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Is a fair trial possible in the metaverse? A procedural justice and sociological perspective in conversation

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Abstract: The legal sphere is increasingly moving towards the metasphere, through the adoption of virtual reality technologies across legal procedures, processes, and education. This article examines how this shift affects the execution and experience of criminal justice. Drawing on procedural justice theory and sociological perspectives, it explores how metaverse-based justice reshapes human connection, communication, and the rituals that underpin the fairness and legitimacy of criminal proceedings. While virtual reality promises greater efficiency and accessibility in criminal trials, it challenges the traditional conception of the courtroom as a physical space where justice is enacted and experienced. Emphasising participation, dignity, and trust, the analysis highlights the importance of experiential dimensions in perceptions of fairness. Key sociological themes are explored, including how virtual environments shape interaction and entrainment. The article argues that the metaverse may transform the social practices that constitute a fair trial, with potential consequences for the core principles of criminal justice. Ultimately, it contributes to critical debates on legal digitalisation by questioning whether virtual technologies can reconcile efficiency with the essential human experience of justice.

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Introduction

In most jurisdictions, the criminal trial has long been a physical event and the right to face one's accuser is typically understood as requiring direct, in-person confrontation in a court of law, with *habeas corpus* almost invoking the demand that the bodies of all *participants* be brought before the judge. In recent decades, however, advances in digital technologies, alongside legal reforms have softened this bond between criminal trials and physical presence, most notably through participation via video link which, in many jurisdictions, has become “the new normal” (Rossner et al., 2021, p. 96; European Commission for the Efficiency of Justice [CEPEJ], 2021; Sanders, 2021; e-Justice, 2020) This has marked a steady shift towards virtual technologies in trials – for participation, evidence presentation, and even educational purposes.

The shift away from physicality towards virtuality is expected to continue, with experts foreseeing trials using virtual reality thereby enabling proceedings to be held in the metaverse within the next 15 years (Hartung et al., 2022). However, there is a growing apprehension that the fairness, legitimacy, and legal security of trials are being threatened by the diminution of physical interactions which are being replaced by virtual interactions (e.g. Turner, 2020; De Vocht, 2022; McKay & Macintosh, 2023). This concern is highlighted in a recent Swedish ruling by the Court of Appeals which states: “video technology cannot fully convey impressions and experiences in all situations *in the same way that personal presence can*” (Sverige, 2022, authors own translation, emphasis added). These concerns appear to find support in some of the extant research on video links in court (Babcock & Johansen, 2010; Mulcahy, 2008) particularly in more recent scholarship (e.g. Ariturk et al., 2020; Bandes & Feigenson, 2021). Concerns have also been raised that metaverse technologies may trivialise criminal proceedings through avatar-based representations and participants' physical absence, potentially weakening the authenticity, immediacy, and disciplinary function traditionally associated with criminal trials (Peristeridou, 2026). As the criminal courts move beyond video links towards ever-increasing virtuality, it is vital to ask and answer the question:

In what ways do virtual reality and other immersive technologies transform legal practices and how should their implications for the realisation of procedural fairness be un-

derstood?

In this article we present a brief overview of the current applications of VR and the use of the metaverse in criminal courts before moving on to a theoretical analysis of the challenges and opportunities at hand from the perspective of procedural justice. We then focus on the particular issues that metaverse trials face with regards to participation and the experience of procedural fairness, by presenting a sociological analysis of the criminal trial as a social phenomenon and the interplay of immersive technologies. The article focuses primarily on communication between judges and defendants because this interaction lies at the heart of the criminal process and procedural fairness, while recognising that virtual courtroom environments may also have important implications for other actors in the process, such as (other) legal professionals, witnesses, and victims. We aim to push the field forwards by nuancing understandings of VR and immersive technologies to present them not only as potential threats but also as enhancers of procedural justice. Our contribution to the field is thus an interdisciplinary approach to understand the sociolegal implications of VR and the metaverse. We incidentally place particular focus on Sweden and the Netherlands since they represent the legal systems we are most familiar with, enabling a more grounded and context-sensitive analysis. At the same time, we recognise that differences in procedural traditions, courtroom design, and legal culture may limit the extent to which the experiences and arguments discussed can be generalised to other jurisdictions. However, given the article's particular focus on communication and interaction within courtroom environments, these issues may be less dependent on specific legal contexts than might initially be assumed.

Section 1. Background

The origins of the metaverse can be traced to the 1800s with the discovery of binocular vision which led to the development of stereoscopes creating 3D illusions – an idea still central to modern VR headsets. In 1956, the Sensorama machine in Brooklyn offered one of the first immersive experiences, combining 3D video audio, scent, and motion. By the 1970s, VR systems could transport users to simulated environments, paving the way for arcade machines drawing that gained popularity in the 1990s. The modern era began in 2010 with the Oculus VR headset, soon followed by competitors like Google. The term “metaverse” itself was coined in Neal Stephenson’s 1992 novel “Snow Crash” to describe a virtual escape, a vision that has since expanded from games and films into business, and now, the courts. Indeed, in 2023, UNESCO organised a webinar on “Virtual Reality Worlds in

Courts” which was attended by over 400 judicial operators and which emphasised the importance of equipping judges with the relevant knowledge to ensure that such technology “augments, rather than undermines, the pursuit of justice in the 21st century (UNESCO, 2023).

Metaverse hearings have already been piloted in some countries, for instance in China in 2022 (PingWest, 2022) and the first criminal trial to take place in the metaverse was conducted in Colombia in February 2023. The case concerned alleged corruption in relation to traffic violations, and all participants – including the judge – appeared in the virtual courtrooms as avatars (Woodford, 2023). Many tech companies stand poised to implement the technology in US courts more broadly (Lederer, 2023). While VR does not currently have a solid presence in any judicial system, it is being used in several ways in and adjacent to the courts. For instance, VR is currently being tested by Victim Support Scotland as a way to help victims and witnesses to prepare for giving evidence in court and it is being piloted for victims of sexual offence cases in Iceland (Antonsdottir et al., 2024).

VR is also being used to present evidence. One of the first uses of VR technology in US criminal trials was in 2024 when, a judge in Florida used an Oculus headset to experience a VR reconstruction of the defendant’s perspective in a case concerning alleged aggravated assault during a wedding reception. The defendant claimed it was self-defense and the VR simulation – provided by the defense – allowed the judge to view the wedding reception and the circumstances of the case before and during the alleged offence (Heidrick, 2025; see also Bailenson et al., 2006; Bunker, 2019).

VR is also being used as a pedagogical tool in legal training. For instance, the Open University (2025) in the UK has designed a highly immersive virtual courtroom which can be used to engage in mock hearings and develop advocacy skills (see also Barbe et al., 2022), and, as outlined below, the Swedish courts have a similar tool.

To the best of our knowledge, European jurisdictions have not yet implemented metaverse courts in routine criminal proceedings. For some legal systems such a development may still seem a long way off. For instance, trials in Dutch courts, based in a continental civil-law system with inquisitorial roots are chiefly document and case-file oriented. Although video links were used during the pandemic, there has since been a return to a more conservative approach to using technology for communicative purposes in the courtroom. Video links are thus mainly a pragmatic supplementary tool and there is currently limited interest in more experi-

mental forms of virtual or immersive hearings.

In contrast, the Swedish courts, shaped by the Nordic civil-law tradition emphasise oral proceedings. In 2018, a significant step towards integrating virtual reality into Swedish courts was taken with the first use of 3D visualisations in a terrorism trial (SR, 2018) which has since become more common. VR is not currently used in trials, however the Swedish courts have developed “Domsim” which uses VR technology to enable trainee judges to interact with and manage a range of situations that may arise in a trial, by drawing on GenAI to create characters (e.g. prosecutors, lawyers, defendants, witnesses) whose actions are dynamic (Domstolsverket, 2025). Importantly, this technology is also seen as a useful tool for drawing candidates to the judiciary as Sweden is currently facing challenges in judicial recruitment (Öster, 2025).

Section 2. Why experience matters: the procedural justice perspective

The shift from physical to virtual participation in criminal proceedings raises the question: whether and how this affects procedural fairness. The principle of procedural fairness is used so often that one could assume its meaning is clear and unambiguous. This is however not the case: the concept evolves over time and can be understood from multiple perspectives. In the legal context, procedural fairness is most often linked to fair trial standards as laid down in various legal human rights instruments such as the European Convention on Human Rights (ECHR) and the EU Directives on procedural rights for suspects and defendants issued by the European Union (such as Directive 2012/13/EU (right to information), Directive 2013/48/EU (right to access to a lawyer) and Directive 2016/343/EU (presumption of innocence and right to be present at trial). These sources provide numerous legal norms that can be used to evaluate the fairness of criminal proceedings. The core of these standards can be found in art. 6 ECHR (the right to a fair trial) which covers several constitutive principles such as equality of arms (i.e. each party has an equal and fair chance to argue their case), effective participation and contradictory proceedings before an impartial and independent judge.

This legal, normative approach to fairness is mainly concerned with the question of whether and how the defendant can effectively challenge a charge. In this respect, the – somewhat simplified – assumption seems to be that respecting the aforementioned normative standards of due process increases the likelihood of a fair trial. For example the concept of effective participation – which is arguably the most relevant ‘legal’ manifestation of procedural justice – primarily refers to

the defendant's ability to understand the proceedings and conduct an effective defence. As such, this definition remains rather narrow and formalistic, leaving limited room for the experiential and relational dimensions of fairness as perceived by those involved in the trial. In other words: the legal perspective provides little analysis of what meaningful trial participation actually entails (Belloni et al., 2025.) It is for this reason that we believe this legal approach will not suffice when exploring the potential impact of immersive technologies on procedural fairness.

Procedural justice theory

To be able to assess the experiential dimension of trials – and more importantly: whether and how this dimension is affected by more immersive elements – the theory of procedural justice that has its roots in social psychology could offer a valuable complementary perspective. As such, procedural justice theory can help shift the focus from formal legal safeguards to the perceptions, experiences, and evaluations of fairness by those directly involved in the proceedings. In contrast to the legal approach described above, the procedural justice perspective moves away from *how decisions are made* and focuses more on how proceedings are being *perceived* and *experienced* by their participants. It is an approach to fairness that highlights individuals' subjective experiences of how they were treated, viewing these experiences as significant – and potentially decisive – in evaluating the overall fairness of proceedings.

Decades of procedural justice research indicate that whether people are satisfied with their encounters with the criminal justice system is fundamental in the sense that (perceived) fairness of proceedings is directly linked to the legitimacy of the criminal justice system. This link means that people who believe they were treated with dignity and respect and felt heard by the authorities will be more inclined to respect and accept the decisions that follow from the proceedings. According to Tyler the concept of procedural justice consists of four key aspects: 1. Voice or participation (giving people the opportunity to tell their side of the story), 2. Trust (people should feel that judges are listening and considering their views), 3. Neutrality (people should trust that decisionmakers base decisions on rules and not on personal opinions) and 4. Respect (people should feel that they themselves and their problems are taken seriously) (Tyler, 2007, for a more elaborate discussion of procedural justice theory: Belloni et al., 2025). A Dutch study on procedural justice has stressed that defendants indeed care deeply about aspects such as interpersonal treatment (the way in which the judge and the public prosecutor interacted with them) and due consideration (whether the judge and the public prosecutor paid sufficient attention to the defendant (Ansems, 2021).

Summing up, using the procedural justice perspective to assess the fairness of trials, allows us to acknowledge that criminal proceedings are first and foremost a combination of social interactions. From this perspective, it becomes immediately apparent that introducing technologies in court is much more than simply using a new tool or adding another layer to the proceedings. It is a fundamental change that can potentially affect all four key aspects of procedural justice: voice, trust, neutrality, and respect. At present, however, there is insufficient experience – and certainly no robust empirical evidence – to substantiate the actual impact of immersive technologies on the different components of procedural justice.

Even in the context of remote technologies such as video links – which as mentioned earlier are far more common in practice than immersive technologies – empirical research on their implications for procedural justice remains scarce. Although numerous studies have focused on different experiential elements of remote justice, such as the increasing cognitive load of communicating via screens (Rowden & Wallace, 2018), the different ways in which interaction and communication may differ in online trials (Feigenson, 2023) and how remote proceedings may have a dehumanising effect or lead to less empathy (McKay, 2018 pp. 73, 111 and 141; Bandes & Feigenson, 2021), empirical research comparing procedural justice in in-person and remote hearings is very limited.

To our knowledge, the only available study is by Factor et al. (2023) which indicates lower levels of voice, respect, and neutrality – but not trust – in videolink hearings compared to in-person trials (Factor et al., 2023; see also Belloni et al., 2025). Given the lack of empirical data, only tentative reflections can be offered regarding the potential implications of immersive technologies and procedural justice. In the next section, we apply a sociological lens to how immersive technologies may reshape courtroom communication and interaction, and what this potentially means for perceptions of procedural fairness.

Section 3. Immersive technologies: the sociological approach

Before addressing specific components of the sociological approach, some general observations can help assess the relationship between immersive technologies and procedural justice. Intuitively, one might fear that immersive technologies could undermine the human interaction essential to criminal trials (see Chen et al., 2022 on the human-AI fairness gap). Among lawyers, there is a strong belief that justice can only be done by humans, and physical proximity is necessary for meaningful encounters in court (Susskind, 2019). Of course, it cannot be denied that hu-

man interaction within virtual environments will challenge traditional communication paradigms (o.a. Tanveer et al., 2023) but it is important to note that they might also be helpful in improving the courtroom experience.

Experiences with VR in other fields than law might provide positive examples in this respect. Insights from disciplines that have already integrated VR – such as medicine, psychology, neuroscience, and education – can inform its application in the criminal justice context and support effective implementation (Ticknor & Till-ingham, 2011). For example, metaverse applications in health and patient care – such as telemedicine, VR-based medical training and digital therapeutic interventions – demonstrate how such technologies have the potential to transform the delivery and practice of healthcare (Haginoya et al., 2025). Another example can be found in the field of speech-language pathology where research suggests that VR enables people to practise communication skills in immersive settings, with early evidence that these skills transfer to real-world situations (Bryant et al. 2020). This indicates that VR could also support communication and participation in a criminal justice setting, provided appropriate ethical safeguards are in place.

In the criminal justice context, current applications of VR training seem to be primarily focused on police practice and investigative interviewing (Kask et al., 2022). However, similar immersive approaches could also be applied to courtroom exchanges – enhancing communication, fostering empathy between participants and creating more accessible and human-centered judicial interactions. For example, VR could be used for perspective-taking exercises which can be valuable in training and promoting empathy in the context of courtroom encounters (Bloch 2021). VR can also assist nonprofessional participants to the proceedings to improve their courtroom experience as traditional courtrooms can be experienced as intimidating environments and a trial may even be experienced as a “degradation ritual” (Garfinkel, 1956). For vulnerable participants – such as individuals with disabilities, stigmatised identities, or body image concerns – the ability to select an avatar that projects dignity and minimises intimidation could make participation more humane and less distressing (Rowden et al., 2013). Of course, such techniques must be designed with great care to uphold dignity and prevent emotional manipulation. Nevertheless, they represent a novel means of embedding empathy within judicial processes, potentially enhancing perceptions of sincerity and fairness in the administration of justice.

It may seem paradoxical to assume that technology can help us to improve skills and qualities – such as empathy – that we tend to consider inherently and exclusively human, but it is not: effective use of technology will allow us to automate

tasks that do not rely on these uniquely human qualities and create greater space and opportunities for humans to train and engage in activities that do (Sharon, 2025). Metaverse courtrooms have the potential to enhance respectful treatment and help train meaningful engagement and – as such – have a positive effect on the different components of procedural justice. At the same time, more immersive technologies in the courtroom may mitigate or even eliminate certain shortcomings of remote justice. For example, participation or “voice” could be altered, as virtual environments might either facilitate free expression – for instance by enabling vulnerable participants to testify through avatars. This could have important implications for the possibility of creating trust because, as claimed by Tait and Rossner (2025), metaverse platforms can recreate shared spaces with realistic eye contact and directional sound, restoring empathy, authority, and credibility assessments to levels comparable to in-person hearings. Tait and Rossner also stress how fully immersive virtual courtrooms could create more intentional forms of movement than just entering a Zoom- or Teams meeting with a single click – such as walking or teleporting into the courtroom – framing court appearance as a “journey” to the courtroom which might help restore a sense of solemnity and legitimacy to the proceedings (Tait & Rossner, 2025). Furthermore, immersive technologies may affect engagement and understanding of all participants by making the complexities of criminal proceedings (such as forensic evidence) more comprehensible.

The examples of VR mentioned here in the context of courtroom interaction are by no means exhaustive and should be regarded as preliminary (somewhat speculative) reflections that require careful empirical examination. In the next section, we highlight two interlinked aspects that, from a sociological perspective, are of particular importance given their centrality in courtroom interactions when considering the implications of immersive technologies on procedural justice namely, entrainment and the social gaze.

Entrainment and eye contact

It is first necessary to present a sociological understanding of a trial as a social phenomenon. A criminal trial can be understood as a “justice ritual” (Rossner, 2021), or set of organised practices and ceremonies that symbolically reinforce the beliefs, values, and norms of a community or society (see also Durkheim, 1995/1912). A successful justice ritual can lead to long-term acceptance of the legal ruling and support of the values upheld within. Or, as is the focus of this article, feelings of respect, voice, neutrality, and trust or, in other words, a sense of procedural fairness can develop (Tyler, 2003; see also Thibaut & Walker, 1975).

Unpacking this justice ritual further, in order for the experience of procedural fairness to emerge, four key aspects of the ritual must be fulfilled according to traditional understandings: participants are co-located meaning that they are physically in the same location; there is a clear focus of attention and a shared mood amongst those participating in the ritual; and lastly, there is a clear division between those who are included and those excluded from the ritual (Collins 2004). If these aspects are in place then participants have shared intersubjectivity – they are all focusing on, and interacting with, the evidence presented. To use Collins' (2004) terminology, there is a high level of “entrainment” (see also Rossner, 2021) which refers to a shared understanding and mutual awareness amongst participants with regards to each other and of what is happening. This has typically demanded co-location in order for participants to see, read, interpret, and act on, social cues from each other, also known as the *social gaze*. The social gaze is vital in social interactions, including in the courtroom where “eyework” (Flower, 2019b) – making and avoiding eye contact to achieve a specific purpose – constitutes a specific practice. For instance, a defence lawyer uses it to convey social information to their client, the judge uses it to indicate when the rules of interaction have been broken, and all parties use it to produce emotional displays such as sympathy and productions of remorse (Flower, 2016).

The important thing to note in the understanding of justice rituals described here, is the demand of co-location and thus the capacity for the social gaze. In other words, “technologically-mediated interaction rituals” (Johannessen, 2023), or virtual justice rituals, are doomed to failure given these traditional understandings. This, in turn, means that a sense of procedural justice in virtual settings may also be doomed.

One key way to improve the capacity of immersive technologies to enable a sense of procedural fairness is by introducing a more contemporary understanding of justice rituals, and in particular, openness to the possibility of virtual entrainment by enabling the virtual social gaze (cf. Tait & Rossner, 2025; Kendon, 1967; Bohannon et al., 2013). The capacity for virtual eye contact in immersive technologies – as suggested by Tait and Rossner (2025) thus represents a critical difference to video links and an important step forwards to enabling virtual entrainment via the social gaze. Current research on video links indicates that when participation takes place via video link, the spatial separation this mediated interaction entails disrupts the possibility of entrainment. This is because interactants may be unable to see a clear or complete image of each other's gestures and facial expressions, which, in turn, disrupts the possibility for interactants to manage the impression they are

making on others as indicated in research from other disciplines. For instance, interactants are unable to emphasise potential strengths and downplay weaknesses using eye contact and body posture (Parkinson & Manstead, 2015; Fullwood & Finn, 2010; Kappas & Krämer, 2011). Low bandwidth, lagging and poor audio-video quality also impede this communication (Wegge, 2006; Bruce, 1996; Mierke et al., 2011). The virtual social gaze can thus enable participants to read social cues which, in turn, can support entrainment, interactional flow, empathy, and the enforcement of judicial authority (cf. Rowden, 2018; Flower et al., 2023).

Hence, unlike two-dimensional video-links VR has the potential to create a stronger sense of presence, allowing participants to feel more engaged in the proceedings. It could also enable more natural forms of interaction such as the social gaze and recreate aspects of the courtroom environment that are lost in remote hearings.

Conclusion

Immersive technologies are becoming more widespread, and although courts around the world seem to be adapting rather slowly and – in some jurisdictions – with reluctance, the use of VR in criminal justice is likely to become increasingly prominent in the coming years. In this contribution we have reflected upon the ways in which VR and other immersive technologies transform legal practices and what this transformation might mean for the realisation of procedural fairness.

To understand how participants actually experience and perceive proceedings, we suggest looking beyond a purely legalistic view of fair trial standards and integrate a procedural justice perspective. This approach allows us to move away from focusing only on how decisions are made and zoom in more on how proceedings are being perceived and experienced by participants. At first glance, immersive technologies such as VR prompt concerns about losing the human interaction that is central to criminal trials. We are particularly sensitive to these risks, likely because such technologies initially appear incompatible with the highly valued human element of courtroom proceedings. This may lead us to assume that immersive technologies cannot enhance procedural fairness, but whether that assumption holds true remains an open question. As we have illustrated, there is evidence from other fields suggesting immersive technologies could enhance communication, empathy, and accessibility in court. For example, while this remains speculative, reducing the psychological pressure associated with formal courtroom architecture and hierarchy in immersive virtual environments might enable (extra) vulnerable defendants and witnesses to engage more confidently and communicate more effec-

tively. We also suggest that by developing more contemporary understandings of social interactions in virtual settings which integrate immersive technologies in ways that can strengthen the capacity for shared understandings and the social gaze, we can invite a more nuanced discussion regarding virtual participation in trials.

At the moment, these claims remain partly aspirational. Much depends on empirical testing of whether immersive technologies do in fact enhance perceptions of fairness and legitimacy. It is also crucial to ensure equitable access and guard against new vulnerabilities. Yet from a procedural justice perspective, the metaverse offers not only risks but also significant promise. If developed with sensitivity to the core dimensions of voice, respect, neutrality, and trustworthy motives, VR hearings may enrich the very qualities of interaction that underpin legitimacy in criminal justice. Rather than only damaging or eroding the human factor, immersive technologies could – paradoxically – create the conditions for more meaningful human encounters in digital courts.

It remains difficult to formulate concrete policy recommendations, not only because metaverse technologies are still rapidly evolving, but also because there is currently little empirical evidence on how immersive courtroom environments affect communication or procedural justice in practice. Before clear regulatory frameworks can be developed, further interdisciplinary and empirical research is needed, including user-based studies involving defendants, judges, and other (non) professional participants across different types of proceedings and technological settings. Pilot projects and experimental courtroom simulations may also be necessary to better understand both the risks and potential benefits of immersive technologies in real-world contexts.

Moving forwards we suggest that all policies regarding immersive technologies and metaverse trials should be anchored in robust and empirically-grounded research and grounded in contemporary understandings of virtual interactions. Beyond ensuring that trust, voice, neutrality, and respect are upheld, it is important that specificity remains central in the implementation of VR and the metaverse, with eligible case categories and participant types clearly defined. Likewise, clear guidelines should be established regarding the appearance of avatars. Only with such careful and evidence-based integration can immersive technologies hope to enhance – rather than risk undermining – the legitimacy and fairness of criminal proceedings.

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