

INTEGRATION OF METAVERSE TECHNOLOGY INTO THE POLICE ACADEMY EDUCATION AND TRAINING SYSTEM

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ABSTRACT

This study explores the potential of integrating the metaverse into police colleges for education and training purposes. The metaverse, considered a futuristic educational platform, is investigated for its viability. The study employs a two-pronged approach involving a review of 13 relevant studies and a survey to gather qualitative data on metaverse usage. The findings reveal a strong willingness to embrace the metaverse, dissatisfaction with current police education programs, inadequate preparedness of cadets after training, and various potential applications of the metaverse in police education, sports training, military training, professional policing, and data management. Recommendations include metaverse adoption in police institutions, thorough risk assessment, and comprehensive training for educators.

KEYWORDS

Education, Metavers, Training, Police.

1. INTRODUCTION

In the context of a rapidly evolving technological landscape, education continues to be a pivotal form of social capital, leading to the continuous refinement of educational systems for optimal learning experiences. A notable technological framework gaining prominence in education is the metaverse. This system is believed to empower educators to model effective teaching practices and create more immersive learning methods. This implies that the metaverse not only improves student learning experiences but also enhances educator readiness. Essentially, the metaverse is a creative, virtual reality platform that facilitates immersive three-dimensional interactivity, offering users an embodied virtual reality experience, particularly beneficial in the educational domain.

In the realm of education, particularly in police training institutions, the metaverse can be harnessed to foster optimal educational outcomes. This technology enables the simulation of realistic scenarios pertinent to police training, such as criminal research, legal and traffic studies, communication skills, and security operations, resulting in more effective results. Additionally, the metaverse has the potential to enhance military and sports training, as well as various police professional applications, thereby allowing students to leverage interactive learning to develop their skills. However, it's important to note that while the metaverse offers tremendous benefits, there might be areas of vulnerability and inefficiency, often leading to its limited use due to security and privacy concerns.

The UAE government has outlined a comprehensive strategy to revolutionize its governance over the next five decades. Through initiatives like the UAE AI Strategy for 2031 and the UAE

Centennial 2071 plan, the country aims to utilize cutting-edge technologies to optimize government operations. The UAE AI Strategy aims to achieve goals such as enhancing government performance, implementing an efficient digital system, and creating a valuable market. The UAE Centennial 2071 plan, spanning from 2021 to 2071, envisions a forward-looking government, excellent education, a diversified economy, and a harmonious society as its pillars, with the goal of positioning the UAE as a global leader. The introduction of the metaverse into police training institutions aligns with this national strategy, aiming to enhance these pillars and contribute to the broader objectives of the UAE Centennial 2071 plan.

2. RELATED WORK

Scholarly Exploration of the Metaverse in Education: Numerous scholars have explored the metaverse's potential in education, particularly its feasibility and benefits. While the metaverse's potential in education has been hypothesized, its practicality and long-term integration remain uncertain. However, there is a lack of research on applying the metaverse in policing institutions, specifically for police education and training. Kristjánsson (2022) emphasizes the importance of practicality and wisdom (phronesis) in police education, inspired by Aristotle's concepts, suggesting the metaverse could create realistic scenarios to promote both practical experience and knowledge.

Stakeholder Perspectives: Students' perspectives on the metaverse's integration into education have been studied. Talan and Kalinkara (2022) conducted research on computer engineering students and found that although they hadn't used the metaverse, they were eager to apply it across various disciplines. Students believed the metaverse could enhance learning by providing engaging, interactive, and immersive experiences, boosting motivation and understanding. However, students also highlighted potential drawbacks such as distraction and disconnection from real life.

Metaverse's Role in the Post-Pandemic Era: The COVID-19 pandemic disrupted education, prompting the need for virtual learning solutions. Suh and Ahn (2022) discuss how the metaverse improved interactivity in virtual learning environments, particularly benefiting elementary school learners who readily embraced the technology. This adaptation suggests that the metaverse's integration in policing institutions, where practical training is key, could be seamless and effective.

Application Possibilities of the Metaverse: Researchers envision vast application possibilities for the metaverse in education. Kye et al. (2021) suggest that diverse metaverse types open limitless educational opportunities, ranging from medical simulations to enhancing creativity and social interaction. The technology's potential to simulate practical scenarios and develop innovative approaches could significantly benefit police education and training.

Risks and Challenges: Despite its potential benefits, the metaverse poses risks and challenges. Tlili et al. (2022) warn about evolving security vulnerabilities due to the metaverse's continuous design changes, raising concerns about privacy breaches. Unclear specifications and incomplete structures in e-learning systems based on the metaverse (Dahan et al., 2022) may result in compromised educational experiences and data leakage. Educator unpreparedness is another challenge, as educators might lack the necessary skills to effectively use the metaverse for teaching (Hirsh-Pasek et al., 2022). This unpreparedness could lead to stagnation and misinformation in education, especially in sensitive fields like police education.

Overall, the research highlights the potential benefits and challenges of integrating the metaverse into education, including policing institutions. It emphasizes the need for cautious adoption, addressing security concerns, and adequately preparing educators for effective implementation.

3. PROBLEM OF THE STUDY

Police education and training globally and in the UAE face challenges related to curriculum, legal issues, recruitment, and delivery. Imbalances between practical skills and knowledge development result in officers lacking applicable knowledge. Evolving crime requires immersive learning, while assumptions about policing hinder effective learning. The absence of a reality-based learning platform and legal protection further compounds these challenges. Introducing the metaverse is crucial to bridge these gaps.

3.1. Importance of the Study

Effective policing is essential for societal harmony, and inadequate training can lead to human rights abuses and crime escalation. The UAE faces advanced criminal networks, necessitating improved training. The study addresses these challenges by proposing metaverse-based solutions. Given the COVID-19 pandemic's impact, technology-driven education is pivotal. This study contributes to knowledge about metaverse application beyond high schools and emphasizes its role in record management.

3.2. Objectives of the Study

The research aims to accomplish three main objectives:

1. Establish the metaverse's applicability in enhancing police education.
2. Assess its role in improving sports and military training.
3. Determine its impact on practical applications and post-graduation paths.

These objectives will guide the study, incorporating existing research findings and new data collection to discuss how the metaverse can enhance police training and education.

3.3. Explanation on the Metaverse

The metaverse is a 3D virtual world that is designed to replicate the real world. It is a place where people can interact with each other, as well as with digital objects and environments. It's a concept that envisions a collective virtual universe, a shared online space where users can interact with each other and digital objects, similar to how we interact in the real world.

In the metaverse, people can create digital representations of themselves called avatars and explore different virtual worlds. These worlds can be realistic simulations of real-world places or entirely fictional landscapes. People can access these worlds using virtual reality (VR) headsets, augmented reality (AR) devices, or traditional computers.

Key characteristics of the metaverse include:

- **Interconnectivity:** The metaverse is a network of interconnected virtual spaces where users can move freely and interact with each other and digital objects.
- **Immersive Experience:** The metaverse is designed to provide users with a highly immersive experience that feels like they are actually present in the virtual world. This is

achieved through the use of advanced technologies such as virtual reality (VR) and augmented reality (AR). VR headsets allow users to completely immerse themselves in the virtual world, while AR devices overlay digital content onto the real world.

- **Shared Environment:** Multiple users can inhabit the same virtual space at the same time. This shared environment allows for social interactions, collaboration, and even economic activities.
- **Digital Economy:** The metaverse has the potential to support its own digital economy, where users can buy, sell, and trade virtual goods and services using digital currencies or tokens.
- **User-Created Content:** Users can often create and contribute to the content of the metaverse. This might include designing virtual spaces, creating objects, and even programming interactive experiences.
- **Variety of Applications:** The metaverse has applications beyond entertainment. It can be used for education, remote work, socializing, training, healthcare simulations, art creation, and more.

The term "metaverse" gained popularity from science fiction literature, where it was used to describe a collective virtual shared space. It has since become a concept that various technology companies and developers are working on realizing. While the idea of a fully-fledged metaverse is still in development, many elements of it are already present in online multiplayer games, virtual reality experiences, social networking platforms, and other digital environments. Companies are actively exploring ways to create more interconnected and immersive online spaces, contributing to the evolution of the metaverse concept.

4. METHODOLOGY

The study employs both primary and secondary research methodologies to investigate the applicability of the metaverse in police education and training. Secondary research involves a thorough review of existing literature on the metaverse and current educational practices in policing institutions. This approach aims to identify strengths, weaknesses, and opportunities of the metaverse and inform the research design.

Primary research consists of surveys conducted virtually in the Abu Dhabi Police College, Federal Police School in Sharjah, and Ministry of Interior, targeting 165 participants collectively. Online questionnaires will be used to assess police preparedness after training, satisfaction with current programs, willingness to adopt the metaverse, and information continuity. This data will gauge institutions' readiness for metaverse integration and identify gaps.

The primary data collected is qualitative, including case studies from other educational institutions utilizing the metaverse. This data provides insights into successes, challenges, and satisfaction levels within existing education systems. Analysis involves organizing the data, generating initial codes, and developing themes related to the metaverse's role in enhancing police education and training.

5. SYSTEM OVERVIEW

5.1. Applicability of the Metaverse in Police Training Institutions

This is perhaps the most critical area when it comes to introducing the metaverse in police education and training institutions. According to studies and surveys, the metaverse's virtual

nature can be applied to five main areas of police education and training, as summarized in the table below:

No.	Parameter	Summarized Description
1	Education	Course books will be taken, then programmed to introduce the scenarios in them into this technology so that the students can simulate the reality set forth in the theoretical books. This will enhance learner interactivity.
2	Sports Training	The cadets body mass will be placed in a system that will tracks their strengths and weaknesses during their performance in the physical fitness test, and to help them develop their body muscles and enhance their fitness levels they will be able to see the realistic and actual training paradigms and routines which were formulated in the metaverse.
3	Military Training	The framework creates realistic classes that would be used to develop cadets' military skills. These areas include weapons classes, firing range shooting, special police training, and overall military training like tactical positioning. The metaverse will create real scenarios that allow cadets to train effectively into learning about the policy of using force.
4	Practical Applications	In order for the students to comprehend the actual situation, the training on the metaverse will be conducted in the police college for a period of three weeks to replicate what is happening in the real police stations then they will head there to continue their work for the remaining period of time.
5	Data and Record Management	A system that analyzes and records a student's data from competency and ability tests, as well as comprehensive tests for all courses from the first semester to the end of the sixth semester, to determine their prior strengths and weaknesses, academic performance, and training outcomes. This information is then used to determine the best career path for them after graduation.

Existing studies and survey responses indicate that the metaverse has the potential to be extensively used in police training institutions. These application areas include education, sports training, military training, police professional applications, and data and record management. On the education front, cadets will be able to improve their skills by coming into contact with the theoretical crimes they solved and attempting to solve them practically; for example, disturbing crimes are the main focus of our country because they are seen as a big deal, so future generations of officers should be aware of and be able to handle those crimes with ease because they do not occur frequently in our country. And in the sports sector, The cadet's body mass will be placed in the system, the cadet's strengths and weaknesses will be tracked, and realistic and actual training paradigms and routines will be formulated in the metaverse to help them develop their body muscles and enhance their fitness levels. Thirdly, for military training, realistic classes will be created that will be used to develop cadets' military skills. These areas of development include weapons classes, firing range shooting, special police training, and overall military training like tactical positioning. The metaverse will create real-world scenarios that allow cadets to train effectively by learning about the policy of using force and knowing when to use their weapon or rely on their combat skills. Fourth, a new training method will be introduced in the police college to help cadets understand the reality of police work. This will involve a three-week period of classes in the metaverse, where cadets will be able to experience what it is like to be a police officer, including using the equipment and systems they will be using, and how to respond to crimes and violations of the law. Finally, the data and recording system, which is a system that

analyzes and records the data of each student from the competency and ability tests and comprehensive tests for the courses they will be taking in the foundation semester, will link the strengths and weaknesses he had with the results he achieved at the end of the sixth semester in overall and formulate an equation that will sum and calculate all of the marks and grades, results, and skills to get a final result that will show the best path of career the cadet should take after graduation, and this will reduce the time and cost for the Ministry of Interior to distribute every graduate to a certain department for 18 months and then assign them to the departments later on. Consequently, cadets will be adeptly prepared for future challenges. Besides, the policing institutions will be ready to propel the country into the future. As mentioned, the metaverse's most significant feature is its ability to create realistic scenarios that can be used to improve education and training. This can help reduce the time and money spent on determining the best career path for graduating cadets. Given that this technological framework uses various advanced modes of technology (forms of artificial intelligence like virtual reality and augmented reality, brain computer interfaces, and various forms of data analytics), it is highly conceivable that it can be successfully used to achieve desirable results in the abovementioned areas. Overall, the application of this framework will foster the UAE Centennial 2071 plan by satisfying the pillars of a future-focused government and provision of excellent education.

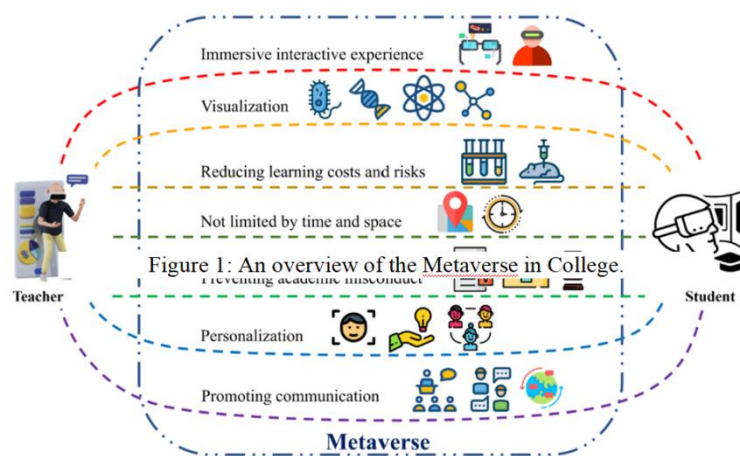
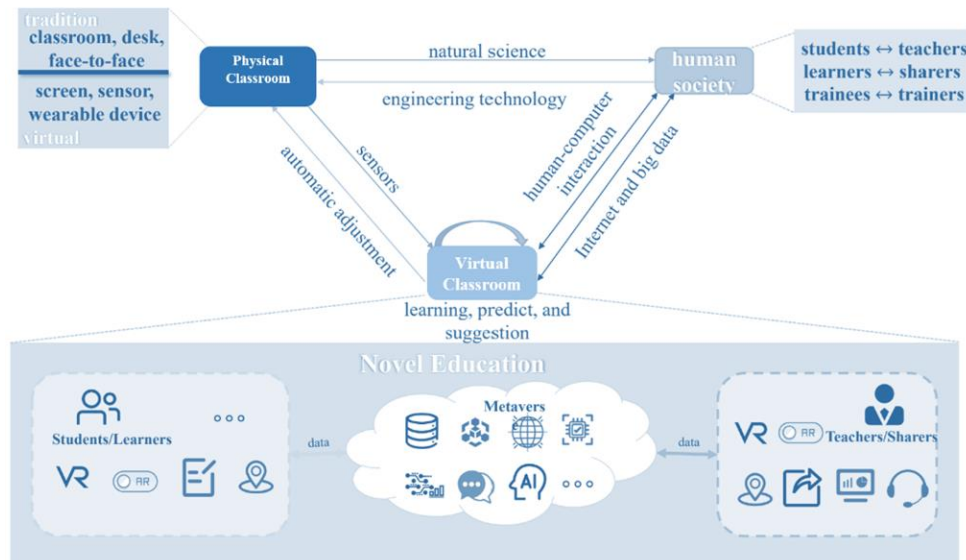


Figure 1: An overview of the Metaverse in College.

5.2. Enhanced Policing in the Metaverse: A Glimpse into Future Law Enforcement Training

By 2040, law enforcement training will have undergone a radical transformation thanks to the seamless integration of the metaverse into police education. Police institutions around the world will have adopted the metaverse framework to revolutionize their training programs, resulting in a highly skilled and adaptable force that is well-equipped to meet the complex challenges of the modern world.

Scene 1: Virtual Crime Scenes

New police recruits at the Global Police Training Institute (GPTI) are no longer confined to traditional classroom lectures. They step into the metaverse to investigate virtual crime scenes, where they interact with realistic simulations of criminal incidents. Trainees analyze evidence, interview virtual witnesses, and collaborate with peers from around the world. This immersive learning experience enhances their critical thinking, problem-solving, and teamwork skills.

Scene 2: Tactical Training

In the metaverse, cadets undergo cutting-edge tactical training that replicates real-world scenarios. Police officers in the metaverse must make quick decisions about how to use force and de-escalation techniques in response to augmented reality threats. This training sharpens their decision-making skills and prepares them for dynamic and high-stress situations.

Scene 3: Cybercrime Investigations

Detectives specializing in cybercrime enter a virtual realm where they dissect digital evidence and trace the steps of cybercriminals. Through their brain-computer interfaces, they navigate complex networks, decrypt encrypted communications, and track down virtual culprits. The metaverse's ability to simulate intricate cyber scenarios equips detectives with the expertise to combat the ever-evolving landscape of cybercrime.

Scene 4: Career Path Guidance

Towards the end of their training, cadets receive personalized career path recommendations through the metaverse's data and record management system. This system evaluates their strengths, weaknesses, and performance metrics, mapping them to various specialized roles within law enforcement. Graduates are assigned to departments where their skills are optimally utilized, reducing the need for extensive trial-and-error placements.

Scene 5: International Collaboration

The metaverse breaks down geographical barriers, allowing police agencies from different countries to collaborate seamlessly. International crime syndicates are met with a united global force, as officers from diverse backgrounds join forces in virtual environments to share knowledge, tactics, and strategies. This collaboration strengthens the worldwide fight against transnational crime.

To conclude that, integration of the metaverse into police education has transformed law enforcement into a proactive, agile, and highly skilled entity. Graduates of police training programs emerge not only with the ability to use technology effectively, but also with a strong

understanding of the ethical principles that guide police work. As the world faces new challenges, this futuristic approach to police education ensures that officers are prepared to protect and serve their communities effectively, ushering in a safer and more secure tomorrow.

6. CONCLUSION:

This paper offers several recommendations based on the discussions presented. First, it suggests the adoption of the metaverse in policing institutions as it aligns with the UAE Strategy for AI and the UAE Centennial 2071 plan. The gradual introduction of the metaverse is advised to prevent overwhelming users. Secondly, a thorough risk assessment should accompany the adoption to safeguard users and sensitive information, considering potential security challenges associated with the evolving technology and the sensitive nature of policing.

The third recommendation emphasizes the comprehensive training of educators in metaverse components and usability to ensure effective education. Educators' proficiency is vital for the successful integration of the metaverse in training and learning environments. These recommendations are particularly relevant given the current state of the metaverse and ongoing research.

In summary, the metaverse presents a technological revolution in education, particularly for practical-based fields like police training. It enables realistic scenario creation through virtual reality, enhancing skill development across various areas. Aligned with UAE strategies, the metaverse contributes to the Centennial 2071 plan's goals. However, challenges include its nascent state, unclear applications, and privacy vulnerabilities, requiring cautious adoption.

To address these challenges, a systematic adoption approach is advised, supported by rigorous risk assessment and educator training. The metaverse's potential to transform policing and the nation at large is substantial, but careful implementation is key to realizing these benefits.

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