



Co-designing Metaverse Ethics: Perspectives of Jamaican Youth

An initiative hosted by

Project Amplify



Jesus College
OXFORD

TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
INTRODUCTION	7
What is the Metaverse?	7
Ethical considerations in Metaverse development and implementation	8
Project Rationale	13
METHODOLOGY	15
Participants	16
Materials	17
Procedures	17
Data Analysis	25
FINDINGS	27
Spotlight One: Privacy and Data Protection	29
Spotlight Two: Autonomy	30
Spotlight Three: Human Flourishing	31
Spotlight Four: Inclusivity and Accessibility	32
Spotlight Five: Reducing Deceptive Patterns in Design	33
DISCUSSION	40
A multi-dimensional view of ethical Metaverse governance	40
Metaverse autonomy: Ethical autonomy within an autonomy life cycle	43
Recommendations	45
REFERENCES	47

Suggested citation:

Johnston, S-K., Wilson, C., & Derrell, C. (2024). *Co-designing Metaverse ethics: Perspectives of Jamaican youth*. Youth Can Do I.T., Jesus College, Oxford. <https://doi.org/10.5287/ora-bpdmxbwdo>

Keywords:

Ethics, Metaverse, virtual reality, ICT, co-design, participatory, Youth Lab, children, youth, data protection, privacy, autonomy, human flourishing, accessibility, inclusivity, dark design patterns, education, learning, social and emotional learning, critical thinking, digital literacy, well-being, artificial intelligence (AI), STEM, Global Majority, Caribbean, Jamaica

License:



This publication is available in Open Access under the Attribution-NonCommercial-ShareAlike 4.0 (CC BY-NC-SA 4.0) license (<https://creativecommons.org/licenses/by-nc-sa/4.0/>). By using the content of this publication, the users accept to be bound by the terms of use of this license. Creations marked with an asterisk (*) do not fall under the “<https://creativecommons.org/licenses/by-nc-sa/4.0/>” CC BY-NC-SA 4.0 license and may not be used or reproduced without the prior permission of the copyright holders. To obtain permission, contact the first author, Dr. Samantha-Kaye Johnston at: drsamanthakayejohnston@gmail.com

With the exceptions of Figures 1 to 4, and the Vision 2030 – Jamaica National Development Plan visualisation on page 11, all visualisations were accessed through Freepik <https://www.freepik.com/> which were created with Midjourney.

Additional Notes:

Please note that the views expressed in this report are those of the authors and do not represent the views or positions of Youth Can Do I.T., Jesus College, Oxford or The University of Oxford. Any errors or omissions are those of the authors.

EXECUTIVE SUMMARY

Co-designing Metaverse ethics: Perspectives of Jamaican youth

Project Amplify: An initiative hosted by Youth Can Do. I.T. & Jesus College, Oxford

Between February 2023 and February 2024, Youth Can Do I.T. (YCDI), in partnership with Jesus College at the University of Oxford and supported by their funding, launched **Project Amplify**. This year-long initiative gathered a cohort of 25 young people (aged 10 to 17 years) from Jamaica to collaboratively design ethical guidelines and spaces for the Metaverse. Project Amplify critically explored the Metaverse through a socio-technical lens, emphasising the ethical implications of this rapidly evolving technology, particularly from the perspective of young people. Conducted during a period of unprecedented and rapid technological advancements in AI, the project also explored how these guidelines might shape the ethical implementation of AI within the Metaverse. As an experimental educational initiative in a Global Majority context, Project Amplify's goal was twofold: (1) to amplify and empower young people's voices in an anticipatory governance process of establishing ethical guidelines for the Metaverse and (2) to establish a collaborative classroom around Metaverse ethics, including ethical Metaverse design.

To more effectively engage Jamaican young people within a Global Majority context and address the prevalent lack of discourse on the Metaverse in Jamaica, the project provided capacity-building training sessions. The sessions aimed to equip participants with the requisite knowledge, skills and dispositions to co-create guidelines around the ethical design and use of the Metaverse. Delivered by experts from diverse fields—such as creative design, philosophy, ethics, AI, education, human-centred design, law and policy development—the training provided a foundation for informed guideline development. In this unique setting, Jamaican youth, who might not ordinarily have access to such training, were given the opportunity to engage in meaningful discussions about complex ethical and digital transformation issues related to the Metaverse. They interacted with peers as well as professionals, scholars, designers, policymakers, and industry leaders. In addition to enhancing the capacity of young people, the project provided capacity-building training sessions for university-aged facilitators from Jamaica and Jesus College, Oxford. This training was crucial as the facilitators were instrumental in advancing the project and leading sessions with the young people, ensuring effective implementation and guidance throughout the initiative. Given that many of the facilitators had limited prior experience with co-designing with young people, the training was vital for supporting the project's critical inquiry and methodological approach.

This document is the result of an iterative co-creation process among the young people, University-aged facilitators, and project organisers. Throughout the project, collaborative tools like Google Jamboard, functioned as dynamic documents in which every participant actively contributed knowledge and insights during remote anchor sessions, breakout sessions, and in-person working groups. Given the project's diverse contributors, viewpoints, and areas of expertise, the synthesis presented, particularly the spotlights in the findings section, should not be seen as exhaustive or fully representative of every theme discussed. While the use of the spotlight format for presenting thematic findings prioritises concise takeaways that informed key ethical guidelines, we recognise that this approach may overlook some intricacies. Consequently, the descriptions provided may be more general than the detailed discussions that took place during the project. However, these intricacies are thoroughly addressed and represented in our complementary ethical guidelines document.

We extend our sincere gratitude to all the young people and their parents/guardians, the University-aged facilitators, the expert presenters who conducted the capacity-building training sessions, and the YCDI staff for their time and dedication to Project Amplify. We also thank Jesus College, Oxford for their collaboration, generous funding and support of this initiative.

Key Highlights and Common Themes

- We employed a participatory design, specifically a **community-based participatory design**, to leverage the existing community within which the project was situated (i.e., the YCDI community).
- Our approach to co-designing was flexible, demonstrating a transition between different co-design models. Specifically, this involved shifting between the **Learning and Co-Designing Spaces** and **Youth Lab** models, depending on the young people's growing knowledge and capacity-building needs.
- By navigating through both models, we were able to acknowledge and illustrate the evolving roles of the young people throughout the project, identifying points where additional learning was required.
- We employed a spotlight approach to highlight common themes, recognising the iterative nature of co-designing the ethical guidelines. This process was facilitated via an online collaborative document, where young people, facilitators, and project coordinators collaborated continuously. Below, we present a summary of the common themes identified during the project.

Throughout the project's discussions, several key themes consistently emerged. These themes were directly relevant to each session's topic or indirectly connected with our broader, ongoing conversations. We present an overview of these common themes below and elaborate upon them in the individual spotlights in the findings section of this report.

- In every session, the theme of **privacy and data protection** emerged throughout our discussions. The group discussed a range of issues in this context, including the nature of how terms and conditions are presented, privacy-preserving infrastructures and the amount of data being collected about young people for undisclosed purposes.
- This prompted further discussions about the lack of empowerment, highlighting the crucial role of **autonomy** in Metaverse interactions. The conversations focused on enhancing autonomy from both regulatory and skill-development perspectives. Crucially, participants emphasised the need to foster autonomy within the Metaverse in an ethical manner (**ethical autonomy**). This includes educating users on the benefits of responsibly sharing their data for the greater good of society, thereby empowering them to exercise ethical control over how their data is used. It was suggested that this process could be effectively managed through an **autonomy life cycle**, which recognises different stages of user autonomy. This cycle would guide and regulate how engagement and disengagement with the Metaverse evolve, develop, and are managed over time, including the management of virtual data. Central to this cycle is the emphasis on fostering critical thinking among Metaverse users, aiming to prevent the emergence of a **critical thinking paradox**, where overanalysing ethical engagement in the Metaverse leads to confusion or inaction. This approach seeks to guide users in making informed, ethical decisions without becoming overwhelmed by the complexities of navigating the virtual environment.
- Relatedly, **human flourishing by design** emerged as a gateway through which participants discussed the central role of well-being, which was closely linked to elevating **inclusivity** and **accessibility**.
- Finally, participants highlighted the importance of **reducing deceptive patterns in Metaverse design**.
- We offer recommendations for policy-makers, investors/funders, Metaverse providers and developers, and researchers.

Project Amplify



INTRODUCTION



INTRODUCTION

At present, we are witnessing the emergence of new waves of computing innovation, characterised by the rise of big data, the integration of humans and artificial intelligence (AI) as collaborative partners, and the development of multi-sensory AI interactions (Coyle & Hampton, 2024; Ozmen Garibay et al., 2023; Wang et al., 2023a). These new computing waves are further intensified by advancements in extended reality (XR) technologies, which encompass three common applications of spatial computing: Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) (Stanney et al., 2021). Moreover, pivotal moments have shaped the course of history,¹ and we are currently experiencing one of them with the growing public interest in AI and emerging technologies like the Metaverse, which is the central focus of the current project (Wang et al., 2023a). Presently, an array of Metaverse platforms is available, exemplified by popular games like Fortnite, Minecraft, and Roblox. These platforms collectively captivate 42 million users, with global organisations like Virbela and Nike establishing virtual environments such as wedding venues and Nikeland, respectively (Hirsh-Pasek et al., 2022). With burgeoning interest in Metaverse development, we are at a pivotal juncture for considering strategies that guide the ethical development of this virtual environment.

What is the Metaverse?

Virtual environments, including the Metaverse, have become integral components of computing history, representing digital spaces that lack physical presence but are crafted through digital means. Early examples like the text-based adventure game *Adventure* in the 1970s laid the groundwork for more immersive experiences like *Ultima Online* and *EverQuest* in the 1990s (Klastrup, 2009). Today, there is a resurgence of interest in the Metaverse concept, underpinned by substantial investments from Big-Tech giants such as Meta, OpenAI and Microsoft in virtual and augmented reality technologies (Bagley, 2024). Supporting the value of investing in the Metaverse is the emerging view that it has significant potential for fostering better communication, personalised learning, and creating low-risk immersive experiences to improve educational outcomes (Akour et al., 2022; Barrera & Shah, 2023; Lin et al., 2022). Furthermore, recent advancements in blockchain and cryptocurrency technologies have introduced the idea of virtual economies within these virtual worlds (Gadekallu et al., 2023). These economies allow for the ownership, trading, and monetisation of digital assets, providing new opportunities for creators and users alike.



In October 2021, Mark Zuckerberg made headlines by announcing Facebook's rebranding to *Meta* (Facebook, 2021). This sparked widespread debate across academic circles, industry sectors, and public discourse on social media platforms (Kim, 2021; Murphy, 2021). However, Facebook's rebranding does not mark the inception of the concept we now understand as the Metaverse. The term Metaverse was coined and introduced in Neal Stephenson's 1992 sci-fi novel *Snow Crash* (Stephenson, 2003), and 30 years later, it continues to be a poorly understood technology, both in its definition and ethical application. It was presented as an alternate VR world

¹ <https://www.theguardian.com/world/2014/nov/22/80-landmarks-in-80-years-that-shaped-our-world>

that was accessible to users across the globe through earphones and goggles; this was constructed through computer graphics. In Stephenson's novel, *The Metaverse's* framework is built upon a protocol named the Street, connecting various virtual communities similar to the underpinning infrastructure of the internet (Mystakidis, 2022). Within the Metaverse, users are represented as avatars and the encounters within this world can significantly influence one's perception and interaction with the physical world. A compelling promise of the Metaverse is its ability to offer an unprecedented sense of presence, something that existing technologies have yet to achieve (Bolognini & Carpenelli, 2022).

The term "Metaverse" is a combination of "Meta" (a Greek prefix denoting post, after, or beyond) and "universe" (Mystakidis, 2022). Essentially, the Metaverse represents a post-reality universe—a continuous and persistent multiuser environment — that seamlessly blends physical reality with digital virtuality. More comprehensively, Parisi (2021) articulates seven fundamental principles that delineate the nature and scope of the Metaverse. According to these principles, the Metaverse is singular, embodying a unified virtual landscape. It operates on the premise of openness, welcoming participation from all individuals. Furthermore, it upholds inclusivity as a core value, ensuring accessibility to everyone. Crucially, no single entity holds absolute control over the Metaverse. Ultimately, Parisi suggests that the Metaverse is synonymous with the Internet, emphasising its interconnectedness and pervasive influence. Drawing on the various existing definitions of the Metaverse, we have chosen to define it in this study as follows: 1) it must be a shared space, that may include the convergence of different technologies, including AR, VR and XR as enabling technologies; 2) there should be an immersive component to how you enter, acknowledging that there is a reality gradient, spanning from physical, augmented, mixed and virtual reality; 3) the environment must be interactive, in which social phenomena occurs, including gaming and social media; and 4) the user should be represented digitally, typically through an avatar (Mystakidis, 2022; Ng, 2022; Wang et al., 2023a).

The growing interest in the Metaverse has led many countries and companies to actively seek deeper integration into this emerging digital world. For example, *Republic Realm*, a virtual land developer company, bought land in The Sandbox from video game company Atari to the tune of \$4.3 million, which is recorded as the most expensive cost for virtual property (Abrar-ul-Haq & Arkam, 2024; Putzier, 2021). Other significant acquisitions include the purchase of a virtual plot by the real estate company Metaverse Group within Decentraland, a platform offering decentralised VR spaces. This transaction, valued at \$2.43 million, represents the second-highest expenditure recorded for virtual property to date (Huynh-The et al., 2023).

Ethical considerations in Metaverse development and implementation

In recent years, there has been a fierce competition to establish the infrastructure, protocols and policies that will define the standards for governing the Metaverse (Mystakidis, 2022). However, alongside these technological advancements, there are often infringements on the rights of the users. A recent example is Meta's proposed updated privacy policy, which seeks to use years of personal posts, private images, and online tracking data to train unspecified AI technology (McMahon, 2024). This technology can gather personal data from any source and share information with unspecified third parties. Instead of seeking user consent (opt-in), Meta asserts that it has a legitimate interest that outweighs the fundamental right of its European users to data protection and privacy (Noyb, 2024). Meanwhile, as this policy space evolves in the commercial world, the development of regulatory frameworks to ensure ethical engagement with the Metaverse remains in its infancy. Similarly, in the research context, challenges persist in defining what it means to be ethical, particularly when accounting for diverse cultural values, societal norms, and stakeholder perspectives (Benjamins et al., 2023). However, understanding the concept of ethics is crucial for developing a shared framework that guides the creation of an inclusive, respectful, and fair Metaverse. What does it mean to create an ethical Metaverse, and how is this currently being considered across various contexts?

Metaverse development in Global North contexts

In recent years, several countries in the Global North have increasingly focused on how to advance the development of ethical Metaverse ecosystems. For example, South Korea committed to becoming a global leader in the Metaverse through proactive policies and substantial investments (Timnaz, 2023). The country released its Metaverse strategy in 2022 (South Korean Ministry of Science and ICT, 2022), and in 2023, Seoul launched *Metaverse Seoul*,² the first urban Metaverse, to enhance communication in education, tourism, and commerce, and support vulnerable communities (Seoul Metropolitan Government, 2023). This initiative is guided by eight ethical principles: authenticity, autonomy, reciprocity, privacy, fairness, data protection, inclusiveness, and future responsibility, all categorised under three broader principles of respect, social fairness, and connection with reality (Seoul Metropolitan Government, 2023; South Korean Ministry of Science and ICT, 2022). The Korean Communications Commission also recommended six Metaverse principles specifically for business operators, including community value and fair economic activity (Korean Communications Commission, 2023). Other countries, despite lagging behind South Korea in their Metaverse development, are actively incorporating ethical guidelines into their Metaverse strategies. For example, Finland emphasises user privacy, security, and autonomy (Vallirinne & Jokitalo, 2023). The European Union (EU) emphasises core ethical values including human dignity, freedom, democracy, privacy, autonomy, justice, and solidarity. It advocates for the adoption of AI ethical principles as a guiding framework to ensure the development of a responsible and ethical Metaverse (Maciejewski, 2023). While the United Arab Emirates (UAE) has developed Metaverse strategies aimed at creating greater employment opportunities, including enhanced human thinking process and providing Metaverse education (UAE Government, 2023), and Japan also have their own Metaverse strategy (Virtual Dimension Center, 2024), both these countries have provided fewer details regarding the specific ethical guidelines driving their Metaverse development.

Metaverse development in Global Majority contexts: A Caribbean perspective

The Global Majority is also establishing a significant presence in the Metaverse (see Kshetri, 2023, for a comprehensive overview of Metaverse development across Africa, Vietnam, and Thailand). Despite being at varying stages of development, a common trend among Global Majority countries is the relatively limited emphasis on strategies guiding Metaverse development, including ethical considerations, compared to the Global North. An exception is China,³ which has a Metaverse strategy grounded firmly in Xi Jinping's socialism principles (Virtual Dimension Centre, 2024).

The Caribbean, including Jamaica—the context of this project—is beginning to establish a presence within the Metaverse. Although the concept of the Metaverse in the Caribbean has received limited attention in academic research, it has seen notable progress through popular media and governmental initiatives. For example, the Government of Barbados has committed to becoming the first nation to establish an embassy in the Metaverse, creating a diplomatic presence within Decentraland (Caribbean Telecommunications Union, 2021; Kimber, 2021). Other Caribbean countries, such as St. Vincent and the Grenadines, are exploring developing a virtual Carnival for access in the Metaverse (Wong, 2022) and Dominica has partnered with TRON to develop *Dominica Metaverse* (Shakyawar, 2023). In Jamaica, Youth Can Do I.T. (YCDI) hosted the first fully-immersive conference in the Metaverse, #IamWITy, in 2022.⁴ In the 2022-2023 Jamaican Sectoral Debate, Member of Parliament Lisa

² *Metaverse Seoul* is available for download on Google Play (for Android) and the App Store (for iOS).

³ While China is often categorised as a developing country, it is also a subject of ongoing geo-political and geo-economic debates regarding its classification as either developing or developed (see Weinhardt & Petry, 2024 for a more comprehensive discussion on the contestation of China's developing country status).

⁴ <https://our.today/a-jamaican-first-ycdi-celebrates-international-girls-in-ict-day-in-the-metaverse/>

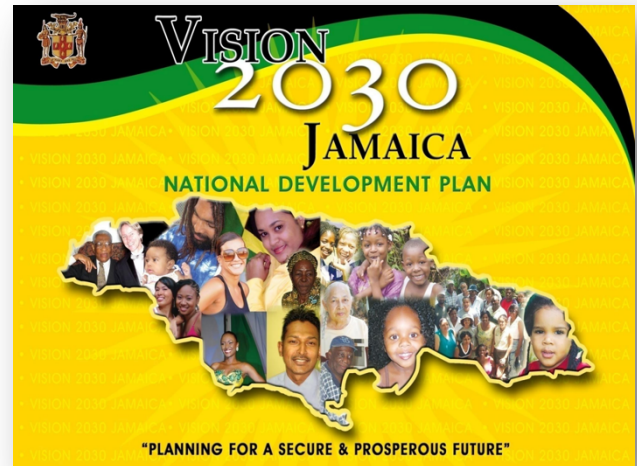
Hanna emphasised the importance of understanding the Metaverse and the economic opportunities it offers, particularly in promoting Brand Jamaica (Public Broadcasting Corporation of Jamaica, 2022). Hanna further highlighted the potential benefits of licensing through Non-Fungible Tokens (NFTs)—unique certificates of ownership for digital assets — for economic development (Mazur & Polyzos, 2024). There is, however, a need for robust infrastructure to support these advancements. Hanna drew a parallel to the success of Jamaican athletics, an industry that has thrived as a result of sustained investments in sports training and development. She emphasised that analogous investments in the Metaverse could similarly empower Caribbean creatives to monetise uniquely Jamaican NFT products and services, such as Jamaican Jerk and Virtual Reality JA (Public Broadcasting Corporation of Jamaica, 2022). The ability to globally expand Caribbean-focused products and services through virtual platforms could enhance economic resilience by leveraging XR technology for diversification. This approach will likely maintain stability in the face of physical supply chain disruptions, thereby strengthening the region’s sustainable development.

Despite the increasing interest in the Metaverse across the Caribbean, our R-Search rapid research (see Verhurst & Young, 2015 for details on the R-Search methodology) highlights a significant disparity. That is, although the Metaverse has been widely covered in popular media, there is a notable paucity of comprehensive academic or industry-based research—particularly studies demonstrating community-oriented approaches—that address the ethical evolution of the Metaverse in the Caribbean. To the authors’ knowledge, at the time of writing this report, only two peer-reviewed journal articles on the Metaverse’s evolution in the Caribbean have been published, both authored by the same researchers. In the first, Rameshwar and King (2022) initially aimed to conduct a bibliometric analysis of Metaverse evolution in the Caribbean, examining 604 articles from the Web of Science database on Metaverse-themed research (including NFTs, blockchain, AR, VR, MR, and XR) from 1995 to 2022. These keywords were chosen as they were previously identified as key to the Metaverse evolution journey within the Caribbean. However, the results showed a lack of specific work on the Caribbean in the Metaverse context. Consequently, the authors expanded their search to Google Scholar, offering a broader dataset focusing more on Industry 4.0 and enabling technologies, such as those related to XR and blockchain (including NFTs), which is where most of the available information on the Caribbean is seemingly concentrated. The review presents 8 NFT product examples and 27 XR project examples within the Caribbean (see Tables V and VII, respectively in Rameshwar & King, 2022). These experiences span various domains such as entertainment, education and escapism, including VR experiences of the former Prime Minister Eric Williams’s 1962 independence address in Trinidad and Tobago, as well as carnivals and heritage tours in the Bahamas.

The second peer-reviewed publication adopted a survey approach across Caribbean XR developers to examine the factors that encourage the development of XR projects in the Caribbean to advance their Metaverse mission (Rameshwar & King, 2023). Although the findings aimed at being representative across 13 Caribbean countries, due to sampling difficulties, the respondents were most heavily represented in Trinidad and Tobago (40.3%) and Jamaica (32.5%), accounting for 73% of the total respondents. While this limitation impacts the generalisability of their research, it offers a valuable foundation for the current study focused on Jamaica, enabling a deeper understanding of Metaverse evolution within the Jamaican context. Rameshwar and King (2023) recommended that successful development and governance of the Metaverse will depend at least on enacting three elements. Firstly, it is crucial to identify the enabling factors for Metaverse development. The study pinpointed key elements such as a clear design focus, a meaningful understanding of users, the location of use, and the purpose of use. For instance, it was identified that most Caribbean developers were particularly interested in leveraging XR opportunities to enhance education and training. Secondly, the researchers recommended developing effective governance through a tripartite strategy that includes an Industry 4.0 (4th industrial revolution) strategy, UX (user experience) strategy, and financial strategy. The UX strategy, in particular, is informed by a deep understanding of the user, which creates more just, equitable, and accessible digital experiences in virtual reality. Finally, it is essential to consider the economic pathways that can be

leveraged to enable, foster, and continue to innovate the industry-oriented possibilities of developing XR in the Caribbean region.

Rameshwar and King's recommendations broadly align with the mission of Jamaica's long-term National Development Plan – Vision 2030 – specifically, Goal 2, which includes National Outcome #5 – *Security and Safety* and National Outcome #6 – *Effective Governance* (Planning Institute of Jamaica [PIOJ], 2009). These outcomes emphasise the commitment to developing a comprehensive plan that prioritises safety, respects everyone's rights, upholds shared values, and provides justice and fairness for all citizens. A recent implementation of Goal 2 is the development of Jamaica's local Data Protection Act (2020), which signals the commitment to context-specific rule of law to promote safe and ethical handling and governance of data. Closely related to this, and aligning with the current study's focus on developing ethical guidelines for Metaverse spaces, is Goal 3, which encompasses National Outcome #11, aimed at advancing a *Technology-Enabled Society* (PIOJ, 2009). However, what remains absent from Goal 3 are specific ethical guidelines and principles to guide the ongoing Metaverse evolution in Jamaica and, more broadly, across the Caribbean. Instead, there is currently an emphasis on securing funding to accelerate digital transformations, such as those provided by the 11th European Digital Funds (Caribbean Community [CARICOM], 2021). Moreover, despite roadmaps like Jamaica's Vision 2030, which emphasise the inclusion of young people in decision-making processes on matters of national and international significance (PIOJ, 2009), there remains a notable lack of focus on co-designing policies with young people, particularly those related to shaping the ethical evolution of the Metaverse.



Co-designing ethical spaces digital spaces with young people

Previous academic research has investigated the nature of the co-design process with young people, including the co-creation of digital spaces in both Global North (McNally et al., 2018; Wang, 2023b; 2024) and Global Majority (Fisher et al., 2016; Third et al., 2021) contexts. For a comprehensive exploration of co-designing with children across various abilities and contexts, refer to Korte et al. (2023) which features a special issue dedicated to pushing the boundaries in this field. Similarly, within industry, major technology companies have documented their commitment to obtaining insights from young people. Meta, for instance, details its co-design process with teens and their parents, highlighting that much of their work is underpinned by rights-based principles, including those outlined by the United Nations (Montgomery & Busso, 2022). For example, Meta acknowledges the importance of General Comment No. 25 (United Nations Convention on the Rights of the Child, 2021), which provides clear guidance on applying the Convention on the Rights of the Child to the digital world: it emphasises ensuring equal access, protecting privacy, preventing online harm, promoting digital literacy, and involving children in digital policy-making, while highlighting the responsibilities of governments and private entities in upholding these rights. Similarly, Article 12, a key principle of the United Nations Convention on the Rights of the Child (UNCRC), grants children the right to be heard in all matters that affect them. It ensures their participation in decision-making processes impacting their lives, allowing them to influence these decisions according to their age and maturity (United Nations, 1989). Together, these policies are aimed at empowering young people, enabling them to lead more productive lives (Patton et al., 2016).

Recognising the critical importance of empowering young people in digital spaces, scholars have developed various toolkits to guide best practices: these toolkits offer frameworks both for engaging young children effectively and for designing digital environments that prioritise their best interests. Cortesi et al. (2021, 2019) have well-documented resources on how to implement youth engagement activities for understanding their perspectives of the digital world. Similarly, the Digital Futures Commission has developed toolkits, including an interactive tool based on their playful by design principles, to assist designers in creating play experiences for young people that respect and uphold children's rights (Colvert et al., 2024). Notably, a partnership between the 5Rights Foundation and the Digital Futures Commission led to the creation of the Child Rights by Design Framework. This framework promotes 11 key principles, including equity and diversity, agency, and consultation, to ensure that a safety-by-design approach is integrated into technological development (Livingstone & Pothong, 2023).

More recently, Kucirkova et al. (2024) have called for a greater focus on using responsive methods to facilitate a more nuanced exploration of young people's experiences in digital spaces. This is based on the understanding that, in our highly networked society, it is becoming increasingly difficult to document and evaluate children's experiences and perceptions of their digital engagement. Importantly, new methods are frequently required to effectively explore the nuanced and sometimes contradictory aspects of design propositions. For example, previous research consulting young people about their perceptions of the risks and benefits of the digital landscape uncovered the concept of "risky opportunities" (Livingstone et al., 2012, p.5). This highlighted that the traditional distinction between risks and opportunities may not fully capture children's online experiences, as some risks can also be perceived as opportunities by children (Stoilova et al., 2016). For instance, while an online game might expose users to seemingly offensive content, it could also provide educational opportunities that enhance critical thinking skills and dispositions. Therefore, both in this case and more broadly, new approaches to co-designing with young people must be context-sensitive to effectively capture the complex interplay between harms and benefits. This further underscores the need for a more nuanced approach to evaluating online experiences, as skills like critical and creative thinking are crucial for empowering students to become responsible global and digital citizens, including strengthening their ability to engage effectively in the co-design process (Gottschalk, 2020).

At the same time, as we seek to engage young people in developing their skills for sharing their perspectives, policy must be developed to align with these efforts. For instance, research indicates that young children often feel their voices are either inadequately acknowledged or dismissed outright (UNICEF and Eurochild, 2019). Studies conducted in Northern Ireland further illustrate this sentiment, showing that many young children perceive their input as having minimal impact (Kilkelly et al., 2005). Nevertheless, there are other positive developments in policy-making, such as the Online Safety Act (Department for Science, Innovation and Technology, 2023) in the UK, which seek to ensure that companies and technology design adhere to best practices in the interest of vulnerable groups, such as children and young people. Arguably, one best practice in this area is to co-design technology with young stakeholders, ensuring that it aligns with their values and needs. Similarly, the US Senate has recently advanced two online safety bills that seek to hold social media platforms accountable for their impact on children and teens (Warburton & Godoy, 2024). Notably, however, there are no specific global laws governing the development of the Metaverse. As the Metaverse continues to develop, it is essential for researchers, children and young people, industry developers, and policymakers to actively engage in co-design to create interactive, immersive, and collaborative experiences that prioritise the best interests of users.

Project Rationale

While Jamaica's Vision 2030 aspires to ensure that *"youth are empowered to contribute meaningfully in building and strengthening the communities to which they belong"* (PIOJ, 2009, p. VI), a significant gap remains in the contributions that young people in Jamaica are making to the design of emerging technologies. As Jamaica and the global community increasingly focus on expanding Metaverse implementations, particularly in the context of education and training (Rameshwar & King, 2023), it is crucial, at this pivotal moment before the Metaverse's widespread adoption, to (1) establish clear ethical guidelines for engaging with this emerging space and (2) **amplify** and **empower** the voices of typically underrepresented groups in Jamaica—especially young people—in the ethical design of the Metaverse, a space that, if expanded within education, will influence their experiences. In this project, we specifically define empowerment as the transformation of students' roles from passive recipients of information to active contributors of knowledge.

Importantly, to effectively collaborate with Jamaican young people, we must recognise that while youth from various backgrounds can assume diverse roles in co-design, a common critique is that participants often come from privileged backgrounds, characterised by affluence and membership in dominant cultural groups (Constantin et al., 2020; Walsh, 2018). These participants may have pre-existing skills that boost their confidence in co-design initiatives (Korte et al., 2023). In contrast, Jamaican youth are typically underrepresented in such initiatives, where co-designing with young people is the exception rather than the norm in Global Majority contexts. Importantly, participants from the Global Majority often face persistent challenges in meaningfully engaging with participatory work related to sharing their perspectives on digital spaces. These challenges stem from limited experience or familiarity with the technology being designed and with the brainstorming processes involved in co-design, often due to educational contexts that do not encourage young people to voice their opinions (Kam et al., 2006; Liu & Roto, 2017). In Jamaica, this issue is often worsened by large class sizes, with up to 50 students per class and only one teacher, which significantly limits opportunities for student participation, particularly verbal expression (Allen, 2018). To bridge the potential familiarity gap with knowledge of the Metaverse and ensure meaningful participation, we offered capacity-building training workshops for the participating young people. Acknowledging that the project predominantly involved young people, who may have limited experience in articulating their perceptions verbally, we primarily provided activities that involved writing or designing solutions, allowing participants to work within their comfort zone. Nevertheless, to develop their verbal expression skills and provide opportunities for oral communication, we incorporated, for example, role-playing activities and round-robin discussions (Sahardin et al., 2019). These approaches were deliberately chosen and designed to promote both creative and critical expression, aligning with the participants' developmental stages and recognising their unique perspectives and diverse forms of creative expression (Scott-Barrett et al., 2023). The key research questions (RQs) that guided the study were:

1. **RQ1:** What are the perceptions of engaging with the Metaverse and co-designing its ethical guidelines?
2. **RQ2:** What guidelines should inform the design and development of ethical Metaverse spaces?
3. **RQ3:** What are the perceptions of co-designing ethical Metaverse guidelines and spaces?

Project Amplify



 Jesus College
OXFORD

METHODOLOGY



METHODOLOGY

The overarching methodological approach in the current study is based on Participatory Design (PD) — an approach that engages stakeholders as active contributors in the design process, ensuring that the design outcomes are both contextually relevant and aligned with the users’ needs and perspectives (Robertson & Simonsen, 2012). Our approach is specifically informed by a community-based PD approach, which we conceptualise through Karasti’s (2014) interpretation of communities as “*social constructs with open, dynamic, and heterogeneous structures for participation*” (p. 143). The young people in this study were existing members of the YCDI community, a collective comprising both students and adults who are engaged in an ongoing effort to become and to nurture, respectively, the next generation of digital content creators. Central to the community-based PD paradigm is the recognition that traditional PD methodologies must be adapted to reflect the complex, ongoing social relationships and dynamics that characterise the community context within which the PD occurs (DiSalvo et al., 2012).

For more than 30 years, PD approaches have been widely employed in the Child–Computer Interaction field to elevate children and young people’s perspectives of technology, particularly through co-design (Druin, 2002; Wilkinson & Wilkinson, 2024). Cortesi et al. (2021) advanced four PD models for researchers seeking to co-design with young people: Youth Labs, Learning and Co-designing Spaces, Youth Boards, and Participatory Research. The current study draws inspiration from the Learning and Co-designing Spaces and Youth Labs models as the foundational approaches for co-developing the ethical guidelines and their application in the creation of ethical Metaverse spaces. While both models support co-designing, the key distinction is that the Learning and Co-Designing Spaces model specifically acknowledges that participants may lack the necessary knowledge and skills for effective engagement in co-design. Consequently, as part of implementing the Learning and Co-Designing Spaces PD model, it is advisable to incorporate experts in instructional design, learning theory, education, and the relevant subject matter to effectively support and facilitate the co-designing process. This recommendation aligns with the suggestions of Lundy and McEvoy (2011), who highlighted the importance of capacity-building sessions in effectively engaging young people as essential contributors to the research process. More broadly, these sessions serve to equip young people with a deeper grasp of the subject domain, bolstering their self-efficacy, confidence, and capacity for critical thought (Abrami et al., 2015).

In contrast, the Youth Lab model recognises that young people already have knowledgeable⁵ insights which they bring to the co-design sessions and thus, may not require extensive training. This distinction is important for our research context, as the participating young people entered the project with limited knowledge of both the complexities of the Metaverse and the processes involved in co-design. Thus, it was necessary to provide capacity-building sessions, in which we further aimed to harness the hidden curriculum to empower the young people (Jackson, 1968). We aimed to create an environment where the young people could deepen their understanding of both the Metaverse and the co-design process, contributing new knowledge while reflecting on their individual and collective values in technology design, all within the context of learning alongside their peers.

Recognising and expecting that the young people’s roles would evolve—from learners during the capacity-building sessions to active contributors and knowledge transmitters during the co-designing sessions—we also considered it appropriate to transition to a PD model that would align with their new knowledge and evolving roles. Importantly, the Youth Lab model emerged as a flexible approach, allowing us to transition seamlessly between this model and the Learning and Co-Designing Spaces based on the specific needs of the situation.

⁵ We acknowledge that, regardless of providing training, young people contribute valuable insights derived from their unique lived experiences. However, it is important to differentiate between “unique” and “knowledgeable” insights. In this context, “knowledgeable” refers to having extensive, near extensive or at least some background information and understanding of a particular topic or process, which the young people in this study initially lacked.

According to Cortesi et al., the Youth Lab model is characterised by its focus on both learning with and from youth, who may possess a good (and sometimes, expert) understanding of the subject material. While we recognise that the young people in the current project may not achieve extensive expertise in the Metaverse and co-design after the short-term training, their participation in these sessions, coupled with the independent study we encouraged, was expected to enhance their foundational knowledge compared to their initial understanding at the project's outset. Additionally, the Youth Lab provides a platform for young people to explore each other's values—an essential aspect of designing ethical Metaverse spaces, especially for addressing and resolving value conflicts in technology design.

At the outset of the project, recognising the importance of providing capacity-building sessions for the young people as a prerequisite for their effective participation, we also considered the optimal duration of the co-design process. While we recognise the potential benefits of shorter co-design approaches (e.g., the 'tick-box' method described by Read et al., 2022), these processes have been criticised for maintaining decision-making power primarily in the hands of adults, thereby limiting young people's opportunities to develop collaborative design skills (Read et al., 2016). Moreover, drawing on our understanding of our young people's lack of familiarity with the intricacies of the Metaverse and the co-design process, we opted for a longer-term engagement, recognising that sufficient time would be required for training, co-designing guidelines, and subsequently developing their spaces. Consequently, our 1-year community-based PD approach aligns more closely with those advocating for longer-term engagement with young people (e.g., Schepers et al., 2022), where their roles evolve throughout the co-design process. This approach is consistent with our broader goal of empowering the young people during the project.

Although some authors (e.g., Antle & Hourcade, 2022) have noted the impracticality of involving many children in prolonged PD processes, the pre-existing community and trust established by YCDI with young people and their parents/guardians provided Project Amplify with the opportunity to engage the young people over an extended period. Importantly, to ensure flexibility and accommodate parents' requirements, parts of the project were conducted either entirely online or in a hybrid format, adhering to best practices for online co-design as established in previous research (e.g., Fail et al., 2022). Finally, to ensure project efficiency and continuity, we recruited university-aged students, including some who were already members of the YCDI community, and trained them to serve as facilitators throughout the project's duration. Their involvement was guided by the distributed data generation methodology, which emphasises training representatives from youth-oriented organisations to lead creative and participatory workshops with children, with the goal of gathering their perceptions and insights (Third et al., 2021). In the following sections, we provide an in-depth account of the PD process over the one-year period,⁶ covering each of the project's phases. It should be noted that the sessions detailed below were conducted on weekends (Saturdays), with the exception of the in-person session in Phase 3, which was held on weekdays.

Participants

Participants included primary and secondary school students from Jamaica and university-aged facilitators based in Jamaica and the UK. Throughout each project phase, we ensured that the sample size of young participants met the saturation criteria typically recommended for qualitative studies, which suggests a range of 9 to 17 participants (Glaser & Strauss, 2017; Hennink & Kaiser, 2022). After securing ethical approvals in accordance with YCDI's ethical requirements, supported by the organisation's formalised data and participant

⁶ The details of this report cover the formal engagement period from February 2023 to October 2023. From November 2023 to February 2024, students concentrated on further developing their Metaverse spaces in preparation for an in-person showcase event, *"Ethics in the Metaverse Through the Eyes of Jamaican Youth,"* held at the Cheng Kar Shun Digital Hub at Jesus College, University of Oxford (Our Today, 2024). The event was open to the broader UK community and was attended by selected young people, facilitators, and project coordinators. During the four months of preparation, the young people continued to receive technical support from project coordinators and available facilitators.

protection process, and obtaining informed consent and assent from both parents and young people, as well as from our facilitators, the project team commenced engagement with the participants. Facilitators included those who were a part of the YCDI's Change Agents (referred to as Change Agents or CAs) Programme as well as masters or doctoral students at Jesus College, Oxford. Change Agents are at the forefront of YCDI's efforts to galvanise young people and be an example of what it means to lead change through technology. Change Agents undergo an 11-month intensive programme⁷ designed to shape the participants – both technically and with the right mindset – for the digital world. Through the broader YCDI intensive programme, Change Agents not only participate in a variety of training sessions, and personal and professional development activities, but are also equipped to implement YCDI projects and programmes. For safeguarding purposes, it is important to note that at least one project coordinator ($n = 3$) was present at all sessions throughout every phase described below.

Materials

The measures and associated activities, such as the interactive, scenario-based approaches detailed in the subsequent sections, were informed by the principles of how students learn, including the use of scaffolding, active-based learning and feedback (Hattie, 2023; Hattie & Yates, 2013; Hirsh-Pasek et al., 2022; Weinstein et al., 2018). The technical implementation of the Metaverse spaces was done through the Mozilla Hubs⁸ and Mozilla Hubs Spoke platforms, an online 3D space hosting tool and online 3D design tool, respectively. The Metaverse spaces needed to have synchronised multi-user experiences that allowed different users to interact with the environment simultaneously, which we were able to achieve through Hubs by Mozilla. The hosting allowed us to integrate YCDI's domain throughout the project, a crucial connection as the participants' spaces were hosted within YCDI's online makerspace.

Procedures

Phase 0: Identifying initial perceptions and knowledge gaps (February, 2023)

Mode of Delivery: Remote via The Metaverse

This phase addressed RQ1: What are the perceptions of engaging with the Metaverse and co-designing its ethical guidelines?

Participating young people ($n = 10$, aged 10 to 15 years, 6 females) and university-aged ($n = 6$, aged 18 to 25 years, 4 females) facilitators convened in a 1.5 hr interactive, semi-structured focus group. Given the participatory nature of the project and the goal of involving young people in shaping the focus of ethical guidelines from the beginning, we invited them, along with facilitators, to share their initial perceptions (including concerns) of engaging with the Metaverse and co-designing its ethical guidelines. Recognising that some participants may be unfamiliar with the Metaverse and thus not fully aware of their concerns, we hosted the focus group session within the Metaverse (via Mozilla Hubs) to introduce them to this



Figure 1. Scavenger Hunt in the Metaverse

⁷ Please note that this intensive training is provided by YCDI and is separate from the capacity-building training offered to facilitators through Project Amplify. The Amplify training was more specifically tailored to achieving the project's objectives.

⁸ At the time of writing this report, Mozilla ended its support on May 31st, 2024: <https://support.mozilla.com/hsb/kb/end-support-mozilla-hubs>

environment. The session included targeted activities, such as a Makerspace scavenger hunt designed to explore ethics and co-design, along with broader discussions about the Metaverse itself. For example, in the Makerspace scavenger hunt, participants used provided clues to navigate to six distinct locations within the Metaverse (see Figure 1).

At each location, participants encountered brief text-based narratives addressing: (1) the definition of the Metaverse, (2) the concept of ethics, (3) the principle of co-design, and (4) ethical principles related to privacy, (5) trust, and (6) accountability, with the latter three topics presented at separate locations. These narratives on ethical principles (Locations 4 to 6) were specifically designed as scaffolding to support participants' understanding of ethical principles, acknowledging their potentially limited prior knowledge of this area. To reduce bias and the limiting of participants' responses, the activity was intentionally open-ended, allowing for the exploration of additional ethical considerations and enabling participants to generate additional principles based on their evolving understanding of ethics. Participants were tasked with ranking the principles (from most important to least important), including proposing additional ethical principles not covered in the initial narratives. This ranking system was strategically used to both identify participants' primary concerns and inform the focus of subsequent capacity-building sessions, ensuring the content addressed their expressed interests and concerns about engaging with the Metaverse. Participants had the flexibility to explore the locations in any sequence and were encouraged to revisit and adjust their rankings as their understanding of ethics evolved; this was particularly relevant if they encountered Locations 4 to 6 (focusing on ethical principles) before Location 2 (where the concept of ethics was introduced), as having the knowledge from Location 2 might better inform their articulation of new ethical principles. Participants were also encouraged to engage in discussions with each other while determining their rankings, which offered an initial opportunity to practise co-designing. Following the exploration, a Metaverse roundtable session was conducted in the form of a semi-structured focus group. This session aimed to discuss the insights gained from the ranking activity, including collectively identify the ethical concerns of greatest and least importance to the participants, and reflect on the concept of co-designing. The insights gained from this session also informed the direction of subsequent capacity-building sessions, as detailed in the following sections.

Phases 1 to 3 addressed RQ2: What guidelines should inform the design and development of ethical Metaverse spaces?

Phase 1: Facilitator Capacity Building Sessions (March to April, 2023)

Mode of Delivery: Remote via Google Meet

Given the central role of university-aged, student facilitators ($n = 6$, aged 18 to 25 years; 4 females), who were either of Jamaican heritage, studying at The University of the West Indies and The University of Technology ($n = 4$) or of Asian heritage studying at Jesus College, Oxford ($n = 2$), in leading co-design sessions with the young people, Phase 1 was devoted to providing capacity-building workshops for these facilitators. Facilitators comprised undergraduate ($n = 2$), master's ($n = 3$), and doctoral ($n = 1$) students, each specialising in a diverse array of disciplines, including International Relations, Political Science, Development Studies, Education, and Computer Science. At the time of participation, one of the Jamaican facilitators was intermittently stationed between Jamaica, Martinique, and France due to a university exchange programme.

Table 1 provides an overview of the six capacity-building sessions delivered to the facilitators by six academic and industry experts, each lasting for approximately 1-hour (~25 minutes of presentation with the remaining time allocated to discussion), featuring representation from YCDI, Mtoto News, Fit:match, The University of Cambridge, Harvard University, and a local law firm in Jamaica. The session topics were tailored to address key

concerns raised by participants during Phase 0. All sessions were hosted via Google Meet, with each session lasting up to 1-hour.

Table 1. Training sessions during Phase 1 for university-aged facilitators

Session	Topic
1	Preparatory session on ‘What is the Metaverse?’
2	Co-designing with young people and considerations around play in digital spaces
3	Emotional Intelligence (EQ) in technology design
4	Ethical and responsible technology design
5	Youth digital and computational literacy (youth digital/computational cultures)
6	Digital safety and security

Importantly, the capacity-building sessions were designed to offer facilitators their first opportunity to engage in detailed reflections on the specific guidelines that could guide the design and development of ethical Metaverse spaces. Session 2, which focused on learning how to effectively co-design with young people, held particular significance since not all facilitators had prior experience involving young people in co-design processes. Moreover, these sessions were intended to foster interactivity and collaboration among facilitators. While some had previously worked together as Change Agents within the broader YCDI programme, they formed a newly established team, with the inclusion of facilitators from Jesus College, Oxford. The training further provided them with the chance to share their learning reflections, consider the training’s implications and, importantly, cultivate camaraderie within the facilitator group. Additionally, facilitators from outside Jamaica (i.e., those from Jesus College, Oxford), were provided with a brief informational document: this document provided insights into Jamaica’s meeting customs, as well as its educational and socio-cultural landscape, helping facilitators better understand and connect with the young people.

Phase 2: Ethical Guidelines Development through Learning and Co-Designing Spaces and Youth Labs (May to July, 2023)

Mode of Delivery: Remote via Google Meet

The goal of Phase 2 was two-fold: (1) to provide capacity building sessions for young people and (2) to engage young people in activities involving critical discussions aimed at co-designing ethical guidelines for the Metaverse. Phase 2 comprised 9 sessions, with each session alternating between these two focus areas. Capacity-building sessions were held one week, aligning with Cortesi et al.’s (2021) Learning and Co-Designing Spaces model. The following week focused on developing ethical guidelines, following Cortesi et al.’s Youth Lab model. Engaging the young people in these capacity-building sessions was crucial, as we aimed to cultivate their critical thinking skills and dispositions for proposing ethical designs. However, the development of critical thinking relies significantly on possessing sufficient and current background knowledge in a specific area, thereby underscoring the necessity of these capacity-building sessions (Abrami et al., 2015; Johnston et al., 2023). Below, we provide a detailed account of the capacity-building training for the young people and the ethical guideline development sessions.

Young People - Capacity Building Sessions: Participants ($n = 25$,⁹ aged 10 to 17, sixteen females) engaged in five, interactive, remote capacity building sessions. Each session lasted approximately 45 minutes, with around 20 minutes dedicated to the formal presentation and the remaining time allocated for discussion. All young persons participated together in this single session. Prior to the commencement of the capacity-building sessions, parents of participating young people were invited to attend a one-hour orientation meeting. This session offered a refresher on the specific topics their children would be engaging with and provided an opportunity for parents to ask any questions. Subsequently, we held the capacity building sessions through Google Meet, delivered by seven academic and industry experts from a variety of organisations, including YCDI, Tufts University, Harvard University, The University of Oxford, Mighty Coconut (former Disney Imagineer), Google, and Social Crypto Art and Future 2050 from Brazil (see Table 2 for an overview of the session topics).

Table 2. Training sessions during Phase 2 for young people

Session	Topic
1	Preparatory session on 'What is the Metaverse?'
2	The Metaverse and co-designing responsible digital spaces
3	Inclusive and creative design in digital spaces (including brand identity)
4	Responsible (ethical) play in digital spaces
5	The Metaverse & digital identity and rights

Note: Sessions 2 and 5 featured two co-presenters.

The university-aged facilitators, who were trained in Phase 1, were also present in these sessions to help guide discussions between the young people and expert presenters. The primary objective of these sessions was to provide the young people with an updated understanding of the nature of the Metaverse and ethics, creative and ethical design, co-design principles in action, design which fosters creative and critical thinking, and the importance of play within and outside of digital environments. These sessions enabled the young people to share their learning experiences and consider the implications of the training on their own thinking for ethical Metaverse design. Before each session, whenever feasible, a member of Project Amplify's project coordinating Committee met with each expert presenter to provide an overview of the project's scope and key findings from previous phases.

Ethical Guidelines Development Sessions: Young people convened with the facilitators for four 1-hour sessions via Google Meet to co-reflect and document key insights from each capacity-building training session, with the goal of co-designing ethical guidelines for the Metaverse. To make the sessions more manageable, the young people were divided into two groups, each guided by multiple facilitators, and remained in these groups for the entire four sessions. However, both groups participated in the same activities. Before breaking out into their groups, we began each session by gathering in the main virtual room for a general ice-breaker activity aimed at fostering group camaraderie. At the end of each session, the groups reconvened, providing the young people with an opportunity to share and discuss key insights with members from the other group.

In preparation for these sessions, the young people were encouraged to conduct research throughout the week and, when possible, share their findings via blog posts on an internal forum developed by YCDI. This additional

⁹ Participants from Phase 0 were included in these sessions, along with new young people who became available to join the project.

independent study allowed the young people to broaden their understanding, often bringing new insights and information to the sessions that were previously unknown to the facilitators or project coordinators. As the young people's roles evolved from primarily learning to actively transmitting and producing new knowledge, the sessions adopted the Youth Lab model. This approach is characterised by co-designing with youth and learning from their skills and knowledge (Cortesi et al., 2021).

To support the planned activities for each session, project coordinators provided facilitators with guiding documents to assist in conducting the co-design activities. However, these guides were intentionally flexible, allowing facilitators to incorporate their professional insights and select activities that best aligned with the session's objectives. As a result, the final session guides were the product of a collaborative effort between the project coordinators and facilitators. Importantly, the project coordinators sought to leverage the facilitators' newly acquired skills and knowledge from their capacity-building training, as well as their existing understanding of Jamaican youth expressions and trends, such as language usage, which might not have been familiar to the project coordinators but could significantly enhance session engagement. After each session, a 15-minute retrospective (retro) meeting was held weekly with the university facilitators and the project coordinators to reflect on the session's process and outcomes, and to refine future approaches. These retrospectives followed a structured format, focusing on what worked, what did not work, and what could be improved.

Guided by principles of learning science (Hattie, 2023; Hattie & Yates, 2013), the four sessions with the young people also followed a consistent (but configurable) structure. This process involved reflecting on the details of the capacity-building sessions, discussing emerging questions, receiving feedback from facilitators and peers, and using common tools like Google Jamboard to document ethical guidelines. For examples of some of the initial guidelines articulated by the participants using Google Jamboard, see Figure 2. In what follows, we describe the specific activities that were conducted in each session. Importantly, the planned activities were aimed at fostering the young people's metacognition—encouraging them to think about their own thinking, including their own values for technology design (Hattie, 2023).

1. Have a report feature and mods to analyze and look over the space. 2. Have a password to open private settings. 3. Making people able to create their own community	1. consistent moderation to ensure rules aren't broken and implementing a proper punishment system	2. having clear and concise explanations of how data will be managed and used	3. Captions, text-to-speech, banning certain fonts so that persons with screen readers can navigate easier	4. reminders to remind users to take breaks from using the app/website and a feature to track and monitor usage of the app/website
4. Let there be sign language as an expression, let there be mic and a help feature if you don't understand.	1. set a report system and if someone is breaking rules then players may report them and they get a deserved punishment such as a kick from the space or a ban or an account suspensio	1. Establish and enforce clear community guidelines that explicitly prohibit cyberbullying and harassment. Users should be aware of the consequences of violating these rules.	2. Implement privacy considerations into the design process from the beginning. Minimize data collection, retain data only as long as necessary, and prioritize user consent	3. Ensure that the metaverse is accessible to individuals with disabilities by incorporating universal design principles. Provide options for different in
4. Design the user interface to be accessible to individuals with disabilities, including features such as easy-to-read fonts, color contrast adjustments.	2. a very short but educational and informative list of privacy rules and settings for an enhanced world experience	3. for a holiday the map is changed in design for that holiday	4. allow your space to be international, if not possible make your space accessible for most countries and your space shouldnt be too high quality so low quality devices can join.	

Figure 2. Examples of initial ethical guidelines that participants articulated using Google Jamboard

Each session was structured around a specific focus area, as detailed below. The thematic focus for each session was informed by a combination of the initial concerns identified in Phase 0 and insights gained from the

capacity-building training sessions. This approach ensured that the co-design sessions addressed both pre-existing issues and newly developed understandings. However, it is important to emphasise our intention to create an interconnected learning experience. While each session had a designated focus, we deliberately integrated thematic elements from previous sessions into the broader discussion, thereby fostering continuity and depth in our exploration.

Session 1: In the first session, the focus was on developing guidelines related to privacy and data protection and control over information. We firstly established a shared understanding of the Metaverse: in this way, we were able to determine if the term “Metaverse” was uniformly understood among the young people according to the definition adopted for our project (*see reminder of this definition in the Introduction - What is the Metaverse?*). We aimed to engage the young people in critically examining the complexities of social networking platforms, encouraging them to reflect on Metaverse guidelines concerning privacy, data protection, and broader security issues. Facilitators explicitly prompted the young people to put on their critical thinking and creativity hats while crafting these guidelines. Prior research underscores the importance of explicitly encouraging participants, particularly young children, to be as creative as possible, given the increased variability observed among individuals; this approach also enhances the likelihood of generating innovative ideas (Harrington, 1975). Additionally, while Google Jamboard was the primary documentation tool, the young people were encouraged to creatively express their ideas in the format that best suited them—whether through text, drawings, or avatar images—to ensure their thoughts were effectively communicated (Scott-Barrett et al., 2023).

Session 2: In the second session, the focus was on developing guidelines related to inclusivity and accessibility. The objective of the second session was to actively involve the young people in a practical examination of responsible design principles across both physical and digital spaces. Working collaboratively in groups, the young people envisioned the design of both physical and Metaverse spaces for YCDI, integrating responsible design elements and participating in a role-playing scenario to further explore their implications, including considerations around resolving value tensions between inclusivity and accessibility.

In the provided role-playing scenario, a tension emerges between enhancing AI-driven inclusivity and ensuring accessibility. Integrating diverse and complex AI features aimed at promoting inclusivity may unintentionally compromise accessibility for users with disabilities if these features are not user-friendly or appropriately designed. Conversely, prioritising accessibility might result in a more streamlined platform that could restrict the range of inclusive features offered. To explore this tension, the young people were encouraged to choose a role representing either the value of inclusivity or the value of accessibility and engaged in a debate with peers embodying the opposing value. This collaborative group activity allowed multiple participants to adopt the same value, facilitating a collective effort to address and resolve the value conflict. While engaging in the role-playing activity, the young people were guided by insights from their capacity-building sessions, where they evaluated potential risks associated with prioritising or de-prioritising a particular value in design, using resources such as the AI-Incident Database to identify AI harms and risks (McGregor, 2021). They were then encouraged to devise effective strategies for resolving the tension while critically assessing whether such a conflict existed (Friedman et al., 2013; van de Poel, 2015).

Towards the end of this session, the young people were also tasked with creating their own avatars, a crucial element for establishing identity within the Metaverse. This activity particularly fosters a sense of inclusivity by allowing young people to represent themselves in ways that reflect their individuality and diverse backgrounds.

Session 3: In the third session, the focus was on developing guidelines for digital well-being. Building on the discussion from the previous session, the young people were first given the opportunity to share the avatars

they had created using Mozilla Avatar Creator and Bitmoji.¹⁰ The main activity, called “Breaking the Rules,” and centred around content moderation: each young person contributed a content moderation rule. They then discussed potential ways to break or bend these rules, fostering a deeper understanding of the challenges in enforcing such guidelines and engaging in broader discussion about what this means for human development (linked to well-being) in digital spaces. Facilitators employed the Socratic method to cultivate critical dialogue among the young people (Paul & Elder, 2019). They also encouraged the young people to engage in debates and explore solutions related to defining acceptable online behaviour. Specifically, through the Round-Robin approach, young people were prompted to brainstorm strategies for enhancing content moderation rules (Sahardin et al., 2019).

Session 4: In the fourth session, the focus was on developing guidelines to reduce “tricky” design patterns. The young people engaged in activities that highlighted manipulative design patterns commonly found in social networking applications, including, the infinite scroll, bait and switch, the roach motel, and confirm-sharing. This final session also served as a checkpoint to ensure that the young people understood the project’s objectives, including the upcoming phase, which involved using the developed guidelines as a framework for designing their own Metaverse environments. In the latter part of the session, time was dedicated to discussing how the young people could conduct further research on ethical design principles related to the thematic areas covered. They were provided with guiding questions to structure their research and encouraged to contribute additional insights to a shared Google document that summarised the guidelines that we co-developed throughout Phase 2. These guidelines, initially captured through Google Jamboard, were consolidated into a Google Document for more efficient editing, facilitating collaboration on refining all guidelines in a central location. This collaborative approach aimed to empower the young people and facilitators to take ownership of the guideline creation process while encouraging continued independent exploration of ethical design concepts.

Phase 3: Metaverse Development (July to September, 2023)

Mode of Delivery: Hybrid via Google Meet and in-person sessions

During this phase, facilitators and young people¹¹ collaborated in a hybrid setting to implement the co-designed ethical guidelines into their Metaverse spaces. In the remote component, the Youth Lab model was employed in which facilitators from Jesus College, Oxford joined to guide discussions with the young people in Jamaica, reminding them of the ethical guidelines developed. They engaged in scaled-down versions of the scenarios presented earlier in Phase 2 (via the use of story/scenario cards as visualised in Figure 3), allowing the young people to review the guidelines, contribute new ideas, and practically consider how these guidelines might translate into the design of their own Metaverse spaces. This process facilitated discussions and potential revisions, including additions or deletions to the initially developed guidelines from Phase 2.

In the in-person component, the young people transitioned to a Learning and Co-Designing Spaces model in which they met project coordinators, facilitators and each other for a total of 40 hours. This was spread across five, full day (8-hr) design sessions, in which the young people acquired technical skills in Metaverse development (e.g., web development) aimed at helping them to design their Metaverse spaces. These practical and interactive technical sessions were delivered by university facilitators and project coordinators with extensive technical backgrounds. Sessions covered a wide range of topics essential for developing the Metaverse, including 3D modelling and animation, game development, and VR and AR design. Facilitators also provided instruction in basic web development, covering HTML and CSS, as well as network engineering for real-

¹⁰ Initially we wanted to use a full body avatar creator, specifically Ready Player Me - <https://readyplayer.me/>. However, due to the ages of our participants, we were unable to use the software without violating age requirements.

¹¹ Although there was a total of 25 young people in this phase, not all of them participated simultaneously due to scheduling conflicts. In any given session, we typically had around 10 to 15 consistent participants.

time interaction. The sessions also included instruction on AI usage and foundational principles of user experience design, ensuring that the young people acquired the knowledge and practical skills necessary to create and maintain an immersive Metaverse environment. Moreover, as the sessions were designed to be interactive, this enabled the young people to develop essential life skills such as collaboration, communication, and public-speaking. The project also facilitated the formation of new friendships among those with shared interests. At the conclusion of this in-person component, participants were awarded a certificate of participation.

Short Story 2



1. You are accessing a game in the Metaverse but to do so, you need to read a very long list of the terms and conditions before accessing the game.



2. You really want to read the terms and conditions but the language they are using is really hard to understand.

Your Task: Write 4 ways that we can design something to make sure that you can easily access the term and conditions and understand this document.

Bait and Switch



The ads show you a certain type of game available to download. But, when you download it, it is something completely different!

Your Task: How can we fix this dark pattern in design?
Suggest at least 2 design solutions to prevent this

Figure 3: Story/Scenario cards to facilitate the scaled down ethical guidelines extension session

Phase 4: Project evaluation (October, 2023)

Mode of Delivery: Remote via Google Meet

This phase addressed RQ3: What are the perceptions of co-designing ethical Metaverse guidelines and spaces?

All young persons, university-aged facilitators, and project coordinators ($n = 34$,¹² aged 10 to 40 years) were invited to take part in a 1-hour semi-structured focus group via Google Meet. Due to scheduling conflicts, the session was limited to 15 participants (aged 10 to 40, including eleven females across the group), of whom 10 were young people. The focus group explored the following areas: (a) the nature of ethical Metaverse design, including the challenges and affordances involved in ethical Metaverse development; (b) reflections on the

¹² One project coordinator was excluded from the final count because they participated in the reflection session as the focus group facilitator, not as a participant.

capacity-building and co-design sessions; and (c) reflections on future of co-designing ethical Metaverse spaces. The focus group session was made more engaging by employing a combination of direct questioning and interactive role-playing scenarios. For example, we developed a role-playing scenario designed to address a specific value tension in design. In this exercise, young people were encouraged to adopt the persona of one of the values under discussion and explore how to resolve the conflict from that perspective. This scenario was familiar to participants, as they had previously engaged with a similar activity in Phase 2 – Session 2 of the project. They received analogous instructions on how to approach this activity.

Data Analysis

The primary approach to data analysis involved content and thematic analysis of discussions among young people, facilitators, and project coordinators, drawn from focus groups, co-design sessions, and reflection documents generated with participants across each phase (Bowen, 2009; Braun & Clarke, 2006). For the development of the ethical guidelines, reflection documents were thoroughly reviewed and synthesised to identify potential pathways for promoting ethical experiences within the Metaverse. The content and thematic analysis method followed three key phases (Bowen, 2009; Braun & Clarke, 2006): skimming (initial engagement with the transcribed documents to establish preliminary codes), reading (a more comprehensive examination leading to detailed synthesis), and interpreting the documents. This process involved organising the data according to recognised codes, which were then refined into themes. We employed an amalgamated approach to coding that combined both inductive and deductive methods to capture any unforeseen findings in the ongoing narratives of our participants (Bruce et al., 2016). The coding process involved iterative reviews by three project team members, who achieved an inter-rater reliability of over 95%. We begin by presenting the findings on participants' initial perceptions regarding engagement with the Metaverse and the co-design of its ethical guidelines (RQ1), highlighting the ranking of seven key ethical considerations based on participant ratings along with their perceptions of co-designing. Next, we report the co-designed guidelines for creating ethical Metaverse spaces (RQ2), organised into five thematic spotlights. Finally, we reflect on participants' views and experiences with co-designing ethical guidelines and spaces within the Metaverse (RQ3).

Project Amplify



Jesus College
OXFORD

FINDINGS



FINDINGS

RQ1: What are the perceptions of engaging with the Metaverse and co-designing its ethical guidelines?

Phase 0 addressed RQ1. When participants were asked about their perceptions, particularly their concerns, regarding engagement with the Metaverse and the guidelines they considered important for shaping ethical Metaverse spaces, their responses aligned with the following ranking (from most to least important as perceived by participants): (1) representation and diversity, (2) privacy and security, (3) (dis)empowerment, (4) well-being, (5) spotting tricky design traps, (6) trust and (7) accountability.

Regarding perceptions of co-design, participants initially had limited knowledge of the concept. However, once they understood its general purpose and process, they recognised its benefits. Both young people and facilitators expressed a shared understanding of the pivotal role that co-design can play in shaping representative outcomes, reflecting a collective commitment to inclusivity and empowerment. Central to this discourse was the assertion that young people's involvement in the design process is not merely desirable but imperative. For example, one facilitator (aged 21) asserted the necessity of co-designing with young people: *"I think that it is important for young people to be a part of the designing process because they deserve to contribute their thoughts and ideas to the finished product."* This sentiment echoed throughout the discussions, emphasising the inherent value of youthful perspectives in enriching design outcomes, with a young person (aged 10) further noting that, *"what older people think is not what young people consider fun and we need to make unique things with our imagination and not close it up [limit our imagination]."* Similarly, other young people noted that *"young people have more fun ideas [compared to adults]"* and *"young people might come up with really good ideas"* (aged 13 and aged 12, respectively).

"What older people think is not what young people consider fun and we need to make unique things with our imagination and not close it up [limit our imagination]."

-Young person, age 10

Furthermore, the inclusion of youth voices was not viewed as a mere token gesture, but as a genuine expression of respect for their right to influence outcomes that directly impact their lives: *"having young people's voices in the co-design process shows respect [for] their basic rights"* (Young person, aged 14). This focus on respecting rights underscores the transformative potential of co-design, not only in its immediate design outcomes but also in its ability to foster a culture of meaningful participation and genuinely listening to children's voices: *"I think young people's voices are essential in the co-design process because adults might not know what young people want"* (Young person, aged 12). Importantly, participants also highlighted the broader societal implications of co-design, emphasising its role in shaping technology that is not only functional but also culturally and socially relevant: *"the co-design process not only combines the ideas of young people and adults but also allows both parties to design technology that represents a diversified result that is inclusive to all demographics"* (Facilitator, aged 22). Together, this reflects not only the practical benefits of co-design with young people but also its profound implications for empowerment, creative problem solving, and social change.

RQ2: What guidelines should inform the design and development of ethical Metaverse spaces?

Phases 1 to 3 addressed RQ2. The final and complete ethical guidelines are presented as a separate, stand-alone document which can be accessed [here](#). We co-developed ethical guidelines that address five areas: (1) **Privacy**

and Data Protection; (2) **Autonomy**; (3) **Human Flourishing**; (4) **Inclusivity and Accessibility** and (5) **Reducing Deceptive Patterns in Design**.

We however acknowledge that while the co-designed guidelines and their thematic titles were largely shaped by the extensive reflections that took place throughout Phases 1 to 3, they were also initially influenced by earlier discussions in Phase 0 (see RQ1), where participants first ranked key concerns about engaging with the Metaverse. As our discussions and co-design sessions advanced, we built upon these initial concerns and revised certain terms in response to participant feedback. For example, the initial concern with well-being developed into the broader theme of *Human Flourishing*, reflecting a more holistic understanding of the concept. Additionally, what participants initially understood as empowerment, or the lack thereof, was reframed under the broader theme of *Autonomy*. Similarly, what participants initially termed avoiding “tricky design traps,” was rephrased as *Reducing Deceptive Patterns in Design*.

Given the iterative nature of our process, including the use of Google documents to refine the guidelines, we have chosen to provide spotlight summaries of the guidelines rather than individual quotes. This spotlight structure captures the evolution of ideas through the collaborative editing of documents, where young people and facilitators were encouraged to continually reflect and propose improvements in wording, concepts, and framing for each suggested guideline. We start by offering our shared consensus on what Metaverse ethics should encompass, followed by the spotlight summaries of the ethical guidelines:

- **Metaverse ethics as moving the conversation from ethical Metaverse to ethical humans:** Technology itself does not determine ethics; it is humans who design, implement, and regulate these processes and systems. Therefore, our discourse should emphasise human responsibility and accountability in shaping ethical practices within Metaverse development.
- **Metaverse ethics as a dynamic process:** Ethics is not static; it evolves alongside advancements in digital technologies. Viewing ethics in binary terms (right versus wrong) is reductionist and oversimplifies the concept. Metaverse ethics should encompass an understanding of societal values and power dynamics, with the goal of implementing the Metaverse in a manner that promotes social justice.
- **Metaverse ethics from a comparative perspective:** We should explore ethics across time—past, present, and future—by defining it through comparative analysis. This includes examining relationships across time, both within and beyond the Metaverse, involving interactions between people and AI, and envisioning the desired outcomes we aspire to achieve.
- **Metaverse ethics as advancing the best outcomes for humans:** Ethical Metaverse design should prioritise enhancing the human condition. However, defining “best for the human condition” is subjective and context-dependent, necessitating a consideration of who defines and enforces these standards.
- **Metaverse ethics as an integrated (rather than an entirely new) branch of ethics:** While potential ethical challenges in the Metaverse will share similarities with past issues, their scale and complexity demand a nuanced approach within existing frameworks. We recognise the dynamic nature of ethics and the unique challenges presented by engaging with and within the Metaverse, particularly in light of the expanding role of AI within this space. Though not fundamentally new, these challenges require careful consideration within existing ethical paradigms. Rather than establishing a distinct branch of Metaverse ethics, we propose an integrated approach drawing from disciplines such as computer science, philosophy, psychology, sociology, and law.

Spotlight One: Privacy and Data Protection

Privacy and data protection refer to the principles, legal frameworks, and practices aimed at safeguarding individuals' personal information from unauthorised access, use, disclosure, alteration, or destruction. Participants highlighted the critical importance of implementing robust data protection measures within the Metaverse to safeguard user privacy and prevent potential breaches. This theme underscores the necessity for developers, platform operators, and policymakers to prioritise the establishment of stringent privacy policies and technological safeguards to ensure that users retain control over their personal information. Furthermore, it emphasises the need for ongoing dialogue and collaboration among stakeholders to address emerging challenges and evolving threats to data privacy within the dynamic landscape of the Metaverse.

Central to the guidelines that address privacy and data protection was the need for enhancing the accessibility and transparency of terms and conditions governing user data within the Metaverse. Recognising that complex legal jargon often acts as a barrier to informed decision-making, participants emphasised the importance of adopting a user-centric approach to data privacy. They articulated a consensus that traditional text-based agreements often prove cumbersome and incomprehensible, particularly for individuals with limited technological literacy. As a solution, a recommendation emerged advocating for the integration of visually engaging representations of data usage and privacy policies, clearly distinguishing the different purposes for which data is used. Such visual aids were envisioned to provide users, irrespective of their technological capabilities, with a clearer understanding of how their data is accessed, used (and re-used), and protected within the Metaverse.

Participants further envisioned that challenges related to privacy and data protection could be mitigated through the thoughtful application of technology. For instance, they proposed the use of *MetaPods* to empower users with greater control over their personal data. The concept of *MetaPods* [Pods = personal online data stores], inspired by the existing Solid Pods offering, is underpinned by decentralised architectures and is proposed as a privacy-enhancing approach tailored specifically for the Metaverse environment. While advocating for technological innovation as a means of addressing privacy and data protection threats in the Metaverse, participants also



cautioned against the risks of data monetisation and exploitation. They emphasised the urgent need for robust privacy safeguards and accountability measures, including stringent encryption protocols and multi-factor authentication mechanisms, to proactively prevent the over-collection and misuse of personal data. For example, the young people proposed a feature called *Uraningrave*,* a multi-factor authentication system that randomises the type of authentication mechanisms that are used each time a user is accessing personal data. Their rationale for the proposed feature name was that combining “Uranium” and “Grave” signals a powerful, secure, and serious authentication system. More specifically, they explained that the term uranium conveys strength and control, while grave implies seriousness and robustness of the system. Furthermore, participants emphasised the importance of holistic approaches to user privacy, advocating for the adoption of comprehensive privacy-by-design principles, which should be a standard platform design guideline for

Metaverse development. From the initial conceptualisation to the final deployment of the Metaverse, participants stressed the importance of embedding privacy considerations as a default within the design process. This approach ensures that user privacy and data protection are prioritised at every stage of development, emphasising that these safeguards should be part of an ongoing, rather than a one-off, process.

Spotlight Two: Autonomy

Autonomy involves people's ability to make independent choices and decisions, free from external coercion or undue influence. This includes ensuring access to information for informed decision-making, and managing how one's data is collected, used, and stored. In the context of the Metaverse, this is driven by transparent data practices, user-friendly interfaces, and mechanisms for user control over digital experiences.

A central tenet of the autonomy-related design reflections and subsequent guidelines was the importance of empowering users to express themselves authentically, both individually and collectively, within digital spaces. Participants emphasised the need to provide Metaverse spaces that enable individuals to showcase their creativity and identity in ways that reflect the inherent diversity of various cultural backgrounds. In this context, participants proposed solutions that celebrate diversity by addressing the unique needs of different ethnic groups and communities. They advocated for the creation of diverse, purpose-driven communities, empowering users to forge meaningful connections and cultivate shared interests within virtual environments. This was viewed as essential not only to the principle of autonomy but also to the broader goals of inclusivity and representation, both individually and collectively, within the Metaverse.

Moreover, participants underscored the significance of onboarding mechanisms that facilitate seamless navigation and user engagement within the Metaverse, particularly for newcomers and individuals with varying levels of technological proficiency. The conceptualisation of the proposed *Meta-Tour Guide** feature, characterised by a controllable interface and comprehensive overview of key safety protocols, emerged as a promising solution to enhance user autonomy in navigating the Metaverse. In parallel, participants advocated for the elimination of barriers to information access and dissemination within the Metaverse, stressing the importance of promoting free and unrestricted access to educational and entertainment materials. However, participants, in critically reflecting on this solution, also cautioned against potential negative impacts around unfiltered access. Instead, there were reflections around unfiltered but moderated design structures and processes. Additionally, mechanisms for reporting rights violations and safeguarding user autonomy were identified as essential components of an autonomy-enhancing Metaverse ecosystem.

More broadly, the guidelines for upholding autonomy were framed within the concept of an “*autonomy life cycle*,” which participants proposed as a structured approach to respecting user autonomy within the Metaverse. The proposed autonomy life cycle consists of four stages related to user interaction with the Metaverse: (1) initial engagement, (2) continuous engagement, (3) disengagement, and (4) re-engagement. The cycle begins with initial engagement, where users are onboarded and thoroughly informed about their rights and responsibilities within the Metaverse. During continuous engagement, users are ethically monitored and provided with tools that empower their virtual identities and content creation. This stage also includes ongoing maintenance and regulation, which involves assessing and adjusting autonomy levels based on user feedback. When users choose to disengage from the Metaverse, clear and transparent processes should facilitate a smooth exit, allowing them to retain control over their data and virtual assets. Provisions for re-engagement ensure that returning users can easily re-enter the Metaverse with updated information and support, ensuring a respectful transition throughout their journey.

Participants further emphasised that the promotion of “*ethical autonomy*” among Metaverse users should be a cornerstone of the autonomy life cycle. They proposed achieving this through integrated educational

processes within the Metaverse that inform users about the benefits of responsibly sharing their data for the greater good of society. This education is intended to empower users to exercise ethical control over their data usage. Participants further highlighted the importance of fostering data literacy and critical thinking as crucial components of achieving ethical autonomy. However, they also cautioned that poor practices in promoting critical thinking could lead to overthinking and paranoia about data sharing, ultimately discouraging users from contributing their data to support Metaverse development.

While the principles of the autonomy life cycle hold promise for upholding user autonomy, participants also recognised the inherent challenges posed by emerging business models in the Metaverse. These models could undermine user autonomy through intrusive advertising, complex legal frameworks that govern interactions within digital platforms and overcollection of user data. To address these challenges, participants proposed an AI-enabled design feature called *Colander*,* which functions much like a colander by selectively filtering out sensitive information that users do not wish to share with third-party applications. This feature could be further enhanced by integrating it with users' *MetaPods* for more robust privacy management.

Participants emphasised that enhancing user autonomy should begin with more thoughtful solutions on how to help users comprehend complex terms and conditions. Participants firstly noted that enhancing terms and conditions can be supported through a feature called *Magic Conch Shell*,* functioning like a call centre with two key functionalities: (1) providing an AI-driven automated response system for simple queries about terms and conditions, possibly enhanced by a dynamic, interactive, and animated chatbot, and (2) offering access to a trained human terms and conditions agent for more complex inquiries. Participants further proposed that user understanding of Metaverse terms and conditions could be improved through the incorporation of tools called *Terminator** and *Conditioner*.* They named the tools *Terminator** and *Conditioner** because they perceived that such design should encourage users to meaningfully pause and engage with the Metaverse content. The *Terminator** aspect prompts users to pause and critically evaluate the information presented, while the *Conditioner** aspect is designed to educate them about their rights, fostering a deeper understanding and conditioning their minds for critical thinking. Specifically, regarding the *Conditioner** aspect, the young people elaborated on their reasoning behind this proposed name, explaining that just as hair conditioner makes hair more manageable, this feature is designed to make complex content in the Metaverse, particularly terms and conditions, more manageable and easier to understand. They further proposed that this tool could be enhanced by a *Woogle Translator*,* a feature that would highlight and visualise key areas of the terms and conditions most relevant to the user. This customisation would be based on the user's pre-specified preferences regarding the aspects of data usage they are most interested in understanding. The overall objective is to integrate tools and features that employ advanced visualisation techniques and interactive elements to simplify and condense legal agreements into a more accessible format, especially for younger users. This approach would empower Metaverse users to navigate their digital interactions critically and confidently, with a clear understanding of their rights and responsibilities.

Spotlight Three: Human Flourishing

Participants emphasised that ethical Metaverse spaces must prioritise human flourishing as a fundamental principle from the very beginning of the design process, rather than addressing it only at later stages. Human flourishing, as collectively understood by participants, involves the holistic development and fulfilment of individuals, encompassing physical, emotional, mental, and social well-being. It goes beyond merely the absence of illness or adversity to include the presence of positive attributes such as happiness, resilience, and meaningful connections with others. In the context of designing ethical Metaverse spaces, participants emphasised that understanding and promoting human flourishing is crucial, as it is central to creating thriving digital communities and societies.

Participants reached a consensus on the importance of recommending that initial engagement with the Metaverse should begin with a mental health check, and continuous engagement should be supported by regular mental health breaks. This approach is intended to promote user well-being and encourage healthier interactions with the Metaverse. Additionally, it aims to foster balanced engagement by offering users opportunities to disengage and reconnect with real-world, physical contexts. Participants also linked these recommendations to the autonomy life cycle, suggesting that these “checks” and “breaks” could serve as integral components of this cycle.



In earlier versions of the guidelines, participants initially proposed making these “checks” and “breaks” mandatory design features. However, upon further reflection, they recognised that enforcing such a requirement could potentially limit users’ autonomy. Consequently, the guideline was restructured as a recommendation. To support these “checks” and “breaks”, discussions focused on using generative and perceptive AI technology that could respond to users’ needs in real-time based on their emotional state. This technology would assess whether a break should be suggested, ensuring timely and appropriate recommendations. For example, participants

proposed integrating engaging and accessible resources within the Metaverse, such as a “How do you feel?” scale featuring emojis depicting various facial expressions. Paired with an AI bot capable of detecting users’ emotional states and alerting a dedicated support team or trained virtual assistant, this feature would aim to provide timely assistance and intervention when necessary.

Additionally, in relation to young Metaverse users, participants emphasised the importance of robust parental controls, including restrictions on explicit content and derogatory language, as well as evidence-based limits on screen time to ensure safe and age-appropriate Metaverse interactions. Beyond setting screen time limits, it is also crucial to explore ways to facilitate collaborative engagement time in the Metaverse between parents and children. Moreover, clear community guidelines, and effective reporting systems, co-created with input from the community, were deemed essential to address inappropriate behaviour swiftly, with measures in place to prohibit cyberbullying and harassment. Enforcing strict terms and conditions, including prohibitions on gambling and explicit content, along with an effective, but fair, regulatory system to deter violations, was also proffered.

Spotlight Four: Inclusivity and Accessibility

Inclusivity refers to the principle of ensuring that all individuals, regardless of their background, identity, beliefs or abilities, feel valued, respected, and represented within the Metaverse. Accessibility, on the other hand, pertains to the design of products, services, and environments in a way that enables equitable access and participation for people with diverse abilities, including those with disabilities.

Interestingly, the guidelines for enhancing inclusivity initially centred primarily on enabling greater visibility of one’s culture, and therefore belief systems. However, through discussions on the concept of inclusivity and adopting a critical perspective on its meaning, the guidelines became more forward-thinking and open-minded, expanding to encompass other aspects of inclusivity, including cultural diversity and diversity of thought.

In relation to upholding inclusivity for people's culture and beliefs, multilingual support and automatic translation features were proposed as a useful way to bridge language barriers, ensuring seamless communication for users of diverse linguistic backgrounds. Additionally, increasing the diversity in avatar customisation options, including a wider range of skin tones, hair types, and body shapes, promotes a more authentic representation of users' identities. Furthermore, the proposal to adapt visualisations in the Metaverse for national as well as international holidays and implement cultural-themed events was thought to foster a sense of belonging and cultural exchange among users. By incorporating these features, the Metaverse can become a more inclusive and culturally rich environment, where individuals from various backgrounds feel represented and valued. In relation to upholding diversity of thought, participants further agreed that the Metaverse should promote open dialogue and create spaces where users can engage in respectful discussions across various topics without fear of discrimination. Algorithms and recommendation systems should be designed to expose users to diverse content and viewpoints, avoiding the reinforcement of existing biases or echo chambers. Educational tools should be integrated to foster critical thinking, guiding users in evaluating sources and considering multiple perspectives.

In relation to the interrelated theme of accessibility, participants' reflections and associated recommendations were aimed at ensuring equitable access for individuals with diverse needs and abilities. A prominent suggestion was the provision of sign language as a form of communication within the digital space, akin to the expressive capabilities afforded by emojis. Furthermore, participants emphasised the integration of technology to translate audio to sign language, enhancing communication accessibility for individuals with hearing impairments. Additionally, the implementation of a voice-activated control system was proposed to accommodate users with physical disabilities, such as cerebral palsy, who may face challenges in manipulating traditional input devices. The importance of designing user interfaces with accessibility in mind was further underscored, with recommendations including easy-to-read fonts, colour contrast adjustments, and text-to-speech features to support individuals with visual impairments or dyslexia; the Universal Design Framework (UDL) emerged as a key potential guiding framework for this design. Moreover, measures to ensure international accessibility and offline functionality were highlighted, acknowledging the diverse technological landscapes and connectivity constraints faced by Metaverse users worldwide. This is particularly important for lower-and middle-income countries where it is acknowledged that there is still a digital divide. For example, in reflecting on the Jamaican context and in recognising the bandwidth-intensive nature of the Metaverse, participants proposed the creation of a dedicated space with reduced bandwidth requirements to facilitate access for users with limited internet connectivity or low-quality devices, thus promoting inclusivity and accessibility, which together, provides equitable participation within the Metaverse.

Spotlight Five: Reducing Deceptive Patterns in Design

Deceptive design patterns encompass a range of strategies employed in digital interfaces to manipulate user behaviour, often leading to unintended (which may or may not be harmful) actions or outcomes. These patterns may include misleading prompts, hidden costs, or exaggerated claims, all designed to exploit cognitive biases and elicit desired responses from users.

It is particularly interesting that privacy policies or terms and conditions agreement requests, specifically their placement as pop-ups when users are not inclined to engage with lengthy legal documents, were perceived by participants as deceptive design. This approach often leads users to unknowingly agree to terms they do not fully understand, thereby undermining the principles of transparency and autonomy in digital interactions. To address this issue, participants suggested implementing design features that allow users to easily adjust the complexity of terms and conditions, thereby mitigating deceptive practices and empowering users to make informed decisions independently.

At the core of the guidelines for reducing deceptive design patterns was the goal of cultivating a symbiotic relationship between users and designers, defined by transparency, accountability, and mutual respect. Participants emphasised the important role of user feedback mechanisms in shaping ethical design practices, advocating for designers of Metaverse spaces to solicit and respond to user input regarding the ethicality of the space. This not only empowers users to voice their concerns but also holds designers accountable for their decisions, thereby fostering a culture of shared responsibility in digital design. Furthermore, participants' reflections highlighted the need for more robust regulatory measures to curb the use of dark patterns, underscoring a collective call for stricter penalties and enforcement mechanisms to deter non-compliant practices. Concurrently, there was a recognition of the importance of equipping users with the skills and knowledge necessary to identify and report instances of deceptive design, thereby enhancing their agency and autonomy in the Metaverse. Importantly, the guidelines reflected emerging concerns surrounding the manipulation of user emotions, augmented reality distractions, and the adverse impact of algorithmic predictions on individual autonomy and privacy. These phenomena were contextualised within broader discussions of human well-being, with a particular focus on the ethical implications of such deceptive patterns for the overarching goal of promoting and sustaining human flourishing. In response to these challenges, participants advocated for holistic approaches that prioritise creative and critical thinking, algorithmic fairness, and the cultivation of trust through transparent indicators of Metaverse integrity.

RQ3: What are the perceptions of co-designing ethical Metaverse guidelines and spaces?

This section presents the findings from a semi-structured focus group involving young people, university-aged facilitators, and project coordinators exploring their perceptions of co-designing ethical Metaverse guidelines and spaces.

Part I: Reflecting on the nature of the metaverse, ethics and value tension resolution

The discussion initially focused on exploring participants' understanding of the Metaverse, before moving on to address the affordances and challenges (e.g., value tensions) involved in co-designing ethical Metaverse spaces. Regarding the understanding of the Metaverse, participants highlighted that it is *"a completely different universe [that includes] ... virtual reality"* (Young person, aged 13); it also involves *"an immersive space"* (Young person, aged 10). The Metaverse was also considered as a space: *"where you can create your own imagination"* (Young person, aged 14). A facilitator (aged 21) further added: *"it's not only immersive, but you need more than one person for it to be considered a Metaverse ... it can't just be ... you alone playing a video game ... you have to be there with another person."*

In preparation for reflecting on the design of ethical Metaverse spaces, participants reflected on the concept of ethics, addressing both its theoretical foundations and practical implications for design. Theoretically, ethics is understood as *"something that is right,"* including having guidelines for *"inclusivity and diversity"* (Young person, aged 10), with the notion of ethical being perceived as *"doing something that is moral, something that respects the code of principles"* (Facilitator, aged 21). There was also the consideration of ethical from a more nuanced perspective when a facilitator (aged 21) asked: *"is there more meaning to [the concept] of being right?"* with other participants agreeing with the importance of asking this question. Similarly, another facilitator (aged 21) expanded this inquiry into what it means to be *"right"* by considering the perspectives of different audiences: *"I agree [with the view that ethical means to do something right], but at the same time ... something that is right for me, or for a particular group, may not be right for another group. So as much as we are thinking we are doing something right, we also have to ... take into consideration the audience you are preparing it [ethical design] for because that then takes into consideration whatever it is I think is right, [and allows me to think] is [this design] actually right?"*

"I agree [with the view that ethical means to do something right], but at the same time ... something that is right for me, or for a particular group, may not be right for another group."

-Facilitator, age 21

Interestingly, part of this nuance included questioning whether notions of what it means to be ethical should be integral to the core definition of the Metaverse itself: *"being ethical is not a requirement for [defining] the Metaverse, but it is definitely a recommendation"* (Project coordinator). However, another project coordinator challenged this view: *"I disagree as we need to ensure that having an ethical mindset from the very beginning and this includes an ethical conceptualisation of the Metaverse, is something I view as driving ethical Metaverse spaces forward."* Practically, when asked to expand on what it would mean to design *"something that is right"* (Young person, aged 10) in the Metaverse context, participants agreed that the design should begin with a human-centred approach, while simultaneously ensuring the protection of privacy: *"we would have to*

consider, who are the persons who will actually be using the space [and] what they want to use it for ... after we establish those objectives, we look at what kind of security measures we can put in place to ensure that when these persons are online, their information is secure (Facilitator, aged 21).

The conversation shifted to exploring participants' perspectives on resolving value tensions in designing ethical Metaverse spaces. These tensions were addressed more practically by engaging participants in a role-playing scenario where they navigated a value tension in the context of designing for accessibility. Participants agreed that it is important to uphold accessibility in design: *"we want to ensure that the [Metaverse] space we are creating is accessible to everyone. So [for] those who probably may have disabilities [we must] ensure that when they get on the Metaverse, they have the same experience as being able to feel, to touch ... just like anybody else who doesn't have any disability"* (Facilitator, aged 21). Designing for accessibility was also viewed as involving the ability to choose how one interacts with the Metaverse, including how one can code and the ability to vary the outcomes of that coding process. It was emphasised that users should have the freedom to tailor their experiences to their needs and preferences, including the ability to: *"code different ways to interact"* (Young person, aged 13).

Participants were then invited to role-play a scenario, with the aim of resolving a potential value tension in designing the Metaverse. The scenario focused on whether to permit voice modifications, weighing *accessibility* (enabling users to alter their voices to sound more inviting) against *trust* (concerns about the potential misuse of voice manipulation). As illustrated in Figure 4, the proposed solution offered by participants reflects broad lessons learned during the capacity-building sessions, categorised across three steps that aligns with the recent work of Sanderson et al. (2024, p.2), with guidance from van de Poel (2015):

1. **Identifying undesirable operational events:** This step involves initially assessing potential negative outcomes that could arise from not prioritising each value in the design process.
 - In Figure 4, the participant representing accessibility suggested that if the Metaverse did not allow for AI-enabled voice modifications, they would feel less confident due to their stutter; this sentiment was acknowledged by the participant playing the role of trust, who agreed that it would not be nice for individuals to feel insecure (Panel 1A). However, the trust participant also highlighted potential adverse outcomes if voice changes were permitted, suggesting it might enable deceptive or predatory activities, such as scamming (Panel 1B).

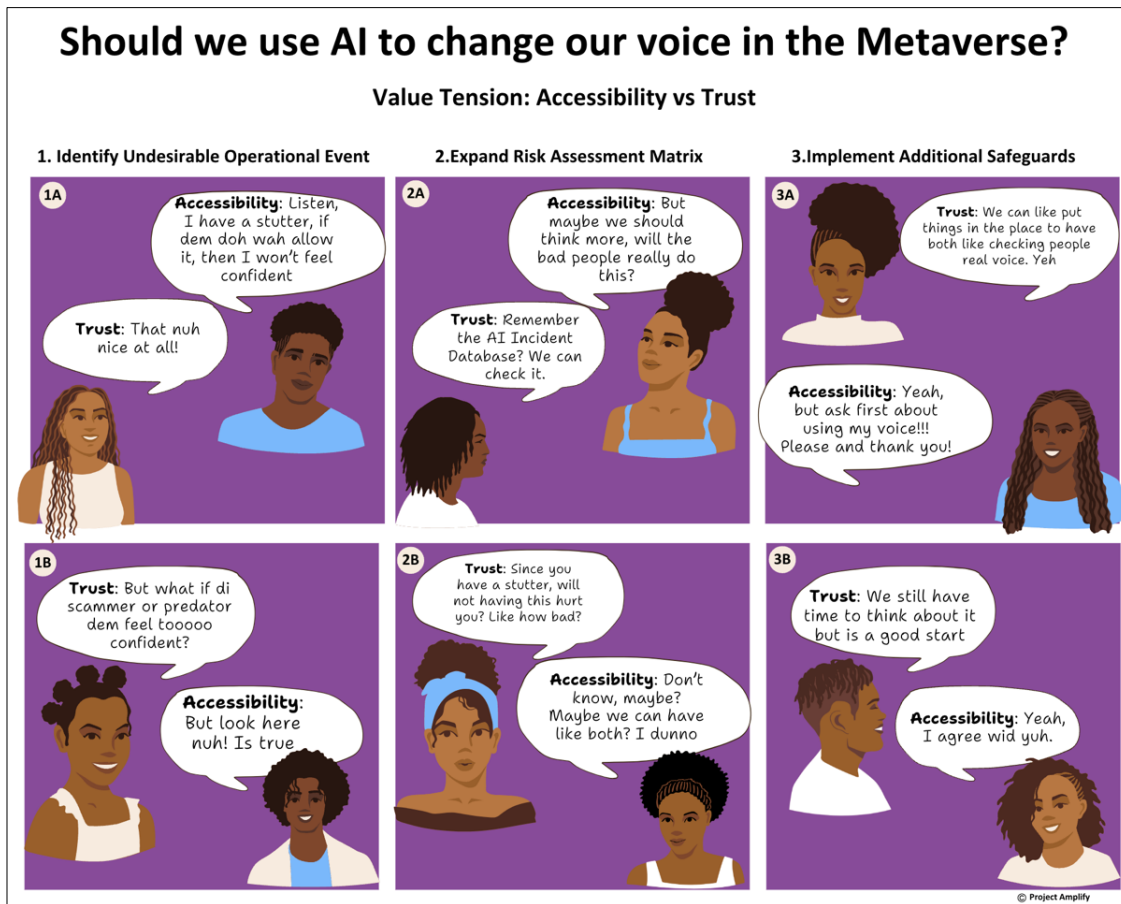


Figure 4. Resolving value tensions between accessibility and trust. Parts of the conversation are delivered in patois, the local language of Jamaica. All participants in the panels represent the voices of the young people, except for those in Panel 1B (Trust – University Facilitator) and Panel 2A (Trust – University Facilitator). Images are derived from the Metaverse avatars that participants developed during the project.

2. **Expanding the risk assessment matrix:** This step involves broadening the evaluation of all potential risks associated with prioritising one value over another, or considering the consequences of not prioritising a particular value in the design process.
 - In Panel 2, participants broadened their consideration of the risks associated with prioritising accessibility over trust, questioning whether malicious actors, such as scammers or predators, might exploit the voice modification feature. They suggested assessing these risks by referencing the AI Incident Database, introduced during a capacity-building session, to determine if similar incidents have occurred (Panel 2A). The discussion then shifted to evaluating potential harms if the voice feature was not enabled, such as the impact on individuals with speech impediments like stuttering (Panel 2B).
3. **Implementing additional safeguards:** This step involves identifying a third, less critical value within the scenario and determining how to ethically compromise this value to achieve a balance between the two primary competing values in the design process.
 - Ethically infringing on the value of privacy to accommodate both accessibility and trust was put forth as a solution to resolving the value tension (Panel 3A). This means allowing voice changes (accessibility) while upholding the value of trust by implementing approaches for voice checks

and validation. These checks and validations were viewed as crucial for resolving the value tension, with participants emphasising the importance of ethically upholding privacy throughout the entire process: *“designing [features] that can improve their [users] privacy ... people will always have their own opinions [of what to do] ... but make sure [this solution encourages users] to not share their actual [revealing] information”* (Young person, aged 14). Moreover, in reflecting on the value of privacy, and acknowledging the ethical implications of potentially infringing upon it, participants also considered designing privacy mechanisms in a way that ensures user well-being and safety. They agreed that, above all, any privacy infringement should be carefully aimed at: *“keeping others away from harm, whether it’s mentally, well mostly mentally, since it’s online. Although it [the selected design] might not make both parties or everybody happy, it’s just much more important to keep everybody safe, in that [Metaverse] space.”* (Facilitator, aged 21).

Part II: Reflecting on the capacity-building training sessions for ethical Metaverse design and development

Participants noted that a key part of co-developing the ethical guidelines and subsequent Metaverse spaces was the knowledge they gained through the training sessions, particularly from the *“discussions”* (Young person, aged 14), with a facilitator (aged 21) emphasising that everyone was enthusiastic in sharing their viewpoints and *“hearing everybody’s ideas.”* Another key aspect was the nature of the content covered in the training sessions: *“the presentations [during the training] were very interesting, especially getting to hear from experts within the field, giving their different opinions... [it was also useful] when experts ... [did] not just talk from experience but literally show[ed] us what [presenter pronoun redacted] has done within the Metaverse ... what [presenter pronoun redacted] made in the Metaverse and how [presenter pronoun redacted] transferred it [the design] into real life, that kind of gave a more tactical perspective”* (Facilitator, aged 21). There was also interest in exploring ethical design through a comparative perspective across different countries and industry contexts: *“the comparison [of designing Metaverse spaces] between Jamaica and Brazil was interesting ... and also learning about designing from the Sesame Street perspective”* (Facilitator, aged 21).

Summer Camp

During the camp, participants were further inspired to collectively explore the legal implications of bad actors in the technology space: *“I really enjoyed the group work as well, it was very fun. I also like web development; it was very good; it was very very fun creating fake companies [to explore the legal requirements of the companies in the Metaverse]”* (Young person, aged 12).

However, challenges emerged that reflected digital divides in the Jamaican context: *“the Wi-Fi was very slow; it was not working most of the time”* (Young person, aged 14), with participants recommending the need to have *“a better venue with Wi-Fi if there is another face-to-face session”* (Young person, aged 10). However, a project coordinator highlighted that in contexts where online stability is lacking, there is an opportunity to design Metaverse elements that encourage greater interaction with the physical world:

“I really enjoyed the group work as well, it was very fun. I also like web development.”

*-Young person, age
12*

We should remember that there is a need for in-person interactions... this is something for us to remember that all of these things [Metaverse spaces] are tools to augment and support what we are already doing, but they are not a replacement for the physical world and real-connection and so even as we look into digital spaces and immersive technologies, they are not a substitute for being with real people in real spaces (Project coordinator).

Participants further emphasised an appreciation of both the technical and social elements of Project Amplify: “[I] enjoyed learning about the Metaverse and coding and making friends with people... and the group work” (Young person, aged 14). One project coordinator also expressed appreciation for a young person’s design, particularly their creativity and problem-solving skills: “one of my memorable moments was you [referring to a young person in the focus group session] explaining the design that you created and the meaning of it, I could see your wheels [thinking process] spinning ... you were able to connect [with others] ... [and] the design [features] ... that was impressive” (Project coordinator).

Part III: Towards the future of co-designing ethical Metaverse spaces

When asked how they would further develop ethical Metaverse co-design initiatives if given a million dollars, participants highlighted the importance of disseminating knowledge across multiple stakeholder levels: “we could see how best we could go into schools, government facilities and talk about what we have uncovered and what we have learnt as well as tech [nology] companies in Jamaica ... we can even take this thing [project] international too” (Facilitator, aged 21). More practically, participants considered the role of ethically using advertisements through social media as a potential gateway for expanding knowledge about ethical Metaverse design which includes “respectful advertisements around the world ... on social media ... on Instagram” (Young person, aged 14). Participants also suggested expanding Project Amplify’s outreach to other Jamaican young people by inviting their “friends” (Young person, aged 13) as “there are some people in the coding club at my school [who] are interested in this” (Young person, aged 14). Moreover, there was consensus on the importance of continuing research in this area. Participants recommended that, over the next few years, the focus should be on validating the guidelines specifically for the Metaverse, as this is a gap, rather than concentrating solely on virtual reality guidelines, more broadly:

... based on the training sessions, some [the presenters] mainly spoke from the virtual reality point of view and not necessarily the Metaverse ... it’s [the Metaverse] something that is evolving everyday ... right now it’s [the Metaverse] not so mainstream but when it becomes mainstream, all the necessary measures are put in place because one of the things I remember from some of the sessions that those who are actually creating stuff, they always say we often create things but we don’t necessarily come up with the guidelines to ensure that they [the creations] are safe. So, for us to actually spend the time researching more about it [ethical Metaverse guidelines and actual implementation] ... would be pretty cool as we develop a standard that not only could be used in Jamaica but could be used as an international standard (Facilitator, aged 21).

Project Amplify



 Jesus College
OXFORD

DISCUSSION



DISCUSSION

The rapid and often unplanned introduction of children and young people to Metaverse spaces, that is mostly not designed with their safety in mind and for which they may not be well prepared, has amplified their risk of exposure to inappropriate or potentially harmful content. What is more concerning is that addressing these challenges, including potentially new forms of harms, are yet to be systematically addressed within Global Majority contexts, including countries within the Caribbean region. Consequently, Project Amplify, a one-year, community-based participatory collaboration between YCDI, a local organisation in Jamaica, and Jesus College, Oxford, emerged to address this gap and empower the next generation of Jamaican content creators of Metaverse spaces. As an experimental educational initiative in a Global Majority context, Project Amplify's goal was twofold: (1) to amplify and empower young people's voices in an anticipatory governance process of establishing ethical guidelines for the Metaverse and (2) to establish a collaborative classroom around Metaverse ethics, including ethical Metaverse design.

Throughout the project, we engaged expert presenters from academia and industry, along with young people from Jamaica (aged 10 to 17) and university-aged facilitators based in Jamaica and the UK (aged 18 to 25), to address contemporary social, ethical, and policy concerns surrounding the Metaverse. Phase 0 laid the foundation by exploring participants' initial perceptions (including concerns) about the Metaverse and the co-design process. Phase 1 involved training both young people and university-aged facilitators, while Phase 2 focused on co-designing the ethical guidelines. In Phase 3, these guidelines were further developed through an iterative process, alongside their practical implementation within Metaverse design. Finally, Phase 4 involved gathering project reflections. We identified five areas that demand immediate attention in the ethical design of the Metaverse: (1) **privacy and data protection**; (2) **autonomy**; (3) **human flourishing** (4) **inclusivity and accessibility**; and (5) **reducing deceptive patterns in design**. The project culminated in an in-person event at Jesus College, Oxford. During this event, the young people, facilitators, and project coordinators showcased their experiences, learnings, and outcomes from the project. In this final section, the key findings will be discussed within the broader context of Metaverse ethics, including their implications for policymakers, investors/funders, Metaverse providers/developers, and researchers.

A multi-dimensional view of ethical Metaverse governance

In the current study, the proposed ethical guidelines were observed to fall into two distinct categories. Uzun (2023) provides a useful distinction between these observed categories, identifying them as *governance-by-the-Metaverse* and *governance-of-the-Metaverse*.¹³ The former involves the establishment of norms and guidelines within virtual environments to regulate user conduct, while the latter addresses the management of broader issues, such as unwanted behaviours and the ongoing development and evolution of the Metaverse itself. This theoretical distinction is crucial, as it clarifies the scope of regulatory frameworks. Functionally, the distinction allows stakeholders to better understand and delineate their responsibilities, thereby reducing potential gaps in accountability (Santoni & Mecacci, 2021). Moreover, the differentiation ensures that rules and policies are effectively targeted and managed across various levels of the Metaverse ecosystem. Both dimensions are reflected in the co-designed guidelines presented in this study, which we explore in detail in the next section.

¹³ Uzun's (2023) bi-dimensional framework for Metaverse governance is employed for its clarity in categorising complex governance issues. However, our overall outlook on the guidelines goes beyond this structure, adopting a multi-dimensional perspective that considers ethical, social, technological, and cultural factors. This broader approach ensures a more comprehensive understanding of Metaverse governance challenges.

Governance-by-the-Metaverse

Governance-by-the-Metaverse focuses on the internal regulation of virtual environments, specifically the establishment of Metaverse norms that inform the development of guidelines for behaviours within this space (Uzun, 2023). These norms and guidelines define how the Metaverse is structured and controlled by its creators, as well as the rules that users must follow when interacting within the virtual environment (Long, 2012). Governance-by-the-Metaverse ensures adherence to these norms through mechanisms such as code enforcement, automated systems, community guidelines, and user self-regulation, all aimed at promoting and upholding pro-social Metaverse interactions (Uzun, 2023; Zhang, 2022). For example, in the current study, a norm embedded within our guidelines is the promotion of user autonomy. This norm was, however, integrally connected to addressing a primary concern identified during the initial phases of our research—namely, participants’ predominant concerns regarding privacy and data protection within the Metaverse. This concern’s prominence aligns with previous research, which identifies privacy as one of the most frequently discussed governance issues in Metaverse use. Notably, 41% of global Metaverse users have reported concerns about their privacy and data protection (Uzun, 2023); this issue was also identified as a top priority for both business owners and consumers (PricewaterhouseCoopers, 2022).

Furthermore, in the present study, norms (and subsequent proposed guidelines) intended to enhance human flourishing may inadvertently amplify concerns related to privacy and data protection. For example, one guideline proposed that the Metaverse be designed with well-being as a core principle from its inception. Accordingly, it was recommended that users undergo an AI-enabled mental health check upon entering the Metaverse. However, the sensitive nature of the health data required to facilitate this engagement is likely to raise significant privacy and data protection concerns. Zhao et al. (2023) emphasise that the Metaverse introduces the new bucket effect, which involves changes in the nature, quality, and quantity of data collected due to a change in environment. That is, engagement within the Metaverse involves an ongoing collection of personal and non-personal data compared to previous platforms, due to its immersive nature, the indistinguishability between virtual and real experiences, and the use of multiple sensors (Bolognini & Carpenelli, 2022). This will likely be further intensified by the integration of AI, including its application to enhance the functionality of the Metaverse across various services (Guo et al., 2022). Moreover, once information is transmitted from the user’s device, it is no longer under their direct physical control, increasing its vulnerability. Therefore, protecting user information at the device level is essential. This approach to data security is primarily infrastructure- and technology-focused, which will be further explored in the section on *Governance-of-the-Metaverse*.

The discussion on governance-by-the-Metaverse, with its emphasis on defining and establishing norms that underpin Metaverse guidelines, implicitly invites an examination of the underlying principles that shape these norms: whose norms should take precedence in shaping expected ethical behaviours and designs within the Metaverse (Egliston et al., 2024)? This inquiry aligns with our findings, where participants suggested that ethical norms should reflect a commitment to striving for what is right; but they acknowledged that there is no single, universally applicable definition of right. While concepts of right and wrong, and subsequent digital designs, are often influenced by cultural or geo-political experiences—such as the design of Metaverse environments in China, shaped by Xi Jinping Thought (Gray, 2021; McMorro, 2024; Peters, 2019; Siu & Chun, 2020)—psychologists have observed that humans generally share a universal sense of morality, irrespective of specific demographic or political characteristics (Black, 2014; Hauser, 2006).

Despite this proposed universality in notions of right versus wrong, we also acknowledge that value tensions in designs often emerge. This is especially pertinent to our recommended guidelines around content moderation. For instance, while we propose guidelines aimed at reducing harmful speech to promote human flourishing, we

also recognise the importance of free speech and thought diversity. In this context, value tensions may arise when attempting to uphold both values—reducing harmful speech while protecting free speech—during the design process. How do we resolve this? This question has long been a central concern within value-sensitive design research (Borning & Muller, 2012; Friedman, 1996; Friedman et al., 2017; Maciejewski, 2023; Veluwenkamp & van den Hoven, 2023). Researchers are increasingly prioritising the inclusion of large-scale public input in the design process to better understand and address these complex value dilemmas (e.g., Awad et al., 2018). For example, in the context of harmful versus free speech, Kozyreva et al. (2023)¹⁴ found that people generally prefer to combat harmful misinformation over preserving absolute free speech. This suggests that when faced with the dilemma of allowing free speech that might include misinformation or restricting speech to prevent harm, many individuals tend to favour actions that mitigate harm, even if it involves limiting certain forms of free expression. However, we must also recognise that limiting speech can lead to outcomes such as the chilling effect, which has significant implications for the preservation of democratic principles (Schauer, 1978).

A more nuanced approach to resolving value tensions and addressing the broader question of whose norms should underpin the *Governance-of-the-Metaverse* might involve shifting the focus from a binary distinction between right and wrong to a deeper consideration of the consequences of Metaverse users' or providers' actions (or inactions). This approach would particularly emphasise the potential harm that could arise from normalising certain behaviours or designs. For instance, a current norm in digital environments, as discussed in our study, is the “generous” provision of personalised services within the Metaverse, which often entails hidden costs, particularly concerning data privacy and user autonomy. These personalised offerings create an unspoken, complex, and opaque cycle of demands between technology companies and end-users, including young children, which involves excessive datafication (Barassi, 2019; Garcia-Rivadulla, 2016). We refer to the mechanism underlying this cycle as the Luke Effect: “*from everyone who has been given much [convenience], much will be demanded [increased datafication]*.”¹⁵ Indeed, there is unprecedented demand on end users, including demands on the provision of their data, demands on their privacy, and demands on their agency (Barassi, 2019). Given that the prevailing norm has been for Metaverse providers to have unprecedented access to users' personal data (i.e., upholding the value of profit over user autonomy), there is a pressing need to better understand the long-term consequences of de-valuing user autonomy. In addition, and more broadly, there is also a need for stronger regulatory demands to ensure ethical data access and handling. This shift in regulatory focus is crucial to protecting user privacy and upholding ethical standards in the rapidly evolving landscape of the Metaverse. This underscores the importance of effective *governance-of-the Metaverse*.

Governance-of-the-Metaverse

Governance-of-the-Metaverse involves broader regulatory and developmental standards and strategies, tackling challenges such as interoperability, technological advancements, and cross-platform consistency, ensuring a robust and swift 5G infrastructure, which are vital for enhancing the overall Metaverse experience (Uzun, 2023). There were relatively fewer instances of this aspect of Metaverse governance reflected in our proposed guidelines. However, the most relevant guideline that aligned with this dimension pertained to the concept of *MetaPods*. The idea for *MetaPods* emerged from the current understanding that fragmented personal data can be collected and each user stores their data in their own online storage space that is called a personal online datastore (Pod). This is linked to ongoing developments in decentralisation efforts, particularly around Solid (*Social Linked Data*) Pods [Solid Pods] (Esposito et al., 2023; Sambra et al., 2016). Developed by Sir Tim Berners-Lee, a Solid Pod serves as a secure repository for various types of personal data, such as contacts,

¹⁴ For readers seeking insight into platform moderation policies, these authors offer a comprehensive overview of the key moderation policies implemented across various platforms (see SI Appendix, Table S9).

¹⁵ Luke 12:48, NIV; parentheses with additional details are added to clarify the point

files, photos, and other sensitive information. Users maintain full control over their data, deciding who can access it and what specific information is shared. This system empowers individuals with complete autonomy, allowing them to manage sharing permissions, grant access, and revoke permissions as they choose (Sambra et al., 2016).

The proposed *MetaPods* are grounded in Solid principles and would serve as secure personal data repositories within the Metaverse, enabling users to manage and control all their interactions, assets, and data. This consideration is crucial given that interactions within the Metaverse can generate extensive personal data, such as unique biometric recordings, eye movements, facial expressions, and heart rates, with Bailenson (2018) finding that a 20-minute virtual reality session could generate nearly 2 million unique body language recordings. To address privacy concerns, some scholars have discussed alternatives like walled gardens, which create a closed Metaverse ecosystem to better secure data (Ng, 2022). However, walled gardens—representing a centralised governance approach—can pose significant issues for users. Similar to the design of current social Web applications such as Facebook, Instagram, and X (*nee* Twitter), this centralised governance approach confines data and interactions within their own ecosystems, significantly restricting users' ability to interact with or transfer data to other systems (Sambra et al., 2016). This confinement undermines and limits user autonomy over personal information. Importantly, this lack of interoperability — the ability of different systems or technologies to work together and exchange information effectively — within walled gardens means users must stay within the same ecosystem to access or manage their data (Berners-Lee, 2010; Cabello et al., 2013). In contrast, *MetaPods*, based on Solid principles, offer a more promising approach by extending the principles of data ownership and privacy while providing greater interoperability across different platforms (Sambra et al., 2016).

Other scholars have yet advanced that the governance-of-the-Metaverse, particularly concerning data privacy and security, should be underpinned by “themes of secrecy” (Uzun, 2023, p. 239). However, this perspective encounters potential drawbacks when data is conceptualised through a property-centric lens. Specifically, an emphasis on walls and secrecy regarding data access may inadvertently impede the facilitating of data access and sharing for the collective good (Remolina & Findlay, 2022; Verhulst, 2023) and to date we do not yet have a nuanced understanding of the potential adverse effects that emerge from not sharing data in service of the public good. This is an active area for future research being implemented through different initiatives, including the Open Metaverse Interoperability Group (OMI Group, 2021).

Metaverse autonomy: Ethical autonomy within an autonomy life cycle

Closely aligned with the concept of sharing data for the public good, the guidelines proposed in this study strongly advocate for upholding *ethical autonomy*. This concept encourages Metaverse users to critically reflect on and responsibly exercise their autonomy in managing control over their data. Our study proposes that integrating this concept into design frameworks ensures users make ethical and informed decisions when interacting with or disengaging from the Metaverse, particularly in terms of data sharing. This proposition aligns with the literature on digital self-determination, which emphasises collective autonomy and is often explored through a Kantian ethical lens (Kant, 1996; Remolina & Findlay, 2021).

We further contribute to this body of work by proposing that one approach to facilitating ethical autonomy is through an *autonomy life cycle*: this refers to a continuous process designed to enhance people's control over their interactions and decisions within the Metaverse, from initial engagement to eventual disengagement and possible re-engagement. Key to this cycle are transparent checkpoints at each (dis)engagement stage, which support and promote users' ethical autonomy. Another central feature of this cycle is its emphasis on promoting critical thinking rather than enabling criticism. We argue that poorly designed autonomy life cycles can lead to

what we term a *critical thinking paradox*, resulting in excessive overthinking, criticism, mistrust, and a reluctance to share data for the public good. To reduce this likelihood, it is crucial that these designs are informed by established research on fostering critical thinking in digital environments (Abrami et al., 2015; Mulnix, 2012; Paul & Elder, 2008; Willingham, 2007). Future research should prioritise identifying design flaws that contribute to the critical thinking paradox, including conducting experimental studies to explore the role of Metaverse environments in fostering critical thinking (Lai, 2024). This approach will help clarify how these digital spaces can either support or hinder users' ability to think critically and ethically, ensuring that the design of the Metaverse aligns with the broader goal of promoting informed and autonomous user engagement. More broadly, the autonomy life cycle proposal addresses the gradual degradation of online platforms, which initially entice users with excellent, often free services, but eventually shift to prioritising profit over user experience and autonomy. This shift leads to intrusive advertisements, exploitative practices, and potentially diminished human flourishing (Doctorow, 2024).

The autonomy life cycle and human flourishing

The *autonomy life cycle* proposal also prompts broader inquiries into the implications for well-being associated with participation in digital spaces like the Metaverse. This is particularly relevant as the cycle is closely tied to our proposed guidelines on human flourishing and the reduction of deceptive design patterns. The cycle aims to create opportunities for users, especially children, to engage with both the virtual and physical worlds, thereby safeguarding their well-being and promoting positive human flourishing.

There, however, remains a significant research gap concerning the specific impact of the Metaverse on the human flourishing of young people, including the effects of video game play in the Metaverse, immersion in virtual environments, and the development of social bonds. However, recent studies outside the Metaverse context have highlighted the potential of video games, for example, to positively impact children's well-being. For example, a recent UNICEF Innocenti Report (2024), based on experimental, ethnographic, and psychophysiological studies conducted across six countries, found that digital games hold promise in enhancing children's well-being, including their autonomy. The study suggested that this might occur through problem-solving within games, exercising agency in decision-making, and customising avatars, all of which foster a sense of autonomy and creativity. At the same time, the study reports that digital games help children to regulate and navigate their emotions, fostering a sense of connection with others and facilitating the management of social interactions. Other scholars have shown that these positive online social interactions seem to also extend to offline settings. For example, Steinsbekk et al. (2024) conducted a longitudinal study involving Norwegian adolescents, revealing a significant association between social media usage and offline face-to-face interactions with friends, particularly among 12 to 14-year-olds. This implies that engaging with the Metaverse could potentially foster increased offline social engagement among youth. However, for these positive benefits of engagement with digital spaces to occur, these virtual environments need to be designed with children's well-being in mind (UNICEF Innocenti, 2024), aligning with our proposed guideline for the Metaverse to have *human flourishing by design*. To achieve this, we propose that the Metaverse should be intentionally designed to encourage engagement with the world outside of it, using an interdisciplinary approach to understand its nuances. To this end, Dwivedi et al. (2022) adopt a comprehensive, multi-perspective narrative, where 42 scholars critically discuss the dilemmas of accessing the Metaverse, including its use and misuse across various domains such as education and youth. They also address broader issues related to fairness, transparency, and the psychological implications of toggling between the virtual and physical worlds.

Recommendations

Recommendations for policymakers

Bolognini and Carpenelli (2022, p. 3) pose a critical and forward-thinking question for policymakers: *“Can our conceptual and technico-juridical categories still function in the Metaverse? And if so, to what extent?”* Jamaica, having recently implemented its Data Protection Act, currently lacks provisions that address the complexities of the Metaverse. This highlights the importance for local policymakers to adopt a proactive rather than reactive stance on data protection policies. This should encompass not only the Metaverse but also digital spaces more broadly, including AI-enabled environments, as outlined in our proposed guidelines. Importantly, given the pervasive surveillance of children's experiences (e.g., see Lupton et al., 2017), policymakers must carefully reconsider and enhance regulations to address the amplified and continuous collection of multiple data points within the Metaverse.

Given the creative solutions that the young people generated and the critical discussions they led, we urge policymakers to invest more resources in providing opportunities for students to address local technological challenges with innovation. This can be achieved either through enhanced out-of-school learning activities or by integrating such opportunities within the formal curriculum. This is crucial for nurturing students' critical and creative thinking—a key area needing improvement, as evidenced by Jamaica's overall low performance¹⁶ in creative thinking during the recent 2022 Programme for International Student Assessment (PISA) cycle (OECD, 2024).

Additionally, Rodney Taylor (2022), Caribbean Telecommunications Union Secretary General, underscores another important perspective: *“One thing we must never do in the [Caribbean] region is relinquish all technological innovation to developed countries and merely consume technology products and services from afar ... Yes, we must build global relationships and collaborate, but we must also take ownership and craft our own destiny.”* In this context, it is crucial to consider the implications of receiving international funding for local Metaverse development and its associated conditions. For instance, Jamaica's history of borrowing from international organisations like the International Monetary Fund (IMF) has often involved austerity measures such as reducing social spending, which can impact local human and economic development priorities (Bissessar, 2014; Clarke & Nelson, 2020). Policymakers must therefore develop a strategic plan to navigate these challenges if they choose to seek international funds to advance the Caribbean Metaverse industry. Relatedly, the upcoming 2024 appointment of Jamaican Minister of Finance, Hon. Dr. Nigel Clarke, to the post of Deputy Managing Director for the IMF could have significant implications for Jamaica's investment in digital technologies (Mitchell, 2024). This strategic positioning may enhance Jamaica's efforts to strengthen its economy by fostering a more robust and sustainable digital infrastructure, aligning with broader economic goals.

Recommendations for investors and funders

Funders are advised to genuinely value the principles of slow scholarship (Carrigan & Vostal, 2018) particularly within Global Majority contexts. In Project Amplify, we aimed to engage in a community-based participatory, citizen science project that extended beyond a single-point interaction. We focused on providing participants with meaningful opportunities to reflect on their experiences, fostering deeper and more sustained

¹⁶ Interpreting these findings should be approached with caution, as they may not fully meet one or more PISA sampling standards (OECD, 2024 recommends viewing Reader's Guide, Annexes Az and A4 for further information).

involvement. In many Global Majority public school contexts, children are often subjected to large class sizes (e.g., up to 50 students per classroom in Jamaica), and therefore often lack opportunities to voice their opinions (Allen, 2018). This suggests that co-design may be more challenging in these contexts, as children often lack opportunities to develop skills for collaborating with adults in the creation of digital products. Therefore, depending on contextual factors, a slow science approach may be essential to build young people's confidence and enable their meaningful engagement over time, addressing gaps often present in formal learning environments. We encourage funders to be mindful of these contextual factors and support longer-term studies, including those with longitudinal ethnographic approaches. This will help to thickly align design implementations more closely with people's values, providing a richer understanding of their true expectations for Metaverse ethics (Nelson, 2023).

Recommendations for Metaverse providers and developers

The key message for Metaverse providers is to prioritise, if not place even greater emphasis on, shifting the focus from ethical Metaverse design to the development of ethical Metaverse developers. Foremost among this shift is the question of what—or whose—values Metaverse spaces ought to align with: Whose ethical systems should be applied? Who gets to make that decision? Who has the responsibility to care about implementing ethical metaverse spaces? Who might enforce ethical regimes once they are established? Indeed, central to the resolution of value tensions in a human-centred way, in a way that is fair, begins not with who we are designing for – it begins with reflecting who we are: What are our values and what are our biases? Whose values get to be included and whose are left out? How do these values influence what we build, how we build, and for whom? (Rainie et al., 2021; Smith et al., 2020). More broadly, in every Metaverse development project, when applying ethical guidelines to design, it is important to ask: “Whose side are our Metaverse ethics codes on?” ... “Are we doing good for everyone, for most people, for the vulnerable, or for a power[ful] elite?” (Washington & Kuo, 2020, p.230-231).

Recommendations for researchers

Our project aimed to design ethical Metaverse guidelines with active input from young people, ensuring their voices and perspectives were integrated into the evolving digital landscape. However, logistical and availability constraints led to the exclusion of families, particularly parents, as key participants. Parents play a critical role in shaping their children's online experiences and ethical viewpoints, and their perspectives should offer valuable insights into potential challenges and solutions. Future research should address this gap in Global Majority contexts by actively and directly involving parents and caregivers more extensively, thereby contributing to the emerging research on parents' perceptions of the Metaverse (Bonales et al., 2024). Such research should explore their concerns, expectations, and recommendations for ethical engagement with the Metaverse and determine how these experiences might differ across context. Additionally, our research introduced concepts such as, the *autonomy life-cycle*, *ethical autonomy* and the *critical thinking paradox*. Future researchers should further investigate and validate these constructs across various contexts, including their conceptualisation, to establish a globally shared understanding. Additionally, researchers could identify best practices for implementing a functional autonomy-enhancing life-cycle that upholds ethical autonomy, and reduces the critical thinking paradox, within the Metaverse.

REFERENCES

- Abrami, P. C., Bernard, R. M., Borokhovski, E., Waddington, D. I., Wade, C. A., & Persson, T. (2015). Strategies for teaching students to think critically: A meta-analysis. *Review of Educational Research*, 85(2), 275-314. <https://doi.org/10.3102/0034654314551063>
- Abrar-ul-Haq, M., & Arkam, F. (2024). Real estate in the Metaverse. In *Blockchain in Real Estate: Theoretical Advances and New Empirical Applications* (pp. 123-151). Singapore: Springer Nature Singapore.
- Akour, I. A., Al-Marouf, R. S., Alfaisal, R., & Salloum, S. A. (2022). A conceptual framework for determining metaverse adoption in higher institutions of gulf area: An empirical study using hybrid SEM-ANN approach. *Computers and Education: Artificial intelligence*, 3, 100052. <https://doi.org/10.1016/j.caeai.2022.100052>
- Allen, I. (2018). *Problem for principals - Education ministry's directive to reduce teacher-pupil ratio to 1:25 rattles schools*. Retrieved from: <https://jamaica-gleaner.com/article/news/20180429/problem-principals-education-ministrys-directive-reduce-teacher-pupil-ratio>
- Antle, A. N., & Hourcade, J. P. (2022). Research in child-computer interaction: Provocations and envisioning future directions. *International Journal of Child-Computer Interaction*, 32, 100374. <https://doi.org/10.1016/j.ijcci.2021.100374>
- Awad, E., Dsouza, S., Kim, R., Schulz, J., Henrich, J., Shariff, A., ... & Rahwan, I. (2018). The moral machine experiment. *Nature*, 563(7729), 59-64. <https://doi.org/10.1038/s41586-018-0637-6>
- Bagley, A. (2024). *EU sets sights on Microsoft/OpenAI, probes Metaverse concerns*. Global Competition Review. Retrieved from <https://globalcompetitionreview.com/article/eu-sets-sights-microsoftopenai-probes-Metaverse-concerns>
- Bailenson, J. (2018). Protecting nonverbal data tracked in virtual reality. *JAMA Pediatrics*, 172(10), 905-906. <https://doi:10.1001/jamapediatrics.2018.1909>
- Barassi, V. (2019). Datafied citizens in the age of coerced digital participation. *Sociological Research Online*, 24(3), 414-429. <https://doi.org/10.1177/1360780419857734>
- Barrera, K. G., & Shah, D. (2023). Marketing in the Metaverse: Conceptual understanding, framework, and research agenda. *Journal of Business Research*, 155, 113420. <https://doi.org/10.1016/j.jbusres.2022.113420>
- Benjamins, R., Rubio Viñuela, Y., & Alonso, C. (2023). Social and ethical challenges of the Metaverse: Opening the debate. *AI and Ethics*, 3(3), 689-697. <https://doi.org/10.1007/s43681-023-00278-5>
- Berners-Lee, T. (2010). Long live the web. *Scientific American*, 303(6), 80-85. Retrieved from: https://oldobjectsnewideas.com/_reading/Berners-Lee_LongLiveWeb2010.pdf
- Bissessar, A. M. (2014). Whose governance? IMF austerities in a small island state: The case of Jamaica. *Journal of Reviews on Global Economics*, 3, 190-199. <https://doi.org/10.6000/1929-7092.2014.03.15>

- Black, D. (2014). *The social structure of right and wrong*. Academic Press.
- Bolognini, L., & Carpenelli, M. E. (2022). *The future of personal data in the Metaverse*. <https://doi.org/10.5281/zenodo.6413046>
- Bonales-Daimiel, G., Moreno-Albarracín, B., & García-Rivero, A. (2024). Children's behavior at metaverses: Interactions, digital identities, and parent's perceptions. *Online Journal of Communication and Media Technologies*, 14(2), e202418. <https://doi.org/10.30935/ojcm/14338>
- Borning, A., & Muller, M. (2012). Next steps for value sensitive design. In *Proceedings of the SIGCHI conference on Human Factors in Computing Systems* (pp. 1125-1134). <https://doi/pdf/10.1145/2207676.2208560>
- Bowen, G. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27 – 40. <https://doi.org/10.3316/QRJ0902027>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Bruce, A., Beuthin, R., Sheilds, L. Molzahn, A. Schick-Makaroff, K. (2016). Narrative research evolving: Evolving through narrative research, *International Journal of Qualitative Methods*, 15(1), 1-6 <https://doi.org/10.1177/1609406916659292>
- Cabello, F., Franco, M. G., & Haché, A. (2013). The social web beyond “Walled Gardens”: Interoperability, federation and the case of Lorea/n-1. *PsychNology Journal*, 11(1), 43 – 65.
- Caribbean Community. (2021). *Digital skills are vital now*. Caribbean Community. Retrieved from <https://caricom.org/digital-skills-are-vital-now/>
- Caribbean Telecommunications Union (2021). *CTU and the government of Barbados traverse the Metaverse*. Caribbean Telecommunications Union. Retrieved from <https://ctu.int/ctu-and-the-government-of-barbados-traverse-the-Metaverse/>
- Carrigan, M., & Vostal, F. (2018). *Now a symptom of that which it sought to critique? A critical reflection on the Accelerated Academy project*. London School of Economics and Political Science. Retrieved from: <https://blogs.lse.ac.uk/impactofsocialsciences/2018/12/03/now-a-symptom-of-that-which-it-sought-to-critique-a-critical-reflection-on-the-accelerated-academy-project/>
- Clarke, C., & Nelson, C. (2020). *Contextualizing Jamaica's Relationship with the IMF*. Springer International Publishing.
- Colvert, A., Pothong, K., & Livingstone, S. (2024). Playful by design: Embedding children's rights into the digital world. *ACM Games: Research and Practice*, 2(2), 1-10. <https://doi.org/10.1145/3678469>
- Constantin, A., Korte, J., Wilson, C., Alexandru, C. A., Good, J., Sim, G., ... & Eriksson, E. (2020). Planning the world's most inclusive PD project. In *Proceedings of the 2020 ACM Interaction Design and Children Conference: Extended Abstracts* (pp. 118-125). <https://doi.org/10.1145/3397617.3398066>

- Coombs, P. H., & Ahmed, M. (1974). *Attacking rural poverty: How nonformal education can help. A research report for the World Bank prepared by the International Council for Educational Development*. International Council for Educational Development
- Cortesi, S., Hasse, A., & Gasser, U. (2021). *Youth participation in a digital world: Designing and implementing spaces, programs, and methodologies*. Youth and Media, Berkman Klein Center for Internet & Society, Retrieved from <https://cyber.harvard.edu/publication/2021/youth-participation-in-a-digital-world>
- Cortesi, S., Hasse, A., Lombana-Bermudez, A., Kim, S., & Gasser, U. (2020). *Youth and digital citizenship+ (plus): Understanding skills for a digital world*. Youth and Media, Berkman Klein Center for Internet & Society. Retrieved from <https://cyber.harvard.edu/publication/2020/youth-and-digital-citizenship-plus>
- Coyle, D., & Hampton, L. (2024). 21st century progress in computing. *Telecommunications Policy*, 48(1), 102649. <https://doi.org/10.1016/j.telpol.2023.102649>
- Department for Science, Innovation and Technology (2023). *Online Safety Act: explainer*. Department for Science, Innovation and Technology. Retrieved from: <https://www.gov.uk/government/publications/online-safety-act-explainer/online-safety-act-explainer>
- DiSalvo, C., Clement, A., & Pipek, V. (2012). Communities: Participatory design for, with and by communities. In *Routledge International Handbook of Participatory Design* (pp. 182-209). Routledge. <https://doi.org/10.4324/9780203108543>
- Doctorow, C. (2024). *Enshittification' is coming for absolutely everything*. FT Magazine. Retrieved from <https://www.ft.com/content/6fb1602d-a08b-4a8c-bac0-047b7d64aba5>
- Druin, A. (2002). The role of children in the design of new technology. *Behaviour and Information Technology*, 21(1), 1-25. <http://dx.doi.org/10.1080/01449290110108659>
- Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., ... & Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 66, 102542. <https://doi.org/10.1016/j.ijinfomgt.2022.102542>
- Egliston, B., Carter, M., & Clark, K. E. (2024). Who will govern the metaverse? Examining governance initiatives for extended reality (XR) technologies. *New Media & Society*, 1-21. <https://doi.org/10.1177/14614448231226172>
- Esposito, C., Horne, R., Robaldo, L., Buelens, B., & Goesart, E. (2023). Assessing the solid protocol in relation to security and privacy obligations. *Information*, 14(7), 411. <https://doi.org/10.3390/info14070411>
- Facebook (2021). *Introducing Meta: A social technology company*. Retrieved from: <https://about.fb.com/news/2021/10/facebook-company-is-now-meta/>
- Fails, J. A., kumar Ratakonda, D., Koren, N., Elsayed-Ali, S., Bonsignore, E., & Yip, J. (2022). Pushing boundaries of co-design by going online: Lessons learned and reflections from three perspectives. *International Journal of Child-Computer Interaction*, 33, 100476. <https://doi.org/10.1016/j.ijcci.2022.100476>

- Fisher, K. E., Yefimova, K., & Yafi, E. (2016). Future's butterflies: Co-designing ICT wayfaring technology with refugee Syrian youth. In *Proceedings of the The 15th International Conference on Interaction Design and Children* (pp. 25-36). <http://dx.doi.org/10.1145/2930674.2930701>
- Friedman, B. (1996). Value-sensitive design. *Interactions*, 3(6), 16-23. <https://doi/pdf/10.1145/242485.242493>
- Friedman, B., Hendry, D. G., & Borning, A. (2017). A survey of value sensitive design methods. *Foundations and Trends® in Human-Computer Interaction*, 11(2), 63-125. <http://dx.doi.org/10.1561/11000000015>
- Friedman, B., Kahn, P.H., Borning, A., Hultdtgren, A. (2013). Value Sensitive Design and Information Systems. In: N. Doorn, D. Schuurbier, I. van de Poel, M. Gorman (Eds) *Early engagement and new technologies: Opening up the laboratory. Philosophy of Engineering and Technology*, vol 16. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-7844-3_4
- Gadekallu, T. R., Wang, W., Yenduri, G., Ranaweera, P., Pham, Q. V., da Costa, D. B., & Liyanage, M. (2023). Blockchain for the metaverse: A review. *Future Generation Computer Systems*, 143, 401-419. <https://doi.org/10.1016/j.future.2023.02.008>
- Garcia-Rivadulla, S. (2016). Personalization vs. privacy: An inevitable trade-off?. *IFLA Journal*, 42(3), 227-238. <https://doi.org/10.1177/0340035216662890>
- Glaser, B., & Strauss, A. (2017). *Discovery of grounded theory: Strategies for qualitative research*. Routledge.
- Gottschalk, F. (2020), "Child empowerment, well-being and inequality", in *Education in the Digital Age: Healthy and Happy Children*, OECD Publishing, Paris, <https://doi.org/10.1787/2af6f0b7-en>.
- Gray, J. E. (2021). The geopolitics of "platforms": The TikTok challenge. *Internet Policy Review*, 10(2), 1-26. <https://doi.org/10.14763/2021.2.1557>
- Guo, Y., Yu, T., Wu, J., Wang, Y., Wan, S., Zheng, J., ... & Dai, Q. (2022). Artificial intelligence for Metaverse: a framework. *CAAI Artificial Intelligence Research*, 1(1). 54-67 <https://doi.org/10.26599/AIR.2022.9150004>
- Harrington, D. M. (1975). Effects of explicit instructions to "be creative" on the psychological meaning of divergent thinking test scores. *Journal of Personality*, 43(3), 434-454. <https://doi.org/10.1111/j.1467-6494.1975.tb00715.x>
- Hattie, J. (2023). *Visible learning: The sequel: A synthesis of over 2,100 Meta-analyses relating to achievement*. Routledge.
- Hattie, J., & Yates, G. C. (2013). *Visible learning and the science of how we learn*. Routledge.
- Hauser, M. (2006). *Moral minds: How nature designed our universal sense of right and wrong*. Ecco/HarperCollins Publishers.
- Hayes, D. (2012). Re-engaging marginalised young people in learning: The contribution of informal learning and community-based collaborations. *Journal of Education Policy*, 27(5), 641-653. <https://doi.org/10.1080/02680939.2012.710018>

- Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, 292, 114523. <https://doi.org/10.1016/j.socscimed.2021.114523>
- Hirsh-Pasek, K., Zosh, J. M., Hadani, H. S., Golinkoff, R. M., Clark, K., Donohue, C., & Wartella, E. (2022). A whole new world: Education meets the Metaverse. Policy Brief. *Center for Universal Education at The Brookings Institution*.
- Huynh-The, T., Pham, Q. V., Pham, X. Q., Nguyen, T. T., Han, Z., & Kim, D. S. (2023). Artificial intelligence for the Metaverse: A survey. *Engineering Applications of Artificial Intelligence*, 117, 105581. <https://doi.org/10.1016/j.engappai.2022.105581>
- Jackson, P. (1968). *Life in classrooms*. Holt, Rinehart & Winston, Inc.
- Johnston, S. K., McGrane, J. A., Vendrell-Morancho, M., & Hopfenbeck, T. N. (2023). A multi-country comparison of lower secondary students' critical thinking under the International Baccalaureate and national curricula. *Review of Education*, 11(3), e3442. <https://doi.org/10.1002/rev3.3442>
- Kam, M., Ramachandran, D., Raghavan, A., Chiu, J., Sahni, U., & Canny, J. (2006). Practical considerations for participatory design with rural school children in underdeveloped regions: Early reflections from the field. In *Proceedings of the 2006 Conference on Interaction Design and Children* (pp. 25-32). <https://doi.org/10.1145/1139073.1139085>
- Kant, I. (1996). Groundwork of the metaphysics of morals. In M. Gregor (Ed.), *The Cambridge Edition of the Works of Immanuel Kant: Practical Philosophy* (pp. 37–108). Cambridge University Press.
- Karasti, H. (2014). Infrastructuring in participatory design. In *Proceedings of the 13th Participatory Design Conference: Research Papers-Volume 1* (pp. 141-150). <https://doi.org/10.1145/2661435.2661450>
- Kilkelly, U., Kilpatrick, R. & Lundy, L. (2005). *Children's rights in Northern Ireland*. Northern Ireland Commissioner for Children and Young People.
- Kim, L. (2021). *Facebook announces new name: Meta*. Retrieved from: <https://www.forbes.com/sites/lisakim/2021/10/28/facebook-announces-new-name-meta/>
- Kimber, M. (2021) Barbados to launch world's first virtual embassy in the Metaverse Retrieved from: <https://news.sky.com/story/barbados-to-launch-worlds-first-virtual-embassy-in-the-Metaverse-12470727>
- Klastrup, L. (2009). The worldness of EverQuest: Exploring a 21st century fiction. *Game Studies*, 9(1), 1-15.
- Korean Communications Commission [KCC] (2023). *KCC announces 'Basic principles to protect Metaverse users*. KCC
- Korte, J., Sim, G., Constantin, A., Eriksson, E., Fails, J. A., Alexandru, C. A., ... & Wilson, C. (2023). Pushing the boundaries of Participatory Design with children. *International Journal of Child-Computer Interaction*, 35, 100547. <https://doi.org/10.1016/j.ijcci.2022.100547>

- Kozyreva, A., Herzog, S. M., Lewandowsky, S., Hertwig, R., Lorenz-Spreen, P., Leiser, M., & Reifler, J. (2023). Resolving content moderation dilemmas between free speech and harmful misinformation. *Proceedings of the National Academy of Sciences*, 120(7), e2210666120. <https://doi.org/10.1073/pnas.2210666120>
- Kshetri, N. (2023). Economic and social impacts of Web3 and the Metaverse in the Global South. In *32nd European Conference of the International Telecommunications Society (ITS): "Realising the digital decade in the European Union – Easier said than done?"*, Madrid, Spain, 19th - 20th June 2023. International Telecommunications Society (ITS). Calgary.
- Kucirkova, N., Livingstone, S., & Radesky, J. (2024). Advancing the understanding of children's digital engagement: Responsive methodologies and ethical considerations in psychological research. *Frontiers in Psychology*, 15, 1285302. <https://doi.org/10.3389/fpsyg.2024.1285302>
- Lai, Y. H., Lin, Y. S., Chang, Y. C., & Chen, S. Y. (2024). Cyber-physical metaverse learning in cultural sustainable education. *Library Hi Tech*, 1-17. <https://doi.org/10.1108/LHT-12-2023-0585>
- Lin, H., Wan, S., Gan, W., Chen, J., & Chao, H. C. (2022, December). Metaverse in education: Vision, opportunities, and challenges. In *2022 IEEE International Conference on Big Data (Big Data)* (pp. 2857-2866). IEEE. <https://doi.org/10.1145/3532640.3532665>
- Liu, J., & Roto, V. (2017). Chinese pre-schoolers as design partners--Lessons learned. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems* (pp. 951-958). <https://doi.org/10.1145/3027063.3053343>
- Livingstone, S. M., Haddon, L., & Gorzig, A. (Eds.). (2012). *Children, risk and safety on the internet: Research and policy challenges in comparative perspective*. Policy Press.
- Livingstone, S. & Pothong, K. (2023). *Child Rights by Design: Guidance for innovators of digital products and services used by children*. Digital Futures Commission, 5Rights Foundation. Retrieved from: <https://childrightsbydesign.digitalfuturescommission.org.uk/page/child-rights-by-design>
- Long, L. (2012). The prospect of social norms as a governing mechanism of virtual worlds. *European Journal of Law and Technology*, 3(1). 1-17
- Lundy, L., & McEvoy, L. (2011). Children's rights and research processes: Assisting children to (in) formed views. *Childhood*, 19(1), 129-144. <https://doi.org/10.1177/0907568211409078>
- Lupton, D., & Williamson, B. (2017). The datafied child: The dataveillance of children and implications for their rights. *New Media & Society*, 19(5), 780-794. <https://doi.org/10.1177/1461444816686328>
- Maciejewski, M. (2023). *Metaverse*. European Parliament's Policy Department for Citizens' Rights and Constitutional Affairs.
- Mazur, M., & Polyzos, E. (2024). Non-fungible tokens (NFTs). In *The Elgar Companion to Decentralized Finance, Digital Assets, and Blockchain Technologies* (pp. 280-297). Edward Elgar Publishing.

- McGregor, S. (2021). Preventing repeated real world AI failures by cataloging incidents: The AI incident database. In *Proceedings of the AAAI Conference on Artificial Intelligence* (Vol. 35, No. 17, pp. 15458-15463). <https://doi.org/10.1609/aaai.v35i17.17817>
- McMahon, L (2024). *Plans to use Facebook and Instagram posts to train AI criticised*. Retrieved from: <https://www.bbc.co.uk/news/articles/cw99n3qjeyjo>
- McMorrow, R. (2024). *China's latest answer to OpenAI is 'Chat Xi PT'*. Financial Times. <https://www.ft.com/content/43378c6e-664b-4885-a255-31325d632ee9>
- McNally, B., Kumar, P., Hordatt, C., Mauriello, M. L., Naik, S., Norooz, L., ... & Druin, A. (2018, April). Co-designing mobile online safety applications with children. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (pp. 1-9). <https://doi.org/10.1145/3173574.3174097>
- Mitchell, W. (2024). *Dr. Nigel Clarke leaving Gov't For IMF post*. Retrieved from: <https://nationwideradiojm.com/dr-nigel-clarke-leaving-govt-for-imf-post/>
- Montgomery, E., & Busso, D. (2022). Our approach to co-designing with teens and parents/guardians. Retrieved from: <https://www.ttclabs.net/news/our-approach-to-co-designing-with-teens-and-parents-guardians>
- Mulnix, J. W. (2012). Thinking critically about critical thinking. *Educational Philosophy and Theory*, 44(5), 464-479. <https://doi.org/10.1111/j.1469-5812.2010.00673.x>
- Murphy, H (2021). *Facebook changes name to Meta in corporate rebranding*. Retrieved from: <https://www.ft.com/content/b20fd8ea-2dda-45ad-aa15-1ed7a7e5e46f>
- Mystakidis, S. (2022). Metaverse. *Encyclopedia*, 2(1), 486-497. <https://doi.org/10.3390/encyclopedia2010031>
- Nelson, R. (2023). *Ethics in AI Annual Lecture with Professor Alondra Nelson: Thick Alignment [Lecture]*. Retrieved from: <https://www.youtube.com/watch?v=7FaWxNwBVTM>
- Ng, D. T. K. (2022). What is the Metaverse? Definitions, technologies and the community of inquiry. *Australasian Journal of Educational Technology*, 38(4), 190-205. <https://doi.org/10.14742/ajet.7945>
- Noyb (2024). noyb urges 11 DPAs to immediately stop Meta's abuse of personal data for AI. <https://noyb.eu/en/noyb-urges-11-dpas-immediately-stop-Metas-abuse-personal-data-ai>
- OECD (2024). *PISA 2022 Results (Volume III): Creative Minds, Creative Schools*, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/765ee8c2-en>.
- Open Metaverse Interoperability (OMI) Group. (2021). *Open Metaverse Interoperability Group*. Retrieved from: <https://omigroup.org/>
- Our Today. (2024). *Jamaica's YCDI presents Metaverse findings at University of Oxford*. Our Today. Retrieved from: <https://our.today/jamaicas-ycdi-presents-metaverse-findings-at-university-of-oxford/>

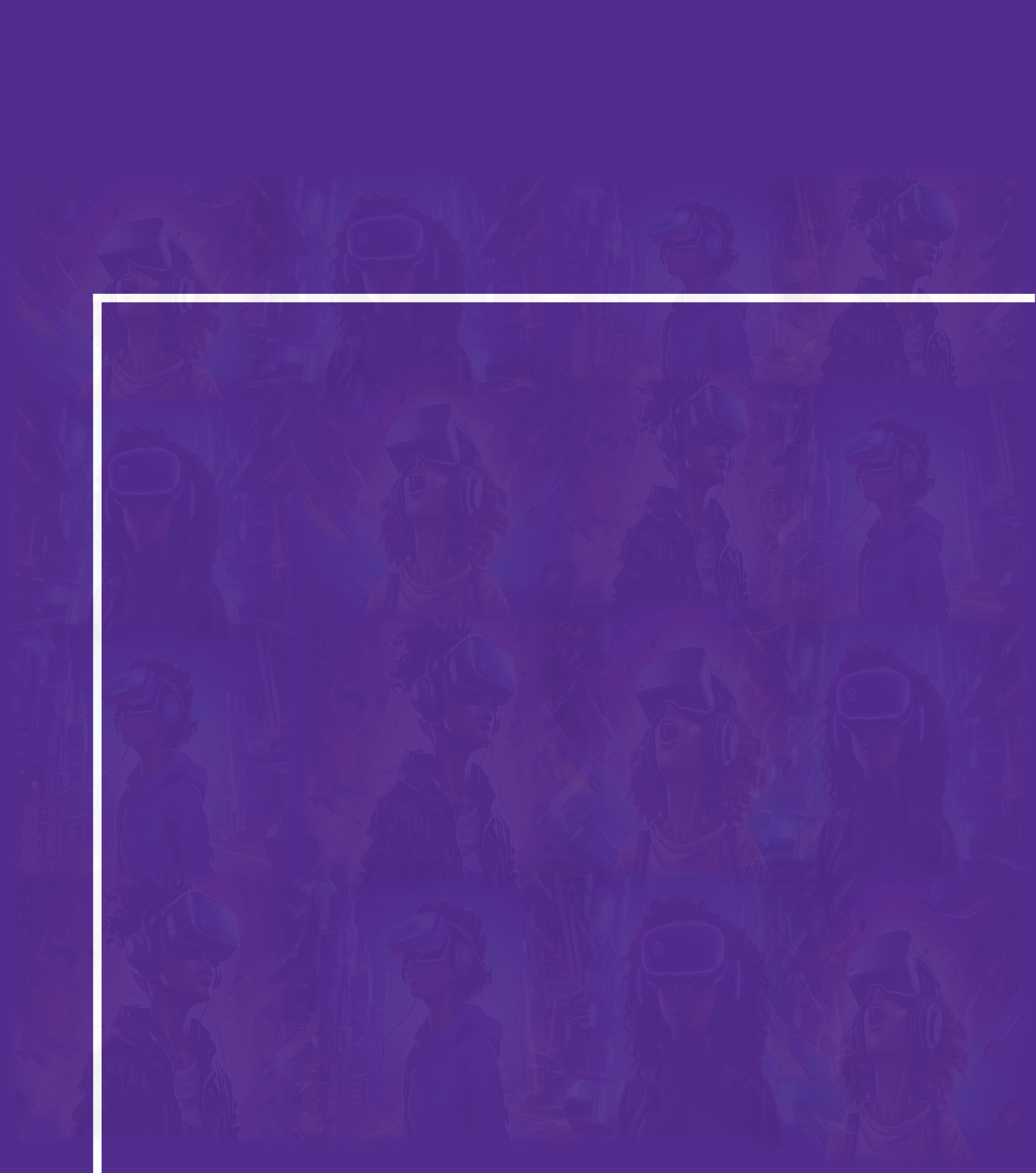
- Ozmen Garibay, O., Winslow, B., Andolina, S., Antona, M., Bodenschatz, A., Coursaris, C., ... & Xu, W. (2023). Six human-centered artificial intelligence grand challenges. *International Journal of Human-Computer Interaction*, 39(3), 391-437. <https://doi.org/10.1080/10447318.2022.2153320>
- Parisi. T. (2021). *The seven rules of the Metaverse*. Medium. Retrieved from <https://medium.com/Meta-verses/the-seven-rules-of-the-Metaverse-7d4e06fa864c>
- Patton, G. C., Sawyer, S. M., Santelli, J. S., Ross, D. A., Afifi, R., Allen, N. B., ... & Viner, R. M. (2016). Our future: a Lancet commission on adolescent health and wellbeing. *The Lancet*, 387(10036), 2423-2478. [https://doi.org/10.1016/s0140-6736\(16\)00579-1](https://doi.org/10.1016/s0140-6736(16)00579-1).
- Paul, R., & Elder, L. (2019). *The thinker's guide to Socratic questioning*. Rowman & Littlefield.
- Paul, R. & Elder, L. (2008). *The miniature guide to critical thinking* 5th edn. Foundation for Critical Thinking Press.
- Peters, M. A. (2019). The Chinese dream: Xi Jinping thought on socialism with Chinese characteristics for a new era. In *The Chinese Dream: Educating the Future* (pp. 28-36). Routledge.
- Planning Institute of Jamaica [PIOJ] (2009). *Vision 2030 Jamaica - National Development Plan*. PIOJ. Retrieved from: <https://www.pioj.gov.jm/wp-content/uploads/2019/08/Vision-2030-Jamaica-NDP-Full-No-Cover-web.pdf>
- PricewaterhouseCoopers (2022). *PwC 2022 US Metaverse Survey*. PricewaterhouseCoopers. Retrieved from <https://www.pwc.com/us/en/tech-effect/emerging-tech/Metaverse-survey.html>
- Public Broadcasting Corporation of Jamaica (2022). *Sitting of the House of Representatives || Sectoral Debate - April 26, 2022*. Public Broadcasting Corporation of Jamaica. Retrieved from: <https://www.youtube.com/watch?v=4OSDaHPtac8>
- Putzier, K. (2021). *Metaverse real estate piles up record sales in Sandbox and other virtual realms*. Wall Street Journal. Retrieved from: <https://www.wsj.com/articles/Metaverse-real-estate-piles-up-record-sales-in-sandbox-and-other-virtual-realms-11638268380>
- Rainie, L., Anderson, J., & Vogels, E. A. (2021). Experts doubt ethical AI design will be broadly adopted as the norm within the next decade. *Pew Research Center*, 16(0), 121-154. Retrieved from: https://www.pewresearch.org/internet/wp-content/uploads/sites/9/2021/06/PI_2021.06.16_Ethical-AI-Design_FINAL.pdf
- Rameshwar, J. R., & King, G. S. (2023). Analysis of the Caribbean XR survey creates an XR development strategy as a path to the regional Metaverse evolution. *Journal of Metaverse*, 3(1), 43-65. <https://doi.org/10.57019/jmv.1179104>
- Rameshwar, J. R., & King, G. S. (2022). Caribbean Metaverse development: A literature review perspective. *Journal of Metaverse*, 2(2), 83-99. <https://doi.org/10.57019/jmv.1120470>
- Read, J., Larusdottir, M. K., Islind, A. S., Sim, G., & Fitton, D. (2022). Tick Box Design: A bounded and packageable co-design method for large workshops. *International Journal of Child-Computer Interaction*, 33, 100505. <https://doi.org/10.1016/j.ijcci.2022.100505>

- Remolina, N., & Findlay, M. (2021). The paths to digital self-determination-A foundational theoretical framework. *SMU Centre for AI & Data Governance Research Paper*, (03).
- Robertson, T., & Simonsen, J. (2012). Participatory design: An introduction. In *Routledge International Handbook of Participatory Design* (pp. 1-17). Routledge.
- Sahardin, R., Heriansyah, H., & Authari, M. D. (2019). The use of Round Robin technique to improve students' speaking skill. *Studies in English Language and Education*, 6(2), 343-352.
<https://doi.org/10.24815/siele.v6i2.14787>
- Sambra, A. V., Mansour, E., Hawke, S., Zereba, M., Greco, N., Ghanem, A., ... & Berners-Lee, T. (2016). *Solid: A platform for decentralized social applications based on linked data*. MIT CSAIL & Qatar Computing Research Institute. <https://www.csail.mit.edu/publications/solid-platform-decentralized-social-applications-based-linked-data>
- Sanderson, C., Schleiger, E., Douglas, D., Kuhnert, P., & Lu, Q. (2024). Resolving ethics trade-offs in implementing responsible AI. *arXiv preprint arXiv:2401.08103*.
- Santoni de Sio, F., & Mecacci, G. (2021). Four responsibility gaps with artificial intelligence: Why they matter and how to address them. *Philosophy & Technology*, 34(4), 1057-1084. <https://doi.org/10.1007/s13347-021-00450-x>
- Schauer, F. (1978). Fear, risk and the first amendment: Unraveling the chilling effect. *Boston University Law Review*, 58, 685-732. <https://scholarship.law.wm.edu/facpubs/879>
- Schepers, S., Schoffelen, J., Zaman, B., & Dreessen, K. (2022). Going beyond short-term, 'reduced' PD: Towards an encompassing typology for children's participation in infrastructuring processes. *International Journal of Child-Computer Interaction*, 33, 100484. <https://doi.org/10.1016/j.ijcci.2022.100484>
- Scott-Barrett, J., Johnston, S-K., Denton-Calabrese, T., McGrane, J. A., & Hopfenbeck, T. N. (2023). Nurturing curiosity and creativity in primary school classrooms. *Teaching and Teacher Education*, 135, 104356. <https://doi.org/10.1016/j.tate.2023.104356>
- Seoul Metropolitan Government (2023). *Official release of Metaverse Seoul*. Seoul Metropolitan Government. Retrieved from <https://english.seoul.go.kr/official-release-of-Metaverse-seoul-2/>
- Shakyawar, A (2023). *TRON to develop Caribbean Metaverse and digital identity initiative for the Commonwealth of Dominica*. Retrieved from: <https://alexablockchain.com/tron-to-develop-caribbean-Metaverse-for-dominica/>
- Siu, L., & Chun, C. (2020). Yellow peril and techno-orientalism in the time of Covid-19: racialized contagion, scientific espionage, and techno-economic warfare. *Journal of Asian American Studies*, 23(3), 421-440. <https://doi.org/10.1353/jaas.2020.0033>
- Smith, C. E., Yu, B., Srivastava, A., Halfaker, A., Terveen, L., & Zhu, H. (2020). Keeping community in the loop: Understanding wikipedia stakeholder values for machine learning-based systems. In *Proceedings of the*

- 2020 CHI Conference on Human Factors in Computing Systems (pp. 1-14).
<http://dx.doi.org/10.1145/3313831.3376783>
- South Korean Ministry of Science and ICT (2022). *MSIT to announce pan-government strategy on Metaverse*. South Korean Ministry of Science and ICT
- Stanney, K. M., Nye, H., Haddad, S., Hale, K. S., Padron, C. K., & Cohn, J. V. (2021). Extended reality (XR) environments. *Handbook of Human Factors and Ergonomics*, 782-815.
<https://doi.org/10.1002/9781119636113.ch30>
- Steinsbekk, S., Bjørklund, O., Valkenburg, P., Nesi, J., & Wichstrøm, L. (2024). The new social landscape: Relationships among social media use, social skills, and offline friendships from age 10–18 years. *Computers in Human Behavior*, 108235.
<https://doi.org/10.1016/j.chb.2024.108235>
- Stephenson, N (2003). *Snow Crash: A Novel*. Random House Publishing Group.
- UAE Government (2023). *Dubai Metaverse Strategy*. UAE Government. Retrieved from <https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/government-services-and-digital-transformation/dubai-Metaverse-strategy>
- Stoilova, M., Livingstone, S., & Kardefelt-Winther, D. (2016). Global Kids Online: Researching children’s rights globally in the digital age. *Global Studies of Childhood*, 6(4), 455-466.
<https://doi.org/10.1177/2043610616676035>
- Taylor, R. (2022). *Traversing the Metaverse – A Caribbean perspective [Webinar]*. Retrieved from: <https://otter.ai/u/xOmlqc3pz06VUvYFLQi9QhFmSIM>
- Third, A., Lala, G., Moody, L., & Theakstone, G. (2021). Children’s views on digital health in the Global South: Perspectives from cross-national, creative and participatory workshops. In *Creative Approaches to Health Education* (pp. 173-189). Routledge.
- Tinmaz, H. (2023). Technology giant South Korea’s Metaverse experiences. In *Metaverse: Technologies, Opportunities and Threats* (pp. 305-322). Singapore: Springer Nature Singapore.
- UAE Government (2023). *Dubai Metaverse strategy*. UAE Government. Retrieved from: <https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/government-services-and-digital-transformation/dubai-metaverse-strategy>
- UNICEF and Eurochild. (2019). The Europe kids want: Sharing the views of children and young people across Europe. Retrieved from http://eurochild.org/uploads/2020/11/Euro_Kids_Want_Brochure_Nov2019.pdf.
- UNICEF Innocenti (2024). *Responsible Innovation in Technology for Children: Digital technology, play and child well-being*. UNICEF Innocenti, Florence. <https://www.unicef.org/innocenti/media/8056/file/UNICEF-Innocenti-RITEC-P2-report-2024.pdf.pdf>
- United Nations. (1989). *Convention on the Rights of the Child*. United Nations. Retrieved from https://treaties.un.org/doc/Treaties/1990/09/19900902%2003-14%20AM/Ch_IV_11p.pdf.

- United Nations Committee on the Rights of the Child. (2021). *General comment No. 25 (2021) on children's rights in relation to the digital environment*. Retrieved from <https://www.ohchr.org/en/documents/general-comments-and-recommendations/general-comment-no-25-2021-childrens-rights-relation>
- Uzun, M. M. (2023). Metaverse governance. In *Metaverse: Technologies, Opportunities and Threats* (pp. 231-244). Springer Nature Singapore.
- van de Poel, I. (2015). Conflicting values in design for values. *Handbook of Ethics, Values, and Technological Design: Sources, Theory, Values and Application Domains*, 89-116. <https://doi.org/10.1007/978-94-007-6970-0>
- Vallirinne, J., & Jokitalo, J. (2023). *Metaverse initiative by the Finnish ecosystem: Virtual potential into real-world impact*. Business Finland.
- Veluwenkamp, H., & van den Hoven, J. (2023). Design for values and conceptual engineering. *Ethics and Information Technology*, 25(1), 1-12. <https://doi.org/10.1007/s10676-022-09675-6>
- Verhulst, S. G. (2023). Operationalizing digital self-determination. *Data & Policy*, 5, e14. <https://doi.org/10.1017/dap.2023.11>
- Verhulst, S., & Young, A. (2015). *R-Search: Rapid re-search enabling the design of agile and creative responses to problems*. The GovLab. https://directus.thegovlab.com/uploads/thegovlab/blog_img_archive//2015/01/R-Search.pdf
- Virtual Dimension Centre (2024). *National Metaverse Strategies worldwide comparison*. Virtual Dimension Centre. Retrieved from <https://www.vdc-fellbach.de/en/knowledge-database/national-Metaverse-strategies-worldwide/>
- Walsh, G. (2018). Towards equity and equality in American co-design: a case study. In *Proceedings of the 17th ACM Conference on Interaction Design and Children* (pp. 434-440). <http://doi.acm.org/10.1145/3202185.3202768>
- Wang, G., Zhao, J., Johnston, S.-K., Zhang, Z., Van Kleek, M., & Shadbolt, N. (2024). CHAITok: A proof-of-concept system supporting children's sense of data autonomy on social media. In *Proceedings of the CHI Conference on Human Factors in Computing Systems* (pp. 1-19). <https://doi.org/10.1145/3613904.3642294>
- Wang, G., Zhao, J., Van Kleek, M., & Shadbolt, N. (2023b). 12 ways to empower: Designing for children's digital autonomy. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1-27). <https://doi.org/10.1145/3544548.3580935>
- Wang, H., Ning, H., Lin, Y., Wang, W., Dhelim, S., Farha, F., ... & Daneshmand, M. (2023a). A survey on the metaverse: The state-of-the-art, technologies, applications, and challenges. *IEEE Internet of Things Journal*, 10(16), 14671-14688. <https://doi.org/10.1109/JIOT.2023.3278329>
- Warburton., M & Godoy, J. (2024). US Senate advances two child online safety bills. Reuters. Retrieved from: <https://www.reuters.com/world/us/us-senate-set-vote-two-child-online-safety-bills-2024-07-25/>

- Washington, A. L., & Kuo, R. (2020). Whose side are ethics codes on? Power, responsibility and the social good. In *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency* (pp. 230-240). <https://doi.org/10.1145/1234567890>
- Weinhardt, C., & Petry, J. (2024). Contesting China's developing country status: Geoeconomics and the public-private divide in global economic governance. *The Chinese Journal of International Politics*, 17(1), 48-74. <https://doi.org/10.1093/cjip/poae004>
- Weinstein, Y., Sumeracki, M., & Caviglioli, O. (2018). *Understanding how we learn: A visual guide*. Routledge.
- Wilkinson, C., & Wilkinson, S. (2024). Principles of participatory research. In *Being Participatory: Researching with Children and Young People: Co-constructing Knowledge Using Creative, Digital and Innovative Techniques* (pp. 15-37). Cham: Springer International Publishing.
- Willingham, D. T. (2007). Critical thinking: Why it is so hard to teach?. *American Federation of Teachers Summer*, 8-19. Retrieved from https://eduq.info/xmlui/bitstream/handle/11515/19710/Crit_Thinking.pdf
- Wong, M. (2022). *St Vincent wants to be first island to host Carnival in the Metaverse*. Retrieved from: <https://caribbean.loopnews.com/content/st-vincent-wants-be-first-island-host-carnival-Metaverse-587786>
- Zhang, Q. (2022). Rule of the Metaverse. *Metaverse*, 3(1), 1-21. <https://doi.org/10.54517/met.v3i1.1812>
- Zhao, R., Zhang, Y., Zhu, Y., Lan, R., & Hua, Z. (2023). Metaverse: Security and privacy concerns. *Journal of Metaverse*, 3(2), 93-99. <https://doi.org/10.57019/jmv.1286526>



Project Amplify: A collaboration between Youth Can Do I.T. and Jesus College, Oxford