

Sexual Crimes in Metaverse: New Frontiers in Forensic Psychology and Legal Challenges

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Abstract—Metaverse introduces novel challenges in the domain of criminal behavior, particularly concerning sexual abuse. Its defining characteristics—heightened presence, embodiment, anonymity, and decentralization—amplify risks and differentiate it from traditional digital platforms. Unlike conventional internet environments, Metaverse simulates real-life experiences with immersive realism, intensifying cybercrimes' psychological impact and necessitating a paradigm shift in legal and regulatory approaches. While digital threats such as the dissemination of pornographic material have long been recognized, behaviors like sexual harassment and assault have historically been addressed primarily within physical contexts. However, in Metaverse, the boundaries between virtual and physical harm are increasingly blurred, as illustrated by the first widely reported case of virtual rape in January 2024, involving the avatar of a young girl assaulted by other users in an immersive gaming environment. This paper, through a literature review, critically examines current psychological and legal perspectives on sexual abuse within the Metaverse. By synthesizing recent empirical findings and documented case reports, the results of this work highlight how immersive environments may exacerbate the psychological toll of virtual sexual victimization, hypothesizing the emergence of trauma responses comparable to those associated with physical assaults. Despite the severity of such experience, significant gaps remain in empirical research concerning the psychological consequences of sexual abuse in immersive virtual environments. This underscores the need for further investigation to better understand victim experiences and inform the development of effective therapeutic and protective measures. Moreover, current legal frameworks are ill-equipped to address offenses occurring in the Metaverse, constrained by definitional ambiguities and jurisdictional limitations. This paper identifies critical regulatory gaps and emphasizes the need for legal standards explicitly designed for immersive virtual contexts. By integrating insights from psychology, law, and technology, it advocates interdisciplinary approaches to redefine strategies for safeguarding users and addressing the complex ethical, psychological, and legal challenges posed by Metaverse.

Keywords—Metaverse, Sexual Abuse, Forensic Psychology, Law

I. THE ADVENT OF METAVERSE

The COVID-19 pandemic in 2020 led to a rapid transformation in modes of social interaction, with a significant shift from in-person relationships to those mediated by increasingly advanced digital platforms [1]. Tools such as Zoom enabled the maintenance of pre-existing social ties and supported crucial areas of civil life, including education [2], work [3], and healthcare [4], thereby preventing a total

paralysis of society and fostering a significant transformation of habits. This shift laid the groundwork for a further evolution toward the Metaverse, the new frontier of digital interaction.

The term "Metaverse", coined by Neal Stephenson in his 1992 novel *Snow Crash* [5], describes a virtual reality (VR) space that utilizes the internet and augmented reality (AR) through avatars and software agents [6]. Defining the Metaverse unambiguously is challenging due to continuous infrastructural innovations; however, it can fundamentally be described as "*a three-dimensional online environment in which users represented by avatars interact with each other in virtual spaces decoupled from the real physical world*" [7]. According to Gartner, by 2026, 25% of people will spend at least an hour every day in the Metaverse [8]. Nonetheless, the Metaverse is still in its infancy, and numerous technical, social, and ethical challenges must be overcome before it can unlock its full potential, potential that includes both positive and negative aspects [9]. Considering those social interactions in the Metaverse mirror those in the real world, it is plausible to expect that certain social problems from physical life will reoccur in this new context. The introduction of revolutionary technologies like the Metaverse, while rich in potential, tends to overlook implications related to public safety and crime, allowing criminal phenomena to arise until such issues are adequately addressed [10].

In their recent systematic literature review, [11] identified 30 distinct crimes in the Metaverse, categorizing them into five main groups. The first category encompasses fraud, forgery, and financial crimes, representing about one-third of the analyzed cases. These include attacks on blockchain technologies, identity theft, and tax evasion schemes. The second category consists of crimes against property, such as using data obtained in the Metaverse to plan real-world thefts, coordinating attacks against physical infrastructures via avatars, and invasion of virtual spaces. Facilitated by the immersive nature of the Metaverse, sexual crimes constitute the third category, including child grooming, sexual assault, non-consensual sexual image offenses, doxing, child sexual abuse material, and virtual trafficking of people for sexual exploitation. Technologies such as haptic suits make these acts more realistic for perpetrators and more traumatic for victims [12]. The fourth category includes crimes against individuals, including cyber-physical attacks, amplified online hate crimes, or incitement to self-harm. Finally, the fifth category includes offenses such as conspiracy to commit crimes. In the study,



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experts classified crimes in the Metaverse according to four dimensions: severity of harm, frequency, ease of execution, and ease in developing/implementing measures to prevent, detect, or render the offense unprofitable. According to [11], sexual offenders (e.g., child grooming and sexual assault) and crimes against people (e.g., harassment and hate crime) were ranked among the ten highest-risk crimes across all dimensions, while property crimes received relatively low risk scores. Notably, five of the ten most hazardous crimes were sexual in nature.

The concerns arising from these recent findings are consistent with prior studies, which have highlighted the growing issue of violence and harassment on social media platforms and within VR environments, particularly in the gaming community [13]. Survey data reveal that as early as 2018, 49% of women reported experiencing at least one instance of sexual harassment in the VR platform [14]. Furthermore, by 2021, users were reportedly exposed to incidents of sexual harassment approximately every seven minutes [15]. Taken together, these results underscore the increasing prevalence of criminal behaviors, particularly of a sexual nature, occurring within the Metaverse, and they reflect mounting concern over the safety and well-being of users in immersive digital environments.

II. SEXUAL CRIMES: FROM PHYSICAL TO VIRTUAL WORLD

Historically, sexual crimes like rape and sexual assault were considered exclusive to real-life interactions. With the advent of the Internet, however, they soon moved into the online world as well, such as harassment on social networks [16,17], forums [18], online gaming platforms [19–21], and virtual worlds [22].

However, the characteristics of the Metaverse make it a conducive environment for these offenses, potentially more severe than in less immersive online contexts [23]. For instance, the use of avatars provides a degree of anonymity, reducing the likelihood of identifying offenders [24,25] and making users more inclined toward hostile behaviors [26]. Another factor facilitating criminal evasion is decentralization—the absence of a central authority [27,28]. Due to decentralization and cloud servers located in different jurisdictions, the laws applicable where the server is based can influence investigations involving the Metaverse [9]. Compared to crimes perpetrated in two-dimensional environments, the higher level of immersion in the Metaverse leads to a greater risk of harassment [12,21,23,29], likely increasing both the benefits for perpetrators and the harm to victims [12], ultimately causing emotional distress to the victims [30].

Unfortunately, these concerns have quickly moved beyond mere hypotheses. To date, numerous cases involving researchers and Metaverse users have reported instances of sexual violence, dissemination of explicit content, and hate speech. The lack of moderation allows the proliferation of toxic behaviors, normalizing sexual harassment—especially toward avatars with a female appearance. In May 2022, researchers from Sum of Us were struck by how easily they encountered episodes of harassment [31]. For example, after only one hour on Meta's Horizon Worlds platform, a researcher

reported being dragged into a private party where she was sexually assaulted by a user who kept telling her to turn around so that other users outside could watch, all while they passed around a bottle of vodka. The act was non-consensual; the researcher described the experience as disorienting and confusing. Psychotherapist Nina Jane Patel, who was conducting research on the same platform, reported experiencing a virtual gang rape after only sixty seconds of logging in [32]. She recounted the "*surreal nightmare*" of being aggressively groped [33] and verbally and sexually harassed, becoming the target of lewd comments due to the female appearance of her avatar.

In 2022, a thirty-year-old man from South Korea was sentenced to four years in prison for producing and storing material involving the sexual exploitation of minors lured in the Metaverse [34]. The man induced underage victims to create and send images and videos of their bodies after meeting them on the Korean Metaverse platform Zepeto, where he used an avatar to misrepresent his age and offered digital gifts to groom the children. In addition to the prison sentence, he was required to complete eighty hours of a treatment program for sex offenders and was barred from any work related to adolescents and disabled individuals for seven years.

In response to repeated reports of harassment and abuse, Horizon Worlds, beyond existing safety features that allow users to block, mute, and report other players, has implemented additional measures. These include a "Safe Zone", a protective bubble that can be activated around avatars when they feel threatened, preventing others from touching, speaking, or interacting with them; and a "Personal Boundary" function, an invisible virtual barrier with a radius of two feet around the avatar, activated by default against non-follower users [35]. This imposes an interpersonal distance of four feet (1.2 meters), causing forward movements of users who reach the personal boundary to be halted.

Despite these precautions, in January 2024, a sixteen-year-old reported having experienced a rape from a group of online strangers while embodying her avatar in a virtual environment leading to the first investigation by British police into a case of virtual sexual assault [36]. Victims equipped with VR headsets do not suffer any visible injuries since there is no physical assault, but authorities highlight that they experience psychological and emotional trauma similar to that resulting from real-world sexual assault, given the fully immersive nature of VR experiences.

Although many traditional crimes can already occur on the web as we know it today, the uniqueness of the Metaverse lies in its three-dimensional immersive environment, which offers a heightened sense of presence and a multisensory reality perceived through headsets, headphones, and haptic devices such as vests [37] and gloves [38,39]. The incorporation of haptic devices, combined with audiovisual elements, enhances user embodiment by creating a more comprehensive connection between the physical body and the virtual avatar. This fusion of technology and perception leads the brain to attribute a physical nature to the experience, treating it as real, even when knowing that it is not, so that people tend to respond realistically to situations and events portrayed within an

immersive VR [40]. As a result, immersion and identification with the avatar are heightened when the experience can evoke emotions in the user [41]. For this reason, it has been used for years in therapeutic settings [42,43]. However, while these immersive technologies offer more vivid and realistic experiences, they also have the potential to make assaults more traumatic, as users have the feeling that events in VR could be real. For example, victims of sexual abuse in virtual environments have described the emotional harm as "*very real*" [44], demonstrating the profound psychological impact these experiences can have.

Currently, specific research analyzing in detail the psychological and social consequences of sexual abuse (including rape) occurring in the Metaverse is lacking, and it remains unclear whether such events can generate the same traumatic effects as those occurring in physical reality. Existing literature suggests that sexual abuse in the Metaverse could provoke psychophysiological consequences analogous to those in the real world, with some studies even hypothesizing that 3D technology could be more dangerous due to its immersiveness. According to [12], the immersive nature of VR can cause trauma experienced in a virtual environment to transfer into real life, potentially having a greater impact than abuses occurring in the physical world. This raises fundamental questions about how to manage crimes that occur in virtual worlds and whether the trauma resulting from such virtual experiences can affect the real lives of victims.

This evident lack of empirical studies represents a significant research gap in our understanding of the psychological impact of virtual sexual abuse. While theoretical insights and initial observations point to the potential severity of trauma within immersive environments, the absence of systematic investigations leaves many questions unanswered. Without robust data, it is difficult to assess the extent to which virtual violations mirror or diverge from real-world abuse in terms of psychological consequences, coping mechanisms, and long-term effects. Addressing this gap is crucial for developing effective prevention and intervention strategies and informing legal and ethical frameworks that can adequately respond to offenses committed within the Metaverse.

III. THE POINT OF VIEW OF JURISPRUDENCE

Sexual violence is a globally pervasive issue, yet legal responses to it vary widely across cultural and national contexts. Understanding how different countries conceptualize and regulate sexual offenses reveals both shared principles and deep-rooted divergences. For example, in some Eastern jurisdictions, the legal definition of sexual violence remains narrow, requiring evidence of physical resistance or focusing exclusively on penile-vaginal intercourse, thereby excluding many other forms of non-consensual acts. However, recent decades have seen substantial legal reforms driven by both international human rights standards and domestic advocacy. In India, for example, the Criminal Law (Amendment) Act of 2013 significantly expanded the legal definition of rape following the 2012 Delhi gang rape case, incorporating non-penile penetration and criminalizing acts involving coercion, threats, or exploitation of vulnerability. In Japan and South

Korea, major revisions of the Penal Codes between 2020 and 2023 marked a shift toward a consent-based model, replacing the prior requirement for physical resistance with a focus on the absence of voluntary agreement.

In most Western legal systems, sexual violence is classified as a crime against the person, aimed at safeguarding individual liberty, sexual self-determination, and physical and psychological integrity. While variations exist among different jurisdictions, several essential elements are commonly shared. These include sexual acts committed without the victim's consent and other behaviors that violate sexual integrity, the absence of consent, and the use of coercion or threats, moving away from antiquated notions that required proof of force or victim resistance.

In certain countries, any physical contact of a sexual nature can constitute the crime of sexual violence, irrespective of penetration or completion of a sexual act. For instance, in the United Kingdom, under the Sexual Offences Act 2003, the concept of sexual assault encompasses any intentional sexual touching of another person without their consent, even if it does not involve penetration. While the Act primarily addresses physical interactions, non-physical sexual offenses, such as those committed online, may be prosecuted under separate legislation.

In the United States, although specific laws vary across states, sexual assault is generally regulated through both federal and state legislation, defining it as a crime involving non-consensual sexual acts committed through force, threat, coercion, or exploitation of the victim's incapacity to give consent. At the federal level, 18 U.S.C. § 2241 (Aggravated Sexual Abuse) criminalizes the use of force or threats to compel another person to engage in sexual acts, while 18 U.S.C. § 2242 addresses sexual abuse involving victims incapable of consenting due to mental or physical incapacity. Federal law also recognizes a broad spectrum of sexual violence, including offenses committed without direct physical contact, such as those involving coercion or exploitation.

Similarly, in Italy, sexual violence is classified as a crime against the person, committed by anyone who, through violence, threats, or abuse of authority, forces someone to perform or undergo sexual acts (Article 609 bis of the Penal Code). Furthermore, the law stipulates the punishability of those who induce a person to perform or undergo sexual acts by exploiting a condition of physical or psychological inferiority or through deception (Article 609 bis, paragraph 2, of the Penal Code). However, a crucial issue for the punishability of online behaviors concerns the interpretation of the term "*sexual acts*", which could be construed as requiring direct physical contact between the aggressor and the victim. Neither Article 609 bis nor Article 609 ter, which relates to aggravating circumstances, explicitly references crimes committed via electronic means.

To address this legislative gap, the Italian Supreme Court (Corte di Cassazione) issued ruling n. 19033/2013, clarifying that in cases of sexual violence committed through telematic means, the absence of physical contact does not constitute a mitigating circumstance. Jurisprudence has already recognized that acts of sexual violence can occur without physical contact,

such as when a person is coerced into sending sexually explicit images under the threat of publishing compromising content (Cass. Pen., Section III, judgment no. 17509/2018; Cass. Pen., Section III, judgment no. 25266/2020). However, as of now, it must be excluded that a sexual assault carried out via an avatar in a virtual space fulfills the elements of the crime outlined in Article 609 bis of the Penal Code since the sexual act does not occur in the real world and thus escapes the grasp of criminal law.

Also in the United States, addressing sexual violence through digital or virtual means presents a critical legal challenge. In cases involving coercion to produce or share sexually explicit materials online, the absence of physical contact does not necessarily preclude liability, as such acts can fall under broader categories of sexual exploitation or abuse. However, the application of existing laws to scenarios involving avatars or virtual interactions in the Metaverse remains ambiguous. U.S. jurisprudence has yet to definitively determine whether acts of virtual sexual violence meet the criteria established under federal or state sexual assault statutes. This uncertainty highlights a significant legislative gap in regulating such behaviors in immersive digital environments. For example, under the current legal framework, virtual sexual assault may not be considered a crime in states like California, as there is no "*real*" physical touching or contact. The California Penal Code, for instance, defines sexual battery as involving physical touching: "*Any person who touches an intimate part of another person, if the touching is against the will of the person touched, and is for the specific purpose of sexual arousal, sexual gratification, or sexual abuse, is guilty of misdemeanor sexual battery*" (CAL. PENAL CODE § 243.4(e)(1)). This limitation underscores the need for legislative and judicial developments to address the unique challenges posed by virtual and digital environments.

However, regulating sexual abuse, and in general, criminal behavior, within the Metaverse poses exceptionally complex challenges due to the unique characteristics of virtual environments. Some authors have proposed divergent approaches to address these issues. One perspective advocates for treating criminal behaviors in the Metaverse, such as sexual abuse, with the same severity as offenses committed in the physical world, emphasizing that the psychological harm experienced by victims can be comparable [45]. This may suggest adapting existing legal frameworks to the Metaverse, conceptualizing it as an extension of traditional social interactions. Conversely, some researchers argue that conventional legal systems, designed for the physical world, are insufficient to address the intricacies of virtual environments, which are marked by dematerialization and a lack of clearly defined boundaries. They propose the development of a specialized regulatory framework tailored to the Metaverse. This includes the creation of a "Metaverse Constitution," a dedicated Metaverse Criminal Law, and a judiciary system specific to virtual contexts [46,47].

All of these positions open a series of controversies mainly linked to the very nature of the Metaverse. The first difficulty lies in proving an abuse that occurred in a virtual environment. The technical infrastructure upon which the Metaverse is built makes it complicated to identify the individuals involved,

especially considering the anonymity. Identifying the culprit, therefore, requires sophisticated investigative tools and the cooperation of private entities managing these spaces, which introduces additional legal challenges related to jurisdiction and data protection.

Some authors [45] point out that the legal approach to sexually related behaviors in virtual environments depends on the level of immersion experienced by the victim and the perpetrator's awareness of that immersion. For instance, touching the victim's chest in a two-dimensional virtual environment may not be classified as sexual assault in the strict sense but may instead be considered sexual harassment. However, in a three-dimensional immersive setting, the same act could be deemed sexual assault, with its severity depending on the specific circumstances and the perpetrator's criminal intent (*mens rea*). Moreover, attention should be given to the nature and severity of the harm experienced by the victim in the physical world.

In addition, virtual sexual harassment or abuse, such as in online or VR environments, is often underestimated, primarily due to the absence of physical contact and the assumption that simply disconnecting could be a sufficient defense against the continuation of the non-consensual experience. There is, therefore, a risk that virtual sexual abuses are perceived as less severe than those committed in the physical world. As observed by [48], this phenomenon manifests similarly when discussing the effects of VR. On one hand, the tangible benefits—such as using VR for therapeutic or educational purposes—are emphasized, attributing to it the capacity to effectively simulate "real" experiences. On the other hand, negative consequences, such as sexual abuses, tend to be downplayed and treated as "unreal" or less impactful experiences. This approach not only risks diminishing the perception of the harm suffered by victims but also discourages reporting, leading to a systematic underestimation of the phenomenon.

The tendency to discredit the testimonies of victims of virtual sexual abuse reflects a broader cultural and legal resistance to acknowledging the reality of the damage caused by such experiences. If positive experiences in the Metaverse are consistently valued for their ability to replicate authentic human interactions, it is inconsistent to consider negative experiences as unrealistic or less impactful. Consequently, for the Metaverse to be effectively regulated, it is necessary to recognize the complex and nuanced nature of virtual experiences, as well as to promote a legal framework capable of adequately protecting victims and prosecuting offenders.

Currently, various strategies have been adopted to protect individuals from abuse and inappropriate behavior on virtual platforms. One such approach is the reporting of transgressive content, which allows users to notify platform administrators of incidents involving harassment or sexual violence. This mechanism is particularly utilized by adolescents to report cases of sexual harassment on social networks [49]. Another strategy involves the use of advanced algorithms that automatically detect harassing texts and language, as demonstrated in studies on cyberbullying detection [50]. Additionally, platforms can implement "block lists" that enable

users to block harassing content or individuals—a practice shown to be effective in moderating online content [51]. Content moderation in multi-user immersive experiences, such as VR and AR, represents an additional layer of protection by ensuring harmful content is filtered in real time [52]. Finally, users can adopt specific coping strategies, such as avoiding interactions with strangers during gaming or in virtual environments.

IV. FUTURE PERSPECTIVES

In our opinion, future approaches to addressing the issue of sexual abuse in the Metaverse necessitate integrated interventions involving virtual platforms, the legal framework, and scientific research (Figure I).

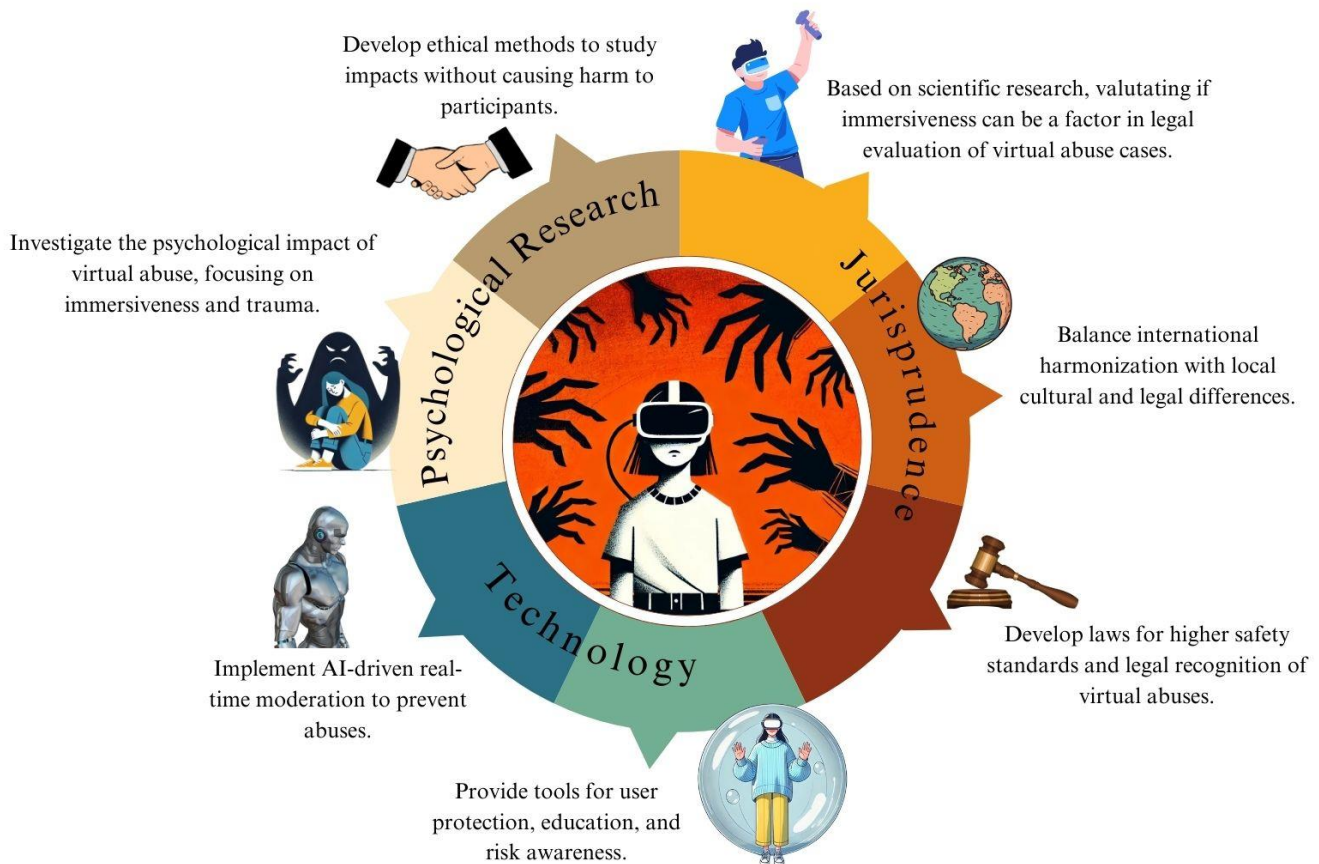


FIGURE I. SEXUAL CRIME IN METAVERSE: FUTURE PERSPECTIVES

Note. Figure I highlights a multidisciplinary approach to addressing sexual crime in the Metaverse, integrating psychological research, legal frameworks, and technological solutions to ensure user protection, legal recognition, and effective prevention of virtual abuses.

While attributing direct legal responsibility to platforms hosting such behaviors is complex, these platforms nonetheless bear an ethical and social obligation to provide users with tools for defense and protection. Digital platforms should develop advanced solutions to enhance awareness of the risks associated with interactions in the Metaverse and to improve online safety. This includes the integration of educational and preventive tools aimed at informing users about potential risks of victimization and strategies to avoid them. For example, implementing interactive guides, tutorials, and awareness campaigns can promote safe and responsible behaviors within virtual environments. Simultaneously, it is essential to strengthen security measures through the adoption of more effective moderation technologies. Artificial intelligence for example can be utilized to monitor interactions in real time, promptly identifying and intervening in potentially abusive situations. This proactive approach can help prevent abuses

before they occur, thereby protecting the most vulnerable users.

Events in the Metaverse underscore the urgency of regulatory policies to prevent sexual abuse that consider the vulnerability of certain groups, particularly women and adolescents, and the relationship between avatar identification and risk perception. This connection suggests the necessity of introducing specific laws that impose higher safety standards on Metaverse platforms, aiming to reduce the likelihood of victimization and facilitate the legal recognition of virtual abuses. Furthermore, establishing clear guidelines on platform responsibility is crucial to ensure adequate regulation and to guarantee that perpetrators of such crimes are legally prosecuted.

One of the primary issues we address is the possibility of harmonizing regulations governing the Metaverse at the international level. While a coordinated approach might seem

desirable to tackle the global challenges posed by this new virtual dimension, the heterogeneity of legislative needs and priorities among different countries raises significant questions. In theory, a uniform legal framework across countries could provide a clear and cohesive system, fostering international collaboration, facilitating the investigation of crimes, and supporting democratic governance within the Metaverse. [53] proposed a model along these lines, emphasizing the potential of a decentralized governance framework that leverages blockchain technology and transparent artificial intelligence algorithms. This model seeks to respect the borderless nature of the Metaverse while addressing the limitations of traditional legal systems. However, we contend that caution is necessary when considering the feasibility and effectiveness of a single universal legal framework. The diversity of cultures, legal systems, and political priorities makes it challenging to implement a one-size-fits-all regulatory approach. An international framework may risk being overly rigid, unable to accommodate local specificities, thereby hindering both innovation and the capacity to address the unique needs of individual national contexts effectively.

In addition, when addressing the issue of emotional harm resulting from virtual experiences, it is essential to understand that the legal treatment of such experiences is closely linked to the level of immersiveness of the technology involved [45]. Immersiveness thus determines a series of legal scenarios of varying relevance and complexity. The more immersive an experience, the greater its capacity to elicit emotional responses, thereby intensifying the perception of realism and, consequently, potentially causing more harm in cases of abuse. From this perspective, perhaps a specific legislative approach for the Metaverse, rather than a mere adaptation of traditional real-world laws, might be optimal, considering the different nature of the virtual environment. The issue we raise concerns the possibility that sexual abuse committed in virtual environments with varying degrees of immersiveness might be treated differently from a legal standpoint. Technologies such as VR and AR, as well as less immersive environments like social platforms or two-dimensional virtual worlds, pose unique challenges in terms of legal responsibility and justice for victims. Therefore, we question whether the degree of immersiveness should be a discriminating factor in the legal evaluation of abuse, considering that the victim's perception and level of psychological involvement could vary significantly based on the intensity of the virtual experience. The introduction of criteria related to immersiveness within the legal framework could represent a significant turning point for the regulation of abuses in the Metaverse and advanced digital platforms. However, the ethical and legal implications of such an approach require careful analysis, as creating a legal hierarchy based on degrees of immersiveness could risk neglecting abuses committed in less immersive contexts, which may be equally harmful to victims.

In this regard, an aspect of crucial importance concerns the psychological consequences that immersive virtual experiences—particularly those involving harassment or abuse—can have on victims. This is a critical and emerging area of concern that demands immediate and systematic

investigation. Research in psychology has already shown that highly immersive virtual environments are capable of eliciting emotional and physiological responses comparable to those triggered by real-life events [45, 54]. As emphasized by [55], the potential of VR to induce unpleasant mental states—owing to its capacity to freely generate virtual scenarios, including disturbing ones, with a strong sense of realism that significantly affects users' emotions—represents an additional factor that casts a shadow over the enthusiasm surrounding these new interactive possibilities. Such findings suggest that virtual experiences, even though they occur in digitally mediated spaces, should not be dismissed as inconsequential or “less real.”

These insights raise urgent questions about the potential impact of traumatic events, such as sexual abuse, occurring in virtual spaces. Despite increasing public attention to the issue of online harassment and a growing body of research on trauma in virtual settings, such as military training simulations or exposure therapy, there remains a striking lack of empirical studies specifically addressing sexual violence or harassment in immersive virtual worlds. In particular, some key questions that in our opinion need to be solved are, for example: How do individuals cognitively and emotionally interpret acts of sexual aggression that occur in virtual environments? What coping strategies do they adopt, and are these strategies effective in mitigating long-term harm? Can the trauma experienced in the Metaverse produce enduring psychological consequences similar to those seen in physical-world assaults? Does the degree of technological immersiveness (e.g., VR headsets, haptic feedback, avatars with realistic embodiment) modulate the intensity of the psychological impact? Without targeted empirical research in this area, our understanding of the psychological ramifications of sexual abuse in the Metaverse remains fragmented and insufficient. As immersive technologies become more integrated into everyday life, the urgency to address these gaps in knowledge becomes all the more pressing.

However, delving into the psychological impact of such virtual abuses presents substantial ethical challenges. Traditional research methodologies may inadvertently expose participants to further harm or re-traumatization, conflicting with the ethical imperative to do no harm. The necessity to understand these impacts must be meticulously balanced with the obligation to protect participants from additional psychological distress. This delicate equilibrium raises pivotal questions about how to ethically conduct research that explores the profound effects of virtual sexual abuse without compromising the well-being of those involved. Addressing these challenges requires a multifaceted approach. Researchers must innovate new methodologies that allow for the exploration of these sensitive topics while safeguarding participants such as utilizing anonymous surveys, virtual simulations that do not replicate traumatic events, or retrospective studies that analyze past experiences without re-exposure.

In this regard, for example, case study methods could provide valuable insights into these questions by capturing the lived experiences of individuals in-depth and exploring the contextual factors that shape psychological consequences,

paying close attention to contextual variables such as the level of immersion, the nature of the abuse, the presence (or absence) of bystanders or institutional support, and the personal histories of the victims. Through detailed, qualitative analyses of individual narratives, case studies enable researchers to reconstruct not only the events as they unfolded in the virtual space, but also the psychological processing and emotional aftermath experienced by the victim. This approach allows for the identification of recurring themes, coping strategies, and specific triggers of distress while preserving the individuality and complexity of each experience. Nonetheless, this method is not without limitations. Findings derived from case studies cannot be generalized to the broader population and are susceptible to subjective interpretation. However, it offers a feasible and ethically sensitive pathway to begin addressing the urgent need to understand how victims of harassment in the Metaverse process and internalize their experiences, and what psychological consequences may follow.

V. CONCLUSION

In conclusion, the advent of the Metaverse offers unprecedented opportunities for connection and innovation, but also presents new challenges that mirror those found in the physical world. As technological advancement intersects with human psychology, it is important to ensure that virtual spaces do not become arenas for harm. The complexity of virtual sexual abuse demands a robust interdisciplinary response, combining insights from psychology, ethics, law, and technology, to ensure the safety, dignity, and justice of users. While this study offers a conceptual and theoretical exploration of legal and psychological implications related to abuse in the Metaverse, it is important to acknowledge that it is based solely on a literature review and, as such, carries certain methodological limitations, not including empirical validation of the claims discussed. For this reason, future research should focus on collecting first-hand data, particularly through qualitative methodologies such as in-depth case studies. These would allow a closer examination of how victims of virtual harassment experience psychological harm, how different degrees of immersiveness may influence their emotional responses, and what protective and therapeutic measures might be most effective. Such research would provide crucial empirical grounding to support policy-making, legal reform, and platform-level safety interventions.

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G.M.: Conceptualization, Writing-Original draft preparation, Writing-Reviewing and Editing.

M.M.: Conceptualization, Writing-Original draft preparation, Writing-Reviewing and Editing, Supervision

CONFLICT OF INTEREST

Authors declare that they have no conflict of interest

DATA AVAILABILITY

Not applicable.

ETHICAL STATEMENT

This article followed the principles of scientific research and publication ethics. This study did not involve human or animal subjects and did not require additional ethics committee approval.

DECLARATION OF AI USAGE

No generative AI tools were used for content creation in this manuscript (e.g., drafting, rewriting, or generating ideas).

REFERENCES

- [1] Johns Hopkins Coronavirus Resource Center. (2020). *Coronavirus COVID-19 global cases by the Center for Systems Science and Engineering*.
- [2] Wiyono, B. B., Indreswari, H., & Putra, A. P. (2021). The utilization of "Google Meet" and "Zoom Meetings" to support the lecturing process during the pandemic of COVID-19. In *2021 International Conference on Computing, Electronics & Communications Engineering (ICCECE)* (pp. 25–29). IEEE.
- [3] McGloin, R., Coletti, A., Hamlin, E., & Denes, A. (2022). Required to work from home: Examining transitions to digital communication channels during the COVID-19 pandemic. *Communication Research Reports*, 39(1), 44–55.
- [4] Tajan, N., Devès, M., & Potier, R. (2023). Tele-psychotherapy during the COVID-19 pandemic: A mini-review. *Frontiers in Psychiatry*, 14. <https://doi.org/10.3389/fpsy.2023.1060961>.
- [5] Stephenson, N. (1992). *Snow crash*.
- [6] Joshua, J. (2017). Information bodies: Computational anxiety in Neal Stephenson's *Snow Crash*. *Interdisciplinary Literary Studies*, 19(1), 17–47.
- [7] Ritterbusch, G. D., & Teichmann, M. R. (2023). Defining the metaverse: A systematic literature review. *IEEE Access*, 11, 12368–12377.
- [8] Rimol, M. (2022). Gartner predicts 25% of people will spend at least one hour per day in the metaverse by 2026. *Gartner*.
- [9] Interpol. (2024). *Metaverse: A law enforcement perspective – Use cases, crime, forensics, investigation, and governance*.
- [10] Norman, D. (2013). *The design of everyday things: Revised and expanded edition*. Basic Books.
- [11] Gómez-Quintero, J., Johnson, S. D., Borrión, H., & Lundrigan, S. (2024). A scoping study of crime facilitated by the metaverse. *Futures*, 157, 103338.
- [12] Wiederhold, B. K. (2022). Sexual harassment in the metaverse. *Cyberpsychology, Behavior, and Social Networking*, 25(8), 479–480.
- [13] Blackwell, L., Ellison, N., Elliott-Deflo, N., & Schwartz, R. (2019). Harassment in social virtual reality: Challenges for platform governance. *Proceedings of the ACM on Human-Computer Interaction*, 3(CSCW), 1–25.
- [14] Pluto VR & The Extended Mind. (2018). *Virtual harassment: The social experience of 600+ regular virtual reality users*.
- [15] Center for Countering Digital Hate. (2021). *Facebook's metaverse: One incident of abuse and harassment every 7 minutes*. <https://Counterhate.Com/Research/Facebooks-Metaverse/>.



- [16] Nova, F. F., Rifat, M. D. R., Saha, P., Ahmed, S. I., & Guha, S. (2019). Online sexual harassment over anonymous social media in Bangladesh. In *Proceedings of the Tenth International Conference on Information and Communication Technologies and Development* (pp. 1–12).
- [17] Pater, J. A., Kim, M. K., Mynatt, E. D., & Fiesler, C. (2016). Characterizations of online harassment: Comparing policies across social media platforms. In *Proceedings of the 2016 ACM International Conference on Supporting Group Work* (pp. 369–374).
- [18] Masden, C., & Edwards, W. K. (2015). Understanding the role of community in online dating. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems* (pp. 535–544).
- [19] Cote, A. C. (2017). “I can defend myself”: Women’s strategies for coping with harassment while gaming online. *Games and Culture*, 12(2), 136–155.
- [20] Fox, J., & Tang, W. Y. (2017). Women’s experiences with general and sexual harassment in online video games: Rumination, organizational responsiveness, withdrawal, and coping strategies. *New Media & Society*, 19(8), 1290–1307.
- [21] McLean, L., & Griffiths, M. D. (2019). Female gamers’ experience of online harassment and social support in online gaming: A qualitative study. *International Journal of Mental Health and Addiction*, 17(4), 970–994.
- [22] O’Leary, A. (2012). In virtual play, sex harassment is all too real. *The New York Times*.
- [23] Freeman, G., Zamanifard, S., Maloney, D., & Acena, D. (2022). Disturbing the peace: Experiencing and mitigating emerging harassment in social virtual reality. *Proceedings of the ACM on Human-Computer Interaction*, 6(CSCW2), 1–30.
- [24] Avery, J. (2010). Gender bender brand hijacks and consumer revolt: The Porsche Cayenne story. In *Consumer behavior: Human pursuit of happiness in the world of goods* (pp. 645–649).
- [25] Martin, K. D., & Smith, N. C. (2008). Commercializing social interaction: The ethics of stealth marketing. *Journal of Public Policy & Marketing*, 27(1), 45–56.
- [26] Lapidot-Lefler, N., & Barak, A. (2012). Effects of anonymity, invisibility, and lack of eye-contact on toxic online disinhibition. *Computers in Human Behavior*, 28(2), 434–443.
- [27] Ball, M. (2021). *Framework for the metaverse: The metaverse primer*. MatthewBall.vc.
- [28] Deloitte. (2022). *The metaverse overview: Vision, technology, and tactics*.
- [29] Vogels, E. A. (2021). *The state of online harassment*.
- [30] Winkelman, S. B., Oomen-Early, J., Walker, A. D., Chu, L., & Yick-Flanagan, A. (2015). Exploring cyber harassment among women who use social media. *Universal Journal of Public Health*, 3(5), 194.
- [31] Sum of Us. (2022). *Metaverse: Another cesspool of toxic content*.
- [32] Patel, N. J. (2021). *Reality or fiction?* Medium.
- [33] Clayton, M. (2022). Mother says she was virtually groped by three male characters within seconds of entering Facebook’s online world Metaverse. *The Mail on Sunday*, 29.
- [34] Park, D. (2022). S. Korean man sentenced to four years for sexual abuse in metaverse. *Forkast*.
- [35] Sharma, V. (2022). Introducing a personal boundary for Horizon Worlds and Venues. *Meta*.
- [36] Camber, R. (2024). British police probe virtual rape in metaverse: Young girl’s digital persona “is sexually attacked by gang of adult men”. *Daily Mail*.
- [37] Faisal, A. (2017). Computer science: Visionary of virtual reality. *Nature*, 551(7680), 298–299. <https://doi.org/10.1038/551298a>.
- [38] Sun, Z., Zhu, M., Shan, X., & Lee, C. (2022). Augmented tactile-perception and haptic-feedback rings as human-machine interfaces aiming for immersive interactions. *Nature Communications*, 13, 5224. <https://doi.org/10.1038/s41467-022-32745-8>.
- [39] Oh, J., Kim, S., Lee, S., Jeong, S., Ko, S. H., & Bae, J. (2021). A liquid metal based multimodal sensor and haptic feedback device for thermal and tactile sensation generation in virtual reality. *Advanced Functional Materials*, 31(21). <https://doi.org/10.1002/adfm.202007772>.
- [40] Slater, M. (2009). Place illusion and plausibility can lead to realistic behaviour in immersive virtual environments. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1535), 3549–3557.
- [41] PDiniz Bernardo, P., Bains, A., Westwood, S., & Mograbi, D. C. (2021). Mood induction using virtual reality: A systematic review of recent findings. *Journal of Technology in Behavioral Science*, 6(1), 3–24.
- [42] Gutiérrez-Maldonado, J., Ferrer-García, M., Plasanjuanelo, J., Andrés-Pueyo, A., & Talam-Caparrós, A. (2015). Virtual reality to train diagnostic skills in eating disorders: Comparison of two low-cost systems. *Annual Review of Cybertherapy and Telemedicine*, 2015, 75–81.
- [43] Gao, Y., Xu, Y., Liu, N., & Fan, L. (2023). Effectiveness of virtual reality intervention on reducing the pain, anxiety and fear of needle-related procedures in paediatric patients: A systematic review and meta-analysis. *Journal of Advanced Nursing*, 79(1), 15–30.
- [44] Belamire, J. (2016). *My first virtual reality groping*. Medium.
- [45] González-Tapia, M. I. (2023). Virtual emotions and criminal law. *Frontiers in Psychology*, 14, 1260425.
- [46] Lee, W. S. (2022). The role of criminal law in the metaverse. *Legal Journal*, 42, 177–202.
- [47] Kostenko, O., Furashev, V., Zhuravlov, D., & Dnipro, O. (2022). Genesis of legal regulation web and the model of the electronic jurisdiction of the metaverse. *Bratislava Law Review*, 6(2), 21–36. <https://doi.org/10.46282/blr.2022.6.2.316>.
- [48] Franks, M. A. (2017). The desert of the unreal: Inequality in virtual and augmented reality. *UC Davis Law Review*, 51, 499.
- [49] Van Royen, K., Poels, K., & Vandeboosch, H. (2016). Help, I am losing control! Examining the reporting of sexual harassment by adolescents to social networking sites. *Cyberpsychology, Behavior, and Social Networking*, 19(1), 16–22.
- [50] Dadvar, M., & De Jong, F. (2012). Cyberbullying detection: A step toward a safer internet yard. In *Proceedings of the 21st International Conference on World Wide Web* (pp. 121–126).
- [51] Jhaver, S., Ghoshal, S., Bruckman, A., & Gilbert, E. (2018). Online harassment and content moderation: The case of blocklists. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 25(2), 1–33.
- [52] Castro, D. (2022). *Content moderation in multi-user immersive experiences: AR/VR and the future of online speech*. Information Technology and Innovation Foundation.
- [53] Qin, H. X., & Hua, Y. W. P. (2022). Identity, crimes, and law enforcement in the metaverse. *arXiv*.
- [54] Chirico, A., & Gaggioli, A. (2019). When virtual feels real: Comparing emotional responses and presence in virtual and natural environments. *Cyberpsychology, Behavior, and Social Networking*, 22(4), 220–226.
- [55] Dremliuga, R., Prišekina, N., & Yakovenko, A. (2020). New properties of crimes in virtual environments. *Advances in Science, Technology and Engineering Systems Journal*, 5(6), 1727–1733.