategies in a timely manner. Eighth, Challenges and potential risks: Despite the many advantages, there are also challenges for applying metaverse technology in education, such as technology accessibility, digital divide, students health and well-being (e. g., eye fatigue or sports sickness caused by prolonged use of VR devices), and data privacy and security issues.

In short, the application of the universe technology in higher education has great potential to improve the quality of teaching and learning experience, but it also needs to pay attention to and solve the accompanying challenges and risks. With the continuous progress of technology and further educational practice, these problems are expected to be solved effectively.

5. Challenges and Opportunities of Application of Universe Technology in Higher Education

5.1. Technical, Ethical and Practical Challenges Facing the Application of Meta-Cosmic Technology in Higher Education

The application of meta-cosmic technology in higher education brings many innovative educational opportunities, but it also faces a series of challenges, including technical, ethical and practical issues:

Technical challenges: First, the accessibility and cost of hardware equipment: high-quality VR / AR equipment is often expensive, which limits the popularization of metacom technology in education. Second, network bandwidth and stability: The meta-universe requires a high-speed and stable Internet connection, but not all regions can provide adequate network support. Third, technical compatibility and standardization: there are compatibility problems between different meta-universe platforms and devices, and the lack of unified technical standards will lead to increased difficulty in implementation. Fourth, data processing and storage: The meta-universe generates large amounts of data and requires effective data processing and storage solutions.

Ethical challenges: First, privacy protection: the collection and use of students personal data requires strict compliance with privacy protection laws and regulations. Second, the digital divide: differences in accessibility to technology and equipment can exacerbate social inequality, especially for economically weaker student groups. Third, content review and management: how to effectively manage and review educational content to prevent the dissemination of misinformation and inappropriate content. Fourth, students well-being: Long-term use of VR / AR devices will have an impact on students visual acuity and mental health.

Practical challenges: First, teacher training and adaptation: teachers need to receive relevant training in order to effectively use the meta-universe technology for teaching. Second, curriculum design and implementation: designing and implementing curriculum content suitable for metaverse environments requires additional time and resources. Third, student engagement and interaction: Maintaining student engagement and effective interaction in a virtual environment can be a challenge. Fourth, evaluation and certification: how to conduct effective learning assessment and certification in a metacosmic environment.

In short, the application of metatechnology in higher education needs to overcome the series of technical, ethical and operational challenges, which require interdisciplinary cooperation, support of policy makers, innovation of technology developers, and the active participation of the educational community.

5.2. Thinking on Strategies to Solve Challenges

To address the technical, ethical and operational challenges of the application of meta-cosmic technology in higher education, the following strategies are taken into consideration:

The strategy to solve the technical challenges: first, increase the accessibility and affordability of equipment: reduce the cost of access to the necessary hardware for students and teachers through subsidy policies from the government or educational institutions. Second, improve network infrastructure: Partnerships and government investment will help improve the quality and stability of campus networks. Third, promote technology standardization: cooperate with industry partners to formulate and promote unified technical standards. Fourth, strengthen data processing and storage solutions: invest in more advanced cloud computing services and data centers.

Strategies to address ethical challenges: First, ensure privacy and data security: develop strict data protection policies, and use encryption and security technologies to protect user information. The second is to narrow the digital divide: providing financial assistance and technical support to ensure that all students can access the Universe platform. Third, content management and review: establish an effective content management system and review mechanism to ensure the accuracy and suitability of educational content. Fourth, pay attention to students well-being: monitor the time and way students use the meta-universe, and provide guidance and support to avoid negative effects.

Strategies to solve practical challenges: first, teacher training and development: providing teachers with training and professional development opportunities on universe technology and teaching methods. Second, innovative and flexible curriculum design: develop curriculum content and teaching methods adapted to the meta-cosmic environment, and encourage innovation and experimentation. Third, to enhance students participation and interaction: to design more interactive and participatory learning activities to improve students participation in the meta-cosmic environment. Fourth, adaptive assessment methods: develop new assessment tools and methods to accurately assess students learning outcomes in the meta-cosmic environment.

Through the implementation of these strategies, we can effectively solve the challenges of the application of meta-technology in higher education, and thus better use this technology to promote the development and innovation of education.

6. Future Development Trend

6.1. The Future Development Direction of Metasmos Technology in Higher Education

The future development of universe technology in higher education will follow in the following main directions:

One is broader integration and application: meta-universe technology will be used in more disciplines and courses in the future, especially in areas requiring highly interactive and practical operations, such as medicine, engineering, design and art.

Second, improved technology and better user experience: with the progress of technology, the interactive experience in the meta-universe will become more real and smooth, in the future, higher quality VR / AR devices will be introduced to the market at a lower cost, and the user interface and interaction mode will become more intuitive and comfortable.

Third, personalized and adaptive teaching: Using artificial intelligence and data analysis, metaverse will be able to provide a more personalized learning experience in the future, and the system can adjust the teaching content and difficulty according to students learning speed, style and interests.

Fourth, collaboration and globalization education: The universe will become a powerful tool to promote international cooperation and cultural exchanges in the future, with students and teachers crossing geographical boundaries to collaborate and communicate with peers around the world.

Fifth, virtual internship and vocational training: yuan universe will be able to provide virtual vocational internship and training opportunities in the future, so that students can gain experience in the actual working environment before graduation.

Sixth, expand educational resources and access: through the meta-universe, higher education institutions can provide richer educational resources for distance students, including virtual laboratories, libraries, lectures and seminars.

Seventh, emphasize life skills and social interaction: It is not only a platform for academic learning, but also a place for students to develop life skills such as communication, teamwork and problem solving.

In general, the future application of the meta-cosmic technology in higher education will be more advanced and extensive, and will also continue to evolve to meet the diverse needs and challenges of education. With the development of technology and the deepening of educational practice, the meta-universe has the potential to greatly change the face of higher education.

6.2. Changes in the Education Mode Caused by the New Technology

New technology, especially the universe technology, the future will bring significant change of higher education mode, these changes mainly reflected in the following aspects: first, from the traditional classroom to the virtual space: education will no longer be limited to the physical classroom, but extended to the virtual space, provide more flexible and accessible learning environment, it is not only convenient for distance education, can also create a unique, immersive learning experience. Second, the strengthening of personalized and adaptive learning: with the help of artificial intelligence and big data analysis, educational content and learning paths will

be more personalized, and can be customized according to students abilities, interests and learning progress. Third, the improvement of collaborative and interactive learning: the new technologies will promote more collaborative and interactive learning styles, with students working with students from around the world in virtual environments to participate in projects and discussions. Fourth, innovation in practical and simulation training: In the fields of medicine, engineering, science and so on, simulation and virtual experiments will become an important part of teaching, providing safe and cost-effective practical learning opportunities. Fifth, globalization and diverse educational experiences: New technologies will make education more global, easier for students to access and understand different cultures and perspectives, and promote the cultivation of a global perspective. Sixth, the support for continuous learning and lifelong education:

The application of new technologies will support lifelong learning, providing flexible learning arrangements and rich online resources to meet changing career needs and personal development goals. Seventh, changes in assessment and certification methods: Assessment methods will be more diverse and integrated, evaluating not only academic knowledge, but also practical skills, creativity, and teamwork. Eighth, impact on equality in education: While new technologies help improve educational accessibility, they may also intensify the digital divide, so special attention is needed to universal access and equal access to technology.

This series of changes triggered by new technologies have not only changed the way they teach and learn, but also affect the structure and management of the education system. With the progress of technology and the deepening of educational practice, this series of changes will continue to evolve, bringing new challenges and opportunities to the field of education.

7. Conclusion

After studying the application status quo, development and future of meta-universe technology in higher education under the background of digitalization, the following main findings can be obtained:

Application status: The application of the universe technology in higher education is still in the preliminary stage [10], But has shown great potential, especially in providing an immersive learning experience, promoting distance learning, enhancing student engagement, and supporting professional skills training.

Technology drivers: The development of high-speed Internet, VR / AR, AI, blockchain and other technologies is the key driving force for the application of metaspace in the field of higher education [10].

Reform of educational mode: Meta-universe technology promotes the transformation from traditional classroom to virtual space, strengthens personalized and adaptive learning, promotes collaborative and interactive learning, and brings innovation to practice and simulation training.

Challenges: technical challenges (such as e. g., equipment costs, network infrastructure), ethical challenges (e. g., privacy protection, digital divide), and practical challenges (e. g., teacher training, curriculum design) are the main obstacles to the widespread application of metasome technology in education.

Future development trend: In the future, universe technology will be more widely used in higher education, technology will be more mature, user experience will be more optimized, and more attention will be paid to personalized learning, global educational experience and innovative evaluation methods.

Strategies and suggestions: In order to overcome the challenges and fully leverage the potential of meta-universe technology, comprehensive strategies, including technology improvement, policy support, teacher training and curriculum innovation, are needed.

Combined, the above findings show that meta-cosmic technology has great influence and broad prospects in higher education, but to realize its potential, technological development, ethical issues and practical operational challenges need to be considered comprehensively. With the continuous progress of technology and the deepening of educational practice, it will become an important development direction in the field of higher education in the future.

Abbreviations

IoT	Internet of Things
VR	Virtual Reality
AR	Augmented Reality
AI	Artificial Intelligence
HMD	Head Mounted Display

Author Contributions

Zhang Yue is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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Biography

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